



## *DR-500 Series Handheld OTDR User Guide*

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## General Information

<b>Limited Warranty</b>
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<b>12 Months From Original Factory Ship Date</b>
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All Advanced Fiber Solutions products are warranted against defective material and workmanship for an period of 12 months from original factory ship date. Any product found to be defective within the warranty period will be repaired or replaced by Advanced Fiber Solutions. In no case will Advanced Fiber Solutions liabilities exceed the original purchase price of the product.

### Exclusions



The warranty on your equipment shall not apply to defects resulting from the following

- Misuse, negligence or accident.
- Unauthorized repair or modification.

For full details of Advanced Fiber Solutions warranty, please visit  
[www.afsi.us](http://www.afsi.us)

Or call 508-238-7100 for a copy of Advanced Fiber Solutions warranty.

## Safety Information

Safety Information	
Product Offering	Laser Class
<ul style="list-style-type: none"> <li>AF-DR-515 (850nm/1300nm)</li> <li>AF-DR-525 (1310/1550nm)</li> <li>AF-DR-529 (1310/1550/1625nm)</li> <li>AF-DR-535 (850/1300/1310/1550nm)</li> </ul>	<p>Class 1 laser output</p> 
<ul style="list-style-type: none"> <li>VFL Port</li> </ul>	<p>Class II laser output – Do not stare at beam</p> 



**Warning!** When working with an OTDR, **Never** look or stare directly into the optical outputs of fiber optic test equipment, patch cords or test jumpers.

Use of procedures or adjustments other than those specified herein may result in hazardous radiation exposure. Optical radiation that is harmful to the eye may be present. This may result in permanent eye damage. While the chances of such an occurrence taking place is very unlikely, Advanced Fiber Solutions, Inc. still strongly advises against this. Refer to your company's safety procedures when working with optical systems.

The DR-500 series Handheld OTDR contains no user serviceable parts. Except for cleaning the optical port, this instrument must be returned to Advanced Fiber Solutions, Inc. or an authorized agent for repair or calibration.

The unit corresponds to GOST 12.2.091 (IEC 61010-1), equipment class III. The AC/DC adaptor corresponds to GOST 12.2.091 (IEC 61010-1), equipment class II.

## Introduction

Thank You for purchasing Advanced Fiber Solutions, Inc. Optical Time Domain Reflectometer. The purpose of this User Guide is to explain how to use and maintain this OTDR. If you have any questions regarding your fiber optic instrument or if you need technical or application support, please contact Advanced Fiber Solutions, Inc. This manual includes the technical characteristics, operating principles and operating procedures for the DR-500 Series Handheld OTDR.

### DR-500 Series Package Includes

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• DR-500 Series Handheld OTDR device</li> <li>• AC/DC adapter</li> <li>• Interface cable USB A – mini USB B</li> <li>• Storage Battery</li> </ul> | <ul style="list-style-type: none"> <li>• OTDR PC Application Software CD</li> <li>• User Guide for OTDR and PC application software</li> <li>• Carrying Case</li> </ul> |
|--|---|

## Recommended Accessories

Fiber optic test cables (launch cables, pulse suppression cables, patch cords or jumpers) to connect the fiber under test and the OTDR. The test cables must have the same core and cladding size as the fiber under test.

A supply of optical cleaning pads, isopropyl alcohol or filtered compressed air is recommended for cleaning the fiber optic connectors.

**Important!** Proper care in handling should be taken when using any precision optical test equipment. Scratched or contaminated optical connectors can impact the performance of the instrument. It is important to keep the optical ports covered when the unit is not being used.

## Unit Introduction

The unit is one of the most compact OTDR's on the market today, idea for handheld use and pocket transportation. The unit is light weight weighing less than 1.6 Lbs. It is extremely rugged with a thick protective rubber boot surrounding the outer case. It also offers a long battery life enabling the technician to continuing test up to eight hours.

It is a full featured OTDR offering four different performance classes to choose from, with a dynamic range starting at 23dB going up to 43dB. Class A is optimized for private and premise networks. Class B is optimized for FTTx and CATV networks. Class C is optimized for close event detection and large attenuation measurements like PONS networks. Class D is optimized for long haul applications.

Along with a wide dynamic range to choose from, the unit offers a number of wavelength options for both single mode and multimode applications with single, dual, tri and quad models available. Wavelength options include 850nm, 1300nm, 1310nm, 1550nm and 1625nm.

The unit is simple to operate and is the perfect installation, maintenance and link trouble shooting tool. It is the ideal OTDR for either the inexperienced or the experienced technician. The unit supports both a manual mode for the expert user which enables parameter setup and an automatic mode for the less experienced user which allows one touch auto run testing. The unit utilizes active sync for seamless USB connectivity with desktop software for advanced data analysis and storage capabilities.

It is fully compliant and compatible with the .sor file format outlined in the belcore GR-196 OTDR data standardization document. Other optional features offered by this industry leading OTDR include a built in power meter, light source and Visual Fault Locator.

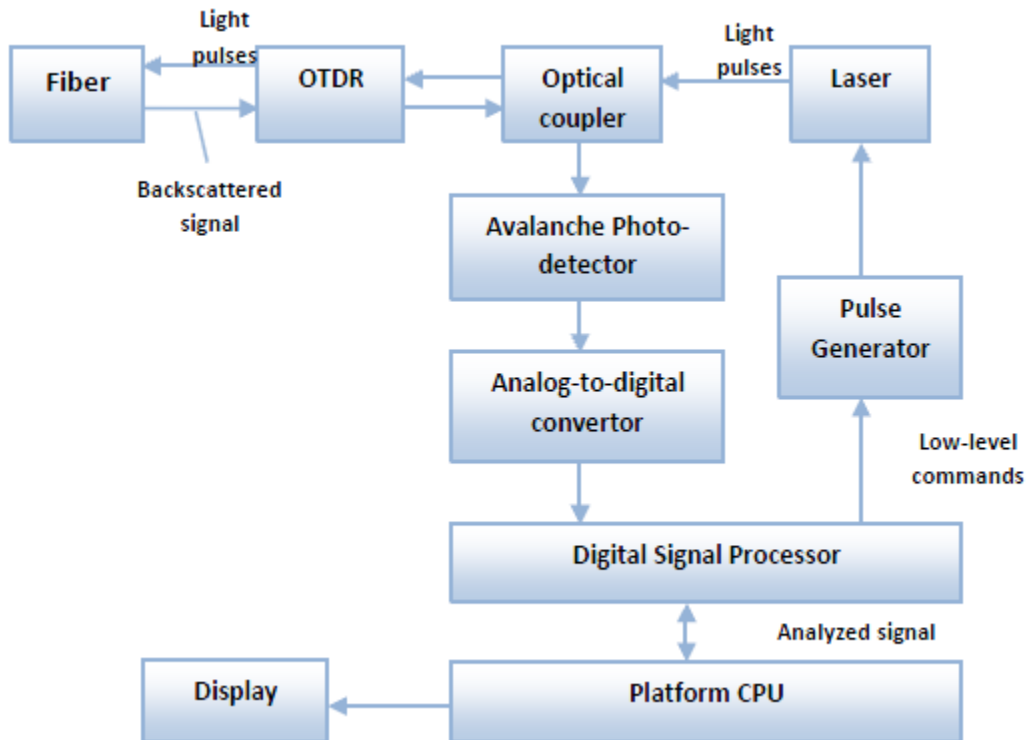
Product Highlights and Key Features	
<ul style="list-style-type: none"> <li>• Compact and rugged case</li> </ul>	<ul style="list-style-type: none"> <li>• Bellcore .sor format compatible</li> </ul>
<ul style="list-style-type: none"> <li>• Single, dual, tri and quad <math>\lambda</math> models available</li> </ul>	<ul style="list-style-type: none"> <li>• USB jump drive compatible for extra storage</li> </ul>
<ul style="list-style-type: none"> <li>• Events table and auto test function</li> </ul>	<ul style="list-style-type: none"> <li>• 9 hours of operation, fast charging Li-Ion battery</li> </ul>
<ul style="list-style-type: none"> <li>• Up to 43dB Dynamic Range</li> </ul>	<ul style="list-style-type: none"> <li>• High contrast full color display</li> </ul>
<ul style="list-style-type: none"> <li>• Weight less than 1.6 lbs</li> </ul>	<ul style="list-style-type: none"> <li>• User friendly and easy too operate</li> </ul>
<ul style="list-style-type: none"> <li>• Four performance classes to choose from</li> </ul>	<ul style="list-style-type: none"> <li>• Optional features: Power Meter and Light Source</li> </ul>



## Working Principle

The OTDR's operating principle is based on the measurement of the Raleigh Backscattering Signal, generated by sending a high power optical pulse from the OTDR through the optical fiber. Light is reflected back to the OTDR. This backscattered light is measured by the sensitive optic receiver, converted to digital form and averaged to improve the signal to noise ratio. The resulting signal forms a graph called a **TRACE**. The trace is a visual representation of the backscattering coefficient created by the OTDR to determine the "events." The trace shows the "events" on the fiber optic link such as breaks, splice loss, bends, attenuation and distance.

OTDR Distance Calculation Formula
<b>Distance = c * t / ( 2 * n )</b>
c = speed of light in a vacuum
n = index of refraction of the fiber under test
Time delay between pulse emitted





## Technical Specifications


Class Definitions**							
Class Definitions	Ax	A	A+	B	C	D	D+
Dynamic Range Single mode 1310/1550/1625nm	25/27dB @20uS	31/29/28 dB @20uS	34/32/31 dB @20uS	39/37/36 dB @20uS	37/35/34 dB @20uS	42/40/39 dB @20uS	44/42/41dB @20uS
Dynamic Range Multimode 850/1300nm	N/A	23/24dB	N/A	N/A	26/28dB	N/A	N/A
Event Dead Zone Both MM & SM	2.5 M	2.5 M	1.8 M	1.8 M	1.0 M	1.4 M	1.4 M
Attenuation Dead Zone Both MM & SM	12 M	9.5 M	6.5 M	6.5 M	4.5 M	9.0 M	9.0 M
All Units							
Distance Range	2,5,10,20,40,80,120,160,240 Km						
Data Points	Up to 64,000						
Loss Resolution	0.001dB						
Distance Accuracy	$\pm(0.5+5'10^{-5}'L+(\square n/n)'L)$						
Refractive Index Range	1.0000.....2.0000						
Language	English						
OTDR Modes	Full Auto, Expert and Real Time						
Attenuation Measurement Accuracy	0.05dB						
Sampling Resolution	0.16m.....7.6m						
Storage Capability	~ 500 traces						
Unit Measurement	Meter						
Temperature Specifications							
Operation Temperature	0°.. +40°C						
Relative Humidity	95% Without Condensation						

## GETTING STARTED

### Preparation for work

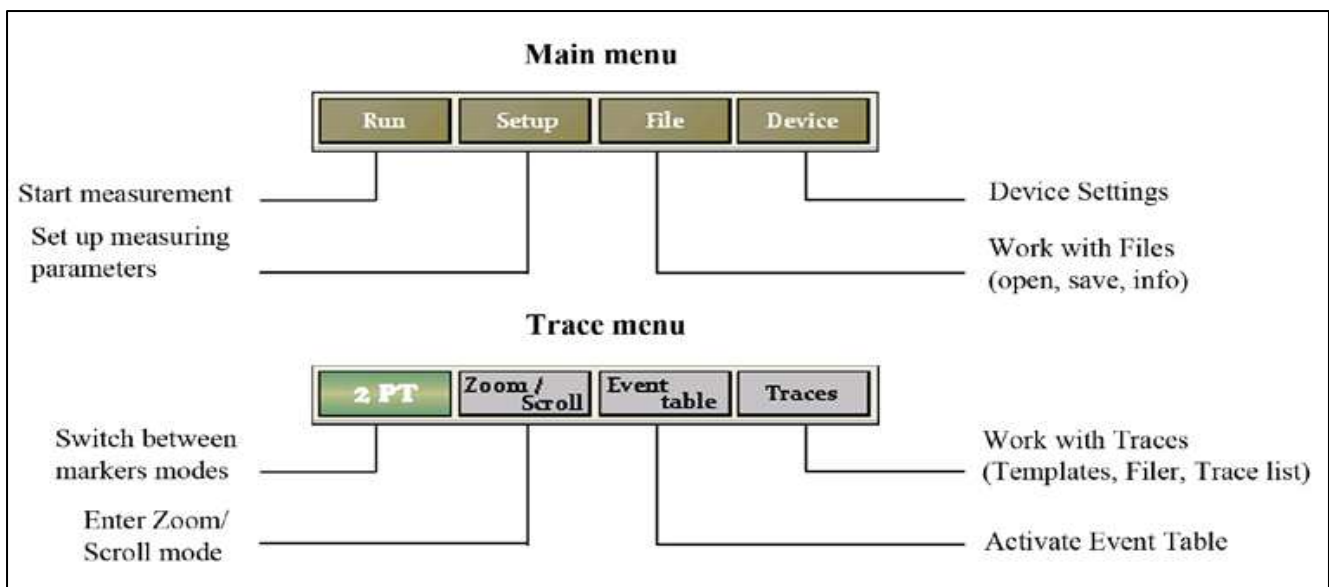
The device may be operated when powered by the external 12V AC/DC adapter or separately by the internal battery, once the battery is charged to an acceptable operational level. If the unit is being charged by the external 12V power supply both the green "BATTERY" LED and the orange "CHARGE" LED on the face panel will illuminate. The fiber to be tested is connected to the OTDR's optical connector on the front panel of the unit. It is recommended to always use a launch cable when using an OTDR but it is not necessary. If testing the cable directly with the OTDR the cable connector style must match the OTDR output connector. Power Meter optical port offers versatility with removable connector adapters. All OTDR connector ports and test cables should be kept clean and free of dust and dirt for optimal unit operation.

### Powering On/Off unit

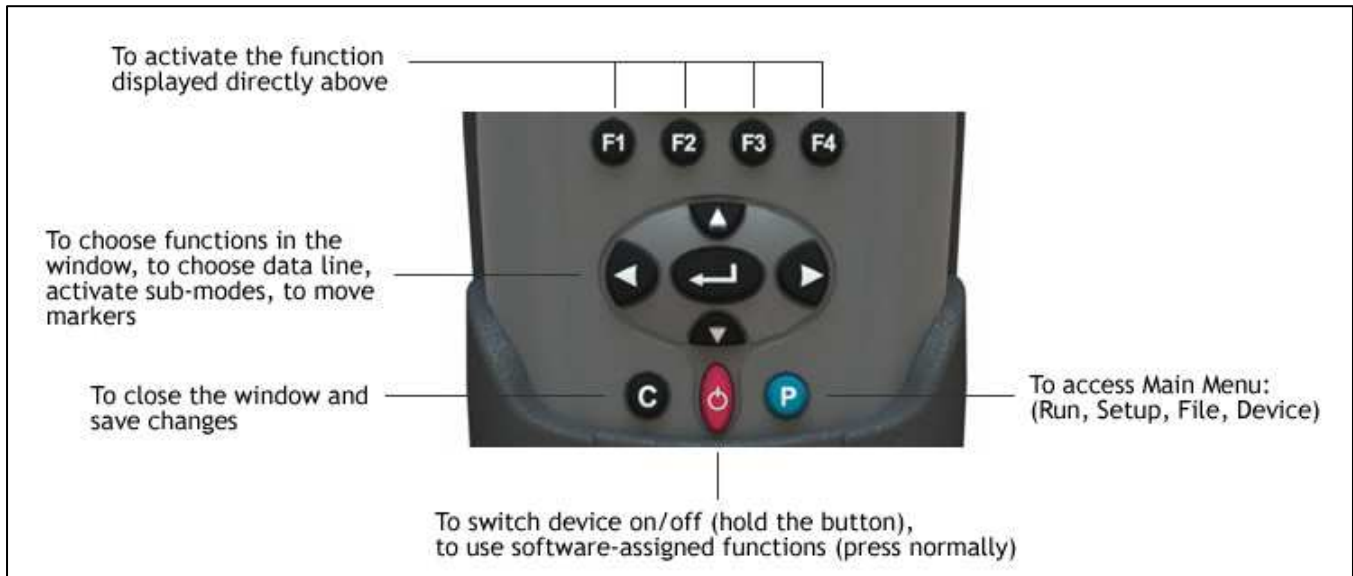
The unit is powered On or Off by pressing and holding the  button for several seconds.

When the unit is powered on the green LED on the face panel will illuminate.

### Menu Options



## Keypad Options




### Parent Buttons P, C and

**P Button** enables the technician to switch between currently activated menu to **Main** menu.

**C Button** by default is an ESC key (escape or back) but it can also be used for the following

- Stop a measurement when running.
- Reset to **Main** menu.
- Exit from dialog boxes and modes (for instance the Events table mode).
- Un-zoom/Reset zoom state of trace.

 **button** as well being the key to turn the unit On and Off also has a software assigned function and will show/hide a trace preview box in the right top area of the screen when pressed.

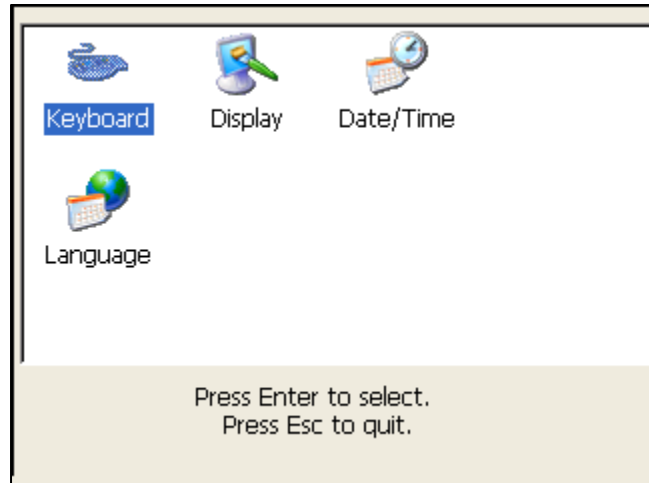
## Customizing your OTDR

The following features can be customized on the DR-500 series unit.

- Keyboard
- Display
- Date/Time

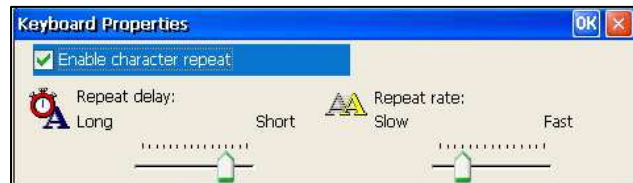
To customize the device.

- Press **P** to access the Main menu.
- Press **F4** (Device) to enter device mode.
- Press **F1** (System Setup) to activate the setup window.
- Use the **left/right** arrow to choose the desired icon in the window.



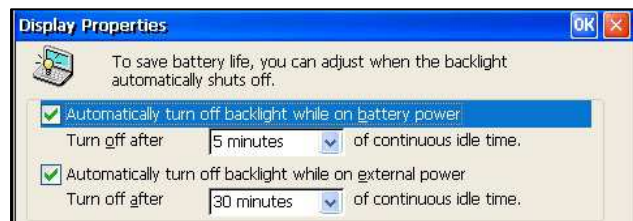
## Keyboard Properties

- Select the Keyboard icon and open the keyboard properties window.
- Use the **up/down** arrows to move between the lines.
- Use **left/right** arrows to change the values.
- Tick the “**Enable character repeat**” check box to enable a continuous repeated action when the desired button is continuously pressed.
- Press **C** to close the window and save the changes.



## Display Properties

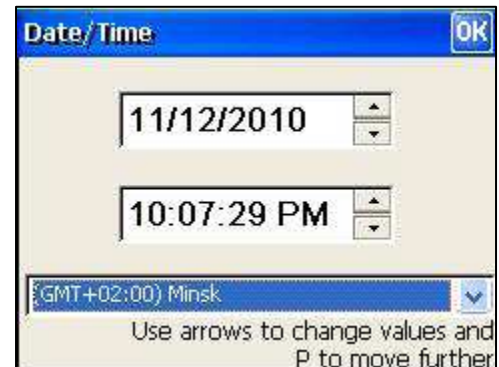
- Select the Display icon and open the Display properties window
- Use the **up/down** arrows to move between selections.
- Press **Enter** to enable any checkbox or show the list of values.
- Press **C** to close the window and save changes.



## Setting Date and Time

**Note:** When a trace is saved the device also saves the corresponding time and date

- Select the Date/Time icon and open the Date/Time properties window.
- Use the **left/right** arrows to move to the next selection to be changed.
- Use the **up/down** arrows to change values.
- Press the **P** to move to between selection options.
- Press the **C** to close the window and save the changes.



## Setting Language

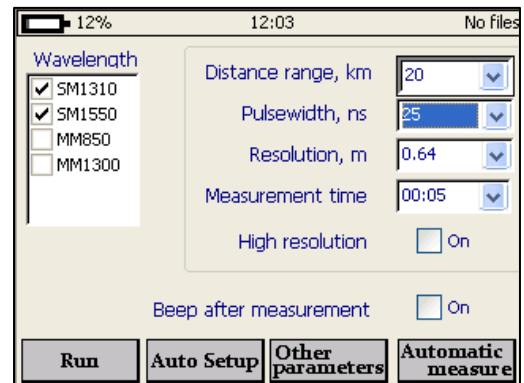
- Select the Language icon and open the Language properties window.
- Use **up/down** arrows to select the desired language.
- Press **C** to close the window and save the changes.



## Working with the OTDR

### Setting up Measuring Parameters

- Press **P** to access the main menu.
- Press **F2** (Setup) to access the measuring parameters window.
- To move to desired parameter selection use the **up/down** or **left/right** arrows.
- Press **Enter** to activate the desired parameter selection.
- Use the **up/down** arrows to choose the desired value. The value will become highlight.
- Press **Enter** to confirm changes.
- Press **C** to close the window and save the changes.



**Note:**

- 1 Several wavelengths can be selected simultaneously. In this case measurements will be performed on all chosen wavelengths one after another without stopping.
- 2 If an DR-500 Series is the quad OTDR model (for both Single mode and Multimode applications) the choice of single-mode OTDR wavelength (SM1310, SM 1550 etc) will automatically cancel out the choice of multimode OTDR wavelengths (MM 850, MM1300) and vice versa.



## Parameters

- **Wavelength** - For Multimode 850nm or 1300nm and for single mode 1310nm, 1550nm or 1625nm.
- **Distance Range, Km** - The maximum value of the measured distance. The value of the distance range should exceed the length of the line under test by more than 20%.
- **Pulsewidth, ns** - This determines the value of the optical pulse duration. The range of the acceptable optical pulse value is dependent on the chosen **Distance Range** and is automatically limited by the OTDR program.
- **Resolution, m** - This determines the distance between two samples (sampling intervals) of the trace. The value is dependent on the **Distance Range**.
- **Measurement Time, Min/Sec** - This determines the duration of the measurement process with averaging. *Live mode performs fiber monitoring in real time mode.*
- **High Resolution** - In this mode the optical receiver bandwidth is increased. *Best used when testing a short cables and requiring excellent dead zone - do not use on long fiber lengths than require high dynamic range.*

**Note:** To have the unit Auto Select the parameters press **Auto Setup**. The program will perform a short measurement on the connected fiber and automatically define the optimal parameters for that fiber. The technician can then modify the parameters manually if desired and run a measurement



## Additional Measuring and Analysis Parameters

- Press **P** to access the Main menu.
- Press **F2** (Setup).
- Press **F3** (Other Parameters) to activate the additional measuring parameters window.
  - Set **Refractive Index** for each OTDR wavelength.
  - Set **Backscattering Coefficient** for each OTDR wavelength.
  - Set automatic **Analysis Threshold** parameters.
- Move to the desired parameter selection using the **left/right** arrows. Press **Enter** to activate the selection.
- Use the **up/down** arrows to choose the desired setting. Once highlighted press **Enter** to confirm and change.
- Press **C** to close and save changes.

## Additional Parameters

- **Backscattering Coefficient, BC** – represents the level of backscattering in a particular fiber. It is used for Reflectance and ORL measurement and can be obtained from the fiber manufacturer. This parameter value can be stored for any saved trace.
- **Refractive Index** – (*also known as group index*) is used to convert time to distance. For precise distance measurement it is important that this value is accurate and can be obtained from the fiber manufacturer. This parameter value can be stored for any saved trace.
- Automatic Trace **Analysis Threshold** – have the following selectable features
  - **Splice Loss, LT** – threshold of the event attenuation value in dB. Events with attenuation value that exceeds the threshold value will be shown in the **Events Table**.
  - **Reflectance, RT** – threshold of the event reflectance value in dB. The reflected event having a reflectance higher than the threshold value are shown in the **Events Table**.
  - **End-of-Fiber, ET** – threshold of the event attenuation value in dB for defining the fiber end. The first event with an attenuation exceeding the threshold value is defined during the automatic trace analysis as an optical fiber end. All subsequent events will be ignored.
  - **Attenuation, CT** – Attenuation coefficient threshold value of the section in dB/km. Exceeding the attenuation coefficient threshold value will mark the section with an \* in the **Event Table**.

## Trace View Parameters

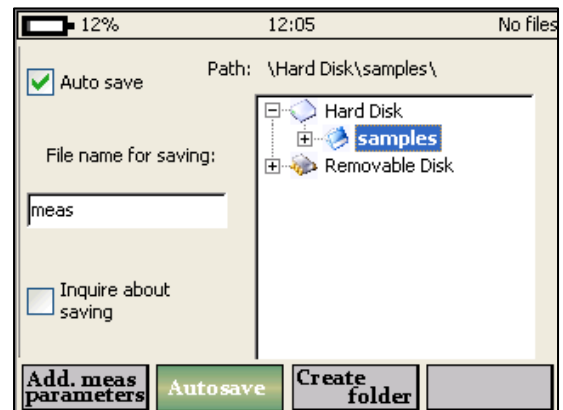
- **Zoom coefficient selection** – x1.1, x1.3, x2, x5 or x10.
- **Inverts color in trace window** – changes the trace color for different lighting environments.
- **Show grid scale values** – Displays grid lines value.

## Automatic Saving

The program enables the automatic saving of measured traces into the DR-500 Series memory immediately after a measurement completion. It is advisable to use Auto-Saving option when measuring a large number of traces (like cable cores) to collect data for post testing analysis.

**Warning!** To avoid unwanted file saving and flash memory overflow, **Autosave** option is disabled when device is turned on.

- Press **P** to access Main menu.
- Press **F2** (Setup) and enter parameters field.
- Press **F3** (Other Parameters).
- Press **F2** (Autosave) to activate the Autosave setup window.



- Press Enter to select or de-select the Auto save check box.
- Use the **up/down** arrows to choose the desired field. The field will become highlight, press **Enter** to activate it and change the value.
- Change the name of the template for auto saving in the "File name for saving" field.
- To have the OTDR ask if a file should be saved upon completion of a measurement select the "Inquire about saving" check box.
- The file path window allows the user to change the Auto save file location.
- Press **F3** (create folder) to create a new folder for the Auto save location.
- Press **C** to quit the Auto save window and save settings.

## Start Measurement

- Press **P** to access the Main menu.
- Press **F1** (Run) when in the Main menu or **F1** (Run) when in the Measuring Parameters field to run a measurement. The measurement will operate according to the values set in the **Measuring Parameters** window.
- The green bar at the bottom part of the screen will indicate the time past for the current measurement.
- The green "**Laser**" LED on the face panel will be illuminated during a measurement.
- Press **C** to stop a measurement manually.

## Working with Files

All traces are saved in memory in the BELLCORE version 2.0 format and have a .sor file extension

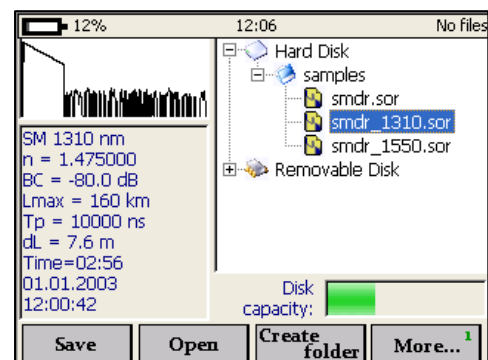
DR-500 Series files can be opened in other OTDR software programs if the program supports the .sor file format. If several wavelengths are measured simultaneously all the traces are saved as a group. They will have the same common part of the name with the wavelength value added to the name – example afs\_1310, afs\_1550 e.t.c.

## Opening Trace Files

The device can open up to four traces at a time – an active trace and additional traces.

### To open file

- Press **P** to access the Main menu.
- Press **F3** (File) to enter the File window.
- Use the **up/down** arrows to navigate through the file list.
- Use **right** arrow to open folders.
- Highlight the required file.
- Press **F2** (Open) to open the file.
- To open additional traces see "Select Traces to Compare".



**Note:** If the measurement was performed on several wavelengths the user will be asked to open all corresponding files.

## Saving Trace Files

- Press **P** to access Main Menu.
- Press **F3** (File) to enter File window.
- Use the **up/down** arrows to navigate through the file list.
- If required press **F3** (Create Folder) to create a new folder.
- Highlight the required file or folder to save it and press **F1** (Save) – the File name dialog box will be opened.
- **Note: the file can be saved in .sor format or .pdf format.**
- Use arrows to enter the desired name for the trace.
- Press **F2** (Left) and **F3** (Right) to navigate through the name.
- Press **F1** (Delete) to delete any letter.
- Press **C** to save the trace or **F4** (Cancel) to return to the File window without saving.



**Note:** Highlighting the file will tell the program to use its name and location as a template for a new trace.

## Additional functions

To access additional functions press **F4** (More). This menu enables the technician to copy or delete the highlighted trace. It also allows access to the information table of the highlighted trace.

### To access the information window

- Activate additional function window.
- Use the **up/down** arrows to select and highlight a trace.
- Press **F1** (Information) to activate the information window.

**Note:** Data in the information window can not be modified.

### To delete files

- Activate additional function window.
- Use the **up/down** arrows to select and highlight a trace.
- Press **F2** (Delete) to remove the selected file from the memory of the device.
- Confirm the deleting process.

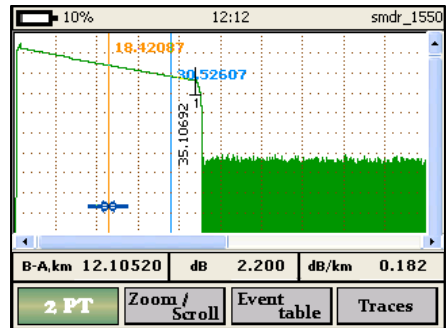


## To Copy and Paste

- Activate additional function window.
- Use the **up/down** arrows to select and highlight a trace.
- Press **F3** (Copy) to copy the selected file/trace from memory.
- Use the **up/down** and **left/right** arrows to select a location to copy to.
- Press **F3** (Paste) to paste a file to the selected location.

## To Open a File

- Activate File window.
- Use the **up/down** arrows to highlight a file/trace.
- Press **F2** (Open) to open the selected trace.

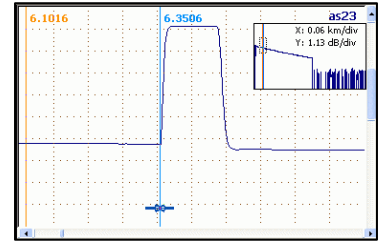


## Manual Measuring Modes

## Using the Markers

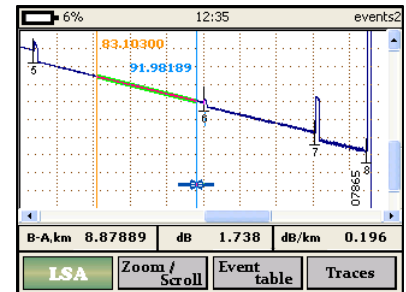
### Measuring Attenuation between two marker points - (2 PT)

In this markers mode values are shown at the bottom of the screen in the horizontal information panel. The measurement values are based upon where the left hand marker (**A**) and right hand marker (**B**) are positioned on the trace screen. The **dB** field in the information panel displays the attenuation between the left and right hand markers, while the **dB/km** field displays the attenuation coefficient.



### Measuring the Attenuation by Approximation - (LSA)

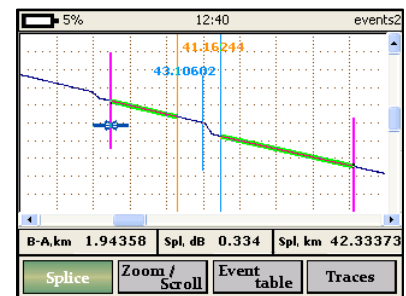
The attenuation measurement by approximation mode is used to measure “non- event” sections of the fiber optic link. This mode increases the accuracy of the attenuation measurement between the two markers by using a straight line to approximate the measurement. The approximation straight-line measurement values are shown at the bottom of the screen in the horizontal information panel. The measurement values are based upon where the left hand marker (**A**) and right hand marker (**B**) are positioned on the trace screen. The **dB** field in the information panel displays the attenuation between the left (**A**) and right (**B**) hand markers, while the **dB/km** field displays the attenuation coefficient.



### Attenuation Measurement of an “Event” – (Splice)

Using the “Five Markers” method the OTDR measures the attenuation of a specific event. The “five marker” method works as follows

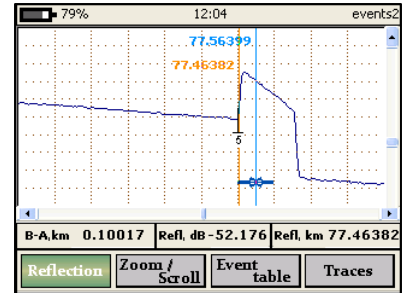
The left marker (**A**) and right marker (**B**) are placed on either side of the event, as close as possible to the edges of the event, without touching the event itself. The two outermost markers (**a** and **b**) are used to calculate the straight line approximation of the fibers on both sides of the event and the fifth marker (**c**) is used to locate the beginning of the event. The measurement results are displayed in the horizontal information panel. The **Spl, dB** field in the information panel displays the attenuation of the event while the **Spl, km** field displays the distance to the event being tested (middle marker).





## Reflective Coefficient Measurement - (Reflection)

This marker method is used to measure the reflection coefficient of a specific connector event. Place the right marker (**B**) on the peak of the reflected event. Place the left marker (**A**) on the base line of the trace directly before the event. The measurement results are displayed in the horizontal information panel. The **Refl, dB** field displays the reflective coefficient between markers **A** and **B** while the **Refl, km** field displays the left (**A**) marker and location of the base of the connector.



## Optical Return Loss - (ORL)

This marker method measures the Optical Return Loss of a partial fiber section or the whole fiber link

Place the left (**A**) and right (**B**) markers on the fiber link that is being tested. The measurement results are displayed in the horizontal information panel. The **dB** field in the information panel displays the attenuation between the left (**A**) and right (**B**) hand markers while the **ORL, db** field displays the ratio (in dB) of the optical power entered into the fiber link verses the power which is returned to the beginning of the fiber.



## To Select a Particular Marker Method

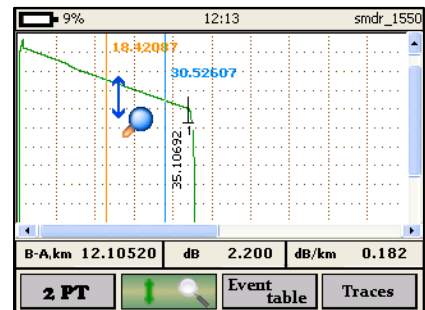
- Enter the trace screen and menu.
- Press **F1** (Markers) to select a particular marker method (2PT, LSA, Splice, Reflection or ORL)
- Use the **up/down** arrows to highlight a desired markers setting.
- Press **Enter** to select the marker setting.
- A pop up window indicates which markers are currently active.

**Note:** If a marker is moved too close to another, both will move together to ensure minimal distance between each marker. Marker can be moved separately or all together simultaneously. At the top of each marker there is a distance position value in kilometer with respect to the beginning of the optical fiber.

## Zoom/Scroll/Markers Controls

### Using Zoom Controls

- Enter the trace screen and menu
- Press **F2** (Zoom/Scroll) to activate the Zoom/Scroll mode. A magnifying glass icon with direction arrows will appear on the screen.
- Press **Enter** to choose the desired zoom mode (horizontal, vertical or both).
- Use the **left/right** arrows to move the magnifying glass icon to the area where you want to adjust the zoom.
- Use the **up/down** arrows to zoom in or out on the trace.



### Using Scroll Controls

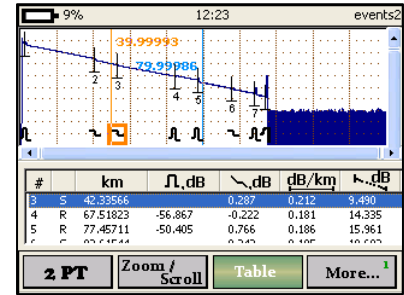
- Enter the trace screen and menu.
- Press **F2** (Zoom/Scroll) to activate the Zoom/Scroll mode.
- Press **Enter** several times to choose the Scroll mode.
- Use the **left/right** and **up/down** arrows to move the trace horizontally or vertically.

**Note:** The scroll function is only available after zooming. In the Zoom/Scroll mode the markers are inactive. While in the trace window the power button will activate a preview window. The visual part of the trace will be marked with a dotted line. Press the power button again to hide this window.

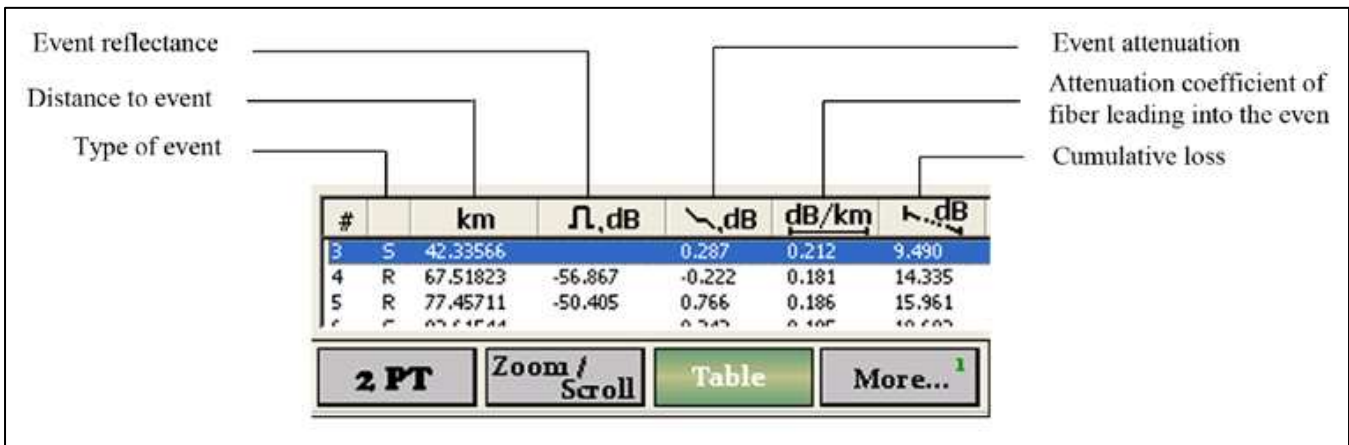
## Events table

The Events Table displays all the events found by the auto trace analysis feature.

- Enter the trace screen and menu.
- Press **F3** (Table) to open the Events Table.
- Use the **up/down** arrows to navigate through events list. Highlighted events will be marked on the trace.
- Press **Enter** to zoom in on a highlighted event.
- Press **C** to exit and hide the Events Table.



**Note:** User can still continue working with the trace while in the Event Table mode. F keys enabled functions include moving markers, zooming and scrolling.



## Type of the event

- **R** – depicts an event with "reflection" once the reflection coefficient is higher than the set threshold value irrespective of the attenuation in the event.
- **S** - depicts an event "without reflection" once the attenuation coefficient is higher and the reflection coefficient is lower than the set threshold values

## Working with events

### To Create Event

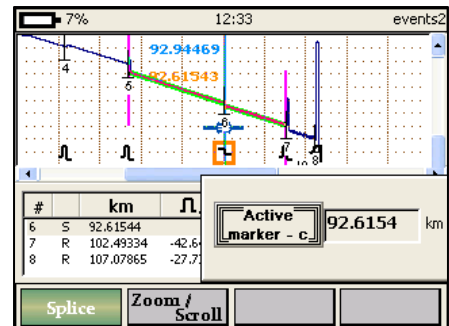
- Make sure that the trace menu is active and the Events Table is open.
- Press **F4** (More) to activate Create, Delete and Move events menu.
- Use **up/down** arrows to zoom to required location.
- Move the markers to the required location for event to be created.
- Press **F1** (Create Event) to create a new event in the Events Table.

### To Remove Event

- Make sure that the trace menu is active and the Events Table is open.
- Use the **up/down** arrows to highlight the required event to delete from the Events Table.
- Press **F4** (More) to activate Create, Delete and Move events menu.
- Press **F2** (Delete event) to remove the event from the Events Table.

### To Move Event

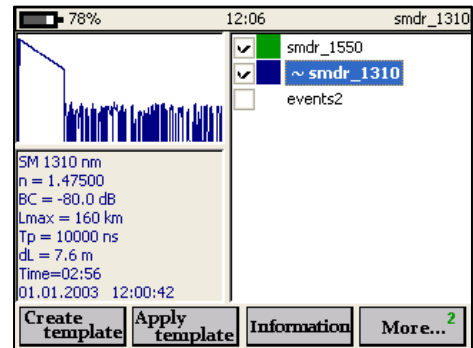
- Make sure that the trace menu is active and the Events Table is open.
- Use the **up/down** arrows to highlight the required event to be moved.
- Press **F4** (More) to activate Create, Delete and Move events menu.
- Press **F3** (Move Event) to activate the edit mode.
- Press **Enter** to select the required marker.
- Use the **left/right** arrows to set the markers to appropriate position.



## Working with Traces

- Enter the trace screen and menu.
- Press **F4** (Traces) to activate the trace list.
- Use the **up/down** arrow to highlight the desired trace.
- Press **Enter** to select the highlighted trace. Four traces can be selected at once.
- When a trace is highlighted the **right** arrow allows the technician to make that trace the "active trace" which will be indicated by the ~ symbol next to it.
- Press **F3** (Delete trace) to remove a trace from the list.
- Press **C** to close the window.

## Select Traces to Compare



**Note:** The trace list can contain no more than 12 traces at a time. When a new trace is opened and added to the list the last trace will be pushed off the list and removed. A previously measured trace that is on the list can be saved once it is the "active" trace.

## Automatic Trace Analysis

Auto trace analysis performs the following operations.

- It will search for events – with attenuation or reflection coefficient that exceeds defined threshold values.
- Defines the distance to the event and the attenuation coefficient of the section between the events.
- The acquired data analysis is then stored in the Events Table and with corresponding marks highlighted on the trace.
- A previously marked trace events will be removed from the trace when automatic analysis is applied.

To perform auto trace analysis on a trace

- Enter the trace screen and menu.
- Press **F4** (Traces) to activate the trace list.
- Use the **up/down** arrow to highlight the desired trace.
- If required change the threshold parameters for the active trace – (see *Changing Parameter for a Measured Trace*).
- Press **F1** (Apply analysis) to apply auto analysis to trace. Wait a few seconds.
- After analysis is finished the results can be viewed in the events table.

**Note1:** The option to **Apply analysis after measurement** immediately after completing a measurement is available under the Setup window/Additional Parameters section.

**Note2:** On long fiber links when distant trace sections are distorted by noise, the automatic analysis feature can be inaccurate, e.g. splices with low attenuation may remain unrecognized in the noise background. These sections should be analyzed "manually" utilizing such features as moving, deleting and creating events described earlier.

## Trace filtering

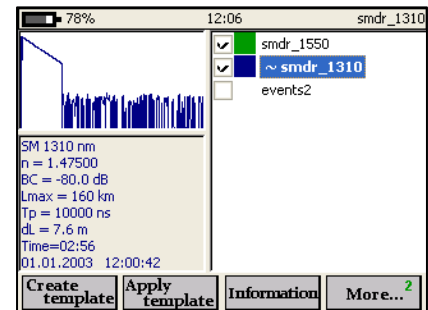
The program provides the option to apply a smoothing digital filter to the trace after a measurement is acquired.

- Enter the trace screen and menu.
- Press **F4** (Traces) to activate the trace list.
- Use the **up/down** arrow to highlight the desired trace.
- Press **F2** (Apply filter) to apply the filter to the selected trace.
- To cancel the filtering effect Press **F2** ( Unapply filter).

**Note:** The degree of filtering depends on the duration of the probe pulse.

## Applying trace template

This is an important feature when testing multi-fiber cables with multiple events. It allows the technician to certify and analyze the fiber link quickly and easily with the use of the Template. It will transfer the events of one cable onto another cable.



To activate the **Template Feature**

- Open a trace that has the desired event locations.
- Make sure that the event locations are accurate and in the desired position before using these events as the template.
- The trace menu should now be present – if not press **P** to activate the menu.
- Press **F4** (Traces) to activate the trace list.
- Use the **up/down** arrow to highlight the desired trace.
- Press **F4** (More) to activate additional trace menu.
- Press **F1** (Create template) to create a template based on the selected trace.
- The pop up "Template is Created" will appear.
- Press **C** to close the window and go back to the trace. Newly created events will be listed in the Events Table.

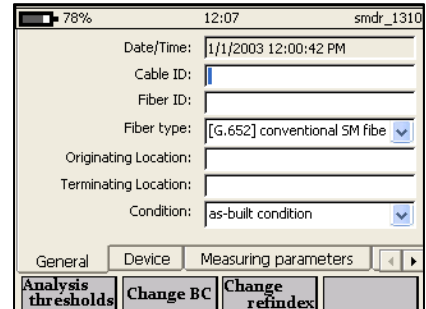
**Note:** After applying template the previously created events will be removed.

## Information about the Trace

Each trace has an information panel with the option to add additional operating information.

To access the panel

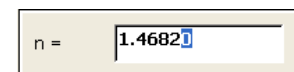
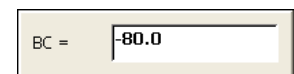
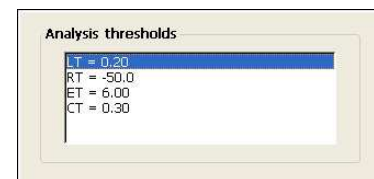
- Enter the trace screen and menu.
- Press **F4** (Traces) to activate the trace list.
- Use the **up/down** arrow to highlight the desired trace.
- Press **F4** (More) to activate additional trace menu.
- Press **F3** (Information) to open the information panel.
- Use the **left/right** arrows to navigate between tabs.
- Use the **up/down** arrows to navigate between text windows.
- Press **Enter** to enter or modify text in the General Tab.
- Press **C** to close the window and save the information.



## Changing Parameters for a Measured Trace

Once in the information panel the technician has the option to change the trace parameters (Analysis Thresholds, Backscattering Coefficient and Refraction Index)

- Enter the trace screen and menu.
- Press **F4** (Traces) to activate the trace list.
- Use the **up/down** arrow to highlight the desired trace.
- Press **F4** (More) to activate additional trace menu.
- Press **F3** (Information) to open the information panel.
- Press **F1** (Analysis thresholds) to change automatic analysis thresholds.
- Press **F2** (Change BC) to change the back scattering coefficient.
- Press **F3** (Change refindex) to change the refraction index value.
- Use the **left/right** and **up/down** arrows to modify the values.
- Press **Enter** to close the window and save the changes.





## COMMUNICATION WITH A PC

### Compatible PC Software includes the following features

- Device operational control features.
- Trace analysis and PC storage.
- Enables data transfer to and from the device via the USB port.

The CD software folder includes the following files and folders

- **ActiveSync** containing the files for Microsoft ActiveSync program.
- **Software Package** compatible PC software for controlling the DR-500 series unit, data analysis and data storage functionality.

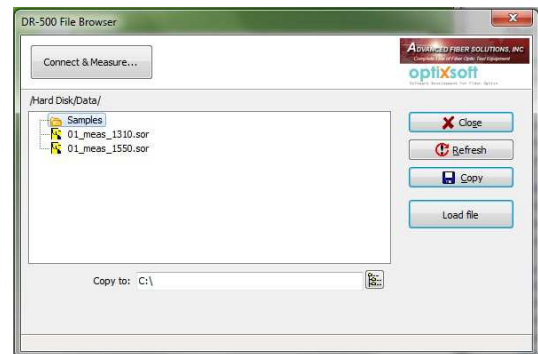
To Connect the Device to PC software

- Switch on the device.
- Insert a CD into PC disk drive.
- Install the program Microsoft ActiveSync (XP) or Mobile Device Center (Vista, Win7).
- Connect the device to PC via the USB-A to USB-B cable.
- ActiveSync will propose a partnership when loaded – answer NO.



### Transferring Files to PC

- Switch on the device.
- Connect the device to PC via the USB-A to USB-B cable.
- Once the unit has established a connection with the PC the DR-500 file Browser will be activated.
- This Browser will enable the user to connect and launch the *AFS Reflect* OTDR software, transfer files to the PC, copy files or load files directly to the *Reflect* platform.

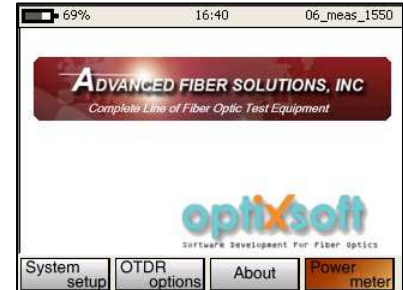




## Optional Features – Power Meter & Light Source

The unit also offers the optional features of both a power meter and laser light source.

To enter the Power Meter and Laser Light Source mode press the F4 button "Device" when in the main menu. This will open the device menu as shown here.



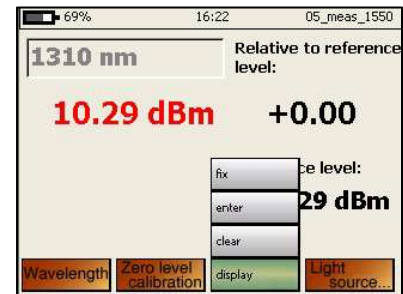
To enter the Power Meter and Laser Light Source field press the F4 button "Power Meter" again.

This will open the Power Meter and Laser Light Source field as shown here.



To select a specific wavelength press the F1 button "Wavelength". This will enable the user to scroll to the desired wavelength and select that wavelength by hitting the return key. Selectable wavelengths include 650/850/1310/1490/1550/1625nm

F3 "Reference Level" enables the user to display the reference level, enter a specified reference value or "fix" use the current dBm level as a zero reference value by scrolling to the desired option and hitting the return key.



F4 "Light Source" enables the user to turn the 1310nm or the 1550nm light source on or off. Both wavelengths have two transmitting options either CW(constant wave) or 2Khz mode.

- ON → CW mode
- ON\* → 2Khz Mode



## **STORAGE**

Optical connectors on the device should be periodically cleaned to prevent any contamination like dirt or dust. It is recommended to use specialized cleaning products to clean optical plugs and ports.

When charging the DR-500 Series OTDR use the provided AC/DC 12V 2Amp adapter. The battery will continue to charge whether the unit is powered on or off. A fully charge of a discharged battery will take 3 hours. There is a slow discharge when the unit is powered off so it is recommended that the battery be charged every 25.....30 days.

### **Storage Specifications**

Before unit is unpacked and opened

- Ambient temperature 5 to 40 °C
- Relative ambient air humidity up to 80% at 35 °C.

After unit is opened

- Ambient temperature 10 to 35 °C
- Relative ambient air humidity up to 80% at 25 °C.

Store in safe area clear of dust, acid vapor, alkali or gases that could can corrosion.

## **TRANSPORTATION**

The DR-500 Series OTDR, as packed by the manufacturer, can be transported in closed-type vehicles of any kind [by rail, by truck/car, by river (in holds)]. When transported by air the instrument should be placed in a heated airtight compartment.

When transporting the packed instrument, all attempts should be made for the DR-500 Series OTDR to be kept within the following limits

- Ambient temperature ranging from -20°C to 50° C
- Relative ambient humidity up to 95% (at 35°C)

The arrangement and fixation of packed instruments should be in compliance with the normative and technical documentation applicable to the vehicle used.

If the instrument was transported, as packed by the manufacturer, at sub-zero temperatures, after the transportation it should be left unpacked for two hours.

## **Warranty Certificate**

Advanced Fiber Solutions, Inc warrants that its products sold by it to purchaser will, upon delivery to purchaser, be free of defects in workmanship or materials and will conform and function in accordance with the specifications for the product as published by Advanced Fiber Solutions, Inc and in effect at the time of delivery. Should any failure to conform to this warranty become apparent during the one-year period after date of delivery of the product to purchaser, AFS will, upon prompt written notice from the purchaser, correct such non-conformity by repair or replacement at AFS's Boston, Massachusetts facilities, shipment to such facility to be at purchaser's cost and repaired or replaced components to be shipped to purchaser FOB AFS's facility in Easton, Massachusetts. Correction in the manner provided herein shall constitute a fulfillment of all liability of AFS with respect to the quality of any products sold by it to purchaser.

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