

Operations Manual Edition 1.3



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DAS[™] Data Acquisiton Suite Operations Manual - Edition 1.3

Chapter 1 Introduction





Overview

This is a synopsis of the DAS[™] Data Acquisition Suite and its various features.

1.1 Introduction

MREL's DAS™ Data Acquisition Suite has been designed to be utilized with **MREL** VOD/Data recorders. This software suite will allow the user to program (where applicable), download and analyze the data from each recorder. The **DAS™ Data Acquisition Suite** will allow the user to manage all of the files downloaded from **MREL** VOD/Data recorders using a single software.

The **Standard Edition** will allow the user to open data files from any of the three recorders. The user can perform all of the standard features that the users have been accustom to. For a **VOD** channel, the measurements that a user can do are as follows:

- Measure Velocity of Detonation
- Borehole or Sample
- Measure Column Height
- Measure Booster Location
- Measure Time Delay Between Holes
- Measure Effectiveness of Decking

For a **Scope** channel, the measurements that a user can do are as follows:

- Analyze DC Voltage Data
- Apply Offsets
- Measure Values of Peaks
- Measure Time Between Peaks
- Apply Formulas to Convert Voltage to Engineering Units

For a **Strain** channel, the measurements that a user can do is as follows:

• Convert the data from the strain gauges into Microstrain (µE)

The **Advanced Edition** will allow the user to apply filters to the data to either clean the data up for ease of reading/presentation or to apply a specific filter to allow the data to be compliant with a particular standard. Some additional operations such as curve fitting and integration are available.

The Advanced Edition can perform all of the Standard Edition features plus the following to a channel data:

- Apply the following filters to the data
 - Bessel
 - Butterworth Chebyshev
- Median
- Moving Average
- Savitzky-Golay
- Elliptic
- Windowed Finite Impulse Response
- Apply the following operations to one (or two) selected plot/s
 - Curve Fitting (Polynomial, Exponential, Linear, Gaussian etc.)
 - Differentiation and Integration
 - Area under the curve

- Miscellaneous Filters
- Negative Distance Removal (VOD channel only)
- Normalize, Scale, Quick Scale, Clip
- AC/DC Estimation, Statistics
- Add, Subtract, Multiply, Divide (all 2-plot operations)

See Section 8 for more details on the Advanced Edition. The software can be downloaded from www.mrel.com/das at any time.



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NOTE: Some of the features discussed in this manual are available in DAS[™] version later than 1.0.0.0. Please check for any available updates in DAS[™].

Chapter 2 Installation





Overview

This section will step the user through the installation procedure on their computer.

2.1 System Requirements

The minimum system requirements for **DAS™ Data Acquisition Suite** are as follows:

- 32-bit/64-bit CPU: AMD/Intel
- Memory: 2 GB
- Hard disk space: 1 GB, more space is required for large number of files.
- Ports: USB port (internal or powered)
- Monitor resolution: 1200 x 800
- Operating system: Windows XP (SP3) or above (32 or 64 bit)
- Full .NET 4 framework

Administrative type of user account and Internet connection required for registration, upgrades, updates and support. The software can be used offline when not performing any of the previous tasks.

2.2 Recommended System Requirements

The recommended system requirements for DAS™ Data Acquisition Suite are as follows:

- 64-bit CPU: AMD/Intel
- Memory: 8 GB or more
- Hard disk space: 25 GB or more
- Ports: USB 2.0 or 3.0 port (internal or powered)
- Monitor resolution: 1200 x 800 or more
- Operating system: Windows 7 or above (64-bit)
- Any suitable mail client program such as Microsoft Outlook, Mozilla Thunderbird etc.
- Full .NET 4.5 or above framework
- Administrative type of user account and Internet connection required for registration, upgrades, updates and support. The software can be used offline when not performing any of the previous tasks.

2.3 Prerequisites Installation Process

The **DAS™** Data Acquisition Suite setup will display a message if necessary prerequisites from internet are needed to be installed first. It will direct user to the correct download page if computer is connected to the internet. If not connected, it will show the error page in the computer's default web browser.



2.3.1 .NET Framework 4.0 Installation Process (if required)

Double click on the DAS[™] Data Acquisition Suite install package (.msi) file or Right-Click on the file and choose install. You need to be using administrative type of user account on the computer to perform the installation.

If setup program has detected that the .NET Framework 4.0 is not installed, it will show the message as shown on the right.

If the computer is connected to the internet and user chooses **Yes** in above dialog, the default web browser is opened showing the .**NET Framework 4.0** Full package download page.

Click the **Download** button to download .NET Framework 4.0 setup.

The optional components suggested by the page can be ignored by clicking **No thanks and continue** button as shown to the right.





Click the blocked pop-up tool-bar (if pop-up is blocked by browser) and select **Download File...** option as shown to the right.

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🚖 Favorites 🛛 🍰 😰 Suggested Sites 🔹 😰 Web Slice Gallery 🕯 🚰 • 🗊 - 🗆 👼 • Page • Safety • Tools • 🚇 • Bownload Microsoft .NET Framework 4 (Standalo Download File_ What's the Risk? Microsoft Information Bar Hel Download Center Categories Security Software Support Shop Thank you for downloading Microsoft .NET Framework 4 (Standalone Installer) If your download does not start after 30 seconds. Click here Free PC updates Install Instructions Security patches Software updates Service packs
 Hardware drivers (2) Run Microsoft Update Popular downloads Internet | Protected Mode: I 1009 2 http:// microsoft.com/e + 47 × 3 🊖 Favorites 🛛 🙀 🔊 Suggested Sites 💌 🔊 Web S 🏠 • 🔯 - 🖾 🖶 • Page • Safety • Tools • 🚱 • Do ad Microsoft .NET Framework 4 (Stan Microsoft 23 Download Center 0% of dotNetFx40_Full_x86_x64.exe from d Categories Software Security ad - Security Warning × ile Do Doy nt to run or save this file? Name: dotNetFx40 Full x86 x64.exe Thank you for Type: Application, 48.1MB From: download.microsoft.com Microsoft .NET Framework Run Save Cancel If your download does not start after 30 Free PC updates Sies from the internet can be useful, this file type can tally harm your computer. If you do not trust the source, do not save this software. <u>What's the talk?</u> Install Instructions Security patches Software updates Service packs · Hardware drivers @ Run Microsoft Update Popular downloads linternet | Protected Mode: On €a • ₹ 100% • _ **D** _ X 🕒 🕞 🔹 Libraries 🕨 Documents 🕨 • +• Sea Ø Organize • Dopen Share with - Burn New folder H • 🔟 🔞 **Documents library** 🙀 Favorites Arrange by: Folder * Desktop Includes: 2 locations 🗼 Downloads Name Date modified Type Size E Recent Places HotNetFx40_Full_x86_x64 3/18/2010 9:44 PM Application 49,268 KB

• +y 🗙

Save the file in a desired temporary location as shown to the right.

Double click the downloaded file (.exe file) to install **.NET Framework 4.0** shown to the right.



Libraries
Documents
Music

T: +1-613-545-0466 www.mrel.com contact@mrel.com

Click the **Yes** button in UAC "User Account Control" dialog shown to the right.

The package will uncompress and shows the initial **Microsoft** .**NET Framework 4 license Agreement** dialog. Check **Accept** check box and click **Install** button as shown to the right.

When Installation finishes with success, you can proceed to run the installation package for **DAS™ Data Acquisition Suite** as described in the following section.



2.4 Installation Process

The installation package can be obtained at **http://www.mrel.com/das** and locally save it if you have either not received copy or have misplaced it.

2.4.1 Installation Process for Windows Vista® and Higher

IMPORTANT

MREL recommends exiting all programs before starting installation.

Double click on the **DAS™ Data Acquisition Suite** setup package (.msi) or **Right-Click** on the file and choose install. You need to be using an administrative type of account on the computer to perform the installation. The installation dialog will appear with License Agreement as shown to the right.

	nt	
lease take a moment to read gree", then "Next". Otherwis	I the license agreement now. If you a se click "Cancel".	accept the terms below, click "I
By clicking "Next" an you accept the follow terms and conditions,	nd continuing with the installa ving terms and conditions. If , please cancel the installatio	tion of this software, you do not accept the n.
This software is inten	ded to be used for HandiTra act lines from MREL Group	ap II™, MicroTrap™, of Companies Limited.
DataTrap II ^{IM} produ		
DataTrap II™ produ	AND USE RIGHTS. You	1 may install the software +



Click **I Agree** and click on **Next**. This will display the image to the right.



Click the **Next** button to confirm the installation process to begin. This will results in the following screen.

Click the **Next** button which results in the following **User Account Control (UAC)** dialog for Windows 7® or above.

Click YES to proceed.



In **Windows Vista®**, the User Account Control (UAC) dialog may look like the image shown to the right. Click **Allow** to proceed

Installation process will begin and the image to the right will be shown.

User Account Control × An unidentified program wants access to your computer Don't run the program unless you know where it's from or you've used it before. C:\Users\Dev1\Downloads\MrelDataSuiteSetupX86.msi Unidentified Publisher Cancel I don't know where this program is from or what it's for. Allow I trust this program. I know where it's from or I've used it before. ✓ Details User Account Control helps stop unauthorized changes to your computer. Cancel < Back Next > DAS Data Acquisition Suite - - -Installing DAS Data Acquisition Suite MREL DAS Data Acquisition Suite is being installed. Please wait. Cancel < Back Next > DAS Data Acquisition Suite - 0 🔀 Installing DAS Data Acquisition Suite DAS Data Acquisition Suite is being installed. Please DAS™ Data Acquisition Suite X Drivers need to be installed for MREL data recorders. Install these drivers? Yes No Cancel < Back Next >



Click the **YES** button to install the needed drivers.

T: +1-613-545-0466 www.mrel.com contact@mrel.com

Make sure to check the HandiTrap II[™] USB Interface Cable driver's WREL Data Acquisition Suite manufacturer's trust **check box** and click the **Install** button to install Installing MREL Data Acquisition Suite MDEI the needed drivers as shown right. × Would you like to install this device software? Follow the same procedure if **MicroTrap™ USB Interface Cable** Name: HandiTrap USB Interface Cable Driver driver installation message is displayed. Publisher: ASIX s.r.o. Don't Install Install Always trust software from "ASIX s.r.o.". You should only install driver software from publishers you trust. How can I decide which device software is safe to install? Cancel < Back Next > For DataTrap II™ USB Interface Cable driver installation, check the DAS Data Acquisition Suite 뻻 driver's manufacturer's trust check box and click the **Install** button Installing DAS Data Acquisition Suito Windows Security to install the needed drivers as follows. Would you like to install this device software? Name: libusb-win32 Publisher: MREL Group of Companies Limited Install Don't Install Always trust software from "MREL Group of ~ Companies Limited" You should only install driver software from publishers you trust. How can I decide which device software is safe to install? < Back Cancel Next 2 Click **OK** to the following message box which shows the drivers - • • DAS Data Acquisition Suite Installing DAS Data Acquisition Suite DAS Data Acquisition Suite is being installed. Please wait. DAS[™] Data Acquisition Suite × Drivers installed successfully. OK





Click **Yes** to restart the system to complete the installation (this is recommended) in the image shown right.

System will restart to complete the installation.

If you clicked **No** so as not to restart the system, click **Close** to complete the installation.



The DAS™ Data Acquisition Suite has been successfully installed.

A program group **MREL** with the folder **DAS™** will be created in Start > All Programs menu. Also a shortcut named **DAS™ Data Acquisition Suite** is created on the desktop as show to the right.



2.5 Drivers Files Location for Manual Installation

In some instances such as **Windows XP®**, when the **USB cable** for **MREL** recorders is connected for the first time, the **Found New Hardware** dialog box asks for driver location. All driver installation files reside in their respective folder under **DAS™** installation directory which is installed on the Windows operating system's "Program Files" location as shown to the right.

🗸 III Viev	ws 🔻 🗔 Explore 📴 Share	8 Burn		
ke.	Name	Date modified	Туре	Size
	dt2-drivers	11/02/2014 10:21	File Folder	
ents	ht2-drivers mt-Drivers	11/02/2014 10:21 11/02/2014 10:21	File Folder File Folder	



Just point the **Found New Hardware** dialog to search in folders dt2-drivers, ht2-drivers or mt-drivers for **HandiTrap IITM**, **MicroTrapTM** and **DataTrap IITM USB Cables** respectively.

2.6 Uninstallation of DAS[™] Data Acquisition Suite

IMPORTANT

To uninstall the software, you need to use an administrative type of user account on the computer.

2.6.1 Uninstallation Process

Uninstalling **DAS™ Data Acquisition Suite** on supported version of **Windows®** Operating Systems is similar.

To uninstall **DAS[™] Data Acquisition Suite**, click **Control Panel** panel in **Start**. The control panel is displayed as follows.

Control Panel +	All Control Panel Items >	✓ 4y Search Control Panel
Adjust your computer's set	tings	View by: Small icons 🔻
Action Center	administrative Tools	autoPlay
Backup and Restore	Color Management	Credential Manager
Date and Time	👦 Default Programs	Desktop Gadgets
Device Manager	Devices and Printers	🕎 Display
Ease of Access Center	Folder Options	🙀 Fonts
Getting Started	🜏 HomeGroup	🔒 Indexing Options
Tinternet Options	Exploard Explored	Decation and Other Sensors
J Mouse	Network and Sharing Center	Real Cons
Parental Controls	Performance Information and Tools	Personalization
Phone and Modem	Power Options	Programs and Features
Recovery	🔊 Region and Language	🐻 RemoteApp and Desktop Connections
Sound	Speech Recognition	Sync Center
🕎 System	Taskbar and Start Menu	Troubleshooting
👪 User Accounts	💐 Windows Anytime Upgrade	📑 Windows CardSpace
Windows Defender	P Windows Firewall	Windows Update

Click **Programs and Feature** icon in **Control Panel** which displays a screen shown as to the right.



Select **MREL Data Acquisition Suite** in the list and Double-Click it. This shows the image on the right.





Click Yes button to the dialog asking Are you sure you want to uninstall MREL Data Acquisition Suite? which shows the Preparing to remove status dialog.



the right.

In Windows Vista®, the UAC dialog box will look like the image shown to the right. Click Allow to proceed

Uninstall will show a progress dialog box similar to the image to the right.

Once the progress dialog box completes, the **DAS™ Data** Acquisition Suite will be successfully uninstalled. However, your data and related settings will still be present.

You can now close Programs and Features dialog and the Control Panel itself.

14 2.7 Software Registration

DAS[™] always installs as Evaluation version. With the DAS[™] Data Acquisition Suite software installed, the lower right-hand corner will display Evaluation Edition, Unregistered.

The **Evaluation** edition allows the user to evaluate the software for 30 days (one-time) on a given computer. After evaluation period expires, the user will need to either register the software or uninstall the **DAS™ Data Acquisition Suite Software**. Registration is required to upgrade **DAS™** to **Standard Edition** (FREE) or **Advanced Edition** (Paid). The user has to apply upgrade key after registration to complete the process.

The user can at any time click on the **Help** tab in ribbon menu and then on **Register** in the tab or use top menu **Help** > **Register/Upgrade**. The registration (and upgrade) requires an administrative type of user account and internet access. After **DAS™** asks to be restarted, it will display registration dialog. The user will fill in the required fields (red-coloured) such as First Name, Last Name, Company Name, City, Country, Email and Industry. Any required field having invalid data will be flagged by red exclamation icon next to it. After all required fields are filled, user will click the **Register** button. After successful processing, the software will be registered and display a success message. Click **OK** to close that message.

At this point, the lower right corner of the software will display Evaluation Edition, Registered.

An email will be sent to the email address provided while registering and will include the **Standard Edition** upgrade Key for the computer. When the email arrives, the user will click on Help and then **Register/Upgrade**... menu item, displaying the registration dialog. At the bottom of the form is **Upgrade** checkbox. Check mark that and **Install/Upgrade** Type drop-down menu is now enabled. Select **Standard Edition** in this drop-down menu and a text box will appear for the input of the upgrade key. Copy and paste the key (as is) from the email into the text box and click **Upgrade** button. After successful processing, the displayed text on status bar on lower-right will change to **Standard Edition, Registered**. Close **DAS™** and run it again. At this point, the software is registered/upgraded successfully and will not expire on the computer until uninstalled. The software is available to all users who have account on the computer. Only one user must run **DAS™** at a given time. The users have their own default data area under **My Documents\MREL\Data**.

Note that registered **DAS™** will expire until the upgrade key is applied. The software will stop normal function and will only allow registration/upgrade after 30 days of installation.

To upgrade to the Advanced Edition, refer to Chapter 8.

2.8 Updating DAS™

Updating to new version of **DAS[™]** software requires that lower version of **DAS[™]** exists on the machine. **DAS[™]** must be registered and upgraded to either **Standard Edition** or **Advanced Edition**. Evaluation version of **DAS[™]** can not be upgraded to newer version.

Update Process:

Check for updates from within **DAS™** by clicking on **Help > Updates...**

If an updated version of **DAS™** software exists, it will be offered to be downloaded. Download the software (a compressed (.zip) file) and save in a local temporary folder where you can later extract it. After download is complete, Exit **DAS™** and extract downloaded file. Double-click to run the extracted file. Follow prompt.



Chapter 3 Starting the DAS[™] Data Acquisition Suite





Overview

This Chapter describes the starting process for the DAS™ Data Acquisition Suite.

3.1 Starting the DAS[™] Data Acquisition Suite

Double click on the **DAS™ Data Acquisition Suite** desktop icon.

Alternatively access the program through the **Start Menu**. **Start > All Programs > MREL > DAS > DAS™ Data Acquisition Suite**.

The following splash screen will show up.



When **DAS™ Data Acquisition Suite** completes loading, the splash screen fades away to show the main screen as shown to the right.

After the initial screen is displayed, the **DAS™ Data Acquisition Suite** may check and update the main display for any connected **MREL** Data or VOD recorders and any tests stored if any.

Cres Data File	DataTeas IIII	
File Type		
IN DT2	DataTrap II ^{***} Connected: NO	
	HandiTrap II ^m	
Open Data From Browse O Recently Opened Files		
Recently Downloaded Calendar	Cable Not Connected	
Next	HandiTrap II ^{nst} Connected : NO	
	Micro Trap ¹¹	
Hardware	Cable Not Connected MicroTrap [™] Connected : NO	
Analyze		

Note: The message box to the right is displayed for a short period of time upon starting the software. The software is checking for any hardware attached to the computer. The software periodically checks for any changes in connected status of the recorders.

Connected Recorder Devices Status

It may take upto one minute to recognize the connected/disconnected recorders/cables



Chapter 4 Programming the Recorders





Overview

This Chapter describes the programming procedures for all of the Recorders.

4.1 Programming the Recorders

This section will define how the recorders can be programmed using DAS™ Data Acquisition Suite.

4.2 Programming the HandiTrap II[™] VOD Recorder

The HandiTrap II[™] VOD Recorder cannot be programmed. It does not have any user-programmable settings. Please refer to the HandiTrap II[™] VOD Recorder Operations Manual for clarification.

4.3 Programming the MicroTrap[™] VOD/Data Recorder

The **MicroTrap™ VOD/Data Recorder** has the ability to record the velocity of detonation (**VOD**) as the standard feature with an upgrade to measure scope data. In order to program the **MicroTrap™ VOD/Data Recorder**, ensure that the cable drivers have been installed (normally done when **DAS™** is being installed), the USB interface cable has been connected to the computer (displaying a green light at its end). The cable is then connected to the **MicroTrap™ VOD/Data Recorder** after 10 seconds, the unit is powered on. If unsure how to complete this task, refer to the **MicroTrap™ VOD/Data Recorder Operations Manual**.

4.3.1 VOD Setup in the MicroTrap™ VOD/Data Recorder

With the **MicroTrapTM VOD/Data Recorder** connected to the computer, start the **DASTM Data Acquisition Suite**. Upon fully starting, the screen will appear as shown to the right.

Click on the **Hardware** tab on the left panel of the screen (As marked in the right image) and the image on the next page will be displayed.





Click on the MicroTrap[™] VOD/Data Recorder radio button under Choose Device and the Setup radio button under Hardware. Then click on the **Next** button.

This screen will display many details of the individual unit. This includes the serial number, calibration due date, if a Memory

When checked, it will allow all saved tests to be deleted in the MicroTrap[™] VOD/Data Recorder when the settings are saved.

into and the number of tests remaining.



CAUTION

IF THERE IS IMPORTANT DATA IN THE UNIT, DO NOT CHECK THIS BOX. If the box is checked, the total number of tests allowed can be changed on next screen. With the box checked, the software will tell the user how many tests will be erased.

With the standard MicroTrap[™] VOD/Data Recorder, only the VOD radio button can be selected. If existing tests needs to be cleared or number of total tests needs to be changed, check mark "Allow tests to be erased" (Tests can also be erased directly on the recorder, please refer to the MicroTrap[™] VOD/Data Recorder Operations Manual.)

Once the choices have been made on this screen, click on the **Next** button.



On this screen, the user will be able to adjust all of the VOD settings on the MicroTrap[™] VOD/Data Recorder. This includes the VOD Trigger Level, Pre-Trigger Time, Number of Tests (if the Erase Tests check box on previous screen is checked)), the Sampling Rate and the settings for the external trigger. Refer to the MicroTrap[™] VOD/ Data Recorder Operations Manual for definitions on these settings. Once the settings have been selected, click on Change Settings button.

e Help									
Dper Cara Nie	HicroTrap" Se	ettings							
A Hardsone	Setal Number	6395	Hemory Upp	prede Geteched	True 7	vid Tests			
	Calibration Due	2 December 202	Scope Lang	rade Detected	Stat Res	anng Testa	1		
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	C: \$00.Hz	C 200 HM	O NH	O MHF	(C) \$HE	0.198			
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	Marning Tre	pper switch on the	recarder overris	des the adernal/e	sternal trigger chas	04.			

DAS™ Data Acquisition Suite	DAS [™] Data Acquisition Suite
Rre you sure you want to change MicroTrap [™] settings	MicroTrap [™] settings saved. For these settings to take effect, please disconnect cable at MicroTrap [™] end, Wait 10 sec and re-connect the cable to MicroTrap [™] .
Yes No Cancel	ОК

The **DAS™ Data Acquisition Suite** will confirm that the user wishes to changes the settings. If the user is sure, click **Yes,** if not click **No**. Once **Yes** has been

selected, the software will confirm that the settings have been saved and that the **USB cable** will need to be disconnected from the unit, wait 10 seconds then reconnect so that new settings can take effect. Generally, this is also done with a power off, wait 10 seconds and then power on **MicroTrap™ VOD/Data Recorder**. Then select the **Finish** button and the software will return to the main screen of the software.

4.3.2 Scope Setup in the MicroTrap™ VOD/ Data Recorder

With the **MicroTrapTM VOD/Data Recorder** connected to the computer, start the **DASTM Data Acquisition Suite**. Upon fully starting, the screen will appear as shown to the right.

Click on the **Hardware** tab on the left panel of the screen as highlighted in the image and the image on the next page will be displayed.





Click on the MicroTrap™ VOD/Data Recorder radio button under Choose Device and the Setup radio button under Hardware. Then click on the **Next** button.

This screen will display many details of the individual unit. This includes the serial number, calibration due date, if a Memory

into and the number of tests remaining.



CAUTION

IF THERE IS IMPORTANT DATA IN THE UNIT, DO NOT CHECK THIS BOX. If the box is checked, the total number of tests allowed can be changed on next screen. With the box checked, the software will tell the user how many tests will be erased.

With the Scope Upgrade in the MicroTrap™ VOD/Data Recorder, the user can select any of the 3 different radio buttons. In this section, the Scope radio button will be selected. Once the items have been selected on this screen, click on the Next button.



This screen will allow the user to adjust all of the Scope settings including the Scope Trigger Level, Pre Trigger Time, Number of Tests, Sampling Rate, Enabled Scope Channels with the voltage range and if that channel will be a Trigger. This screen will also allow the user to configure the External Trigger. Refer to the MicroTrap[™] VOD/Data Recorder Operations Manual for definitions of the settings. Once all of the settings have been selected, the user will need to click on Change Settings.

File Help	Head rea" Settings					
Cont Data No.	Seral Number	Internet v Lippe and	to Described	1. A	und have	-
A Hardware	Column Day Manufacture	and Printerson	Contract of Contract			
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Internation					Ave.	
Chattal Oracler					11110	
Onesh Test?"	Step1: Check Clearing Test		504	p2: Choose P	rogram Mode	
@ manhart	L tests on the MicroTrap ⁴⁴ w	if be Saved	Pa	opram Mode:	Scope	
A	1999 (1999) (1999) (1999) (1999)					
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e tena						
O Constant	Euro Reserve d					ė.
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	Time Between Texts					
	Number Of Tests					
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	Recording Rate			-	1.0	
	@ 1504					
	O 500 km O 100 km	0 10 km	© 10kH	0.54%	C THM	
	© 500 Hz © 100 Hz	© 50 Hz	O 12 Hz	0.5H	0.144	
	and a second second					
	🗵 Scope 1 🔄 Bruble brit Tropp	0.0-257	0-1-1×	TY 0 #251	0 +XY 0 +377	
	🖉 Scope 3 🔄 Bruible Ster Troppe	C 0-254 (0 8-37 0 8-1	DV # 4251	C +57 C +101	
	🖉 \$00pe3 🔄 Endle SetTrigge	0 0-1.5V	0 8-1Y 0 8-1	EV. © +25V	* +5Y 0 + 10V	
	E Scope 1 E Strakle Int Trapp	· 0.0-25V	0.8-51 0.8-1	EV © #2.57	0 atr # azir	
	Informal Tomas					21
	· NAR D	at O Break Cro	ut i	Canud	Ourge Setting	
	Marning Tripper suitch on the	recorder overvides	the internal/enter	nal tripper chose	•	
-						
And Sta	in the second					

The **DAS™ Data Acquisition Suite** will confirm that the user wishes to changes the settings. If the user is sure, click **Yes,** if not click **No**. Once **Yes** has been selected, the software will confirm that

DAS [™] Data Acquisition Suite	DAS™ Data Acquisition Suite
? Are you sure you want to change MicroTrap [™] settings	MicroTrap [™] settings saved. For these settings to take effect, please disconnect cable at MicroTrap [™] end, Wait 10 sec and re-connect the cable to MicroTrap [™] .
Yes No Cancel	ОК

the **USB cable** will need to be disconnected from the unit, wait 10 seconds then reconnect so that new settings can take effect. Generally, this is also done with a power off, wait 10 seconds and then power on the **MicroTrap™ VOD/Data Recorder**. Then select the **Finish** button and the software will return to the main screen of the software.

4.3.3 VOD & Scope Setup in the MicroTrap™ VOD/Data Recorder

With the **MicroTrapTM VOD/Data Recorder** connected to the computer, start the **DASTM Data Acquisition Suite**. Upon fully starting, the screen will appear as shown to the right.

Click on the **Hardware** tab on the left panel of the screen as highlighted in the image and the image on the next page will be displayed.





Click on the MicroTrap™ VOD/Data Recorder radio button under Choose Device and the Setup radio button under Hardware. Then click on the **Next** button.

This screen will display many details of the individual unit. This includes the serial number, calibration due date, if a Memory

into and the number of tests remaining.



CAUTION

IF THERE IS IMPORTANT DATA IN THE UNIT, DO NOT CHECK THIS BOX. If the box is checked, the total number of tests allowed can be changed on next screen. With the box checked, the software will tell the user how many tests will be erased.

With the Scope Upgrade in the MicroTrapTM VOD/Data Recorder, the user can select any of the 3 different radio buttons. In this section, the VOD & Scope radio button will be selected. Once the items have been selected on this screen, click on the Next button.



This screen will allow the user to adjust all of the **Scope** settings including the **VOD Trigger Level**, **Pre Trigger Time**, **Number of Tests**, **Sampling Rate** and **Enabled Scope Channels** with the voltage range.

Note: With the MicroTrap[™] VOD/Data Recorder having VOD enabled, the unit can only trigger internally from the VOD Channel. The External Trigger can still be used.

This screen will also allow the user to configure the **External Trigger**. Refer to the **MicroTrap™ VOD/Data Recorder Operations Manual** for definitions of the settings. Once all of the settings have been selected, the user will need to click on **Change Settings**.

n Help									
Com Cata Na	HicroTrap ¹⁴ Se	ttings			- 22	- 35		10	_
	Serial Number	6195-	Periory	upprote Cet	ncted and	Tist	Tens Tents		
- C. Parlows	Califration Due	2 Occurber 20	Same	Opprade Data	clad	164	lamaring Test	. 3	
Addition Server Device in Formula		1.00						100	_
tra farc of File Next		Sec			hart			freeh	
O reading in	Step1: Chec	k Clearing Tests			50	p2: Choose	Program N	tode	
A second second	1 bests on th	e Mostfrag ^{ter} wi	be Saved		10	ogrem Mode:	VOD & SI	cope	
forvitail*									
Rindeani									
				19725					1
O Secolar	L	VOD Trigger Level		94	15 1				
	F	Pre-Troper Time		11.	15. 1	8			
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	L	Title Deliveer Texils	-		· · ·				
		Number Of Texts			900				
	The same			1 14		(neb		×	
	Becelon Rd					1 100.0	. E		
	# 1894								
	C 500 kHz	0.100449	O 5044	. 0	10444	0.54Hz	0.1	kHz.	
		C) 100 Hz	0 50 Hz		10 Hz	0.5H	0.1	+44	
	100	For Internal Int	per mode, i	te Mon lo	ap ^m can sety	tologen			
	IZ Second	C 8-25Y	0-14		0 +237	0.457	0.430		
	12 Suger	C 4.24V /	0.50	0.0.00		0.01	0.000		
	12 tutes?	D. R. 194 .		-					
	ST Support	C 8-251 C	0-21	C. A. MA	0.4244	0.444			
		17 8 4 E ST 1			~ ****				
	Colored	# Male	out 0	Break Choir		Canal		Overge Settings	
	Marriag To	loper switch on th	recorder a	nervides the	e internal/ex	ternal tripper	choice.		

The **DAS™ Data Acquisition Suite** will confirm that the user wishes to changes the settings. If the user is sure, click **Yes,** if not click **No**. Once **Yes** has been selected, the software will confirm that the settings have been saved and that

DAS [™] Data Acquisition Suite	DAS™ Data Acquisition Suite
? Are you sure you want to change MicroTrap [™] settings	MicroTrap [™] settings saved. For these settings to take effect, please disconnect cable at MicroTrap [™] end, Wait 10 sec and re-connect the cable to MicroTrap [™] .
Yes No Cancel	ОК

the **USB cable** will need to be disconnected from the unit, wait 10 seconds then reconnect so that new settings can take effect. Generally, this is also done with a power off, wait 10 seconds and then power on the **MicroTrap™ VOD/Data Recorder**. Then select the **Finish** button and the software will return to the main screen of the software.

4.4 Programming the DataTrap II[™] Data/VOD Recorder

The **DataTrap II™ Data/VOD Recorder** has the ability to function as ±10 Volt DC Scope as the standard feature with an upgrade to measure **Velocity of Detonation** (**VOD**) data. In order to program the **DataTrap II™ Data/VOD Recorder**, ensure that the driver has been

installed, the cable has been connected to the computer, connected to the **DataTrap II™ Data/VOD Recorder** with the unit powered on. If unsure how to complete this task, refer to the **DataTrap II™ Data/VOD Recorder Operations Manual**.

4.4.1 Scope and VOD Programming in the DataTrap II™ Data/VOD Recorder

With the **DataTrap II™ Data/VOD Recorder** connected to the computer, start the **DAS™ Data Acquisition Suite**. Upon fully starting, the screen will appear as shown to the right.

Click on the **Hardware** tab on the left panel of the screen and the following will be displayed.





Select DataTrap II™ Data/VOD Recorder from the Choose Device

and **Setup** from the **Hardware** window and the following window is displayed.



In the Setup Mode window, there are four (4) options. The options are: Clear All Tests, Standard Setup, Advanced Setup and Recall Setup File.



4.4.1.1 Clear All Tests

When the user selects **Clear All Tests** radio button on the **Hardware tab** and clicks **Next**, the following window will appear.

This operation will delete all of the tests currently saved in the **DataTrap II™ Data/VOD Recorder** and will keep the settings.

Note that if there are no more tests available to be conducted in **DataTrap II™**, the **Clear All Tests** option must be used first before user is allowed to use **Standard** or **Advanced** setup screens.





The user will need to confirm the action of clearing all the test data in the unit by clicking **Clear All Tests** button. If the user does not want to proceed, the **Cancel** button can be clicked.

When **OK** has been selected, the user will receive conformation that the data has been deleted. The user will then need to click the **Cancel** button on the **Clear All Tests** screen to return back to the main menu.

4.4.1.2 Standard Setup

This section describes the details of the **Standard Setup** for the **DataTrap II™ Data/VOD Recorder**. This will be the recommended programming option for majority of the users.



Clear All Tests

Are you sure you want to clear all tests on the DataTrap

OK

Clear Tests Successfully

Cancel

OK

When the user selects **Standard Setup** radio button on the **Hardware tab** and clicks **Next**, the following window will appear.

If the unit's last setup was Advanced Setup and now the Standard



Setup is chosen, the following message will appear.

			DAS [™] Data A	cquisition S	uite				
File Help									
Open Data File	Setup For Te	st 1 of 32	Serial #		9113	Tests Used	0	VOD Installed	No
Hardware	and the second s		Calibrati	on Due	7 Jan 2014	Total Tests	32	Memory	512 MB
Add New Sensor Device or Formula	Change Number	of Tests	Keep Sto Court Sto	red Tests	al Number of 1	Faulto 22			
Choose Device			O Clear sto	red lests 10	tai Number of	iests 32			
HandiTrap II**	Channel	1 🗹	2 🗹	3 🗸	4 🗹	5 🗹	6 🗹	7 🗹	8 🗹
MicroTrap ^{***}	Input Range	0-2.5 V ¥	# 2.5 V V	0-5V ¥	±5∨ ~	0 - 7.5V ¥	±7.5V ♥	0 - 10 V V	0-7.5V ¥
DataTrapII	EXT Trigger								
Hardware Setup	Mode	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
O Download	INT Trigger Mode Level	Low Level 90%	Low Level 90%	Low Level 90%	Low Level 90%	Low Level 90%	Low Level 90%	Low Level 90%	Low Level 90%
Setup Mode	Sample Speed	10 MHz Y	SMHz Y	2.5 MHz V	2.5 MHz V	1 MHz v	500 kHz V	200 kHz Y	1Hz Y
Clear All Tests									
Standard Setup	T ime Total	105 ms	210 ms	419 ms	419 ms	1049 ms	2.10 s	5.24 s	12.1 days
Advanced Setup Recall Setup File	Pre-Trigger	26 ms (25%)	52 ms (25%)	105 ms (25%)	105 ms (25%)	262 ms (25%)	0.52 s (25%)	1.31s (25%)	3.0 days (25%)
	Pre-Trigger Time			Inter	nal Trigger				
	<		> 25	a. 🗆	Set to Standard	VOD Internal Trigg	er Settings		
	External Trigger	.Low ○M .High ○Br	ake 🔿 Makeor eak	Break	OFF OF	nv Level O gh Level O	Rising Edge Falling Edge) Rising Or Falling	Edge
					frigger Level	<			> 90%
	Set All Char	nels to Channel 1	Settings				Close	Save To File	Apply Settings
Analyze Ready								Standar	rd Edition, Registered

If the user wishes to continue in the Standard Setup click Yes, if not, click No or Cancel.



This is the standard setup screen for the DataTrap IITM Data/VOD Recorder. This screen will tell a lot of information about the DataTrap IITM Data/VOD Recorder, working top to bottom, in the first section the Serial Number, the date the Calibration is due, the number of tests used, the total tests the memory has been divided into, if the VOD Upgrade has been installed and the amount of memory installed. This menu will allow the user to control the setup of each individual channel with its own settings.

In the next section down labeled **Change Number of Tests**, if the radio button **Keep Stored Tests** is selected, the box to the right of **Total Number of Tests** will display the number of tests the memory has been divided into, if **Clear Stored Tests** is selected, a slide bar is displayed to the right of **Total Number of Tests** for the user to change the number of total tests the memory is divided into.

The third section is the details of each channel. With the **DataTrap II™ Data/VOD Recorder**, there are 8 channels for the user to configure. The check box beside each number will enable (when checked) or disable (when not checked) each channel. The user can independently change the voltage range setting of each channel to suit the voltage range of input signal. This is the standard setup for a scope channel on the recorder.

Note: If the VOD Upgrade is installed in the unit, VOD will be able to be selected in the Input Range. The standard Trigger settings for the internal Trigger or a VOD Channel is Low Level with the Trigger Level set to 90%.

The next line in the third section displays the status of the **External Trigger**. The **External Trigger** can be modified in the lower left corner of the screen and will be described later in the manual. The next line displays the status of the **Internal Trigger** which can be modified in the lower right corner of the screen and will be described later in the manual. The sample speed of each channel can be independently changed to suit the input signal or the recording time required. In the bottom part of the third section is the display of total time for each channel followed by the **Pre-Trigger time**. The **Pre-Trigger time** can be adjusted by the slider below and to the left labeled **Pre-Trigger Time**. It is adjusted in percentage of the total time available for the channel.

To the right of the **Pre-Trigger Time** slider is the check box for **Internal Trigger** to set the internal trigger for **VOD**. Since this unit does not have the **VOD** option installed, this check box is not available and has been greyed out. If the **VOD Upgrade** was installed, the check box would be available but this check box would only effect the channels which have their **Input Range** set to **VOD**. Below the check box is the settings for the internal trigger. There are six (6) choices: **Low Level**, **High Level**, **Rising Edge**, **Falling Edge**, **Rising or Falling Edge** and **Off** with a sider bar to adjust the level for the trigger. To the left of the **Internal Trigger** settings is the **External Trigger** settings. There are six (6) choices: **TTL Low**, **TTL High**, **Make**, **Break**, **Make** or **Break** and **Off**. For details of each of the twelve (12) settings, refer to the **DataTrap IITM Data/VOD Recorder Operations Manual**.

The bottom left of the screen is a button that will change all of the settings of **Channels 2 through 8** to how **Channel 1** has been setup. This is a quick option for the user to configure **Channel 1** and click this button to automatically setup all the other channels.

At any time the user wishes to exit the **Standard Setup** of the **DataTrap II™ Data/VOD Recorder** without saving new settings, the user can select the **Close** button in the lower right.

If the operator uses multiple setups with the unit, the user can save the individual setups in a setup file to be recalled at a later date. To save the file, the user will need to configure the unit as described above and once complete, the user will click on the **Save to File** button. This will open a directory/file structure window from the local computer as shown to the right.

	Sav	e As		
Select Save Directory New Folder				
Desktop Desktop Homegroup Homegroup Desktop D		test.dt2s	test1.dt2s	
File Name				
Full Path C:\Users\User\Documents\MREL				



The software will default to a standard location on the local hard drive, but the user can place the files in any location that is desired. A file name that describes the setup is required by the user to be typed into the **File Name** window. The user then would click **Save**. The file extension for this file is **.dt2s**. The description on recalling this file will be described later.

Once the user has configured the **DataTrap II™ Data/VOD Recorder** with the desired settings, **Apply Settings** must be clicked to upload the settings into the unit. Once the button has been clicked, the following box will appear.

The user will need to click **OK** if the settings are desired to be uploaded to the unit or **Cancel** if a mistake has been made. Once **OK** has been selected, the file will upload new settings to the unit and the following message will be displayed.

Once **OK** has been selected, the software will return to the main screen.

4.4.1.3 Advanced Setup

This section describes the Advanced Setup of the DataTrap II™ Data/VOD Recorder.

IMPORTANT

This section should only be used by either experienced **DataTrap II™ Data/VOD Recorder** users or veteran data collectors.



DAS[™] Data Acquisition Suite

Are you sure you want to save the settings to the DataTrap II"

OK

DAS[™] Data Acquisition Suite

DataTrap II[™] settings were saved successfully

You can safely unplug the DataTrap II[™] cable

Cancel

OK

With the **Advanced Setup** radio button selected on the **Hardware tab** and the **Next** button clicked, the following screen will appear.





The Advanced Setup of the DataTrap II[™] Data/VOD Recorder is quite powerful and if the user is not careful, some channels may not get recorded due to an invalid trigger setting. This screen will tell a lot of information about the DataTrap II[™] Data/VOD Recorder, working top to bottom, in the first section the Serial Number, the date the Calibration is due, the number of tests used, the total tests the memory has been divided into, if the VOD Upgrade has been installed and the amount of memory installed. This menu will allow the user to control the setup of each individual channel with its very own settings.

In the next section down labeled **Change Number of Tests**, if the radio button **Keep Stored Tests** is selected, the box to the right of **Total Number of Tests** will display the number of tests the memory has been divided into. If **Clear Stored Tests** is selected, a slide bar is displayed to the right of **Total Number of Tests** for the user to change the total number of tests the total memory is divided into.

The next section describes the **Network Setup Groups** (or trigger grouping). This is a quick overview of the trigger setup for all of the triggers. In the above example, all of the channels are in **Group A**. This means that if any of those channels cross the trigger threshold (to be described later) then all of those channels will trigger and call that point in time the zero point. In the **Advanced Setup**, the user can select groupings of channels to be triggered. By placing

different channels in different groups, one grouped channels will trigger when any channel in that group triggers. This gives channels in different grouping the ability to trigger at a different time and possibly record for longer time if recording at slower sampling rate. This kind of setup calls for careful planning of channel grouping so as to ensure reliable capture of valuable data. If the user clicks on the **Edit** button at the end of the Group row, the following window will be displayed.

In **Network Setup Groups** window, the user can select the groupings of the channels that are to be triggered together. The user has the ability to have each and every

channel trigger separately. Once the user has selected the required groupings of the channels, click OK. If a change is not required, click Cancel.

To the right of the trigger group selection is the **External Trigger**. There are six (6) choices: **TTL** Low, **TTL High**, **Make**, **Break**, **Make** or **Break** and **Off**. For details of each of the six (6) settings, refer to the **DataTrap II™ Data/VOD Recorder Operations Manual**.

Below the trigger group selection is tabs labelled **1-8**. These are the individual details and the configuration settings for each channel, beside the number at top there is a check box. If this check box is not checked, the channel will be disabled. Within this section, the user can select the **sampling rate**, **voltage range**, including **VOD** if the **VOD Upgrade** has been installed, can review and change the triggering group (by clicking on **Edit**), review the total amount of time and change and review the pre-trigger time with the slide bar. This is the setup for a standard scope channel on the unit. If the **VOD Upgrade** is installed in the unit, the standard **Trigger Level** for the internal **Trigger** are **Low Level** with a **Trigger Level** set at **90%**. In this section, the user can click on **Edit Memory Allocation**. It will display the **Time Balancing** window.



Keep Stored Tests
 Clear Stored Tests
 Total N

Setup For Test 1 of 32



	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8
Group A	0	0	0	0	0	0	0	0
Group B								
Group C								
Group D								
Group E								
Group F								
Group G								C
Group H								C

	Time	Sample Speed	Samp	oles
Ch 1	105 ms	10 MHz	٥	1.048576 M
ch 2	105 ms	10 MHz	\$	1.048576 M
Ch 3	105 ms	10 MHz	٥	1.048576 M
Ch 4	105 ms	10 MHz	٥	1.048576 M
ch 5	105 ms	10 MHz	٥	1.048576 M
Ch 6	105 ms	10 MHz	0	1.048576 M
2h 7	105 ms	10 MHz	0	1.048576 M
Ch 8	105 ms	10 MHz	^	1.048576 M



T: +1-613-545-0466 www.mrel.com contact@mrel.com

The user has the ability to change the number of points allocated to each channel. The user can click on the **up** and **down** arrows beside the number of samples (points) to change the memory available to each channel. The user will need to monitor the value in the **Unused Samples** as this can never be less than zero. Therefore, the number of points will need to be reduced in one of the channels prior to increasing them in another. With the changing of the number of points, the amount of time in each channel will change. This screen will display the amount of time with the selected sampling rate for the user to review prior to continuing. When the user is satisfied with the memory allocation, they will need to click **OK** or if the changes are not desired, click **Cancel**.

The next section refers to the **External Trigger**. If in the upper section the **External Trigger** is set to **OFF**, then in this section the only choice is **OFF** for all channels and the **ON** is labelled in red for each channel. If a selection in the upper section other than **OFF** is selected, than

ON is in black and the radio button has the ability of being selected for the channel. When the **ON** radio button is selected, the type of trigger that was selected above is

 External Trigger
 External Trigger

 OFF
 OFF
 OFF
 TTL High
 TTL Low
 Make
 Break
 Make or Break

displayed to the right of the button. To the right of the **External Trigger OFF/ON** area is a label displaying the current channel and any channels that can trigger the current channel. This is confirmation display of the trigger grouping window settings and to ensure the user is aware of the channels that are effected by the decisions above.

The bottom part of the screen is the Internal Trigger setup.

IMPORTANT

This is the setup for each individual channel.

Each channel has independent trigger levels. The small graphic of simulated data trace is to demonstrate when a valid trigger is received. Each channel can have two (2) **Internal Trigger** levels as shown. **Trigger 1** is the red line while **Trigger 2** is the green line. In the top image **Trigger 1** is set to **High Level** at 4.5 Volts and **Trigger 2** is set to **Low Level** at -4.5 Volts. In the graphic on the right side, the circles will indicate when a valid trigger is received. When the circle is lit, the **DataTrap IITM Data/VOD Recorder** would register a valid trigger for that channel. In the top example the data tracer is between -4.5 and 4.5 Volts so both indicators are off. In the bottom example, **Trigger 1** is set to Low Level at 4.5 Volts and **Trigger 2** is set to High Level at -4.5 Volts, so with the data tracer in the middle, it is registering a valid trigger. For more details on the effect of the individual triggering modes, refer to the **DataTrap IITM Data/VOD Recorder Operations Manual**.

At any time the user wishes to exit the **Advanced Setup** of the **DataTrap IITM Data/VOD Recorder** with out saving, the user can select the **Close** button in the lower right. If the operator uses multiple setups with the unit, the user can save the individual setups in a setup file to be recalled at a later date. To save the file, the user will need to configure the unit as described above and once complete, the user will click on the **Save to File** button. This will open a directory/file structure window from the local computer as shown to the right.





	Save	As		
Select Save Directory New Folder				
Desktop SkyDrive SkyDrive Werroup Suser Local Disk (C:) D-Users User User User User Wetwork O-Usetwork	entis B	test.dt2s	test1.dt2s	
File Name				
File Name Full Path C:\Users\User\Doc	uments\MREL			


The software will default to a standard location on the local hard drive, but the user can place the files in any location that is desired. A file name that describes the setup is required by the user to be typed into the **File Name** window. The user then would click **Save**. The file extension for this file is **.dt2s**. The description on recalling this file will be described later.

Once the user has configured the **DataTrap II™ Data/VOD Recorder** with the desired settings, **Apply Settings** must be clicked to upload the settings into the unit. Once the button has been clicked, the following box will appear.

The user will need to click **OK** if the settings are desired to be uploaded to the unit or **Cancel** if a mistake has been made. **Once** OK has been selected, the file will upload to the unit and the following message will be displayed.

Once **OK** has been selected, the software will return to the main screen.

4.4.1.4 Recall Setup File

This section describes how the user can recall a saved setup file generated from the previous section.



DAS[™] Data Acquisition Suite

Are you sure you want to save the settings to the DataTrap IITM

OK

DAS[™] Data Acquisition Suite

DataTrap II[™] settings were saved successfully. You can safely unplug the DataTrap II[™] cable

Cancel

OK

When the user selects **Recall Setup** File and clicks **Next**, the following window will appear.





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The user **MUST** check the check box to agree to erase all of the current data saved in the **DataTrap II™ Data/VOD Recorder**, otherwise the **Next** button will not be able to be selected. Only the **Cancel** button is available to be selected without the check box checked. With the box checked, the user can click on the **Next** button.

The next screen displays the same file structure window displayed when the file was saved. The user **MUST** select a file or only the **Back** and **Cancel** buttons are available. When the file has been selected, the **Finish** button will become selectable.



This window to the right will be displayed as the file is being checked against the configuration of the **DataTrap II™ Data/VOD Recorder**.

If the file	is configured	for a VOI) setting	and the	unit	does	not	have	а	VOD	Upgra	de
installed	, the following	window v	will be d	lisplayed								

	Checki	ng			
	E	rror Loadir	ng File		
8	/OD is not insta	illed in the Cur	rently Conne	ected DataTrap	
				OK	-

If the Setup File is configured properly for the DataTrap IITM Data/VOD Recorder, the screen of either Standard or Advanced Setup will be displayed. This will depend on which type of setup was used to create the file being recalled. The user would then need to click Apply Settings to save the configuration to the unit.



Chapter 5 Downloading from the Recorders





Overview

This section describes how the data is retrieved from the recorders. Here the procedure is described for each type of recorder.

5.1 Downloading from the HandiTrap II[™] VOD Recorder

This section will detail the download procedure for the **HandiTrap II™ VOD Recorder**. With the unit connected to the computer and the hardware tab selected, the following screen will be displayed.

With the radio buttons selected of HandiTrap II[™] VOD Recorder in the Choose Device section, Download selected in the Hardware section and Download All Tests in the Test Selection, the user will click on Next. The following screen is displayed.







	DAS [™] Data Acquisition Suite
Ele Help	
Open Data File	Select Save Directory
Hardware	New Folder
Add New Sensor Device or Formula	Dedop A Stoffing A Stoffing
Chapter Denilled	A User
And the second	Local Disk (Cr)
6 Hande Hapte	- Users
D MicroTrap**	Documents
DetaTraptI**	MREL Deta
tarðwäre.	Ubraies
🕑 tietupi	Am Network
Dewnload	
est Selection	File name: HT2014Feb001
Download All Tests	Add Comments: Downloaded from Hand/TrapEl at 09:03 on 21/February/2014
O Download Selected Tests	
	Test Options:
	Probe: PROBEROD 322.5 Ofwis/m
	VCD Units (e) m/h () ft/h Setal# 356 Download Close
Maralyze	
Ready	Standard Edition, Registered
	Downloading
	Downloading





pading Test <1> - <21%> done

This will return to the download screen and the user can click **Close** to exit the download area for the **HandiTrap II™ VOD Recorder**. Each of the downloaded files from the **HandiTrap II™ VOD Recorder** generates two files with the same user file name entered while downloading. The **.ht2** file is the configuration file while the **.raw** is the data file. If the test files are moved from one directory to another, both files are required to be moved.

If the user has download a test with incorrect probe value, download the test again with correct choice of probe value. (Do not turn off the recorder otherwise test will be lost).

5.2 Downloading from the MicroTrap™ VOD/Data Recorder

This section will detail the download procedure for the **MicroTrap™ VOD/Data Recorder**. With the unit connected to the computer and the hardware tab selected, the follow screen will be displayed.

With the radio buttons selected of MicroTrap[™] VOD/Data Recorder in the Choose Device section and Download selected in the Hardware section. There are two types of downloads that can occur with the MicroTrap[™] VOD/Data Recorder. When there are more than one test stored in the memory of the unit, both radio buttons are available, Download All Tests and Download Selected Tests. This manual will step through both options.



5.2.1 Download All Tests - MicroTrap™ VOD/ Data Recorder

With the **Download All Tests** radio button selected, the user will need to click on **Next**.





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This is the screen that the user will view showing the directory/file structure of the computer. The user will need to select a direct on the hard drive where the data is to be saved. With the dire selected, an appropriate file name for the group of tests that be downloaded needs to be entered in the File Name text bo default file name provided can be used as well.

structure of the computer. The user will need to select a directory on the hard drive where the data is to be saved. With the directory selected, an appropriate file name for the group of tests that are to be downloaded needs to be entered in the File Name text box. The default file name provided can be used as well.	Be bio Secondar Fri Secondar Fri Ablites Secondar Fri Conset Device Andhes Secondar Antes Secondar Constat Device Secondar Constat Secondar Downlad Secondar Texts	Select Save Directory Terr Hole Select Save Directory Select Save Directory Select Save Directory Finance Finance Finance Finance Finac	Derivad
	Analyze Ready		Standard Edition, Registered
When the Download button is clicked, the following progress bar is c	lisplayed.	Down Please Wait Downloading Tests <60%> done	nloading
When the download has been completed, click OK to display the Ac shown below.	cept screen as		DAS [™] Data Acquisition Suite Download finished successfully
When the downloading of tests has been finished, the following scree the test by clicking Accept Test button for each test downloaded.	en is displayed. En 1840 State The	The user has to accept DA5 ^{the} Data Acquisition Suite Select Save Overclary	ок
On the top of the screen is the directory/file structure of the local computer.	Add tien Senar Device or Furnula Add tien Senar Device or Furnula Bient Choose Device © Hand Tirpul ¹¹⁴ @ High Tingh ¹¹⁴	Trave Fader Trave Fader Sectors Secto	99 99
On the right side, the user selected name appended by _01 for the first test and _02 for the second test. Each of the MicroTrap™ VOD/ Data Recorder downloaded tests comprise of two files. A .mcr file for the configuration of the unit and a .raw is the data file. If these files are moved from one directory to another, both files are required to be moved. This example shows the download of both tests.	Oxaling Classifier Oxaling Classifier Oxaling Classifier Oxaling Classifier Oxaling Classifier Oxaling States Oxaling States Oxaling States	Test 1 of 2 Devended from Horsfrag 21 Pelowary 2014 test 1 of 2 Test Quytom: Public (MCORECLO 251.0 Cheme) YOO Units Min (Min Cheme) YOO Coope 1 Scope 2 Off Off Off Off	Acopt Tet 3 Canod V Scopi-3 OF OF
Just below the file structure window shows the following information about this test. In the image to the right, this is the comments text box for Test 1 of 2 downloaded in this session. The user can enter any important and relevant information regarding the test. For	Analyze Ready		Standard Edition, Registered .

example: Location, hole size, hole depth, explosive type, gauge type, gauge serial number, signal amplification, gauge location.

In the next section, the user should select the units prior to selecting the Probe to ensure the correct units are displayed in the pull-down box. To the right of the VOD Units is the display of the Serial Number. Below is the display of the individual channel details. If the VOD channel is OFF (on units with the Scope Upgrade), the Probe selection pull-down is unavailable. When all of the data has been entered into Test 1, the user needs to click Accept Test 1. The next test will be displayed and the above process needs to be completed for each individual test downloaded. The unit can store up to 16 individual tests in the recorder.



Note: For VOD channels, the correct Probe MUST be selected. This cannot be changed later.

Once all of the data has been entered for all of the downloaded tests, the following window appears. The **Cancel button** if clicked rejects the test and no files for it will be created when download process is finished.

5.2.2 Download Selected Tests - MicroTrap™ VOD/Data Recorder

This section will detail the **Download Selected Tests** options of the **MicroTrap™ VOD/Data Recorder** download feature.



When the user selects the **Download Selected Tests** and presses the **Next** button, the following screen will appear.

This is the screen showing the directory/file structure of the computer. The user will need to select a directory on the hard drive where the data is to be saved. With the directory selected, an appropriate file name for the group of tests that are to be download needs to be entered in the **File Name** text box (a default name is suggested). If all of the tests are checked, the software will act as if the **Download All Tests** button was selected and is described in **Section 5.2.1**. The user will enter the name (a default name is suggested) and only check-mark the tests that is desired to be downloaded.

When the **Download button** is clicked, the following progress bar is displayed.

Bit Bith Comparison Decision Formula Additions Decision Formula Matter Choose Decision PraceTrangt ⁽¹⁾ © PraceTrangt ⁽¹⁾ © Donatificagt ⁽²⁾ © Don	Inter Adar Contago	
Add tites besur Denice of Penula Boot Denical Denice O Franci Tragit" O Instal Tragit" O Instal Sector O Test Selection O Denical All Tests	© Priston ∧ № 17231/##e0002_01.0.mm ▲ Strücht ● № 17231/##e0002_03.mm ● Street ● ●	
Constitut friend Train	Orech Trest Runder Orech	Download Central
Analyze Ready		

When the download has been completed, click **OK** to display the **Accept** screen as shown below.





OK

DAS[™] Data Acquisition Suite

All test settings saved

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On the top of the screen is the directory/file structure of the local computer.

On the right side, the user selected name followed by _01 for the first test and _02 for the second test from memory. Each of the **MicroTrap™ VOD/Data Recorder** downloaded tests comprise of two files. A **.mcr** file for the configuration of the unit and a **.raw** is the actual data. If these files are moved from one directory to another, both files are required to be moved. This example shows the download of 1 test.

Just below the file structure window shows which test the following information is for. In the image above, this is the comments text box for **Test 1 of 2**. The user can enter any important and relevant information regarding the test.

Eee Fierb	
Open Data File	Select Save Directory
Hardware	New Folder
Address Sensor Decisor or Formula Read: Octoorse Device Prevalifing: MonoSing: Northease: Senso: © Downlead	Kession Second State Kession Kession
Trat Selection CountractAll Tests Countract Selected Tests	Opersteaded from MicroTrace 23 Advaury 2014 test 1 of 2
	VOD Scope1 Scope2 Scope3 Scope4 OII OFF OFF OFF OFF

In the next section, the user should select the units prior to selecting

the **Probe** to ensure the correct units are displayed in the pull-down box. To the right of the **VOD Units** is the display of the **Serial Number**. Below is the display of the individual channel details. If the **VOD** channel is **OFF** (on units with the **Scope Upgrade**), the **Probe** selection pull-down is unavailable. When all of the data has been entered into **Test 1**, the user needs to click **Accept Test 1**. If more than one test was selected for download, each test will cycle with the same screen.

Note: For **VOD** channels, the correct Probe **MUST** be selected. This cannot be changed later.

If only one test was selected, as in this example, the user will click on **Accept Test 1** and the following window will be displayed. The **Cancel button** if clicked rejects the test and no files for it will be created when download process is finished.



5.3 Downloading from the DataTrap II[™] Data/VOD Recorder

This section will detail the download procedure of test data for the **DataTrap II™ Data/VOD Recorder**. With the unit connected to the computer and the hardware tab selected, the follow screen will be displayed.

With the radio buttons selected of DataTrap II[™] Data/VOD Recorder in the Choose Device section and Download selected in the Hardware section. There are two types of downloads that can occur with the DataTrap II[™] Data/VOD Recorder. When there are more than one test stored in the memory of the unit, both radio buttons are available, Download All Tests and Download Selected Tests. This manual will step through both options.





5.3.1 Download All Tests – DataTrap II[™] Data/VOD Recorder

With the **Download All Tests** radio button selected, the user will need to click on **Next**.



This is the screen that the user will view showing the directory/file structure of the computer. The user will need to select a directory on the hard drive where the data is to be saved. With the directory selected, an appropriate file name for the group of tests that are to be download needs to be entered in the **File Name** text box. The default file name provided can be used as well.



na Test <2> - <97%> done

When the **Download** button is clicked, the following progress bar is displayed.

When the download has completed, the **DAS™ Data Acquisition Suite** will confirm the successful finish. The user will need to click on **OK** to continue with **Accept** screen as follows.





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Afterwards the following **Accept** screen is displayed, which is essential part of download process.

On the top of the screen displays the file path on the local computer where the file has been saved.

In the **File Comment** section, the user can enter any important and relevant information regarding the test. For example: Location, hole size, hole depth, explosive type, gauge type, gauge serial number, signal amplification, gauge location.

To the right is the **VOD** selection. If **VOD** is present in data, the **VOD** Units will be selectable as well as the pull-down menu will be available for the user to select the correct probe. This will be the default setting for all **VOD** channels. The user should select the units prior to selecting the **Probe** to ensure the correct units are displayed in the pull-down box.

Heb										
Open Data File	Test	1 of 2								
Marduare										
		ana: ICI	Dense Juess	freezenense heer freez (r.	2014/200	P4_01.002				
Add New Sensor Device or Formula	Tile C	omment :								
Next	Data 21/Fe	tetrieved fra bruary/2014	n DataTrap II for Test 1 of 2	** at 14:16:01 on		#.+h 0	hh.			
luiste Device					Sal Prote	taure for all VCO C	in the	6		
Praedilitas22**					PROBECA	BEOLS 3 Desh			<u>*</u>]}	
Prioratiap=	-	insi Senatr D	euce or Form	ula						
DetxTrapi0**	-	1					_			
udwore		Channel	Voltage	Probe Values / Device Sensor	3	Orientation	141	Prain Used	Stran Device	- îl
9 Setus	ľ	2	\$2.57	No Device Selected		No Orientation	-	0	NA	- 11
Download		3	0-5V	No Device Selected	4	No Orientation	Ų.	-	NA	
nit Selection		4	45V	No Device Selected	v	No Orientation	÷		N/A	
Download All Tests		5	0+7.5¥	No Device Selected	¥	No Orientation	¥		nj/A	
Developed Sciences Texas		6	# 7.5 V	No Device Selected	v	No Orientation	¥		N/A	18
	L	7	0 - 10 V	No Device Selected	4	No Orientation	v		N/A	
	<	W	÷.	94 1	100				1	·
									Accept Tes	11
									Cancel	

The next button down is the Add New Sensor Device or Formula. Refer to Section 5.4 that describes this function separately.

In the grid view is the configuration of the DataTrap II[™] Data/VOD Recorder referencing the channel number and the voltage settings (or VOD) during the recording. In the Probe Values/Device Sensors, the user would use this menu to pre-select the calibration factors of sensors that have been entered into the system using the Add New Sensor Device or Formula or VOD Probe. Otherwise, if No Device Selected is selected the data will be displayed in Volts.

Note: For **VOD** channels, the correct Probe **MUST** be selected. This cannot be changed later.

The Orientation column is designed for the user to input a specific orientation of the particular channel. This is generally used in accelerometers or strain gauges. This information is about the sensor & gauges used to collect data.

If the **DataTrap IITM Data/VOD Recorder** has the **Strain Upgrade** installed and the channel is connected to a strain gauge then the user must check the box of the particular channel that is a strain channel. This will allow the user to then select the **Pre-Amp Resistance** and the **Strain Gauge Factor**. The user will need to enter these values to allow the **DASTM Data Acquisition Suite software** to convert the recorded data into the microstrain ($\mu\epsilon$).



The user must then click **Accept** button to save the current test or **Cancel** button to reject it. Click **OK** in the final download message to finish the process.



5.3.2 Download Selected Tests – DataTrap II™ Data/VOD Recorder

This section will detail the **Download Selected Tests** options of the **DataTrap II™ Data/VOD Recorder** download feature.



1 1 1 1 2 2

'est <2> - <97%> do

When the user selects the **Download Selected Tests** and presses the **Next** button, the following screen will appear.

This is the screen that the user will view showing the directory/file structure of the computer. The user will need to select a directory on the hard drive where the data is to be saved. With the directory selected, an appropriate file name for the group of tests that are to be download needs to be entered in the **File Name** text box. The default file name provided can be used as well. Below the name text box, the test numbers available for download are being displayed. If all of the tests are checked, the software will act exactly as if the **Download All Tests** button was selected and is described in **Section 5.2.1**. The user will enter the name and only check-mark the tests that are desired to be downloaded. In this example, only **Test 1** will be selected.

When the **Download** button is clicked, the following progress bar is displayed.

When the download has completed, the **DAS™ Data Acquisition Suite** will confirm the successful finish. The user will need to click on **OK** to continue with **Accept** screen as follows.



Cancel



Afterwards the following **Accept** screen is displayed, which is essential part of download process.

In this example, only test 2 was selected for download.

On the top of the screen displays the file path on the local computer where the file has been saved.

In the **File Comment** section, the user can enter any important and relevant information regarding the test.

To the right is the **VOD** selection. If **VOD** channel is present in data, the **VOD Units** will be selectable as well as the pull-down probe values menu will will be available for the user to select the correct probe. This will be the default setting for all **VOD** channels. The user should select the **VOD Units** radio button prior to selecting the **Probe** to ensure the correct units are displayed in the pull-down box.

			DAS TH Data Acquisitio	on Suite					
Help									
Open Data File	Test 2 of 2								
Hardware	at a star				-				
-	neren: []	1/Dense/Dens	/Documents/Hitt/Data/D1	101499600	/_03.003				
dd flew Senstr Device ar Fernula	File Comment			100 Onte					
Next	Data Retrieved 1 24/February/20	for DataTrap I 4 for Test 2 of	2"" at 08:07:17 on		8.01	O.N			
ouse Device				Set Proce Values for all POD Channels					
Hand Tread Com.				PROTECA	KE 35.07 Ofymy				
MirraTiap=	Add Inc. Cases	Dening on East	1						
DataTrapII"		Cence of the							
duare	Channe	Voltage	Probe Values / Device Senso	18	Orientation	-	Strain Used	Strain Device	-6
Delug .		0-2.5 V	No Device Selected		No Orientation	~		NA	-1
Downlaad	2	82.57	No Device Selected		No Orientation	¥		108	-1
		457	No Device Selected	0	No Orientation	10		105	-
d selection	5	0-7.5V	No Device Selected	0	No Orientation	U.	0	NA	-
Oownised An Testa	6	# 7.5V	No Device Selected	v	No Orientation	v		NA	-
Download Selected Tests	7	0 - 10 W	ho Device Selected	¥	tio Orientation	¥		NA	
	6						6 - ⁵²	-	,
						_		Access Te	-12
								Circi	
								Canor	1

The next button down is the Add New Sensor Device or Formula. Refer to Section 5.4 that describes this function separately.

In the grid view is the configuration of the DataTrap II[™] Data/VOD Recorder referencing the channel number and the voltage settings (or VOD) during the recording. In the Probe Values/Device Sensors, the user would use this menu to pre-select the calibration factors of sensors that have been entered into the system using the Add New Sensor Device or Formula or VOD Probe. Otherwise, if No Device Selected is selected the data will be displayed in Volts.

Note: For **VOD channels**, the correct Probe **MUST** be selected. This cannot be changed later.

The **Orientation** column is designed for the user to input a specific orientation of the particular channel. This is generally used in accelerometers or strain gauges. If the **DataTrap II™ Data/VOD Recorder** has the **Strain Upgrade** installed and the channel is connected to a strain gauge then the user must check the box of the particular channel that is a strain channel. This will allow the user to then select the **Pre-Amp Resistance** and the **Strain Gauge Factor**. The user will need to enter these values to allow the

DAS[™] Data Acquisition Suite software to convert the recorded data into the microstrain (µε) units. For hardware configurations for Strain Channel setup, refer to the DataTrap II[™] Data/VOD Recorder Operations Manual.



The user must then click **Accept** button to save the current test or **Cancel** button to reject it. Click **OK** in the final download message to finish the process,

5.4 Add New Sensor Device or Formula

This section describes how the user can input commonly used equations for their applications or sensor calibration factors of sensors that are currently used. It only can be used on **Scope** data and **NOT** on **VOD** data. Therefore, this section is **not applicable** to the **HandiTrap II™ VOD Recorder** or the standard **MicroTrap™ VOD/Data Recorder**. Adding sensors will assist the user in allowing the ease of the application of the calibration data for each individual sensors. These sensor equation/calibration can be applied to the data **ONLY** during downloading of test data from **DataTrap II™ Data/VOD Recorder**.



5.4.1 Entering a New Sensor

A new sensor, device or formula can be added into the software from the main menu under the **Hardware** tab.

Click on **Add New Sensor Device or Formula** and the following widow will appear.

	Sensors & Formulas	
Quantity (e.g. Distance):	002023	Add Linear Sensor
Unit (e.g. metres):	metres	Add Sensor Formula
Y-Axis:	Distance (metres)	Cancel

The names that are typed into the **Quantity** and **Unit** text boxes are the units of the Y-axis quantity in the graph. By default, y-axis label is generated using these units and quantity. Y-axis caption or label can be changed by user independently (note that does not change quantity or related units). Various examples for **Quantity** text box are Distance, Length, Pressure, Acceleration, Temperature, Force, etc. Various examples for the **Units** text box are metres, feet, kPa, psi, g's, m/s^2, Celsius, Fahrenheit, Kelvin, Rankine and so on. This is displayed in the **Y-Axis** box at the bottom. There are two options for adding information for quick reference: **Add Linear Sensor** and **Add Sensor Formula**. These formulas or equations can only be applied to the data while accepting each test during downloading of data from **DataTrap II™**. There are other facilities to create formulas and apply them on demand in **Analyze** ribbon menu (See **Apply Formula** in **Filters and Formulas tab**).

5.4.2 Add Linear Sensor

The user will use **Add Linear Sensor** when a sensor is used with a calibration value. This will allow a quick selection of the intended sensor with the proper calibration to be applied to the the collected data when accepting a test from **DataTrap II**TM.

When the Add Linear Sensor button is clicked the following window is displayed.

The definition of the Y-Axis is shown at the top and the user is required to enter a **Device Name**. This is the name of the sensor which will appear in a device list on the **Accept** screen of **DataTrap II™** data download process. In this example, the serial number of the sensor has been entered. From manufacturer calibration sheet, numerical value of the sensor calibration is entered in device formula text box and correct units is selected on the right with radio buttons choice. The **Frequency Limits** are informational values entered by the user. This information can be referred to at a later date without looking up the frequency limits on the technical specifications of the sensor. The user will then select **Save** to add the device to the list or **Back** to return to the previous screen or **Cancel** to stop the process.

Once **Save** has been clicked, the following message is displayed. The user should click **OK** to return to previous screen. The user can add another sensor or formula on the main screen or click **Cancel** to close it.

Y-Axis:	Pressure (psi)	
Device Name:	6235	
Device Formula &	Units	
	O psi / V	
10.52	🔿 psi / mV	
	⊖ v / psi	
	mV / ps	1
	Y = V * 95.0570342205323	
	Y = V * 95.0570342205323	
	Y = V * 95.0570342205323	
Frequency Lim	Y = V * 95.0570342205323 its (Hz)	
Frequency Lim	Y = V * 95 0570342205323 its (Hz)	
Frequency Lim	Y = V * 95.0570342205323 its (Hz)	
Frequency Lim	Y = V * 95 0570342205323 its (Hz)	



OK

Device Added Successfully

Open Data File Hardware

HandiTrapII

O MicroTrap™

○ DataTrapII[™]
 Hardware
 ○ Setup
 ○ Download

Analyze

Add New Sensor Device or Formula

Next

5.4.3 Add Sensor Formula

The user will select this button when straight math formula is needed to be applied to the collected data. When **Add Sensor Formula** button is clicked, the following window is displayed.

The user can enter any valid mathematical equation into the **Y=** text box. To the right is a window describing all of the different mathematical expressions that can be used to modify the voltage that has been recorded.

With the formula entered into the text box, the user can click **Check Formula** and confirm that the format of the equation is correct if a check mark appears in the check box labeled **Formula Validated**.

At any time, the user can select **Back** to return to the previous screen and **Cancel** to exit.

When the user clicks **Save**, the following message is displayed. Click **OK** to return to previous screen where the user can continue adding other sensors or **Cancel** to close it.

	Add Sensor Formula -
Y = 110 - V	
	Check Formula Formula Validated
	Back Save Cancel
E	DAS™ Data Acquisition Suite
Mathematical E	xpressions for operand V:
Abs(V)	Output: absolute value of V
Acos(V)	Output: angle whose cosine is V
Asin(V)	Output: angle whose sine is V
Atan00	Output: angle whose tangent is V
CailingOO	Output: cmallect integer greater than or great to V
Cening(v)	Output, smallest integer greater than or equal to V
Cos(V)	Output: cosine or v
Exp(V)	Output: Euler's constant raised to Vth power
Floor(V)	Output: largest integer less than or equal to V
Log(V, i)	Output: logarithm of V to the ith base
Log10(V)	Output: base 10 logarithm of V
Pow(V, i)	Output: V raised to the specified ith power
Round(V, i)	Output: V Rounded to the nearest integer
	or i decimal places
Sign(V)	Output: Value indicating the sign of V
Sin(V)	Output: sine of V
Sart(V)	Output: square root of V
TanOO	Output: tangent of V
Truncate(V)	Output: integral part of V
Note:	
Not all operation	ons are applicable as output may not be array of
values(ex: Abs).	
	ОК
	DAS [™] Data Acquisition Suite
screen	
3010011	Formula Added Successfully

OK



Chapter 6 Opening a Data File





Overview

This section describes how to open a previously saved data file downloaded from either a HandiTrap II™ VOD Recorder, MicroTrap™ VOD/Data Recorder or DataTrap II™ Data/VOD Recorder.

6.1 Selecting a Data File

From the main screen, select the **Open Data File** tab. The following screen will be displayed.

By default, all recorder data file types are selected (DT2-**DataTrap** II[™] Data/VOD Recorder, HT2-HandiTrap II[™] VOD Recorder, MT-MicroTrap[™] VOD/Data Recorder). The user can select only the one type of file if desired. Once the desired file type is selected to be visible in the next screen, there are four (4) different ways to search for a file. They are Browse, Recently Opened Files, Recently Downloaded and Calendar.

6.2 Browse

The **Browse** feature is the typical way to use the file browser to find a file. By clicking the **Browse** radio button and selecting Next, the following screen will be displayed.

This screen will allow the user to navigate through the directory/file structure of the computer to find the desired file. From the previous page, only the selected file types will be displayed. The user can click on **Go To Home** to return to the default directory defined in the software. When the desired file is located, select the file by left clicking on the file name once and then clicking **Open**. To stop the process, click **Cancel**. When **Open** has been clicked, the file will start to load. After file is located, the main window will return with the **Analyze** tab opened. To analyze the data, refer to the **Analyze** section.



	DAS ^{ter} Data Acquisition Suite	- 0
ile Help		
Open Data File	Go To Home	
File Type III All III 012 III H12 III H12 III H17	Constant Second Seco	1.62 1.62 1.62 1.62 1.62 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.
Open Data From Erowse Recently Opened Files Recently Downlaaded Calendar	Control Fund - Revice In desitop	
Next		
	File Name File Type (*.)x2);*.dt2);*.mor	v
		Open
Hardware		Carte
we Analyze		
Ready		Standard Edition, Register



6.3 Recently Opened Files

This section is used to open a file that has been opened recently. The computer will record the files that have been opened and will produce a list of files for the user.



The user will select **Recently Opened Files** radio button from the **Open Data File** tab and select **Next** and the following window will appear.

The **DAS™ Data Acquisition Suite** will display eight (8) previously opened files. This includes all of the file types selected in the **File Type** window in the previous section. The user will just click on the blue link and the file will open and the file will show up in the **Analyze** tab. If no files wish to be opened from the list, the user can click **Close**.



If there is a **zip button** present next to a file entry, clicking it will create a zip file of original data on your desktop. That is useful if you want to send data to **MREL** (see **Section 10.2**)

	DAS ¹⁰ Data Acquisition Suite	
Heb		
Open Data File	Recently Opened Files:	Close
	C: Users Liver Desktop Vesktop hod Film 24-4n steel Ites 20-92, est	
the type All	Data retrieved from McroTrap at 08:20 AM on 25 Nov 2010 Test 2 of 2 s/h 7156[n]4:	
E 012	Critisanti tar Dedito Maktoria Ricchia da inactitati a 10 an	
M 812	Data retrieved from MicroTrap at 08:17 AM on 25 Nov 2010 Test 2 of 2 s/n: 6117[n] 4"	
IM MT		
	C. Users User Desktop Idesktop int-test (MT2013Rov-005_03.mp	
Open Data From	Downloaded from MicroTrap 7 November 2013 test 3 of 4	
O Browse	Sector States and an entrance of the sec-	
Recently Opened Files	Citizers User Documents IMPEL Data 072013901009_03.02	
Security Downloaded	para kereveo non basarrap u ~ at 11/41/15 on 11/kovender/2013 for Test 3 of 3	
@ Calendar	CilibertVide/DecktovCct 2013Wednesdav/kett1/kett11 m 11.dt2	
10027-2010	Data retrieved from DataTrapII at 09:23 AM on 30 Oct 2013 Test 11 of 11[H]Test 11	
Next		
	Cilibersither Desktop/Oct_2017Wednesday/test11/best11_s_11.dt2	
	pata retreved from Data maps: at 09723 AM on 30 Oct 2013 Test 11 of 11[n]Test 11	
	C:kaerskier/Desktop/Oct 2013/Wedresdev/Inst14/Jest14 m 14.dt2	
	Data retrieved from DataTrapII at 01:44 PM on 30 Oct 2013 Test 14 of 14[n]Test 14	
	Ciliners/Liner/Desktop/Dct. 2013/Wednesdev/test14/test14 s. 14.dt2	
	Data retrieved from DataTrapII at 01:45 PM on 30 Oct 2013 Test 14 of 14[n]Test 14	

6.4 Recently Downloaded Files

This option will open a list of the most recent downloaded files from the recorders.





With the **Recently Downloaded** radio button selected and selecting **Next**, the following window will be displayed.

The **DAS™ Data Acquisition Suite** will display eight (8) previously downloaded files. This includes all of the file types selected in the **File Type** window in the previous section. The user will just click on the blue link and the file will open and the file will show up in the **Analyze** tab. If no files wish to be opened from the list, the user can click **Close**.



If there is a **zip button** present next to a file entry, clicking it will create a **zip** file of original data on your desktop. That is useful if you want to send data to **MREL** (see **Section 10.2**)

6.5 Calendar

This section is used to open a file if the download date is known.

With the **Calendar** radio button selected and selecting **Next**, the following window will be displayed.

This option will display a calendar for the user to select the date that the file was downloaded. A blue box is placed around the current date and the date that is in bold font has a file associated with that date. In the example above, February 21, 2014 has a **DataTrap II™ Data/VOD Recorder** file associated the date. In the box below is the file location of the data with the file name. All of the files downloaded on the selected date will show in the bottom window. The user will select the file from the bottom box and click **Open**. The file will open in the **Analyze** tab. If no files are to be opened, click **Cancel**.



If there is a **zip button** present next to a file entry, clicking it will create a **zip** file of original data on your desktop. That is useful if you want to send data to **MREL** (see **Section 10.2**)





A 2-column CSV (comma separated values) file can be imported in **DAS™**. The imported data creates a scope channel. The user has to enter correct time units for 1st column when asked by importation process. The user has to enter "s" for seconds, "ms" for milliseconds etc. See the following text box for an example.



6.7 Working With the Data File

The image to the right shows a data file **Borehole_Ex.ht2** open. It shows one **VOD** channel with the **Original Graph**, which is indicated by a locked icon, and a saved graph (**VOD Graph -0.64 ms**) which is indicated by an unlocked icon. The meaning of the lock is that the data cannot be modified on permanent basis or saved though it allows you to work with it. A user should always create a saved graph to work on. A saved graph needs to be created for **VOD/Delta calculation**, **apply filters**, **formulas**, **apply offset (zero shift)**, **moving data points, creating point cursors** and **annotations** and more. To create savable graphs, the user can **Right-Click** on the locked graph and save it as a different graph (a default name is suggested). The saved graph can also be deleted in this manner.

An **Active Plot** is normally required to do most operations such as exporting data, change plot line or point colour, creating point cursors, creating annotations, creating **VOD** or **Delta** calculations. For making a plot active, check mark a plot entry in **Active Plot Selector Grid** on the lower left of **Analysis tab**. Only one plot in a graph can be active at a given time.

In the next example shown to the right, the file name of **DT2010Oct004_02.dt2** shows **8** channels and the display **All Graphs**. The user can also select the **All Graphs** which provides a display of all original data from all active channels overlaid on the same screen for visual comparison. There are not savable operations on this graph but new graph can be saved from this. In this scenario, only current active plot is saved as new graph. Instead working on individual channels is strongly encouraged. Also in this example, channel **1** is a **VOD** channel, channel **2** is a **Strain** channel and channels **3** through **8** are scope. This

example has no saved graphs on any of the channels. When the user clicks on the channel number, the software will display a summary of the settings and information for the selected channel on the right side of the screen when the file was downloaded.

6.8 Closing a Data File

To close a data file, **Right-Click** on the file name in the **Graph Tree** and select **Close**. The software will ask for a confirmation, click **Yes** to close the file or **No** to cancel and return to the file. The user can also use **Close All** in top **File** menu which closes all opened files.



Original Graph

Original Graph

Original Graph

Original Graph

Original Graph

Original Graph

All Graphs

🖻 🥑 DT-II CH4 (Scope)

🖃 🥝 DT-II CH5 (Scope)

🖻 🕑 DT-II CH6 (Scope)

DT-II CH7 (Scope)

🖻 📀 DT-II CH8 (Scope)

🖻 🕝 All Graphs Channel

..... <u>P</u>

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Chapter 7 Data Analysis





Overview

This section will detail the analysis of the data collected from the HandiTrap II[™] VOD Recorder, the MicroTrap[™] VOD/Data Recorder and the DataTrap II[™] Data/VOD Recorder.

This section will detail the analysis of the data collected from the recorders. It will show how the software will work and not the correct or incorrect way to analyze certain types of data. The data filtering portion of the software can be found in **Section 8**. Below is the view of the software with a data file open. Across the top of the screen is a ribbon menu with six (6) different tabs.





7.1 Home Tab

🚵 💠 🤁 🤤 = ➡ Home View V	OD	2-Point Functions	Filters & Formulas	s Help	
 Q Zoom In → Full Q Zoom Out Ø Original 	ago	Save As Delete	Point CursorShow/Hide	Annotation / Line Arrow Simage	Cut Copy Paste
Zoom	Pan	Graph	Point	Annotations	

In the Home tab most functions are of general nature that are used in graphing, saving and zooming. It includes the following functions:

- Zoom In Allows the user to zoom in on the graph to an area of interest.
 The feature works by clicking on Zoom In and selecting a box around the area of interest by dragging a mouse with left mouse button pressed in.
- Zoom Out Allows the user to zoom out.
 Click on Zoom Out as many times it is required or until the full view has been reached.
- Full Allows a single button click to zoom out to the maximum range of the graph. Click on once for maximum zoomed out area.
- Original Allows a one button click to zoom out to the maximum range of the saved graph. Click on once for the saved graph to return to its original saved range.
- Pan Allows for the scrolling of the graph.
 The pan button is a toggle ON or OFF. When it is on, the mouse can be used to click in and drag the graph.
- Save As Allows a graph to be saved as a new graph with the current zoomed range.
 With the current viewable area as desired range, click on Save As and a text box will pop up to allow a name to be entered by the user.
- Delete Allows the Saved As graphs to be deleted. Will not delete the original graphs.
 With a saved graph selected, the user can click this button and a conformation box will appear to confirm the deletion of the graph.
- Point Cursor Creates a movable vertical point cursor which shows the X, Y coordinate of current data point on the graph. Click on the button and follow the on screen directions. The Point Cursor can be moved with the mouse or the left and right arrow keys.

To select an individual point, the user may need to zoom in closer to select the desired point. The user can have multiple **Point Cursors** on the screen.

To remove, **Right-Click** on the **Point Cursor** and select **Delete**. Also with the **Right-Click** on the **Point Cursor** and selecting **Modify**, the user can adjust all of the individual properties on the **Point Cursor**.

The **Show/Hide Point Cursor** will allow the user to copy the individual coordinates pointed by point cursors to the clipboard to be pasted into a different application.

• Show/Hide - Will allow the user to copy the individual coordinates pointed by the point cursors in the graph to the clipboard so as to be pasted into a different application. Click on the button. It can also be found in the **Right-Click** context menu of the individual **Point Cursor** or graph.



- Annotation Will allow user to enter text onto the graph. Follow the instructions on screen.
 Click on the button and then click on the screen. Right-Click on the Annotation and select Modify to modify the text, colour or font.
 From the Right-Click menu, the user can also delete the Annotation.
- Arrow Will allow the user to draw an Arrow with a caption.

The user will draw an arrow with a textual caption attached to the end of the line. The user can change the text in the box by rightclicking and selecting **Modify**. The shape at the arrow end of the line can be removed by in the same **Modify** box, scroll down to **ShapeStyle** and select none. The arrow tip can not be moved without a **ShapeStyle** present.

• Line – Will allow the user to draw a Line.

The user will click on the **Line** button and follow the on screen instructions. The line can be extended or moved. User can modify its font or thickness using its Modify context menu.

• Image – Will allow the user to insert a picture.

The user will click on Image and follow the on screen directions. A directory/file structure window will pop up of the local computer. The user can navigate the computer and select the image of interest. The user will need to select top-left corner of the image to drag it to the area of interest and will be able to **Right-Click** on the corner to select **Modify** and adjust the displayed size. The **Modify** dialog box also allows user to select a different image using "**Change...**" button.

• Cut – Will allow the selected annotation to be cut. The selected annotation has a red rectangle around it when user Left-Click it once.

The user will need to select an item and then select **Cut**. If no item or a non-valid item is selected, the **Cut** button will not be available. The item will be placed on the computer's clipboard.

• **Copy** – Will allow the selected annotation to be copied.

The user will need to select an annotation and then select Copy. If no annotation or a non-valid item is selected, the Copy button will not be available. The annotation will be placed on the computer's clipboard.

• Paste – Will allow the last copied or cut annotation to be pasted.

This button will allow the user to **Paste** the item in the same graph that has been placed on the computer's clipboard. Note that annotation can be pasted to different graph nodes of the same or different data file (in version later than 1.0.0.0). **VOD** and Delta values cannot be copied or pasted.



7.2 View Tab

In the View tab are features that effect how the data is displayed.

- Linear Displays the X and Y axes with a linear scale.
 The user can click on the Linear check box to change the axes to Logarithmic
- **Logarithmic** Displays the X and Y axes with a logarithmic scale. The user can click on the **Logarithmic** check box to change the axes to Linear



Axes Range – Displays the following text box for the user to manually enter the axes range

The user can enter specific ranges into the menu without the requirement to zoom. Enter the desired values and click **Apply** or if no changes are desired, click **Close**.

Axes Title – Allows the user to modify the axes titles or graph caption. The user can modify the titles by entering the desired information in the text box and clicking Apply. If no changes are desired, click Cancel.

From the main graph window, **CTRL Key + Left-Click** on the X-axis, Y-axis or graph caption bar to display individual title change dialog.

- **Plotting Styles** Allows the user to change the way a plot is drawn. The default is Line connecting the data points with a line. Point will only display the data points while Point + Line will display both. Only the Active plot is affected.
- Line Thickness Allows the user to change the line thickness of the active plot. . The user can either click and drag the slider bar or use the + and - buttons to change the thickness of the drawn line.
- Point Colour Allows the user to change colour of the data points of active plot. • The Point Colour button will change the colour of the data points of active plot while the pull down arrow will allow the user to select the colour from a pallet of colours.

Line Colour - Will allow the user to change the line colour of the active plot. The Line Colour button will change the line colour of the active plot while the pull down arrow will allow the user to select the colour from a pallet of colours.



Minimum

X-Axis -36.21623770

Y-Axis -0.770949207

Apply

X-Axis Caption: Time (ms)

Y-Axis Caption: Distance (m)

Graph Caption: VOD Original Graph



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 Graph Tree – Allows the user to show and hide the graph tree view on the left side of the screen. It will allow the graph area to extend from the right image all the way to left edge of main window:



To the image to the right:

A single click on the **Graph Tree** button will change back and forth between the two screens.



- Grid Lines Major By selecting the check box will display the major grid lines. It can be turned on and off by the check box.
- **Grid Lines Minor** By selecting the check box will display the minor grid lines. It can be turned on and off by the check box.



7.3 VOD Tab

NOTE: This	tab is only visible whe	n the selected graph (or channel) is VOD data.	
🔁 💠 🔍 🔍 . 🔽 Home	View VOD 2-Poin	It Functions Filters & Formulas Help	
Start Cancel	 ✓ □ Linear Regression ✓ 2-Point 	Point 1 Point 2 VOD Time (ms) Distance (m)	
Calculate	Method	Data	

- Start/Done Allows the start of the VOD measurement. The button will change to Done after the process has been started.
 Follow the on-screen directions and click and drag the vertical point cursors to the desired location. See the Quick Start Guide for the use of the button. Clicking Done will finish the VOD measurement process.
- **Cancel** Allows the **VOD** measurement to be canceled.
- Linear Regression Allows the user to use Simple Linear Regression to produce a line of best fit of the points between the two end points.

The definition of **Simple Linear Regression** is a fit of a straight line through the set of n points in such a way that makes the sum of squared residuals of the model (that is, vertical distances between the points of the data set and the fitted line) as small as possible.

• 2-Point – Allows the user to measure VOD with using only the start and end point.

The **VOD** is calculated by the following equation: (y2-y1)/(x2-x1), where (x1,y1) is the first point and (x2,y2) is the second point. This is used when the data is 'noisy' and the points in the middle need to be ignored. As long as the line matches the straight edge of the data, then the value obtained from the calculation is valid.

Data Section

In this area, values being calculated are displayed when a **VOD** measurement has started and being calculated dynamically. The **VOD** value will be displayed and will change if the user selects Linear Regression or 2-Point method. The values will change accordingly as user moves vertical data cursors by mouse or left (right) keys. The user can finish **VOD** calculation process either by clicking **Done** button in the **VOD** tab or in "**Choose points for VOD/Delta calculation**" dialog. (See more details in Analysis section or in **built-in help**.)

7.3.1 How to measure VOD

See VOD Analysis Section 7.7.



7.4 2-Point Functions Tab

M 💠 🔍 🔍	-				
Home	View VOD	2-Point Functions	Filters & Formulas Help		
Start Cancel	△ ✓ Time (ms)△ ✓ Distance (m)	Time (ms) Distance (m)	Point 1 Point 2 🛆 Value	☆ Apply Offset★ Move Data Pt	
Calculate	Delta Type		Data	Misc	

 Start/Done – Allows the user to measure the amount of time (delta X) and the amount of Y-axis units (m, V or engineering units) (delta Y) between the two selected points.

The user will select start and will follow the on-screen instruction.



The screen to the right shows the two vertical point cursors and the two (X,Y) points. In the ribbon menu in the **Data** section, the values of the two points and the difference is also displayed.



When **Done** is clicked, the calculated values are shown on the graph as in the second screen.





- **Cance** The **Cancel** button is to stop the **2-Point Function** operation.
- Delta X (x-axis units of graph such as ms, s) This check box defines if the delta value for quantity X (usually time) is to be calculated and displayed. If the box is unchecked, the delta value will disappear in the Data section. Also, if the box is unchecked, the value will not be calculated or displayed when Done is selected.
- Delta Y (y-axis units of graph such as m, V or engineering units) This check box defines if the delta value for quantity Y (such as distance, voltage etc.) is to be calculated and displayed. If the box is unchecked, the delta value will disappear in the Data section. Also, if the box is unchecked, the value will not be displayed during the calculation process or after when Done button is clicked.
- Apply Offset Allows the user to shift all of the data on the vertical axis of a single channel. This is not applicable to VOD data. The offset cannot be applied to the original data. It only can be applied to the saved graphs. If it is attempted to be performed on an original graph, the following pop up is displayed.

Click on the button and follow the on-screen directions. On the pop up to the right, click **OK** and then select the data point which the user wants to be a zero value on the **Y-Axis**. When the desired point has been selected, the following **Units And Formula** dialog is displayed.

The actual operation is the subtraction of the selected data point's **Y** component as displayed in the formula bar above. The user will select **Apply** to shift the data the desired amount in the **Y-Axis** or Cancel to stop the operation.

Move Data Pt – Allows the user to move a single point in the vertical direction. This operation can only be performed on Saved Graphs and not on original graphs.

This feature will allow the user to move a data point that has an error in the data capture. The user will select **Move Data Pt** and the following pop up is displayed. Select **OK** to continue. Select the point of interest to move and then the user will be able to move it in the vertical direction. The user will click again where to place the point.



Navigate to a data point using mouse. Left-Click to mark it for moving. Move mouse to desired Y location and

Left-click again.

DAS[™] Data Acquisition Suite

Offset is not available to original graphs.



OK

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If the user is having trouble finding the individual point, the user can go to the **View** tab and click on **Plotting Styles** and select **Point** + **Line**.

7.5 Filters & Formulas Tab

🖄 💠 🔍 Q) -\$• ⊕, ⊖, -									
Home	View	VOD	2-Point Functions	Filters & For	rmulas	Help				
Open Filters			<table-cell> Sho</table-cell>	w original plot w filtered plot	Apply I	Formula				
		Fil	ters		For	nulas				

This section describes the use of **Formulas**. It is the preferred way of applying sensor equation and math formula to scope data. For discussion on **Filters**, which is only available in the **Advanced Edition**, refer to the **Advanced Edition**.

The image above is the tab status when a **VOD** data channel has been selected. There is no formula that can be applied to the graph.

In the image below is the tab when a scope data channel has been selected.

😁 💠 🔍 🤤	Ŧ				
Home	View	2-Point Functions	Filters & Formulas	Help	
Open Filters			Show original plot	fx Apply Formula	
		Filters		Formulas	

When the user selects Apply Formula, the following window will appear.

In the **Current Formula** text box is the current formula being applied to the data.

In this example, **Y=V**. The user will enter the formula equation into this text box using V as the current value of the y data.

💺 Uni	ts And Formulas	- 🗆 🗙
Formulas Units and Quantitie	25	
Current Formula: Y =	V	
Select Formula: Y =	Voltage : 'Y = V' V	- 2
		Units To Lists
Apply To New Graph	Apply	Cancel



To the right, available operations for the formula box are displayed.

Mathematical E	pressions for operand V:			
Abs(V)	Output: absolute value of V			
Acos(V)	Output: angle whose cosine is V			
Asin(V)	Output: angle whose sine is V			
Atan(V)	Output: angle whose tangent is V			
Ceiling(V)	Output: smallest integer greater than or equal to V			
Cos(V)	Output: cosine of V			
Exp(V)	Output: Euler's constant raised to Vth power			
Floor(V)	Output: largest integer less than or equal to V			
Log(V, i)	Output: logarithm of V to the ith base			
Log10(V)	Output: base 10 logarithm of V			
Pow(V, i)	Output: V raised to the specified ith power Output: V Rounded to the nearest integer			
Round(V, i)				
	or i decimal places			
Sign(V)	Output: Value indicating the sign of V			
Sin(V)	Output: sine of V			
Sqrt(V)	Output: square root of V			
Tan(V)	Output: tangent of V			
Truncate(V)	Output: integral part of V			
Note:				
Not all operation values(ex: Abs).	ns are applicable as output may not be array of			

When the equation has been entered, the user can select the **Units** and **Quantities** tab. The user will assign the **Y Units** (psi, g's, etc.) and the **Quantities** (Pressure, Acceleration, etc.). These quantities and units can be selected from the pull down menus (if already in the system) or typed in. The formula and associated quantity/units can be saved by clicking button **Add Formula & Units To Lists**. As stated previously, the formula cannot be applied to an original graph. The Apply button will be greyed out if current graph is original graph. The user must check-mark **Apply To New Graph** check box and then the **Apply** button will be enabled. The user can always select **Cancel**.

Formulas Units and Quantiti	25
Units Current Y Units: (e.g. psi) V	Quantities Current Y Quantity: (e.g. Pressure) Pressure
Select Y Units: V	Select Y Quantity: Pressure
	Add Formula & Units To Lists
	turb Count

7.6 Help Tab

1	-ĝ. (a , a , ≠						_
-	H	ome	View	VOD	2-Point Fu	nctions Filters	& Formulas	Help
G		SS	2			AS		
	9	1	2		-	Z		
He	lp	Support	Updates	Register	r About	Keyboard Shortc	uts	
	Sup	port		Software		Shortcuts		

This section describes the **Help** tab.

- Help Opens the built-in Data Acquisition Suite Help on the screen in a separate window.
- **Support** Opens an email using your default email client to send an email to **das@mrel.com**
- **Updates** This will check for any updated releases for the software (Internet access is required). If there is an updated version available, user can answer **YES** to download updated package (a zip file) to a temporary folder such as **Download** folder. Once



download process is finished, Exit **DAS™** (Do not uninstall it), extract the downloaded package in the same temporary folder and double-click the extracted executable to run it. Follow the prompt. Local **Administrative type user account** is required to successfully install the update package.

- Register This will restart DAS™ and display registration dialog. The user fills and submit this to get the software registered. Once registered, user needs to upgrade to Standard or Advanced Edition to continue to use the software beyond one-time 30 day evaluation period.
- About Opens the window showing the version number of the software and the contact details for MREL Group of Companies Limited including website, email, address and phone and fax numbers.
- **Keyboard Shortcuts** Displays the keyboard shortcuts. To the right is the screen.

Onen	Ctrl + 0	Zoom Tool Toggle	FS
Close	Ctrl + W	Zoom In	Ctrl +
Close All	Ctrl + Shift + W	Zoom Out	Ctrd -
Savo	Ctrl + S	Full Zoom	Ctrl + 0
Save All	Ctrl + Shift + S	Pan Tongle	F6
Save As Imago	Ctrl + Alt + S	Create Point	F7
Drint	Ctrl + P	Cut	Ctrl + X
Evit	Ctrl + 0	Copy	Ctrl + C
LAR	cur q	Paste	Ctrl + V
		Save As Graph	Ctrl + N
		Axes Logarithmic	Ctrl + L
		the second s	
		Axes Linear	Ctrl + i
Open Filters	Ctrl + F	Axes Linear	Ctrl + i Ctrl + ;
Open Filters Apply Formula	Ctrl + F Ctrl + G	Axes Linear Grid Lines Major Grid Lines Minor	Ctrl + i Ctrl + ; Ctrl + '
Open Filters Apply Formula Helo	Ctrl + F Ctrl + G	Axes Linear Grid Lines Major Grid Lines Minor X-Axis Caption	Ctrl + i Ctrl + ; Ctrl + !
Open Filters Apply Formula Help	Ctrl + F Ctrl + G F1	Axes Linear Grid Lines Major Grid Lines Minor X-Axis Caption Y-Axis Caption	Ctrl + i Ctrl + : Ctrl + ' Ctrl + Left Click on X-Axis Ctrl + Left Click on X-Axis

7.7 VOD Analysis

Analysis of **VOD** is the measurement of the velocity of detonation of explosives. The instruments capable of this measurement is: HandiTrap II[™] VOD Recorder, MicroTrap[™] VOD/Data Recorder and DataTrap II[™] Data/VOD Recorder with VOD Upgrade. With the graph opened, the screen to the right is displayed.

In this example, the file name is **Borehole_Ex.ht2** which is a **HandiTrap II™ VOD Recorder** file. On the left side of the screen, the column displays all of the important information regarding the file. This example shows that there is 1 active **VOD** channel (shown with a green circle with a white check mark).

The user will need to decide which type of **VOD** measurement that is desired: **Linear Regression** or **2-Point**.

Please refer to the descriptions below to which type of **VOD** measurement is desired.

With the desired check box selected and the graph zoomed into the relevant area, click **Start**. The following screen will be displayed.

Click **OK** to continue.

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	Hone Vew VOO 2-Forst Fundions Fithers & Formulas Help	
Andres .		
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0 100	ing room	
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The user will see two vertical point cursors. The selected data points are displayed (**X**,**Y**) where the point cursors intersect the data. The user can click and drag the point cursors to the the desired locations. The **VOD Feedback Line** shown in green here, is a visual aid to user so a better close match to actual data can be achieved. If you do not have this, please update **DASTM** to latest version (See **Section 2.8**).

Reconfirm that the desired method has been selected and the **Data** section will display a quick reference to the two points and the **VOD** prior to pressing **Done**.

Once **Done** has been pressed and the **VOD** line is displayed, this is the only time that the user can compare the **VOD** line to the data.

If the **VOD** line does not match the data, it is not a valid **VOD** measurement.

As shown in the graph to the right, the selected line is not the best fit for the data. The user can place as many different **VOD** measurements as desired.

The line is shown above the data at the beginning, below in the middle and above the measurement at the end. The image to the right is a better measurement.





From the screen to the right, the two **VOD** lines have been closely fit to the data where each line fits the data in the section of measurement. This shows a change in velocity from the bottom of the hole to the top.





7.8 Exporting Graph

7.8.1 Export Graph Data

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Right-Click a graph which displays following context menu.

Choose Export to export active plot original data range to a CSV file. Or choose **Export Visible** to export active plot data using current visible range of graph to a 2-column CSV file.

7.8.2 Export Graph Image

Right-Click a graph which displays following context menu.

Choose **Save As** Image which displays a Save as dialog with directory structure displayed on the computer. The user can save the graph image as Jpeg, Bitmap, Gif and PNG files.

7.9 User Preferences

The user can change various preference applicable (some available in version beyond 1.0.0.0) to many aspects of the software operation. These includes **Auto Save**, **Default Language** (English (default) or French), **Ribbon menu Style**, **Default font**, **Active plot legend ON/OFF**, **Export Time units type** (seconds or default), **Apply Offset type** and **Visual Feedback** line colour for **VOD**. These preferences are controlled through the following dialog using menu item **File > Preferences**. See built-in help for details.

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Chapter 8 Advanced Edition





Overview

This Chapter provides detailed instructions on the Advanced Edition operations and how to upgrade to the Advanced Edition.

8.1 Upgrade to Advanced Edition

To **Upgrade** to the **Advanced Edition**, the user will need to select **Help** from the top menu structure and then **Select Register/Upgrade...**

The registration dialog will appear empty if software is not registered. It will appear with filled information if it is registered whether upgraded to **Standard Edition** or Not upgraded yet. The first image shows an **Advanced Edition** registered software (user information is removed here)



At the bottom of the registration dialog is a link to get a quote (info) for **Advanced** version upgrade from **MREL**. If the user has paid for the **Advanced Edition** in full, have already registered the **DAS™** software on the PC using **Help > Register** menu item. After completing registration process, send request to upgrade using email to **das@mrel.com**. The invoice# (or its screen shot) needs to be mentioned in the email. A screen shot of registration screen is needed for the computer for which **Advanced Edition** is going to be licensed. The user will be provided an **Advanced Edition** license key along with instructions to apply it.

The processing time may take up to 1 business day or more depending upon payment status.

Registration Red fields are required. Registered First Name Instance Last Name Instance Company Name Instance Address Instance Province/State Instance Postal/Zip Code Instance Phone Instance Instal/Upgrade Tup Standard Edition Registration Company Standard Edition Instal/Upgrade Tup Standard Edition Cancel Vuprade

NOTE: Some of the features discussed in this manual are available in **DAS™** version later than 1.0.0.0. Please check for any available updates in **DAS™**.


8.2 Using Advanced Edition – Filters

Once the software has been upgraded to the Advanced Edition as described in the previous section, the features of the Advanced Edition will be accessible. The Advanced Edition offers extra functionality in-addition to what is offered in Standard Edition. The Advanced Edition will allow the user to apply filters to the data downloaded from a HandiTrap II[™] VOD Recorder, MicroTrap[™] VOD/ Data Recorder, DataTrap II[™] Data/VOD Recorder or an imported CSV file data. Moreover, Auxiliary Plots operations such as Curve Fitting and Integration etc. are available in Advanced Edition. In the image below we have saved Original Graph as new graph named Low-Pass. Then in the Filters and Formulas tab, the Open Filters button is clicked. This data has high frequency noise.

When the user clicks on the **Open Filters** button, the following screen will appear which shows that the original and filtered plot are the same as no filter is added and applied yet.

This window allows the user to select different filters to be applied to the data. In the top-left half (**Time-domain view**), the original data is displayed from the file and the lower-half, the filtered Data is displayed if any filters are added and applied. The user selects an added filter on the right, changes its design parameters and preview the filtered data by clicking **Preview Filters Applied** button, the filtered data changes in lower half of left window. Finally when filter output meets the design criteria (parameters), user can click **Apply & Close** button to create a filtered plot in the main window. The unfiltered plot does not change.

See below for an example of Elliptic Low pass filter applied to clean the unfiltered data.

When user is done previewing the filter, the **Apply & Close** button can be clicked to accept the results and the main window has filtered plot (blue colour) added as shown below (or user can **Cancel**).

We have made Original plot hidden to show Filtered plot clearly in the screen shot on the right.

Frequency Domain View:

This view is active when **FFT plots** checkbox is checked marked. It offers frequency domain plots as an aid to design filters by creating plots such as **Magnitude-Phase** plots showing **RMS Magnitude** (or **Power RMS^2**) against linear frequency in Hertz (Hz). Phase is shown in Degrees. A user can switch to Logarithmic scales using related checkboxes for X and Y scales. The following is an example of a composite Sine wave (0.75Sine25 + 0.15Sine100) being filtered for 25 Hz.









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Clearing FFT plots checkbox switches to **Time Domain View** and shows the filtered output as shown below:

The **Advanced Edition** offer the following filter design types which a user can select to apply to the data:

- Bessel
- Butterworth
- Chebyshev
- Elliptic
- Miscellaneous
- Median
- Moving Average
- Savitzky-Golay
- WindowedFir

Along the top of the filter dialog window, there are 5 tool bar buttons that include: **Zoom In, Zoom Out, Zoom to Full range, Pan, Filtered Data Graph Colour** and a text box for filtered plot line thickness represented by a number. On the lower-right, the **Plot Settings** will adjust the settings for both the top and bottom graph. The **Plot Style** defines the plotting method of the graphs. The

choices are: Line, Point or Point + Line. The check box Show Original Range will zoom the graph to the range when filter dialog was started. If the graph has been zoomed in, out or paned, this is the quickest way to return to the range you started with. If unchecked, it will return to current zoom level. The next check box Original & Filtered will place both original and filtered plots in lower half on the same axis to allow the user to view the data to see the differences of the effect of the filtering.

8.2.1 Bessel

Bessel filter family is a type of IIR (Infinite Impulse Response) digital filters which provides a maximally flat group delay with linear phase response. Bessel filters offer very low level of ripples or ringing in the pass band.

The four filter types of Bessel filter design family are: Lowpass, Highpass, Bandpass and Bandstop

Generally Lowpass filter passes through signals having lower frequency than cutoff frequency. Highpass filter passes through signals having higher frequency than cutoff frequency. Bandpass filter passes through signals which have frequencies within the frequency range defined by lower cutoff and higher cutoff frequencies. Bandstop filter passes through signals which are not within frequency range defined by lower cutoff and higher cutoff frequencies.

With the type of **Bessel** filter added and selected, the user will specify the following parameters for **Lowpass** and **Highpass** filters.

- Filter Order
- Cutoff Frequency (Hz)

The parameters for **Bandpass** and **Bandstop** are as follows:

- Filter Order
- Lower Cutoff (Hz)
- Upper Cutoff (Hz)



With these parameters provided by the user, the user needs to click **Preview Filters Applied** to update the Filtered graph and if the desired filtering effect has been achieved, the **Apply & Close** button can be clicked. That will create a filtered plot in the Main window of software in-addition to original unfiltered plot.

Zero Phase Delay checkbox is an optional parameter. If this option is check-marked, filter tries to reduce possible phase delay in output response. The user should reduce Filter Order to half of its value compared to when this options is NOT on.

The user can apply different filters and arrange their order of application by using **Up** and **Down** buttons in Filter dialog. The filters are applied from top to bottom as per the **Current Added Filters** list. The **Cancel** button will close the Filter dialog without applying any changes and main software window is displayed.

8.2.2 Butterworth

The **Butterworth** filter design family is a type of IIR (Infinite Impulse Response) digital filters which provides as flat a frequency response as possible in the **passband**. It is also referred to as a maximally flat magnitude filter.

The frequency response of the **Butterworth** filter has a steeper rolls off than **Bessel** filters. **Butterworth** filters have moderate ripple and provide good overall performance.

The four types of filters for the Butterworth filter design family are: Lowpass, Highpass, Bandpass and Bandstop.

With the type of **Butterworth** filter added and selected in the list, the user will provide the following parameters for **Lowpass** and **Highpass**.

- Filter Order
- Cutoff Frequency (Hz)

The parameters for **Bandpass** and **Bandstop** are as follows:

- Filter Order
- Lower Cutoff (Hz)
- Upper Cutoff (Hz)

With these parameters provided by the user, the user needs to click **Preview Filters Applied** to update the bottom graph and if the desired filtering effect has been achieved, the **Apply & Close** button can be clicked. That will create a filtered plot in the Main window of software in-addition to original unfiltered plot.

Zero Phase Delay checkbox is an optional parameter. If this option is check-marked, filter tries to reduce possible phase delay in output response. The user should reduce Filter Order to half of its value compared to when this options is NOT on.

8.2.3 Chebyshev

Chebyshev filter family is a type of IIR (Infinite Impulse Response) digital filters, having a steeper roll-off and more **passband** ripple than **Butterworth** filters. Steeper roll off can be achieved using **Chebyshev** filters if more ripples are allowed in pass band. These filters have better attenuation in the stop band than **Butterworth** filters.



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With the type of **Chebyshev** filter added and selected, the user will have the following parameters for **Lowpass** and **Highpass**.

- Filter Order
- Cutoff Frequency (Hz)
- Stopband Ripple (dB)

The parameters for **Bandpass** and **Bandstop** are as follows:

- Filter Order
- Lower Cutoff (Hz)
- Upper Cutoff (Hz)
- Stopband Ripple (dB)

With these parameters provided by the user, the user needs to click **Preview Filters Applied** to update the bottom graph and if the desired filtering effect has been achieved, the **Apply & Close** button can be clicked. That will create a filtered plot in the Main window of software in-addition to original unfiltered plot.

Zero Phase Delay checkbox is an optional parameter. If this option is check-marked, filter tries to reduce possible phase delay in output response. The user should reduce Filter Order to half of its value compared to when this options is NOT on.

8.2.4 Elliptic

The **Elliptic** or (Cauer) filter family is a type of IIR (Infinite Impulse Response) digital filter. It provides sharpest roll-off and narrow transition band for a given filter order. This filter provides good control for amount of stop band ripples along with excellent attenuation for stop band and has non-linear phase response. The choices of stop band ripple and stop band attenuation controls the transition rate.

With the type of Elliptic filter added and selected, the user will have the following parameters for Lowpass and Highpass.

- Filter Order
- Cutoff Frequency (Hz)
- Stopband Ripple (dB)
- Stopband Attenuation (dB)

The parameters for **Bandpass** and **Bandstop** are as follows:

- Filter Order
- Lower Cutoff (Hz)
- Upper Cutoff (Hz)
- Stopband Ripple (dB)
- Stopband Attenuation (dB)

With these parameters provided by the user, the user needs to click **Preview Filters Applied** to update the bottom graph and if the desired filtering effect has been achieved, the **Apply & Close** button can be clicked. That will create a filtered plot in the Main window of software in-addition to original unfiltered plot.

Zero Phase Delay checkbox is an optional parameter. If this option is check-marked, filter tries to reduce possible phase delay in output response. The user should reduce **Filter Order** to half of its value compared to when this options is NOT on.



8.2.5 Miscellaneous Filters

Formula

The Formula filter applies a math formula to create a filtered plot. The original plot is not modified. The quantity/units remain the same. Quick examples of formula filter is inversion (-1.0*V), Signal Offsetting (V + 2.58) or other possible formula equations. This is in contrast to **Apply Formula** functionality in the main screen where formula is applied to unfiltered plot along with any quantity/units changes. Both Formula filter and **Apply Formula** are applicable to Scope type of graphs only.



Negative Distance Removal

This filter is applicable to **VOD** type of graph only. It has two parameters which specifies the starting and end x-axis range values. The negative distance spikes on distance data (y values) are removed which occur between this x-axis range specified. Multiple filters can be added to operate using different x-axis ranges as shown below:

8.2.6 Median

The **Median** filter is a nonlinear digital filtering technique, often used to remove noise. The only parameter is the number of points which needs to be an odd number between 1 (no change to data) and 99.

To demonstrate, using a window size of three with one point immediately preceding and following each point, a **Median** filter will be applied to the following simple 1D signal with a window set of 3:

x = [2 80 6 3]

So, the median filtered output signal y will be: y[1] = Median[2 2 80] = 2 y[2] = Median[2 80 6] = Median[2 6 80] = 6 y[3] = Median[80 6 3] = Median[3 6 80] = 6 y[4] = Median[6 3 3] = Median[3 3 6] = 3

i.e. y = [2 6 6 3].

8.2.7 Moving Average

Moving Average filter works on input sampled data using a sliding fixed size window of number of data points. The first point of the **Moving Average** filter is obtained by taking the average of this initial fixed window of points. Then the window is shifted forward such that excluding the first point of the series and including the next point following the original subset in the series. This creates a new subset of points, which is averaged. This process is repeated over the entire data series. The plot line connecting all the (fixed) averages is the moving average. A Moving Average is a set of data points, each of which is the average of the corresponding subset of a larger set of datum points. The only parameter is the number of points which needs to be an odd number between 1 and 99.



8.2.8 Savitzky-Golay

A **Savitzky-Golay** filter is a digital filter that is used to smooth sampled data such that to increase the signal-to-noise ratio without greatly distorting the signal. This is achieved, in a process known as convolution, by fitting successive sub-sets of adjacent data points with a low-degree polynomial by the method of linear least squares. Using this **Un-weighted Smoothing filter**, there are two parameters to be adjusted by the user. The **Polynomial Order** and the **Number of Side Points**. The number of side points MUST be greater than or equal to the order of the polynomial.

8.2.9 WindowedFir (Windowed Finite Impulse Response)

A smoothing window is a mathematical function that is zero-valued outside of some chosen interval. When another function or waveform/ data-sequence is multiplied by a window function, the product is also zero-valued outside the interval, all that is left is the part where they overlap, the "view through the window".

Within the filter parameters, there are different types of **Smoothing Windows** that can be used. Below is a list of the available smoothing windows.

- 1. Rectangular
- 2. Hanning
- 3. Hamming
- 4. BlackmanHarris
- 5. ExactBlackman
- 6. Blackman
- 7. FlatTop
- 8. BlackmanHarris4Term
- 9. BlackmanHarris7Term
- 10. LowSidelobe
- 11. BlackmanNuttall
- 12. Triangle
- 13. Kaiser
- 14. DolphChebyshev
- 15. Gaussian

For Lowpass and Highpass of the WindowedFir, the following Filter Parameters are available.

- Number of Coefficients
- Cutoff Frequency (Hz)
- Smoothing Window
- Window Parameter (With a Smoothing Window of type 13 15).

For Bandpass and Bandstop of the WindowedFir, the following Filter Parameters are available.

- Number of Coefficients
- Lower Cutoff (Hz)
- Upper Cutoff (Hz)
- Smoothing Window
- Window Parameter (With a Smoothing Window of type 13 15).



Windows Parameter specifies Beta for Kaiser, Main-to-Side lobe ratio for **DolphChebyshev**, Standard Deviation for **Gaussian**. Large Beta results in narrower smoothing window, Standard Deviation (if 0 or less then default value will be used which is 0.2) and Main-to-Side lobe height ratio is in decibels.

NOTE: Please see more information about filters in built-in Help (Press F1 in DAS™ application).

8.3 Using Advanced Edition – Auxiliary Plots

NOTE: Some of the features discussed in this manual are available in DAS[™] version later than 1.0.0.0. Please check for any available updates in DAS[™].

DAS[™] Advanced Edition provides functionality of applying a selected operation to a plot to create an auxiliary plot. Some auxiliary

operations can operate on single plot or on two plots. The operands, i.e. the plots selected from a list for a given operation which may require one plot operand or two. More than one plot can be selected using **CTRL Key + Left-Click**. Order of selection of more than one plot is important in some operations such as Subtraction or Division. The selected plot/s are not needed to be **Active** to be selected as operands.

When a user click on **Operations** in **Auxiliary Plots** group in the ribbon menu, the following dialog is displayed.

Various plot operations are available for a selected plot (some operations require two selected plots) in Auxiliary Plots Operations dialog.

- Curve Fit (Linear, Polynomial, Exponential, Power etc.)
- Differentiate
- Integrate
- Area Under The Curve
- Normalize
- Quick Scale
- Scale
- Clip
- AC/DC Estimator
- Add
- Subtract
- Multiply
- Divide
- Statistics

As an example the following shows a curve fit operation on a selected plot.

When **OK** is clicked, the **Operations** dialog closes and creates a curve fit plot line (in green colour) with textual output in the main window showing the parameters values and quality of fit result as follow:

Some operations do not create a graphical output or plot and display textual information only which needs to be copied to clipboard before closing textual information dialog box.









As an example of two-plot operation, the following shows a subtraction operation (red colour) between original plot (black colour) and clipped (y value between -0.3 and 0.2) version of original plot (green colour). Two plot operations requires that both operand plots have the same x-axis range.

The user can delete an **Auxiliary plot** by selecting it in **Active Plot Selector Grid** and pressing **Delete** key or by **Delete** menu in **Auxiliary Plots group** in the ribbon menu.

Auxiliary Plot Operations:

Devend loges direkt.

Curve Fit: This option provides various types of curve fitting methods such as

Exponential, **Linear**, **Gaussian**, **Polynomial** etc. All curve fitting operation require a source plot along with x-axis range selected by user either by entering values in **Start at X/End at X** text boxes or by moving vertical cursors in small plot view window as shown in figures above.

Differentiate: This operation requires a source plot along with x-axis range selected by user either by entering values in **Start at X/End at X text boxes** or by moving vertical cursors in small plot view window. The output is differentiation curve of the source plot. Textual information is also created which can be displayed by **Double-Clicking** the auxiliary plot entry created in **Active Plot Selector Grid** on the lower-left corner of main window.

Integrate: This operation requires a source plot along with x-axis range selected by user either by entering values in **Start at X/End at X text boxes** or by moving vertical cursors in small plot view window. The output is integration curve of the source plot. Textual information is also created which can be displayed by **Double-Clicking** the auxiliary plot entry created in **Active Plot Selector Grid** on the lower-left corner of main window. The textual information includes **Area Under The Curve** as well.

Area Under The Curve: This operation a source plot along with requires x-axis range selected by user either by entering values in Start at X/End at X text boxes or by moving vertical cursors in small plot view window. The output is only textual information and an annotation is also created in the main window showing Area Under The Curve value and input x-axis range.

Normalize: This operation only requires selected source plot. It uses calculated average and standard deviation to create normalized plot. It creates some textual information as well.

Quick Scale: This operation only requires selected source plot. It uses calculated average and standard deviation to create normalized plot which has range of y values in [-1:1]. It creates some textual information as well.

Scale: This operation only requires selected source plot. It uses calculated scale and offset to create scaled plot which has range of y values in [-1:1]. It creates some textual information as well.

Clip: This operation requires selected source plot along with Lower and Upper Limit parameters. It uses these limits to clip the plot. It creates some textual information as well.

AC/DC Estimate: This operation only requires selected source plot. There are no related parameters. The output is textual only which needs to be copied to clipboard by the user.

The operation calculates an estimate of AC and DC levels of the input signal data. AC level is reported in RMS value of the input signal (data) units, for example volts (RMS) if input data is in volts.

The DC level is reported in input signal (data) units, for example if input data is in volts then this value is in volts. At least **three** cycles of the signal must be contained in the time-domain signal for a valid estimate.



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Add: This operation only requires two selected source plots and uses addition to create resulting plot. It creates some textual information as well.

Subtract: This operation only requires two selected source plots and uses subtraction (first select plot minus 2nd selected plot hence order of selection is important) to create resulting plot. **CTRL** key + mouse **Left-Click** is used in the grid entries to select/unselect 2nd plot. It creates some textual information as well.

Multiply: This operation only requires two selected source plots and uses multiplication to create resulting plot. It creates some textual information as well.

Divide: This operation only requires two selected source plots and uses division (first select plot divided by 2nd selected plot hence order of selection is important) to create resulting plot. It creates some textual information as well.

Statistics: This operation only requires one selected source plot and x-axis range selected by user either by entering values in Start at X/ End at X text boxes or by moving vertical cursors in small plot view window. The operation calculates various statistical outputs values such as Mean, Standard Deviation, Variance, Median and RMS (Root Mean Squared). The output is textual only which needs to be copied to clipboard by the user.

NOTE: Please see more information about Auxiliary Plots in built-in Help (Press F1 in DAS™ application).





Chapter 9 Advanced Edition – DataTrap II™ Synchronization





Overview

Multiple DataTrap II[™] units (minimum 2 and maximum 7) can be synchronized to get additional measurement capacity of 16 to 56 channels of data. The units have to be setup for 5 MHz or less sampling rate. One unit has to be setup as Sync-Primary (or Master) and other units as Sync-Secondary (or Slave) as described later in this chapter.

9.1 Necessary Equipment

At least 2 DataTrap II[™] units are required. One DataTrap II[™] unit will be the Sync-Primary (or Master) unit, the others will be Sync-Secondary (or Slave) units. One Synchronization cable for each Sync-Secondary unit. If the operator use 2 units, 1 cable is required. If the operator use 3 units, 2 cables are required, etc.



9.2 Summary of Test Process

Using the menu buttons on the **DataTrap II[™]**, set one unit to be **Sync-Primary** (or **Master**) and the others to be **Sync-Secondary** (or **Slave**). Use the setup software to ensure that all channels are set up to be triggered by the synchronization cable. (They can also be setup to trigger later but still with synchronized time). Set sample speed to 5 MHz or less. See more details in **Section 9.6**. Connect the synchronization cable(s).

Press Next Test on each **DataTrap II™**. Confirm from the menu that they are synchronized, then press **Start** on each **DataTrap II™**. They are now ready to be triggered.

Download the data from all **DataTrap II™** units to the same directory for this synchronization test (".dt2" and ".d2d" files).

Once all data has been downloaded, create group files (".syncd" files) for the data. This is done by picking one of the Sync-Primary files, then choosing its Sync-Secondary file(s). This creates a ".syncd" file.

Open the ".syncd" file. It will now display data from all channels of all tests in the synchronized group.

9.3 Hardware Setup

DataTrap II[™] Synchronization Menu Setup

The **DataTrap II™** units are user-programmed for synchronized data collection using the push button menu on the metal faceplate. This is

started by turning on the **DataTrap II™** and pressing the **left arrow**(♠) button to start Services.

Normally, this is below the word **Services** on the menu, but it may have turned off to save power. After pressing this, the menu shows the 1st service **Erase Last Test**. Press the **right arrow** (ψ) button to choose other services until the option **Synchronization** is shown.

Press the **Enter** button to choose that option. Press the right arrow (♥) button to change **Synchronization** mode from **Off** to **Sync-Secondary** (or **Slave**) or **Sync-Primary** (or **Master**). Press the **Enter** button to choose that mode. Press **Esc** after pressing **Enter** to go up one level in the menu. Keep pressing **Esc** to get back to the original menu state that showed: **DataTrapII Services Config**







Repeat this procedure for the other **DataTrap II™(s)** except that **Sync-Secondary (or Slave)** should be chosen.

NOTE: The operator can press **Esc** instead of pressing **Enter** to make no choice.



The cables are connected in the following way, with power either on or off.

Connect the Sync Out connector to the lower connector of the Sync-Primary DataTrap II™.

Connect the Sync In connector to the upper connector of the 1st Sync-Secondary DataTrap II™.

If this **DataTrap II™** is on and in **Sync-Secondary mode**, it will beep and briefly show **Synced** on the menu. If it is turned on later, it will show **Synced** briefly after powering on (if the **Sync-Primary DataTrap II™** has also been powered on). If the **Sync-Primary** unit is turned on after the **Sync-Secondary** unit, then it will briefly show **Synced** then.

3. If there are more units, connect the **Sync Out** from another cable to the 1st **Sync-Secondary** and connect the **Sync In** connector to the 2nd **Sync-Secondary**.

9.5 Synchronization Menu Start

Before conducting a test using synchronization, connect the cables as mentioned in Section 9.4 and then do the following:

SERVICES

ESC

hronizatio

ENTER

Power on each DataTrap II™.

Press **Next** Test on each **DataTrap II™**. If the cables have been correctly connected, the **Sync-Primary** unit will show a three-line symbol as shown:

The Sync-Secondary unit(s) will have a two-line symbol as shown:

If the cables are not connected or one of the units has not been set correctly by the menu, the two-line symbol will have a slash through it as shown:

Once it has been confirmed that all symbols show a correct connection and setup, press **Start** on all units. It is now ready to trigger and collect data.

SYNCHRONIZATION.







9.6 Programming DataTrap II[™] For Synchronization

Programming For a Synchronized Test

The trigger event from synchronized **DataTrap IITM** is equivalent to another form of external trigger. If the operator wants all **DataTrap IITM** to trigger simultaneously, then all active channels must be set to allow external trigger. They can also be set to be triggered from an internal trigger. The usual practice for a test with internal triggers is to set the **DataTrap IITM** to "**External Trigger - Make**" and leave the external trigger input open. In this way, an actual "**Make**" event will never occur, but the **DataTrap IITM** will receive a trigger from other **DataTrap IITM**. If it fits the plan for the test, the **DataTrap IITM** can be setup to wait for a trigger event just on that **DataTrap IITM** by turning off all modes of external trigger. The time shown for the resulting data will still be time synchronized with the other **DataTrap IITM**.

Programming – Trigger Only From Other DataTrap II™ Units

To setup a **DataTrap II™** so that it can only trigger from another **DataTrap II™** triggering, program it for "**External Trigger – Make**" with internal trigger turned off and leave the external trigger BNC connector in an open circuit state. Note that the chained cover for the BNC connector for Trigger-In will not "**make**" the circuit, so it can remain tightly closed over that connector.

Programming – External Trigger

If the plan for the test requires an external trigger, then the operator can choose any of the external trigger choices given when programming the **DataTrap IITM**. It will be triggered by the external trigger or a trigger event on any other synchronized **DataTrap IITM**. **Only one** of the **DataTrap IITM** will be connected to the actual external trigger. The others should be set to **External Trigger – Make** with the connector left tightly closed.

Programming – Internal Trigger

If the plan for the test requires an internal trigger, then the operator should first turn on **External Trigger – Make**. Next, setup the internal trigger and apply it. The chained cover for the external trigger input should be left tightly closed.

Programming – Sample Speed

The **DataTrap II™** must be set to a sample speed of 5 MHz or less to be synchronized.

9.7 Synchronized Data Retrieval and Analysis

NOTE: This functionality is available only in the DAS[™] Advanced Edition.

1. Initial Download

With the software installed on the computer, connect the **DataTrap IIT**^M to the computer as described in the data download section. Next, start the **DAS**TM software. Select or create a directory for this test where the data from all the **DataTrap IIT**^M units will be downloaded, then download them. A screen shot below shows the downloaded files from **Sync-Primary** and **Sync-Secondary DataTrap II**TM in a directory:





2. Linking Synchronized Files

Once all the files have been downloaded in the directory of your choice, they have to be linked together to create a synchronization file. The following picture shows the **Hardware** tab with a **Link Sync-ed Files** button.

Clicking the above mentioned button, the following **Link Synchronized Files** dialog box will be displayed.

3. Choosing Sync-Primary File

With Link Synchronized Files dialog displayed, browse to the directory where data files have been downloaded. If there are Sync-Primary synchronized files are downloaded and has not been linked yet to any Sync-Secondary, the Unlinked Sync-Primary Files dropdown will be enabled and those Sync-Primary files will be available in the dropdown Unlinked Sync-Primary Files (Total = x) as shown below:

After selecting a **Sync-Primary** file, Choose **Sync-Primary File** button should be enabled. Click it to choose the selected **Sync-Primary file**.









Sync-Primary file entry is displayed in the text box below with full path visible.

4. Choosing Sync-Secondary Files

Once the **Sync-Primary** file has been chosen, clicking **Next** shows the operator a list of files that were downloaded from a unit that was set as **Sync-Secondary** and also connected 1st in sequence after the **Sync-Primary** unit. It also uses the internal calendar/clock of each unit to show the difference between the times when the Start button was pressed on each unit. The date/time can be viewed by pressing the Info button on the **DataTrap IITM**. Typically, this will be 0-60 seconds for data sets collected at the same time and will be much smaller than other possible files. If a **DataTrap IITM** has been used with a computer that is set for a different time zone, then time stamps will be farther apart.

Select a **Sync-Secondary** file in the dropdown. This makes **Choose Current Sync-Secondary File** button enabled.

After clicking the **Choose Current Sync-Secondary File** button, first **Sync-Secondary** file entry is displayed in the **Chosen Sync-Secondary Files** text box.



	achronized Files Location:	
	SyncTests 08Aug2016 UnkTest1 - Co UnkTest2 - Co	DT2016Aug003_01.dt2
nlinked S	sync-Secondary Files (Total :	=1): Choose File for Sync-Secondary #1
0T2016Aug	004_01.dt2 18 sec after Sync-P	rimary. 🗸 🗸
Choose Cu	rrent Sync-Secondary File	
hosen Sv	nc-Primary file:	
::\TestDat	ia (tests (SyncTests (08Aug 2016) La	nkTest1[pT2016Aug003_01.dt2

	chronized Files Loca	tion:		
	SyncTests Black	16 Ist1 est1 - Copy est2 est2 - Copy ~	DT2016Aug003_01.dt2 DT2016Aug004_01.dt2	
Choose Cur	rent Sync-Secondary Fil	•]	Done	•]
ColTestDat	Itests/Suprasts/0840	a 20.16 kink Test 1	00720164up003-01-dt2	
erpeaman	intere blue (cara boun	Ano to Pupilent	to rear and and a rarge	
Chosen Sy	nc-Secondary files:			
	a tests SyncTests 08Au	g2016 LinkTest1	(DT2016Aug004_01.dt2) 18 sec after	



If there are additional related Sync-Secondary files available, user can select and add them too. In this single Sync-Secondary file example, we do not have any more file to add. Now the Finish is enabled. Clicking Done or Finish button will create the ".syncd" file and a message is displayed as shown below:

ry Files (Total =0): DAS[™] Data Acquisition Se Created syncd file C:\TestData\tests 1\DT2016Aug003_01 OK Finish Cancel Open Data File To open a ".syncd" file, user can use the usual methods to browse to the directory where the ".syncd" file File Type created. That is either using or check-marking ".syncd" file type on the Open Data Files tab and clicking All DT2 HT2 MT 🖌 Syncd File **Open Data From** Browse O Recently Opened Files O Recently Downloaded O Calendar Next SyncTests SyncTests Status Status Status Status 072036Aug003_03.ey *342;*.dt2;*.mt;*.set

5 DT2016Aug003_01.dt2

Link Synch

ed File



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The following will be displayed:

5. Viewing Synchronized File

Next button.

Then select ".syncd" file and click "Open" button or double-click the file name. This will open the Sync-Primary file and its linked Sync-Secondary files with all their plots as shown below:

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A **Sync-Primary** file is indicated in left-side graph tree by (**M**) and a **Sync-Secondary** file is indicated in left-side graph tree by (**S**)

In addition an "All Syncd Graph Channel" node is created in Sync-Primary file with an "All Syncd Graphs" node under it. This graph node displays all original plots (related to Sync-Primary and Sync-Secondary) on a single graph. This gives an overall picture of all the plots in the related syncd data sets. Limited operations are also possible on this graph node plots such as calculating VOD for an active plot, calculating Delta X on one or between two plots and calculate Delta Y on one or between two plots (if they have same units and quantities). Working on individual channels are strongly recommended.



6. Definition Of "Time=0"

All the graphs drawn are synchronized to a common "**time=0**". This is normally set as the trigger time of channel 1 on the **Sync-Primary** unit. If channel 1 was not triggered, it is the Stop time for channel 1 on the **Sync-Primary** unit. Events at the same time from different data sets were recorded at the same time.



Chapter 10 Contacting MREL for Technical Support





MREL Group of Companies Limited

Data Acquisition Team (DAS™) Support Team

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 Tel:
 +1-613-545-0466

Email: <u>das@mrel.com</u>

Support: <u>www.mrel.com/contact.html</u>

MREL looks forward to providing you with assistance.

10.2 Emailing Data Files to MREL

For **DAS™ Data Acquisition Suite software**, the user with need to send the following files for analysis of the user's data. In this example, the users file name is **Myfile**.

10.2.1 DataTrap II[™] Data/VOD Recorder

The following files will be needed:

- Myfile.dt2
- Myfile.d2d
- Any related files with the same name such as Myfile.xml and Myfile.zip if applicable

10.2.2 MicroTrap™ VOD/Data Recorder

The following files will be needed:

- Myfile.mcr
- Myfile.raw or myfile.cmp
- Any related files with the same name such as Myfile.xml and Myfile.zip if applicable

10.2.3 HandiTrap II™ VOD Recorder

The following files will be needed:

- Myfile.ht2
- Myfile.raw
- Any related files with the same name such as Myfile.xml and Myfile.zip if applicable







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