













**Test & Inspection**

# **FLX380 and OFL280 FlexTester Series**


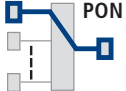

## **Quick Reference Guide**

## Functional Keys

Key	Name	Key Function
	Power	Press and hold (~1 second) to turn the FlexTester on or off.
	VFL	Visual Fault Locator (red laser): ON - Press and hold (~1 second) LED will flash. ON - Press and hold (~2 seconds) LED will be solid. OFF - Press and hold (~1 second) LED should be OFF.
	Menu	Press to access the Main Menu.
	Left & Right Tab keys	Press to display the next/previous available Menu Tab or Test View Tab.
	Arrow (Navigation) keys	The arrow keys provide several functions: <ul style="list-style-type: none"> <li>• Main Menu: these keys are used to navigate menus and change setup parameters.</li> <li>• Trace Screen: in the Zoom mode, these keys are used to adjust zoom. In the Move mode, Left and Right keys are used to move cursors.</li> </ul>
	Select	This key provides several functions: <ul style="list-style-type: none"> <li>• Main Menu: press to display a submenu (if available).</li> <li>• Trace Screen: press to toggle the active cursor between A and B.</li> <li>• Event Table: press to toggle LinkMap and Trace views (for FlexTesters with LinkMap option upgrade).</li> </ul>
	Back	Press once to return to the previous screen. Press one or more times, depending on which menu or editor submenu is displayed, to return to the Main Menu.
	Test	Press to start or stop a test.
	Save	Provides several functions: save the currently displayed test results; set current folder; set current file name; review results.
	Soft keys (under display)	The label shown in the display above each soft key (F1, F2 or F3) indicates the current function for that key. Press to select the indicated function.

# FlexTester3 Test Modes

## OTDR Modes

Test Mode	Network Being Tested	Applications	Setup
FTTx PON OTDR – Test Customer Fiber Only (to splitter)		<b>PON power meter.</b> Customer fiber fault location (fiber may be live or dark).	Auto
FTTx PON OTDR – Test Through Splitter		End-to-end length, loss, and ORL. Splitter loss. Feeder fiber fault location.	Semi-Auto
Full Auto (point-to-point)	<b>Long-haul Metro Access</b> 	Fault location. End-to-end length, loss, and ORL. Connector loss and reflection. Splice loss.	Auto
Real Time	Any	Short range fault location. First connector check. Fusion splice check. Mechanical splice tuning.	Semi-Auto
Expert	Any	Advanced point-to-point and FTTx PON testing for experienced OTDR users.	Manual or Semi-auto

## Light Source and Power Meter Mode

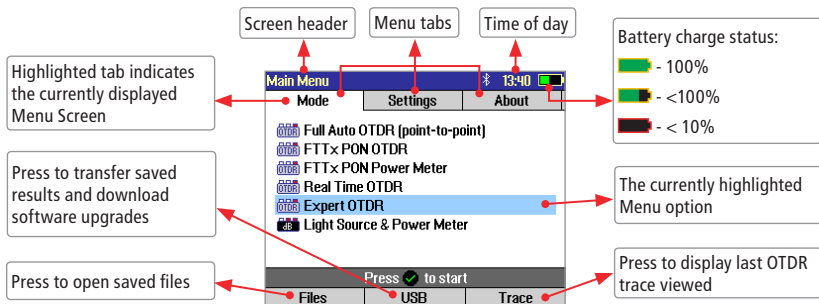
Test Mode	Application
Light Source	<ul style="list-style-type: none"> <li>• Measure end-to-end loss using manually set or Wave ID wavelength.</li> <li>• Trace fibers using tone generation and a NOYES Optical Fiber Identifier (OFI).</li> </ul>
Power Meter	<ul style="list-style-type: none"> <li>• Measure optical power or fiber loss using manually set or automatically detected (Wave ID) wavelength.</li> </ul>

# Main Menu Display Features

## Main Menu Screen (FLX380-303/304, OFL280-103 model shown)


### Notes:

- FTTx PON OTDR combines functions of previous FTTx – In Service and FTTx – PON Construction modes.
- FTTx PON Power Meter measures downstream PON power levels in live PONs.
- Full Auto OTDR should only be used for point-to-point testing applications.





# Running OTDR Tests and Viewing Results

**Note:** After an OTDR test is started, it may take several seconds for the first results to appear and depending on setup, tens of seconds or even several minutes for tests to complete.

**To Start a Test:** press  Test key.

### To Stop a Test:

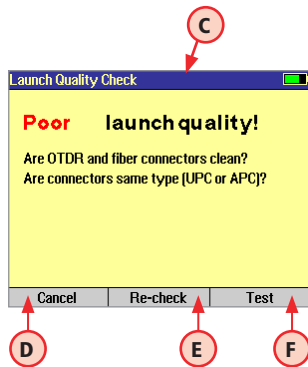
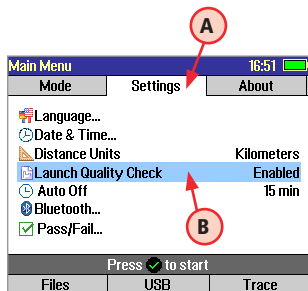
- Pressing  Test key before trace appears will stop the test and display the setup menu. Pressing Test key after trace appears will stop the test, generate the event table and show the partially completed trace.
- Pressing  Back key will stop the test and display the setup menu.

# Launch Quality Check


The FlexTester3 OTDR features an optional launch quality check when an OTDR test is initiated.


To perform the launch quality check:

1. From the Main menu, display the Settings screen **A** using  $\leftarrow \rightarrow$  keys.
2. Using  $\blacktriangle \blacktriangledown$  keys navigate up/down the list to highlight the Launch Quality Check parameter **B**.
3. If set to Disabled, use  $\blacktriangleleft \blacktriangleright$  keys to enable - display Enabled.
4. With the launch quality check option enabled, press the Test  $\checkmark$  key to start an OTDR test.
5. The FlexTester will assess the loss and reflectance at the OTDR's connection to the launch cord (fiber ring) or fiber under test.
6. If excess loss or reflectance is detected, the OTDR displays the 'Poor Launch Quality' screen **C**.
7. From the 'Poor Launch Quality' screen the user may chose to perform one of the following:
8. Cancel a test by pressing Cancel **D** soft key or Back key  $\leftarrow$ .
9. Clean connectors and repeat the launch quality check by pressing Re-check soft key **E** or Select key  $\bullet$ .
10. Continue testing without checking and cleaning the connection by pressing Test soft key **F** or Test  $\checkmark$  key.



## Test Settings: General OTDR Test Modes

Expert			
Test	Event	Fiber	Cables
Wavelength		1310/1550/1625 nm	
Auto Setup		By Range	
Range		120 km	
Pulse		3 us	
Averaging		60 sec	
Resolution		High	
Press  to start			
Files			Trace

Real Time			
Test	Fiber	Cables	
Wavelength		1550 nm	
Auto Setup		Off	
Range		500 m	
Pulse		5 ns	
Resolution		Normal	
Press  to start			
Files			Trace

Setup Parameter	General-Purpose OTDR Test Mode		
	Full Auto	Real Time	Expert
Wavelength	User selects single or multiple wavelength(s) at which to test.		
Auto Setup	N/A (not applicable)	<b>Off:</b> User sets all parameters manually. <b>By Range:</b> User sets <b>Range &amp; Resolution, Pulse width &amp; Averaging</b> selected automatically.	
Range	N/A: automatic	User sets OTDR scan range.	
Pulse width	N/A: automatic, based on auto-detected range	Automatic if <b>Auto Setup</b> parameter is set to <b>By Range</b> option. User-set if <b>Auto Setup</b> parameter is set to <b>option Off</b> .	
Averaging		N/A: 1 second updates	Automatic if <b>Auto Setup</b> is set to <b>By Range</b> . User-set if <b>Auto Setup</b> is set to <b>Off</b> .
Resolution	N/A: automatic	User-set <b>High</b> or <b>Normal</b> .	

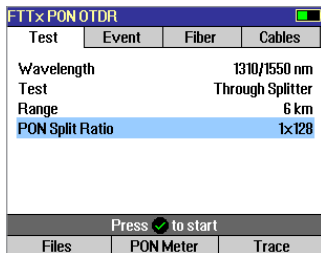
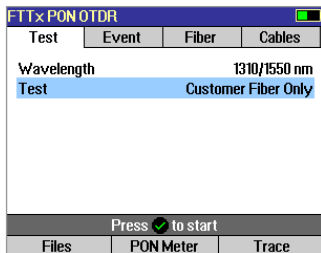
**Range:** When setting manually, select **Range**, which is at least 20% longer than the fiber under test.

**Pulse width:** Select wider pulse widths to obtain cleaner traces (less noise). Select narrower pulse widths to detect events which are close together (better resolution).

**Averaging Time:** Longer averaging times produce cleaner traces.

**Resolution:** **High** resolution provides close data spacing for more precise event location and better detection of closely spaced events. **Normal** resolution uses more filtering to provide a cleaner trace, but with lower resolution.

## Test Settings: FTTx PON OTDR Test Mode



Parameter	FTTx PON OTDR Test Mode
<b>Wavelength</b>	User selects single or multiple wavelength(s) at which to test.
<b>Range</b>	<b>Auto:</b> Range, pulse width, resolution, averaging are automatically determined. <b>Distance settings:</b> User manually selects setting in range 250 m to 240 km.
<b>Test</b>	If set to <b>Customer Fiber Only</b> , tests only to the splitter using automatically determined Range setting. If set to <b>Through Splitter</b> , tests through splitter including customer and feeder fibers using selected automatic or manual range setting.
<b>PON</b>	Not present if <b>Test</b> parameter is set to <b>Customer Fiber Only</b> option. If <b>Test</b> is set to <b>Through Splitter</b> , user sets PON split ratio (1x8, 1x16, 1x32, 1x64, or 1x128).

**Range:** When setting manually, select **Range**, which is at least 20% longer than the fiber under test.

**Pulse width:** If testing through splitter, pulse width is set automatically based on **Range** and **PON** split ratio. If testing customer drop fiber only (In Service), automatically set based on range to splitter.

When testing through a splitter, user can force a wider pulse width to improve trace quality by selecting a longer **Range** or higher **PON** split ratio.

**Averaging Time:** Also set automatically.

**Resolution:** Since PONs are usually short, resolution is typically set to High (close data spacing) for more precise event location.

# OTDR Mode: Trace Screen Features

Trace Screen displays OTDR trace, A/B cursors, Loss, Distance, and max reflectance between A and B cursors

File name (consists of cable name and fiber number), or "New Trace" if file has not been saved

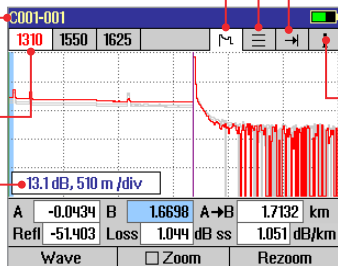
Test Wavelengths (RED is current)

Grid units display dB/div on vertical axis and distance/div on horizontal axis

Event Table displays OTDR event measurements

Summary Screen displays end-to-end link measurements

Information Screen displays OTDR setup parameters, launch and receive cable data, and event thresholds



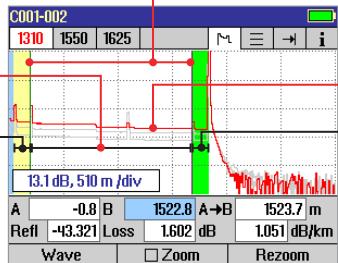
Fiber under test

Launch cable (if present)

A and B cursors

Trace graph (RED is current)

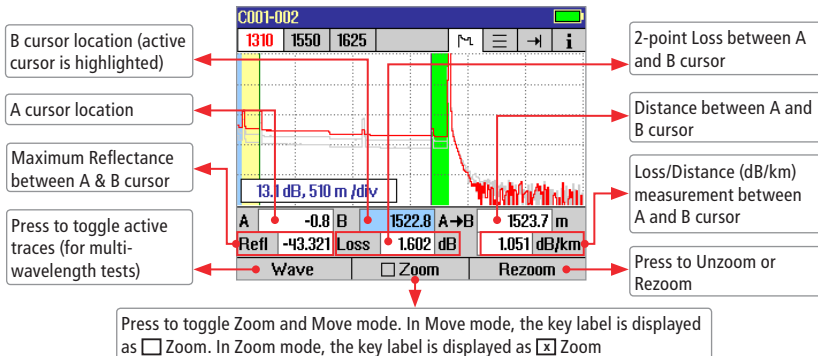
Receive cable (if present)



Soft key labels (see next page for details)

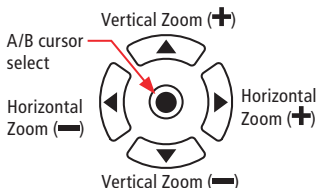


# OTDR Mode: Trace Screen Features

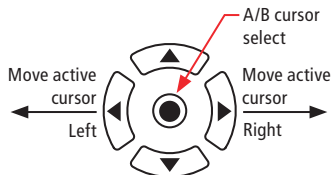


## Navigation Keys

### Zoom mode



### Move mode



**Note:** Zoom expands/shrinks the trace around the currently active cursor.

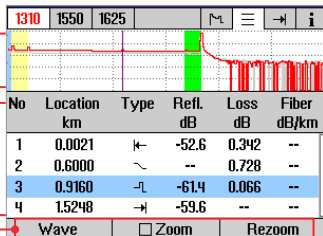
## OTDR Mode: Event Table Screen Features

Event Table is automatically generated when Events are set to Auto in the OTDR Event Settings mode.

Trace Graph display shows trace of the currently selected wavelength

Event Table shows: event Number, event Location in user selected units, event Type, Reflectance and Loss in (dB) and loss/distance (dB/km)

Soft keys provide the same functions as in Trace screen

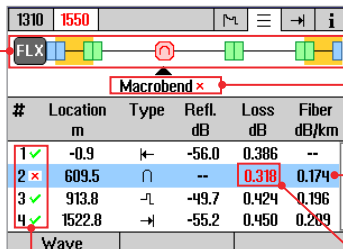


## LinkMap™ with Pass/Fail Analysis (purchased software option)

LinkMap provides icon-based display of link events. When enabled, pass/fail analysis compares event measurements to user-set pass/fail limits.

LinkMap shows

- Event Types
  - Connector
  - Splice (loss or gain)
  - Splitter
  - Macrobend
  - Group
- Color-coded pass/fail
  - Green: Pass
  - Red: Fail
  - Blue: Not evaluated



Pressing Select key toggles LinkMap and Trace Graph display

Label indicates type of the selected event











Currently selected event highlighted in blue  
Press keys to select previous/next event

Pass/Fail Analysis (when enabled) indicates each event as (✓)-pass or (✗)-fail

Failing event parameters are shown in red

## OTDR Mode: Event Table Screen Features

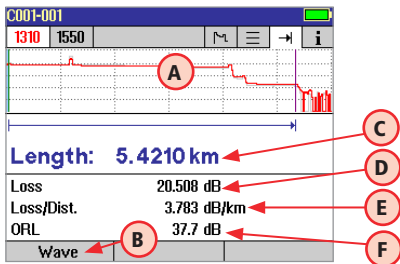
### Event Types

Icon	Event Type	Description
	Start	The start of the fiber under test.
	End	The end of the fiber under test.
	Non-reflective Loss Event	An event with measurable loss but very small or unmeasurable reflectance, typically caused by a fusion splice, fiber break, or macrobend (with macrobend detection disabled).
	Non-reflective Gainer Event	An event with 'negative loss,' which can occur in OTDR traces where two fibers with very different backscatter coefficients are spliced or connected. A gainer will be seen as a normal (positive loss) event when tested from the other end of the fiber. The true loss of the event is approximately equal to the average of its loss measured from each end of the fiber under test.
	Reflective Event	An event with measurable loss and reflectance, typically caused by a connection or mechanical splice.
	Macrobend	A non-reflective loss event with significantly higher loss at longer wavelengths (1550, 1625, 1650 nm) than seen at shorter wavelengths (1310, 1490 nm). Typically caused by a sharp bend in the fiber.
	Splitter	PON splitters are detected only when Event thresholds are set to PON Default or PON User and a high loss event (> 6 dB) is detected which is determined not to be the end of the fiber.
	Group Start Event	First event in multiple event group. Reports loss of entire group. Reports reflectance of first event in group if reflectance of next event can be independently measured. Reports max reflectance of grouped events if next reflectance cannot be independently measured.
	Group Middle Event	Grouped events may contain zero, one, or more middle events. Loss of middle events is included in group loss reported in the group start event. Reports reflectance if it can be independently measured.
	Group End Event	Last event in a multiple event group. Loss of last event is included in group loss reported in group start event. Reports reflectance if it can be independently measured.

## OTDR Mode: Summary Screen Features

Summary screen displays test data as follows:

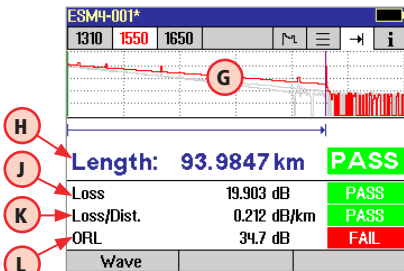
- Trace graph of the current wavelength **A** (for multiple-wavelength tests, press Wave **B** soft key to toggle the wavelength display).
- Link Length in user selected units **C**.
- Link Loss in dB **D**.
- Loss/Distance (End-to-End) **E**.
- ORL - Optical Return Loss in dB **F**.



### Link Summary Pass/Fail (purchased software option)

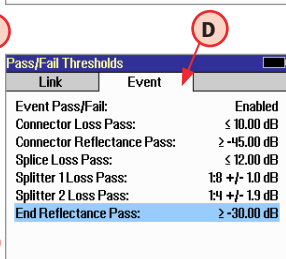
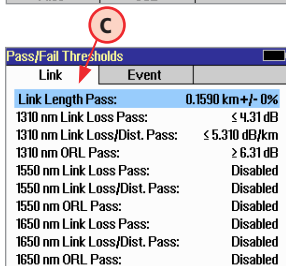
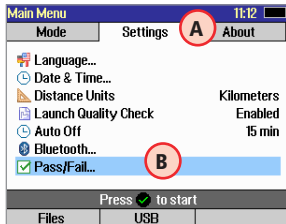
With Pass/Fail enabled, Link Summary optionally evaluates pass/fail based on link length, link loss, loss/distance, ORL (optical return loss) and displays overall link status. Link Summary screen displays test data as follows:

- Trace graph of the current wavelength, **G** (for multiple-wavelength tests, press Wave soft key to toggle the wavelength display).
- Link Length **H** (compared to user-set expected length).
- Link Loss **J** (compared to user-set max loss limit).
- Loss/Distance (End-to-End) **K** (compared to user-set max limit).
- ORL - Optical Return Loss **L** (compared to user-set min limit).

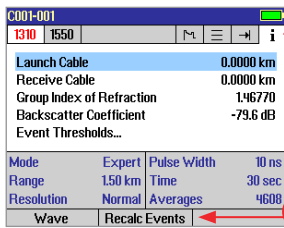


## Adjusting Link & Event Pass/Fail Settings

- From the Settings Menu **A**, navigate to the Pass/Fail **B** option using ▲▼ keys.
- Press Select key **C** to display Pass/Fail Thresholds screen that contains two sub-menu screens, Link and Event.
  - Link sub-menu **C** provides **End-to-End Link Settings**: Expected Length, Loss, Loss-per-Distance, ORL.
  - Event sub-menu **D** provides **Event Settings**: Connector Loss and Reflectance, Splice Loss, Split Ratio & Splitter Loss.
- Tip:** Toggle Link and Event screens using ⇐⇒ keys.
- Adjust Link & Event Pass/Fail thresholds as needed:
  - Using ▲▼ keys navigate to the desired parameter.
  - If a parameter 'Disabled', press Select key **C** to enable.
  - When a parameter enabled, use ◀▶ keys to adjust its value.
- When done, press Back key **E**.
- Settings are applied to subsequent tests.



**Tip:** If Pass/Fail threshold not correctly set before test, update Pass/Fail settings then press the Recalc Events **E** soft key, accessed from the Results Info tab **F**.



## OTDR Mode: Information Screen Features

The Information screen displays how the test was created.

- Use ▲▼ keys to highlight the desired setup parameter.
- Use ◀▶ keys to change the highlighted setup parameter (except Event Thresholds... parameter). You may change these parameters to correct locations in the Event Table after the test is complete.
- When done, press Recalc Events to recalculate the Event Table.


Press  key to display submenu **A**

Use ▲▼ keys to highlight the desired parameter

Use ◀▶ keys to change the highlighted parameter

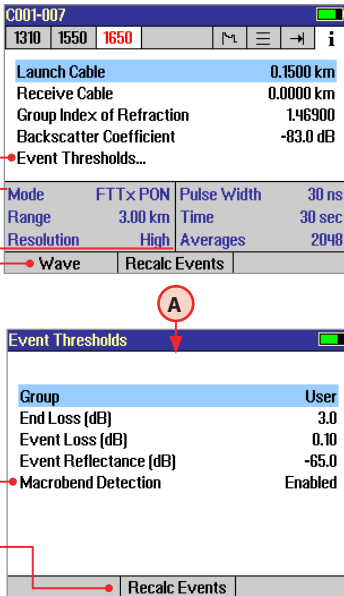
When done, press Recalc Events to recalculate the Event Table

These fields show the current setup conditions

For multiple-wavelength tests, press  to toggle the wavelength and display setup conditions for that wavelength

Event thresholds can be adjusted and macrobend detection enabled or disabled before recalculating events

If Event Thresholds not correctly set before test, update Thresholds settings then press the Recalc Events soft key



The screenshot shows the OTDR Information screen for test C001-007. The top bar displays the test ID and wavelength (1310, 1550, 1650 nm). The main screen is divided into several sections:

- Test Parameters:** Launch Cable (0.1500 km), Receive Cable (0.0000 km), Group Index of Refraction (1.46900), Backscatter Coefficient (-83.0 dB).
- Event Thresholds...** (highlighted with a red circle 'A')
  - Mode: FTTx PON, Pulse Width: 30 ns
  - Range: 3.00 km, Time: 30 sec
  - Resolution: High, Averages: 2048
  - Buttons: Wave, Recalc Events
- Event Thresholds** (highlighted with a red circle 'A')
  - Group: User
  - End Loss (dB): 3.0
  - Event Loss (dB): 0.10
  - Event Reflectance (dB): -65.0
  - Macrobend Detection: Enabled
  - Buttons: Recalc Events

# Saving Test Results

## File Manager System

The FlexTester File Manager system consists of four screens as follows:

Screen Name	Description and Function
Jobs	Lists the Jobs (folders) stored in the FlexTester internal memory. Use to open or delete the highlighted job folder.
Cables	Lists the Cables (folders) in the currently open Job folder. Use to open or delete the highlighted cable folder.
Results	Lists the OTDR trace (.SOR) files and OPM results (.ATD) files in the currently open Cable folder. Use to open (view) or delete the highlighted results file.
Save As	Lists the current job, the current cable, and the fiber number that will be used the next time a group of traces is saved. Use to save the 'new' results created by the most recent test, or the results most recently opened (recalled from memory).

## File Manager - Jobs Screen

The screenshot shows the File Manager interface with a list of job folders. The folder 'PONTTest000000' is highlighted in blue. The interface includes a status bar with the time '13:11 18-10-2014', the date '20/26', and the free space '99%'. Below the list are three buttons: 'Save As', 'Delete', and 'Open'.

Highlighted (selected) Job folder

List of saved Jobs (folders)

Time & date label: shows when the highlighted Job was saved

Press to display the Save As screen

Press to delete the highlighted Job folder

This field shows X/Y:  
X = number of the highlighted job  
Y = total number of jobs in FlexTester memory

Free space (internal memory)

Press to open the highlighted Job (which becomes the current job) and see a list of the cables stored in this job

# Saving Test Results

## File Manager - Cables Screen

Highlight (▲ ..) and press (●) key to return to Jobs screen

Highlighted Cable folder

Time & date label: shows when the highlighted Cable was saved

Press to display the Save As screen

Press to delete the highlighted Cable

List of saved Cables (folders)

This field shows X/Y, where X = number of the highlighted cable  
Y = total number of cables in the current job

Free space (internal memory)

Press to open the highlighted cable (which becomes the current cable) and see a list of test results (OTDR, OPM, fiber end-face inspection) stored in that cable.

## File Manager - Results Screen

Highlight (▲ ..) and press (●) key to return to Cables screen

List of saved test results:

- OTDR trace .SOR files
- OPM .ATD files
- fiber-end image files

Time & date label: shows when the highlighted test result was saved

Highlighted trace file

This field shows X/Y, where X = number of the highlighted results file,  
Y = total number of results files in the current cable

Press to open the highlighted test result.  
Opening the selected trace file will open traces for all wavelengths having the same fiber number

Press to display Save As screen

Press to delete the selected test file



# Saving Test Results

## File Manager - Save As Screen


The screenshot shows a 'Save As' dialog box with the following fields and buttons:







- Job:** OE0000000002
- End1:** END100
- End2:** END200
- FLX @End:** 1
- Cable:** C001
- Fiber:** 001
- Buttons:** Files, Cancel, Save
- Navigation:** Previous and Next field (left and right arrows)

Callouts from the surrounding text boxes point to these elements:

- Currently highlighted character (points to 'O' in Job)
- FlexTester location: End 1 or End 2 (points to 'End1:' label)
- Fiber number is auto incremented or set by user (points to '001' in Fiber)
- Press to view current Job/Cable screen (points to 'Files' button)
- Job name (points to 'OE0000000002')
- Route (made up of the two end names) (points to 'END100')
- Cable name (points to 'C001')
- Previous and Next field (points to navigation arrows)
- Press to save test results (points to 'Save' button)
- Press to return to Main Menu (points to 'Cancel' button)

## Saving Results

- Once a test is complete, press the Save key  to display the Save As screen.
- Perform the following steps to save to an existing Job/Cable folder or save to a new folder:

Existing Folder	New Folder
Press the Save soft key to save test results with the currently displayed Job, Route, Cable and Fiber number.	<ul style="list-style-type: none"> <li>Use   keys to select the previous/next field to edit.</li> <li>Use   keys to highlight any character position within the Job/End1/End2/Cable name fields and Fiber number field.</li> <li>Use   keys to change the highlighted character.               <ul style="list-style-type: none"> <li>- If the Job/End1/End2/Cable name and Fiber number are edited to a name and number that already exists in the current folder, then pressing the Save key will cause the FlexTester to display "Overwrite file?".</li> <li>- If the Job/End1/End2/Cable name is edited to a new name, then pressing the Save key will cause the FlexTester to create a new folder of this name.</li> </ul> </li> <li><b>Note:</b> This is the only way to create new folders!</li> <li>When done, press the Save soft key.</li> </ul>

# Light Source and Power Meter Test Mode

Use ▲▼ keys to navigate Light Source menu.

Use ◀▶ keys to change Light Source menu items.

The screenshot shows the 'Light Source and Power Meter' test mode interface. It is divided into two main sections: 'SOURCE' and 'METER'. The 'SOURCE' section includes 'Laser' (On), 'Mode' (Wave ID), and 'Wavelength' (1310/1550 nm). The 'METER' section shows 'Wave ID' (1310nm, 1550nm) and 'POWER' (-1.21 dBm). A 'Press to stop meter' button is visible. Callouts explain the following controls:

- Turn laser On/Off
- Select test mode: CW, Tone (270 Hz, 330 Hz, 1 kHz, 2 kHz) or Wave ID
- Select wavelength(s)
- Press to toggle units:
  - dB to measure loss
  - dBm or W to measure power
- Hold to set OPM reference level
- Press briefly to see current reference levels
- Press to toggle OPM wavelength

## Wave ID Mode Feature

The Wave ID (automatic wavelength identification) feature significantly increases efficiency:

- Cuts test time in half (or more) by testing multiple wavelengths simultaneously.
- Eliminates user setup error and the need to coordinate manual setting of wavelengths by users located at opposite ends of the fiber under test.

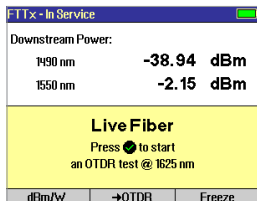
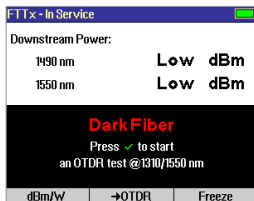
The "Wave ID" field (A) to the left of the displayed Power Meter wavelength will display one of the following:

- 270 Hz, 330 Hz, 1 kHz, 2 kHz, or Wave ID. If none of these are detected, this OPM field is blank.
- When Wave ID is displayed, Power or loss is measured and displayed for the automatically detected wavelengths.
- In other modes, the wavelength must be manually set but tone frequency is automatically detected.

## FTTx PON Power Meter (FLX380-303/-304 and OFL280-103 models only!)

FLX380-303/ -304 and OFL280-103 support AFL's ServiceSafe® capability (US patent 8,411,259), enabling both in-service and out-of-service OTDR testing and live PON power measurements to be made from a single port.

In the FTTx PON Power Meter mode, the first screen displays received FTTx PON power at 1490 and 1550 nm. An OTDR test can be initiated from the PON Power Meter mode. On dark fibers, users can test at 1310/1550 nm. On live fibers, users can test at only 1625 or 1650 nm.



## Transferring Files to a PC using USB

To transfer files from your FlexTester to a PC using a USB cable, perform the following:

1. Connect your FlexTester to a PC using the supplied type A to Mini USB cable. Make sure the mini-plug is fully seated in your FlexTester.
2. Press the USB soft key on the FlexTester's Main Menu.
3. From your PC desktop, open My Computer. A new removable drive named FLX (X:) / OFL (X:) will appear, where 'X:' is the drive letter assigned to your FlexTester by the PC.
4. Under FLX (X:) / OFL (X:) you should see two folders: RESULTS and SOFTWARE.
5. Copy the RESULTS folder to your PC.
6. Under RESULTS you will see TRACES folder and under TRACES you will see all of the folders containing OTDR traces, OPM results and fiber end-face image files.

**Note:** Before removing the USB cable connecting your FlexTester to your PC, or pressing the Cancel soft key on the USB screen, left click the Safely Remove Hardware icon in the Start bar of your PC, then left click the Safely Remove USB mass storage device – Drive (X:) message, where 'X' is the drive letter assigned to your FlexTester. For detailed operating instructions, refer to the FlexTester User's Guide (available on supplied CD and [www.AFLglobal.com](http://www.AFLglobal.com)).



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**Thank you for choosing Test & Inspection!**



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