



Optical Channel Analyzer Users Guide

**Revision E
1/2021**

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Section 1 Using This Manual

This Manual contains information for the Touch Screen Hand Held Optical Spectrum Analyzer. This equipment is touch screen capable and also has a hard keypad for operation. Note that there are a few operations that are only accessible with touch screen operation.

This user's guide is written primarily using the touch screen operation with occasional mention of the hard key equivalents

There are warnings, cautions and notes as described below displayed throughout this manual. Please follow all warnings and cautions for your safety and the protection of the equipment.

Warning

A warning alerts to situations that could cause personal injury.

Caution

A caution alerts to situations that may cause damage to the equipment or produce poor testing conditions resulting in inaccurate test results.

Note

A special annotation that will assist the user with operational features.

Section 2 Safety

Section 3 of this manual is a quick start guide. Prior to using the quick start guide or operating the equipment in any way, it is highly suggested the user reads all safety information.

This product has been designed and tested in accordance with the Manufacturer's safety standards, and has been supplied in a safe condition.

Below are warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition. Failure to follow these safety warnings, can result in damage to the instrument or harm to the user.

Warning

Personnel should always be aware when working with fiber optic test equipment that active fibers may be present and therefore infrared optical energy may be present.

Warning

Never look directly into the end of a connected fiber optic cable or fiber optic adapter of test equipment, to do so could expose the user to laser radiation and could result in severe personal injury.

Warning

To Prevent Fire or Shock Hazard:

- Do not install battery types other than those specified by the manufacturer
- Do not use the charger without the batteries installed
- Do not expose the battery charger to rain or excessive moisture
- Do not use the AC adapter when there are signs of damage to the enclosure or cord
- Ensure that you are using the correct charger for the local line voltage
- Do not use any other charger than the one provided with this instrument.

Section 2 Safety

Failure to follow these cautions may damage the equipment and void the warranty.

Caution

Fiber-optic connectors are easily contaminated or damaged. The connection to the Optical Spectrum Analyzer is a physical contact type of connection and dirty or damaged connectors may impair the instruments capabilities at minimum and at worst result in the need to return the Optical Spectrum Analyzer to the factory for expensive repairs. Prior to making any connection to the unit, ensure that all proper cleaning procedures have been followed.

Caution

The Optical Spectrum Analyzer has two ports, a low power and high power port. The low power port is designed for maximum power of -10dBm per channel and a maximum composite power of +22dBm. The high power port is designed for a maximum of +10dBm per channel and a maximum composite power of +29dBm. If unsure of the power level, it is best to start in high power mode and use the designated high power port. Please refer to Section 8.1 of this manual for instructions on setting the power level.

Section 3 Quick Start Guide

Quick Start Guide


Press  to turn on the Optical Spectrum Analyzer and from the home screen select the OSA icon.

Operation

The port/power setting dialog will be displayed, it indicates the current power setting and which port should be used at that setting. Touch any button on the screen to close this dialog. There are two testing ports, low is for testing up to -10dBm and high for testing up to +10dBm. For accurate readings, it is necessary to use the proper port with the proper setting.

If the power is not set to the desired level, enter the menu and select power to change the power level as required.

Icon Menu

To enter the Icon menu, either press the  button or use the stylus to pull the icon menu up from the bottom of the screen.

Available icons:



Home Icon brings the user back to the home screen to select feature of operation.



Bar graph, touching this icon returns the user to the bar graph.



File icon, touching this icon will bring the user to the file management menu.



Settings icon, touching this icon brings the user to the OSA and general settings menus.



6GHz line graph icon, touching this icon opens the 6GHz line graph view.



Scope icon, this will open the video scope feature.



Table icon, this is used to open the table display of data.



Help displays an on board explanation of features, functions and operations.

Caution

Fiber-optic connectors are easily contaminated or damaged. The connection to the Optical Spectrum Analyzer is a physical contact type of connection and dirty or damaged connectors may impair the instrument's capabilities at minimum and at worst result in the need to return the Optical Spectrum Analyzer to the factory for expensive repairs. Prior to making any connection to the unit, ensure that all proper cleaning procedures have been followed.

Use UPC Finish Connectors Only!

Section 3 Quick Start Guide

Caution

The Optical Spectrum Analyzer has a low power and high power port. The low power port is designed for maximum power of -10dBm per channel and a maximum composite power of +22dBm. The high power port is designed for a maximum of +10dBm per channel and a maximum composite power of +29dBm. If unsure of the power level, it is best to start in high power mode and use the designated high power port. Please refer to section 8.1 of this manual for instructions on setting the power level.

Attached the fiber to be tested to the appropriate optical port. (-10dBm or +10dBm)

Note

On start-up, there is a short warm-up period before the OSA can scan. The scan indicator is in the bottom right of the display. It shows, yellow, red and green. Yellow is warming up, red is ready to scan and green is scanning. This indicator may be use with the stylus to start and end a scan.

Scan

Once the unit is ready to scan, touch the scan indicator or the scan button on the keypad to start the scan.

To stop a scan, touch the scan indicator or press the scan button again.

Cursor Movement/Selection:

To move the cursors touch the screen and the active will snap to that location and moving the stylus up or down on the display will drag the cursor as desired.

Note

Touching the left hand channel number bar is a quick method to switch to the table display and touching the left most channel number bar on the table display will revert back to the graph display. Therefore, it is necessary to stay clear of this area when manipulating the cursors with the touch screen.

To change the active cursor, touch the red or blue cursor points on the right side of the display. The one outlined in black is the active cursor. (A/B button on the keypad)

Auto Test/Zoom: (Keypad only)

The AutoTest button automatically zooms to active channels. This is the first channel starting at channel 1 that is higher than -45dBm in low power mode (-25dBm in high power mode) and setting that as the first channel in the visible range and then starting at the last channel and working backwards to find the last channel that meets the same criteria and setting it as the last channel in the visible range. This button toggles this feature on and off.

Please review the remainder of this user's guide for full instructions on using the Optical Spectrum Analyzer

Section 4 Introduction

The Hand Held Optical Spectrum Analyzer offers a full featured analysis of DWDM systems in a truly hand held portable package. DWDM optical levels in the C-band (1527.9-1565.9 nm or 196.2 - 191.45 THz) may be measured with a resolution of 0.01nm, and measurement levels range from +10 to -50dBm. Parameter settings to optimize the resolution, number of channels displayed, power levels displayed or set the first channel to match the system under test allows for easy and accurate analysis of DWDM scans. Channel spacing may be set at 50 or 100 GHz with 98 Channel units and 100Ghz with 48 Channel units. The This unit has super fast acquisition time of two scans per second. The information may be viewed in graph mode or table mode with a pass/fail feature on the 4 inch color TFT Display. The Optical Spectrum Analyzer is designed with solid state optics and no fragile or moving parts to keep the unit field friendly. There is storage for up to 1000 tests and the test may be viewed and printed with the included CertSoft software for fast and easy reporting. These units are housed in a rugged enclosure with robust protective boot, are designed to withstand the rigors of field use and are extremely user friendly.

Section 5 Preparation For Use

5.1 Inspection

Before shipment, this instrument was inspected and found to be in perfect working order and free of defects.

The shipping carton contains the following:

1. Hand Held Optical Spectrum Analyzer, with protective boot
2. Universal AC/DC charger with interchangeable mains
3. USB cable
4. CD with CertSoft software and user's manual
5. Set of interchangeable adapters, SC and FC, for each OSA port.
6. 2 stylus

5.2 Identification and Configuration

The instrument's Model/Part Number, Serial Number and Date of Manufacture are indicated on a label located on the back of the unit. The instrument's history is filed at the factory by model/part number and serial number. The unit's serial number is also located on the top plate just above the USB Port.

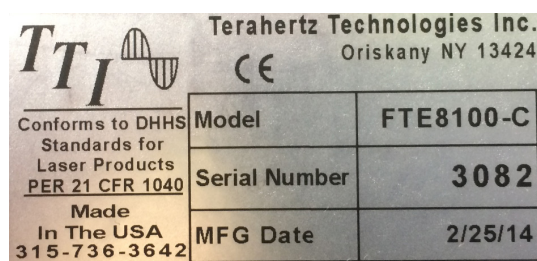


Fig 5.1

5.4 Power Requirements

The Optical Spectrum Analyzer is equipped with a 100-240V input and 15V, 1.2A output, center positive output universal AC/DC battery charger. This charger is supplied with interchangeable mains for US, Great Britain, Europe and Australia. Depending on usage, fully charged battery pack will typically enable approximately 12 hrs. of use. Fully discharged batteries require 3-4 hours of recharging.

Warning

To Prevent Fire or Shock Hazard:

- Do not install battery types other than those specified by the manufacturer
- Do not use the charger without the batteries installed
- Do not expose the battery charger to rain or excessive moisture
- Do not use the AC adapter when there are signs of damage to the enclosure or cord
- Ensure that you are using the correct charger for the local line voltage
- Do not use any other charger than the one provided with this instrument.

Failure to follow these caution statements may void the warranty of this equipment.

Section 6 Physical Description

The Optical Spectrum Analyzer is packaged in a rugged aluminum housing which is further protected with a rubberized boot. Although the front panel is weather resistant, care must be taken to avoid liquids and contaminants around the fragile optical and electrical connectors, and the glass display. Use a mild cleaning agent and damp soft cloth to clean up the panels and the outside case. See the maintenance section for notes to clean the optical connector. NEVER open the instrument for cleaning. Return to the factory for servicing if necessary.

Front Panel



Fig 6.1

Top Plate

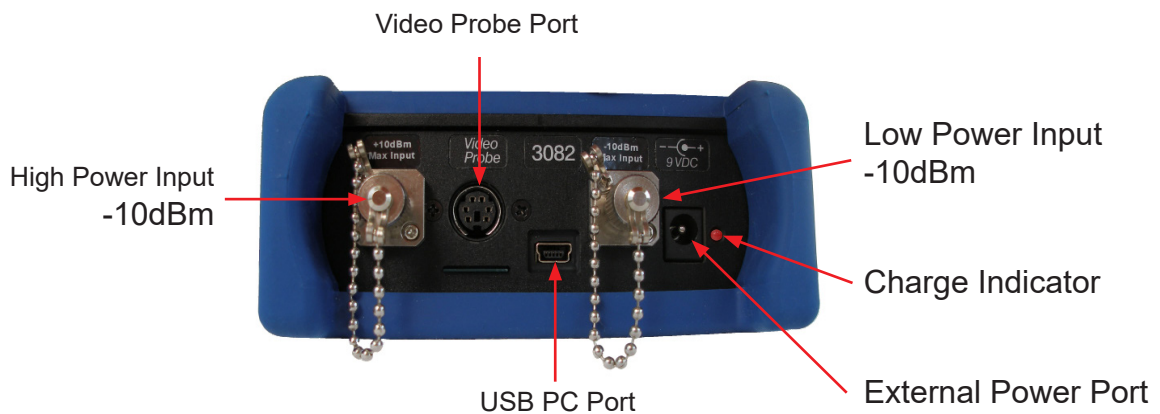


Fig 6.2

Section 7 User Interface

7.1 Keypad



(keypad function only)

Power button turns the unit On and Off.
(Hold for 1 second)



Scan button starts or stop a scan, and resets the table of data.



(keypad function only)

The AutoTest button automatically zooms to active channels.



Toggles the icon menu open and closed on the bottom of the display



Toggles between "A" and "B" as the active cursors.



(keypad function only)

The zoom button toggles between zoom out (all 18 channels) and zoomed in (The range of channels selected in the settings screen).



Only active in the menu mode. Used to make selections of highlighted items.



LRUD (Left-Right-Up-Down) buttons to are used to move the active cursor in scan mode and move through menu selections in menu mode.

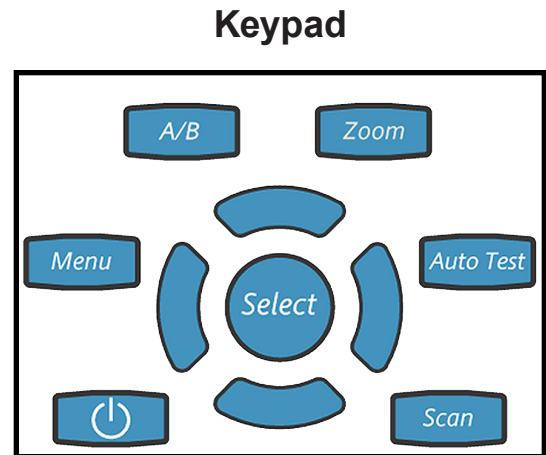


Fig 7.1

Section 7 User Interface

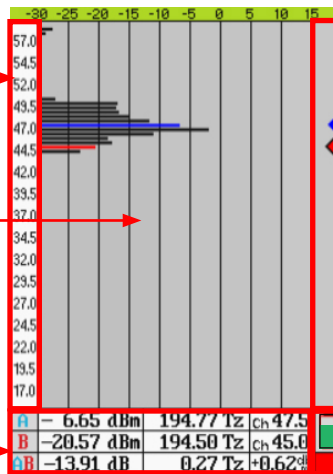
7.2 Touch Display

Graph Mode

Touch channel number column to toggles between graph and table

Touch anywhere in the main graph area to move the active cursor

Touch anywhere in the bottom two rows left of the battery and scan indicators to open the icon menu



Touch the last column in the graph to toggles between A and B cursors

The area around the scan activity indicator toggles the scan mode on and off

Fig 7.2

Table Mode

The White columns represent the channel numbers.

Touch anywhere in the channel/value columns in the main table to snap the active cursor to that channel number

Menu button, opens main menu

25.0	50.0	29.55	37.5	25.0	
32.0	29.44	43.5	28.67	37.0	24.5
31.5	29.91	43.0	29.32	36.5	24.0
31.0	27.18	48.5	28.39	36.0	23.5
30.5	29.90	48.0		35.5	23.0
30.0		47.5		35.0	22.5
29.5	28.73	47.0	29.05	34.5	22.0
29.0	26.15	46.5		34.0	21.5
28.5	24.13	46.0		33.5	21.0
28.0	28.63	45.5		33.0	20.5
27.5	23.87	45.0		32.5	20.0
27.0	10.46	44.5		32.0	19.5
26.5	8.05	44.0		31.5	19.0
26.0	28.11	43.5		31.0	18.5
25.5	25.88	43.0		30.5	18.0
25.0	27.35	42.5		30.0	17.5
24.5	26.96	42.0		29.5	17.0
24.0	28.22	41.5		29.0	16.5
23.5		41.0	29.83	28.5	16.0
23.0		40.5	29.62	28.0	15.5
22.5		40.0	28.84	27.5	15.0
22.0	29.21	39.5	29.60	27.0	14.5
21.5	29.13	39.0		26.5	14.0
21.0	26.68	38.5		26.0	13.5
20.5	28.22	38.0		25.5	13.0

The power values will be indicated in either red (fail) or green (pass)

Note

Active Cursor is can only be selected with the keypad button in the table mode

The Active Cursor is displayed with a black outline.

Select current power, minimum, maximum or average power to be displayed per channel

Scan Button

Fig 7.3

Note

Touch screen descriptions for Parameter, File Management and Scope screens will be covered in their individual sections.

Section 7 User Interface

7.3 Icon Menu

Movement between screens and functions is accomplished through a set of icons located in a menu that is accessed by touching the bottom of the display or pressing menu button. To remove the menu from the bottom of the display, either select an icon, touch the display above the menu or press the menu button.

or press the menu button.

To use the Icon menu, touch to the left or right of the highlighted icon in the center to move the icons left or right. The left and right buttons may also be used to move the icons. With the desired icon highlighted, touch it or press the select button.

Display with Icon Menu Open

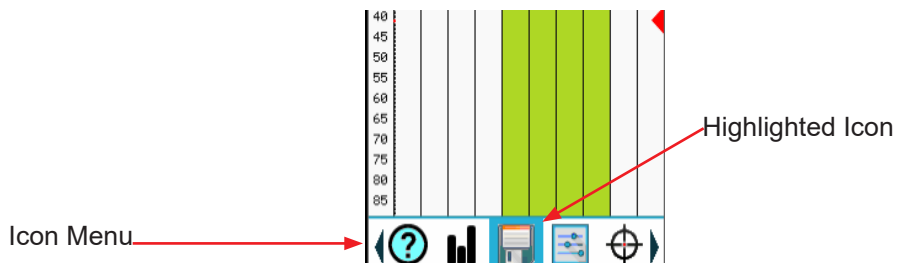










Fig 7.4

Icon Descriptions

Below is a list of the icons found in the icon menu with a brief description of each. More detailed explanations will be found in later in this user's guide.

-  Home Icon brings the user back to the home screen to select feature of operation.
-  Bar graph, touching this icon returns the user to the bar graph.
-  File icon, touching this icon will bring the user to the file management menu.
-  Settings icon, touching this icon brings the user to the OSA and general settings menus.
-  6GHz line graph icon, touching this icon opens the 6GHz line graph view.
-  Scope icon, this will open the video scope feature.
-  Table icon, this is used to open the table display of data.
-  Help displays an on board explanation of features, functions and operations.

Section 8 Setting Test Parameters

8.1 Settings Screens

To ensure the most accurate and usable information is derived from the OSA, it is necessary to set the testing and equipment parameters prior to starting a scan.

Test Parameters parameters may be set at the time of use or they may set and stored for later use. These test configurations are stored in file management.

To set testing parameters and general equipment settings use the settings screen. To access the settings screen, open the icon menu, highlight the settings icons and touch it or press select.

OSA and General Settings Pages

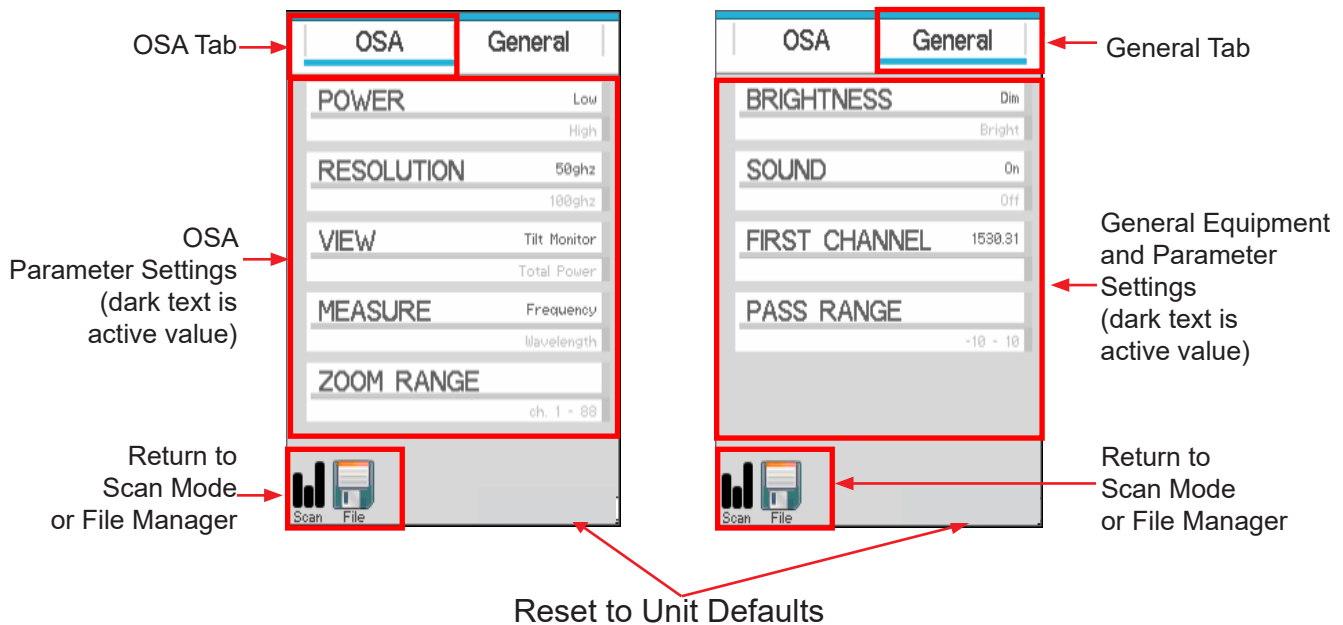


Fig 8.1

Section 8 Setting Test Parameters

Note

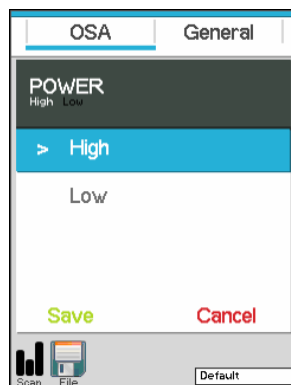
The directional buttons and the select button are not operational in the settings screen.

To select a parameter to be modified, touch it on the display and that parameter setting screen will be displayed.

Parameter Settings Screens

There are two types of parameter screens. The first, as typified by the power setting screen below offers a selection of two item. Select the desired value and touch save. The second type is one where numeric values are selected. These may have one or two values to be entered. If as on the zoom range display below, two values are needed, there will be two tabs, such as begin and end tabs with this parameter. Use the up arrow above the digit or the down arrow below the digit to set the value. If necessary select the second tab and set the second value. Touch save to set the values and return to the settings display.

Power Settings Screen



Zoom Range Screen

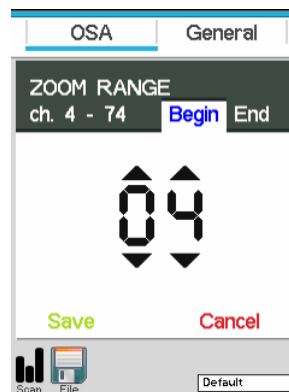


Fig 8.2

8.2 OSA Parameter Tab

Power Level

The Optical Spectrum Analyzer has two optical ports, a low power and high power port. The low power port is designed for maximum power of -10dBm per channel and a maximum composite power of +22dBm. The high power port is designed for a maximum of +10dBm per channel and a maximum composite power of +29dBm. Upon starting the Optical Spectrum Analyzer the switch Port dialog will be displayed which indicates the power setting. If the desired power level is indicated connect the fiber under test to the port shown and touch the screen or press the select button to clear the dialog box. If the wrong power level is indicated, touch screen to remove then open the icon menu and select the settings icon. Touch the power setting, in the power parameter screen, select the desired power and touch save, then touch the scan icon in the bottom left of the display to return to the graph screen.

Section 8 Setting Test Parameters

Resolution

The 98 Channel analyzer allows the use to set the resolution to 50 GHz (0.4 nm) or 100 GHz (0.8 nm) per channel, or High and Low resolution respectively. At 100 GHz spacing the user may also select the in grid, (whole channel) represented by “100ghz A” or off grid (half channel) represented by “100ghz B” data to be displayed.

The 48 channel analyzer will only display the in grid (whole numbered) channels.

NOTE

The first channel will be the first channel as established by the first channel setting in the general tab of the settings screen.

View Setting

The view setting sets the view of the scan to total power or tilt monitoring. Total power is the power being introduced to the fiber. Tilt monitoring is used for both power tilt and gain tilt as describe below. In the tilt monitoring setting, there will be a liner regression line on the display and the value associated with that regression line is displayed in the bottom right cell.

To display the tilt monitor, enter the settings screen by bringing up the icon menu and touching the settings icon. Touch the view setting and select tilt monitor. The tilt monitor is now turned on for power and gain tilt.

Power Tilt

Power Tilt, is displayed as a linear regression line overlaid on the graph and as a numeric indicator in the bottom right of the display. This reading only factors in the channels that are greater than the minimum power level of the scale. This can be used to assist with balancing the power of DWDM system. The flatter (more level) the line, or the closer to zero the power tilt number the more balanced the power between channels.

Gain Tilt

Gain Tilt, is displayed as a liner regression analysis of change in power between the overlapping channels overlaid on the graph comparing two scans. This reading only factors in the channels that are greater than the minimum power level of the scale. This is useful when balancing gain from EDFA systems.

NOTE

Gain Tilt requires two scans be compared. See below for dual scan operation procedures.

NOTE

All the scan data on the display is the data associated with the primary trace.

Section 8 Setting Test Parameters

There are two methods to display dual scans for a Gain Tilt comparison

With New Scan

Use a scan that has just been acquired using the Scan button. After a scan has been taken, bring up the icon menu and select the file management icon. Make sure the OSA table is highlighted and touch above blue highlighted center point to move up through the file list and below to move down the list. With the desired scan highlighted, touch the compare icon and the saved OSA scan will be displayed on the screen with the scan that was just acquired. Please refer to Section 10 for more information on using the file manager. Gain Tilt only measures those channels that meet the minimum value of the displayed scale.

With Saved Scans

The second method is to use the gain tilt, is to use two scans that have already been stored. To do this, enter the file manager as described and with the OSA tab highlighted select the primary scan to be used. Touch the file name while it is highlighted to open it or use the select button on the keypad. (Do not use the select icon on the file management screen.) Enter file management again and with OSA tab highlighted, move the file to be compared to the highlighted bar and touch the compare icon. The primary trace will be the first one selected.

To exit the gain tilt mode, open a different scan file or start a new scan. To exit the gain/power tilt modes and return to the total power mode, enter the icon menu select the view parameter, select total power and save.

Measurement

Depending on the system, channels may be listed in wavelength or frequency. To accommodate this, the Optical Spectrum Analyzer may be set to display in nanometers (nm) for wavelength or terahertz (Tz) for frequency. To change these settings, pull up the icon menu and touch the settings icon. Touch the measure setting, choose frequency or wavelength then touch save.

Zoom

The zoom button is used to zoom in on a specific set of contiguous channels. If the set of channels to be viewed is channel 20 to 50 for instance, this feature allows the user to set this range and by pressing the zoom button on the keypad, show only those channels. To set the zoom span, pull up the icon menu and select the setting screen. Touch the zoom setting and with the begin tab highlighted, use the up and down arrows on each digit to set the first channel to be viewed. To set the last channel, highlight the end tab and set this channel in the same manner as the beginning channel. Touch save and touch the scan icon to return to the graph screen.

8.3 General Parameter Tab

Brightness

Depending on working conditions, a lower level of light may be best for optimal viewing of the OSA. Use this brightness setting to toggle between dim and bright settings. To set the brightness level, enter the settings screen by bringing up the icon menu and touching the settings icon. Touch the general tab and then touch the brightness setting, select dim or bright as desired then touch save.

Sound

The sound setting toggles the keystroke speaker on and off. To set the sound on or off, enter the settings screen by bringing up the icon menu and touching the settings icon. Touch the general tab and then touch the sound setting, select on or off as desired and then touch save.

First Channel

Operating systems may have different numbering schemes for their channels. By default 195.9 THz (1530.3 nm) is assigned to channel number 1, and, depending on the resolution setting, The channel numbers increase from there in 50 GHz (0.4 nm) or 100 GHz (0.8 nm) steps. To help sync the Optical Spectrum Analyzer with these systems, it is possible to set the first channel to match that of the system being tested. To set the wavelength or frequency of the first channel, enter the settings screen by bringing up the icon menu and touching the settings icon. Touch the general tab and then first channel. Use the stylus to raise and lower the wavelength/frequency to match that of the system channels, save and touch the scan icon in the bottom left of the display to return to the graph screen.

NOTE

It's important to note that this prevents reading channels below the established first channel.

Pass Range

For a quick indication of passing channels, the pass range may be set to highlight the power level on the display for a passing channel. Set this range so that channels meeting the passing criteria, fall into the green shaded area of the dBm scale. To set the pass range, enter the settings screen by bringing up the icon menu and touching the settings icon. Touch the general tab and then pass range. Touch the Min tab and use the up and down arrows for each digit to set the minimum acceptable power for a channel. Touch the Max tab and set the maximum acceptable power for a channel in the same method. Touch save to return to the general tab in the settings screen and touch the scan icon in the bottom left of the display to return to the graph screen.

Section 9 Operation

9.1 Start-up Power Level

On start up of the OSA, the unit will display a notice indicating the current power setting and direct the user to connect to the high or low power ports. If the incorrect power is set, follow the instructions in this guide to change the power level. (Section 8.1)

Start-Up Power Level Indicator

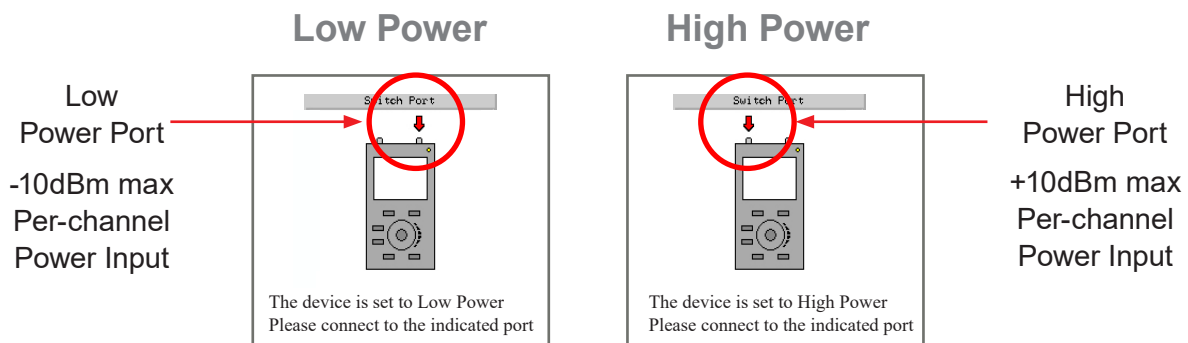


Fig 8.3

Touch anywhere on the display or press the select button to remove the power level indicator from the display.

Warm-up

There is a warm-up stage for the Optical Spectrum Analyzer. The yellow indicator in the bottom right corner of the display indicates the unit is in warm-up mode. When the indicator turns red the unit is ready to scan and a green indicator shows the unit is scanning.

9.2 Connecting Fiber

It is suggested that a test cable be used between the fiber under test and the Optical Spectrum Analyzer. This reference fiber should be approximately one meter in length and have minimal loss. The reference cable should only be removed from the unit when necessary. Limiting removal and termination of connectors to the unit will extend the life span of the connector eliminating down time and costly repairs. Only UPC connectors are to be connected to the Optical Spectrum Analyzer.

Section 9 Operation

Caution

The Optical Spectrum Analyzer have two ports, a low power and high power port. The low power port is designed for maximum power of -10dBm per channel and a maximum composite power of +22dBm. The high power port is designed for a maximum of +10dBm per channel and a maximum composite power of +29dBm. If unsure of the power level, it is best to start in hi power mode. For more information, please refer to the Power Level paragraph in this section of the User's Guide.

Caution

Fiber-optic connectors are easily contaminated or damaged. The connection to the Optical Spectrum Analyzer is a physical contact type of connection and dirty or damaged connectors may impair the instruments capabilities at minimum and at worst result in the need to return the Optical Spectrum Analyzer to the factory for expensive repairs. Prior to making any connection to the unit, ensure that all proper cleaning procedures have been followed. Use UPC Finish Connectors Only!

9.3 Taking Scans

Scanning

There is a short warm-up period for the Optical Spectrum Analyzer. This is indicated by the scan indicator in the bottom right of the display. Yellow is warming-up, red is ready to scan and green is scanning.

Once all the parameters have been set, the scan button may be pressed or the scan indicator may be used on the touch screen to start a scan. Pressing the scan button or touching the scan indicator a second time will stop the scan.

AutoTest

The autotest button automatically zooms to active channels. This is the first channel starting from channel 1 that is higher than -45dBm in low power mode (-25dBm in high power mode) and setting that as the first channel in the visible range and then starting from the last channel and working backwards to find the last channel that meets the same criteria and setting it as the last channel in the visible range. This button does not start a scan but focuses in on the channels as described above on recalled scans or active scans. This button toggles this feature on and off, and sets the span for any scan to follow, until it is pressed a second time. Stored scans will not take the autotest settings from another stored scan, but the setting from a stored scan can be used on new scans.

Using Stored Configurations

Test configurations are stored in the file management screen. To use a stored configuration, pull up the icon menu and select the file management icon. Touch the Config tab, from the file list highlight the

Section 9 Operation

9.4 Viewing OSA Scans

Graph Display

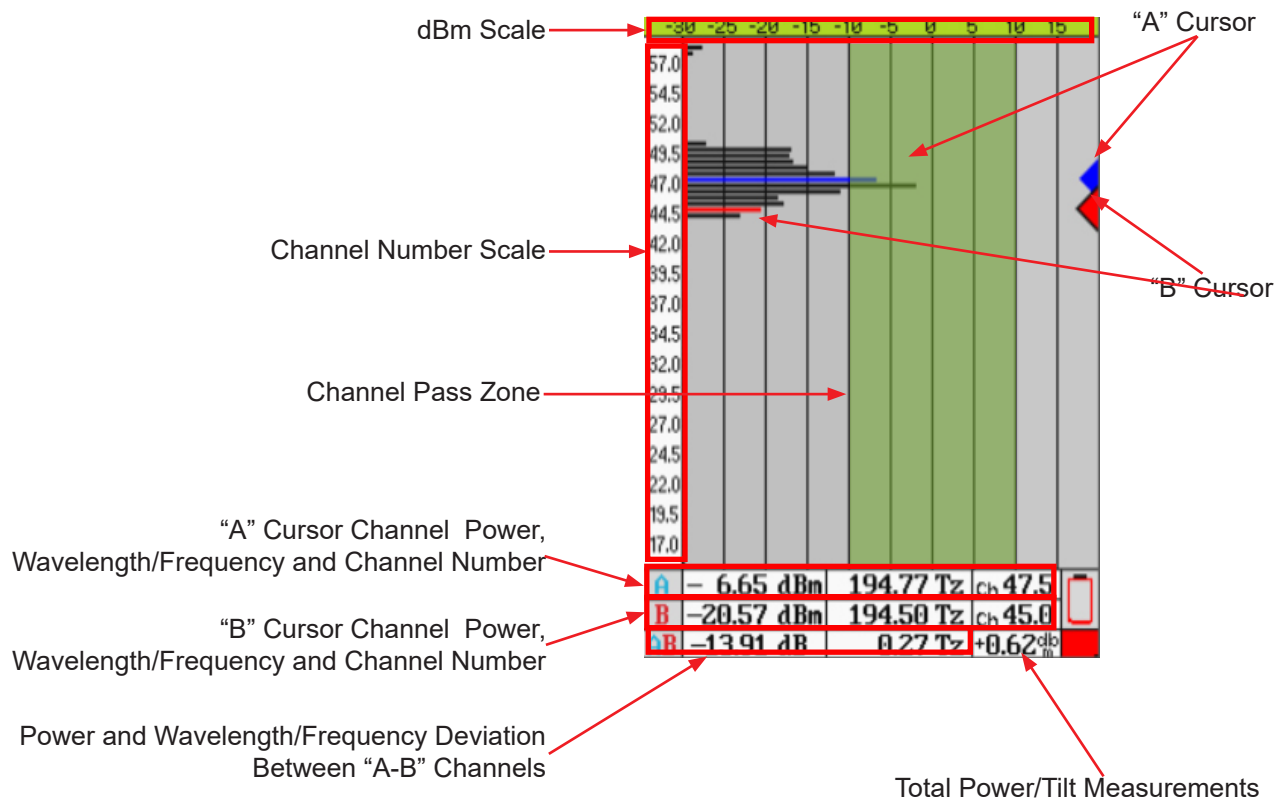


Fig 9.1

Graph Information

dBm Scale

The dBm scale at the top of the page indicate -50 to 0 dBm when in Low power mode and -30 to +20 dBm in high power mode. This scale allows for a quick estimate of a channels power, for a highly accurate indication of power use the "A" and "B" cursors.

Channel Scale

The channel scale displays the channel numbers that may be viewed. The scale is normally 1-88 but may be changed if the first channel feature is used. The first channel setting eliminates the number of channels bypassed from the total number, and shifts the scale accordingly. This scale is also modified when zoom is selected. It shifts the number of channels as selected with the zoom feature. If zoom was set to see only channels 51-60, it would only display those ten channels.

Section 9 Operation

Channel Pass Zone

This green highlighted area of the display assist with quick evaluation of channels for pass/fail state. Set this scale with the pass range setting under the general tab of the settings screen.

Cursor Data Information

Channel power, wavelength/frequency and the channel numbers for selected channels are displayed in the data section at the bottom of the display.

“A” to “B” Cursor Relational Data

The bottom row of the data section indicates the deviation of power and wavelength/frequency between the “A” and “B” cursors.

Total Power/Tilt Measurements

The total power or tilt information is displayed in the bottom right most cell of the OSA's measurement table and graph screen.

9.5 Cursor Movement

The “A” and “B” cursors may be moved with the touch screen or the up and down buttons on the keypad.

Set Active Cursor

The cursor to be moved must be set as the active cursor. This is indicated with a black outline around the cursor point on the right side of the display. To set the active cursor, touch the desired cursor point with the stylus or press the A/B button on the keypad to toggle between the cursors.

Cursor Movement

To move a cursor, touch anywhere between the channel number column and the cursor point column and the active cursor will snap to the channel selected. To slide the cursor up and down on the display, touch the display and slide the stylus up and down to drag the cursor to the desired position/channel number. The up and down buttons on the keypad will move the cursors as well.

Section 9 Operation

9.6 OSA Table View

Using the Table display offers a view of the information in a tabular format. It also allows for a what power should be displayed. The real time power of the active scan, (Last power to be saved in recalled scans) the minimum or maximum power for a given channel or the average power for the duration of the scan for a given channel. Touching any channel value field will snap the active cursor to that channel number, or the stylus may be used to drag the active cursor to a position.

Channel displayed in green, pass the set threshold and channel in red fail the set threshold.

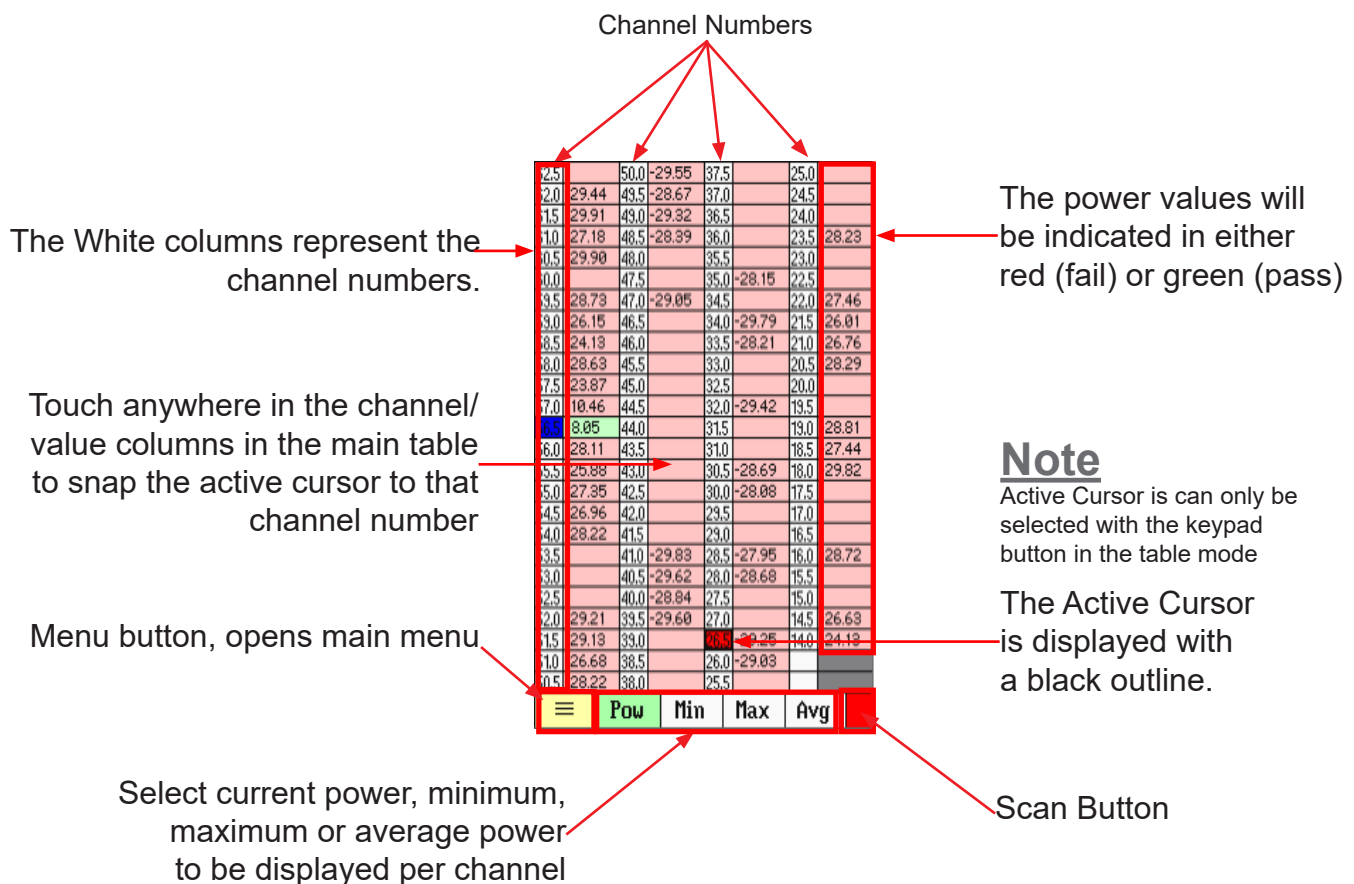


Fig 9.2

Note

Channels that pass based on the pass range setting will have dBm values displayed in green and failed channels will be displayed in red.

Section 9 Operation

9.7 6GHz Line Graph View

To enter the line graph view, pull up the icon menu or press the Menu button and touch the 6 GHz line graph icon.

The line graph shows the scan in 6GHz sections/slices with 8 channels per slice. When zoomed in at 2x or higher the graph will display shaded sections to indicated the 6GHz slices. Below the graph, the data associated with the A and B cursors is displayed in

Note

The line graph is only operational in the landscape mode.

6GHz Display Description

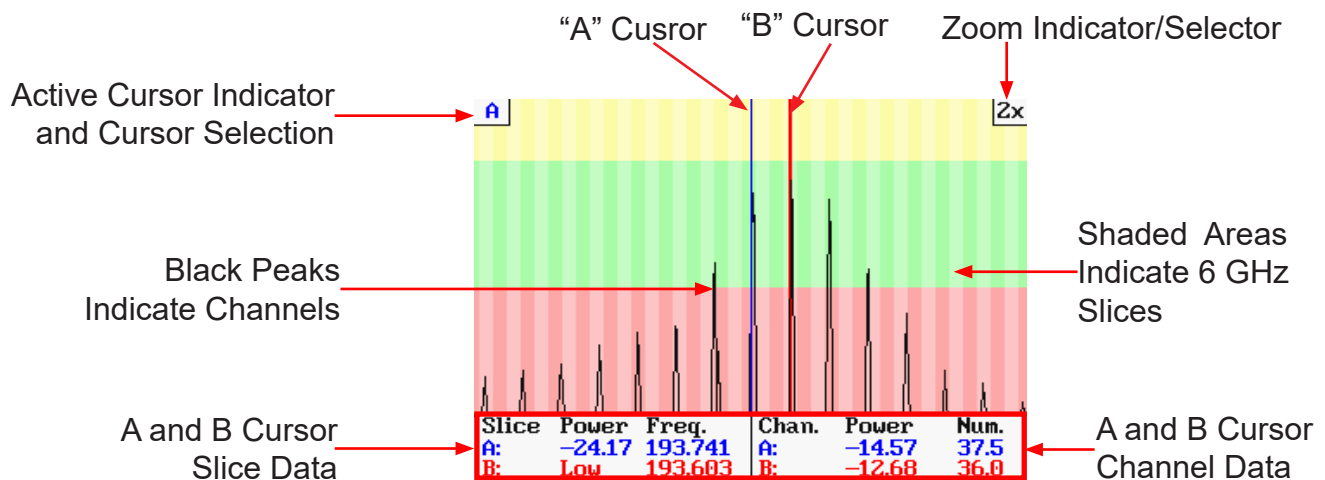


Fig 9.3

Cursor Selection and Movement

Use the A/B key or touch the indicator in the top left of the display to toggle between active cursors. To move the cursor use the left and right selection keys on the key pad (base on horizontal orientation) or touch the cursor on the display with the stylus and drag it left or right.

Zoom

In the top right of the display is the zoom level indicator and selector. Touch this to cycle through 1x, 2x and 5x zoom modes.

A and B Slice and Channel Data

At the bottom of the display is the power and frequency of the slice and the power and number of the channel selected with the A and B cursors. The total power of the slice will be show with a horizontal line drawn within that slice on the active cursor.

Note

Drag up from the bottom of the display to open the menu.

Section 10 File Management

File Management is accessed through the icon menu. To open the file management screen, bring up the icon menu, highlight the file management icon and press select on the keypad or touch the file icon on the display.

10.1 File Management Display

Main File Management Screen (OSA Folder)

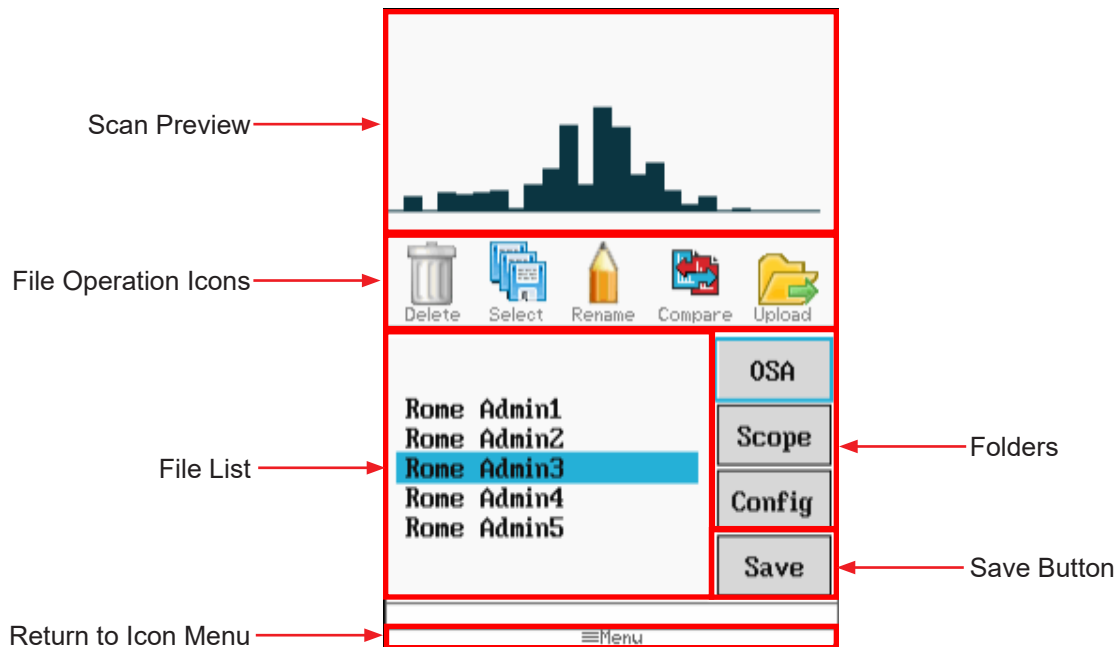
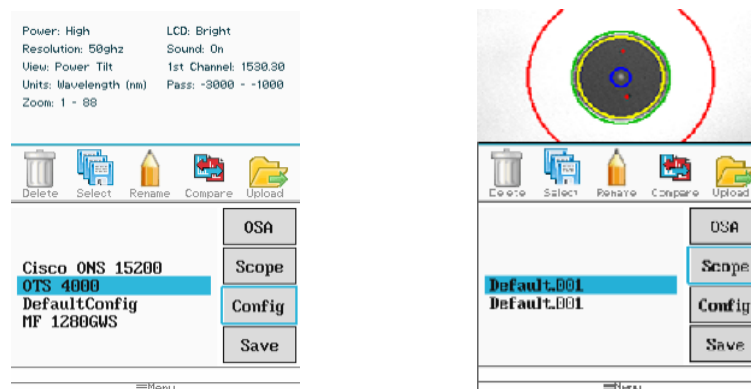


Fig 10.1

Configuration and Scope Folder Displays



Configuration Folder Open with
Configuration Preview at the
Top of the Display

Scope Folder Open with
Scope Image Preview at the
Top of the Display

Fig 10.2

10.2 Saving files

Saving OSA Files

To save an OSA scan, open file management, ensure the OSA tab is highlighted and touch save. The file naming screen with the onboard key will be displayed. The name of the last file saved during a session will be the default name and anytime the unit is powered on the default name reverts to “default” Use the onboard QWERTY keyboard to name the file and touch save.

Saving Scope Files

From within the file management screen, ensure the scope tab is highlighted and touch save. When the onboard QWERTY is displayed, enter the file name and touch save.

Saving Configurations

At any time the current parameters may be save as a testing configuration. To create a set of parameters, use the settings screen and set all the testing parameters to the desired values. Open the file management screen, highlight the Config tab and touch save. Name the configuration as required and touch save.

10.3 File Operations

Marking Files For Batch Operations

Multiple files may be uploaded (copied) to a computer, or deleted at a time. To mark the files for these operations, highlight a file to be included in the operation and touch the mark (select on some units) icon. The highlighted filename will now be displayed in red and the next file will be in the highlighted position. Continue marking (selecting) file by touching the mark (select) icon. To skip files simply move down the file list until the next file to be marked is highlighted and touch mark (select) again. The mark (select) is a toggle and to unmark a file, place it in the highlighted position and touch mark (select) again and it will be unmarked. Once the files are marked (selected) touch the icon for the delete or upload functions.

Note: If files have been marked for batch processing, only the marked files are process not the highlighted file as in single file processing. (The last file in a list may be marked when in the highlighted position)

Delete Files

To delete a single file, with the file name in the highlighted position, touch the delete icon. To delete a group of files, mark (select the files as noted in batch processing and touch the delete icon.

Note: Once the delete icon is selected, file are immediately deleted and they may not be recalled.

Rename Files

To rename a file, position the file to the highlighted position and touch the rename icon. Use the QWERTY keyboard to name the file as desired and touch save.

Compare Files

The compare files feature is used as described in Gain Tilt function and to simply overlay one scan to another. The primary scan is the first scan on the graph. This scan will determine the parameters and the data listed will be that of the primary scan. The primary scan is displayed in black and the secondary scan is displayed in pink.

New scans that have just be acquired but not saved may be used as the primary scan. Once the scan has been acquired, open file management, with OSA tab highlighted, highlight the file to be used as the secondary file and touch the compare icon. If the View is set to total power the scans are just in comparison mode with the primary scan information. If the view parameter is in Tilt Monitor mode the gain tilt regression line will be displayed.

Upload Files

The upload files icon is used to send files to the computer for use with the CertSoft software suite. One or more files may be uploaded at a time. Use the mark (select) feature to select multiple file or have the file to be uploaded in the highlighted position. With the OSA connected to the computer with the USB cable, and the CertSoft software running touch the upload icon and the files will transfer to the selected folder on the computer.

Note: config files cannot be transferred to the CertSoft software.

Section 11 Video Scope Operation

11.1 Entering Video Scope Function

To operate the video scope, from the home screen, highlight the Scope icon and press the select button. If a probe is not connected already, connect the VIS300 video probe to the video probe port on the top of the OTDR.

11.2 Video Scope

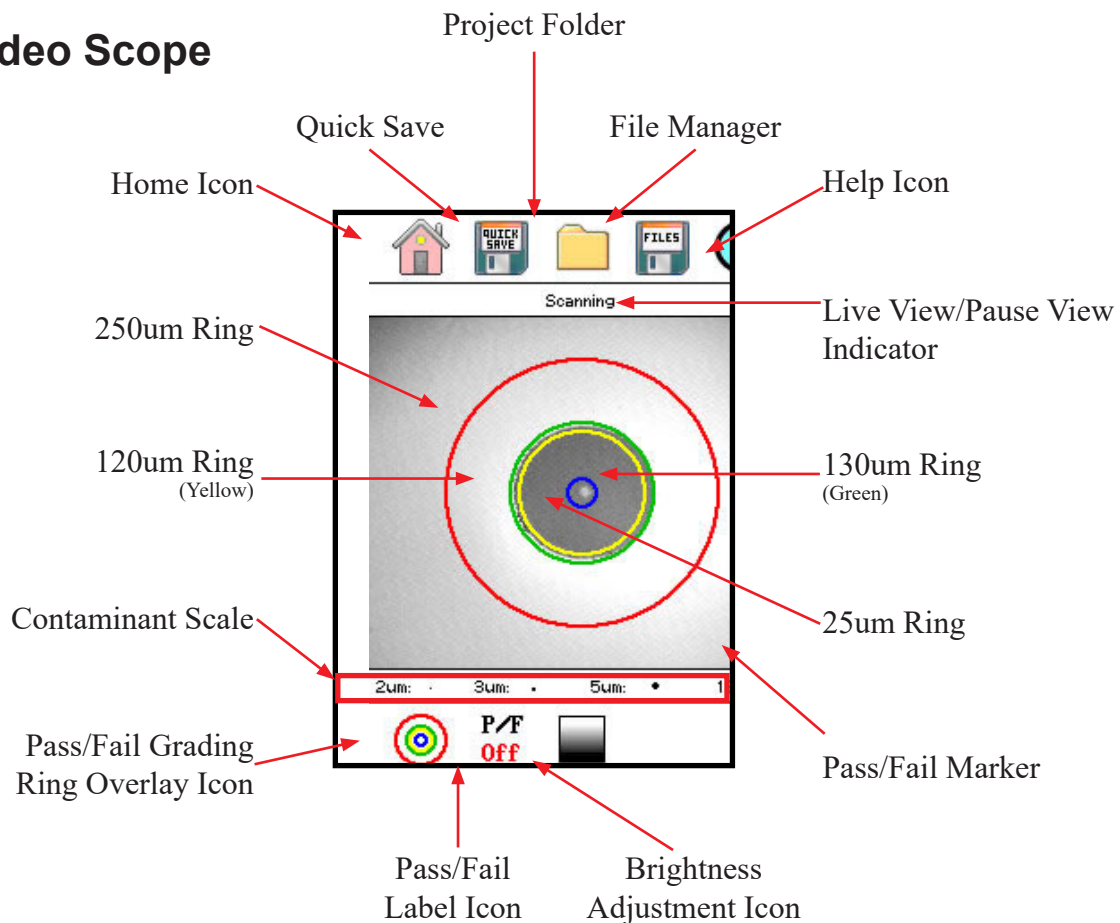


Fig 11.1

Touch Screen Tip

The icons on the video scope screen are operational with the touch screen feature, though this guide is written using the keyboard whenever it is available.

11.3 Video Scope File/help Icon Menu

The Icons at the top of the display are Home, file save, project management, file management and Help.

Home

Press the menu button, use the left and right buttons to highlight the home icon and press select to return to the home Screen.

Quick Save

Press the menu button, use the left or right buttons to highlight the quick save icon and press the select button to store a file image of the scope screen in the file folder within an active project. Scope files will be preceded by a target icon.

Project Management

To open project management, press the menu button, use the left or right buttons to highlight the project management folder icon and press select. Use the project management folder to open the project that the scope images are to be stored. When entering the video scope function, the active folder will be the one last used in the OTDR or LTS. For more information about the project management system, please refer to Chapter 9 of this guide.

File Management

To open file management, press the menu button, use the left or right buttons to highlight the file management icon and press select. Use File management to view a list of saved files or to open a stored image. File types are identified by the preceding icon. Trace files are indicated by a trace icon, LTS file by an LTS icon and scope files are preceded by scope (target) icon

Help

Press the menu button, use the left and right buttons to highlight the help icon and press select to view the help information.

11.4 Video Scope Operation Icon Menu

The following functions are only available for use when the video scope is in live scan mode.

Grading Rings

Used to turn on and off the rings that indicate the IEC61300-3-35 grading zones.

Enter the menu mode with the menu button, use the LRUD buttons to highlight the pass/fail grading rings overlay icon and press the select button. Exit the menu mode and use the LRUD buttons to center the image in the rings. Use the Pass/Fail Criteria Tables from page 44 to grade the connector end face. 2, 3, 5 and 10 micron contaminant examples are displayed just below the connector image on the video scope display.

Pass/Fail Label

Used to turn cycle through P/F (Pass/Fail) Off, P/F Man (In Red "Fail"), P/F Man (In Green "Pass") and P/F auto. To set the pass/fail indicator, press the menu button, use the left or right buttons to highlight the pass/fail icon and press select to cycle through the pass/fail states.

Touch Screen Tip

The touch screen may also be used to make these selections.

Brightness

Press the menu button, use the left and right buttons to highlight the brightness icon, use the Select button to cycle through the adjustments for the brightness level.

11.5 Video Scope Operation

Video Probe Tips

There are a number of video probe tips available. To remove a tip from the Probe, grasp the probe tip and unscrew the tip retention nut from the tip. Pull the tip straight up from the probe. To place a tip on the probe, ensure the lens is clean, slide the tip on to the end of the probe and tighten the tip retention nut. Do not overtighten the retention nut.

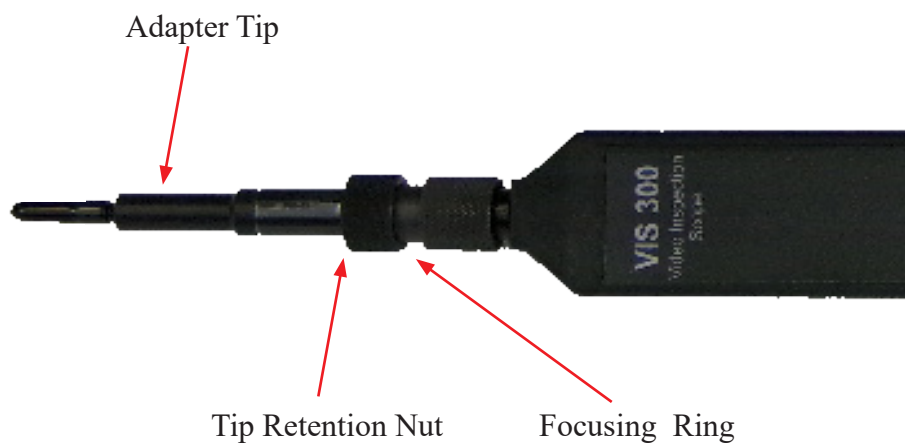


Fig 11.1

Viewing/Focusing a Connector

With the video scope turned on and the video probe plugged into the OTDR, insert a connector in to universal tip or insert the panel adapter tip into the appropriate port. The scope must be in the live scanning mode to make focus adjustments. Use the focus ring to get the connector image as sharp as possible. When using panel adapters it is possible to turn the body of the probe to while the adapter is inserted into the panel to make focus adjustments.

NOTE

To make position adjustments with the LRUD buttons, the unit must not be in menu mode. Menu mode is evident when there is a light blue box positioned around one of the icons. When the touch screen is used to roughly center the connector image, the menu mode is automatically turned off.

Centering a Connector Image

Once the image is stable and focused, use the stylus to touch the approximate center of the connector to snap the image near the center of the display and the center of the grading rings. Use the LRUD buttons to fine tune the image to the center of the display.

Pausing Image Scan

To freeze an image in position and focus level for inspection, press the scan button. This will pause the image at the current position and focus level. Simply press the scan button again to set the operational mode back to live mode for focus and position adjustments

Grading Rings

Turn on or off the grading rings by pressing menu and using the left or right buttons to highlight the grading ring icon and press select. The unit must be in live scan mode to turn the rings off or on.

Manual Pass/Fail

Use the pass/fail criteria tables on the next page to determine if the connector passes the IEC61300-3-35 standard. There is a guide to contamination size located at the bottom of the image. To mark a connector as Pass or Fail, enter the menu mode, highlight the Pass/Fail Label icon and press select to cycle through pass, fail, or no grading. This must be done in the Live Scan mode. Once the pass fail status has been entered, the scan may be paused with the scan button and the points of contamination that caused a failure may be marked on the image.

Manually Marking Points of Contamination

To mark the points of contamination the unit must be in paused mode. Pick up the contamination marker by using the stylus and touching the contamination sample size that is required. Touch the image to place the marker. The marker may be fine tuned with the stylus to cover the contamination point on the image to be marked. Once the marker is positioned properly, touch the area just below the image that states, "Place marker, touch here to apply" to lock the marker in place. Repeat this as necessary to mark all the points that need to be indicated for the pass/fail status. At this point the image should be save with the Quick Save icon

NOTE

Marking the points of contamination should be done last, just before saving the image. Once the unit is returned to live mode the markers are removed.

Auto Pass/Fail

Once the image has been centered in the grading rings, set the P/F icon to Auto and press the scan button. The video scope will evaluate the image and grade it with Pass or Fail. Contamination will be displayed on the image.

Exiting Video Scope Operation

Enter the menu mode, use the left or right buttons to highlight the Home icon and press select.

11.6 Pass/Fail Criteria Tables

Fiber End Face Criteria Table for Angled PC Polished Connectors

Zone	Description	Diameter	Allowable Scratches (Width)	Allowable Defects (Diameter)
A	Critical Zone	0 μ m to 25 μ m	$\leq 4\mu$ m	None
B	Cladding Zone	25 μ m to 120 μ m	No limit	No Limit < 2 μ m 5 from 2 μ m to 5 μ m None > 5 μ m
C	Adhesive Zone	120 μ m to 130 μ m	No limit	No limit
D	Contact Zone	130 μ m to 250 μ m	No limit	None $\geq 10\mu$ m

Fiber End Face Criteria Table for Ultra PC Polished Connectors

Zone	Description	Diameter	Allowable Scratches (Width)	Allowable Defects (Diameter)
A	Critical Zone	0 μ m to 25 μ m	None	None
B	Cladding Zone	25 μ m to 120 μ m	No limit $\leq 3\mu$ m None > 3 μ m	No Limit < 2 μ m 5 from 2 μ m to 5 μ m None > 5 μ m
C	Adhesive Zone	120 μ m to 130 μ m	No limit	No limit
D	Contact Zone	130 μ m to 250 μ m	No limit	None $\geq 10\mu$ m

Fiber End Face Criteria Table for SM PC Polished Conn. (Single Mode Fiber, RL ≥ 26 dB)

Zone	Description	Diameter	Allowable Scratches (Width)	Allowable Defects (Diameter)
A	Critical Zone	0 μ m to 25 μ m	2 \leq 3 μ m None > 3 μ m	2 \leq 3 μ m None > 3 μ m
B	Cladding Zone	25 μ m to 120 μ m	No limit $\leq 3\mu$ m None > 3 μ m	No Limit < 2 μ m 5 from 2 μ m to 5 μ m None > 5 μ m
C	Adhesive Zone	120 μ m to 130 μ m	No limit	No limit
D	Contact Zone	130 μ m to 250 μ m	No limit	None $\geq 10\mu$ m

Chapter 12 Loss Test Set

12.1 Entering Loss Test Set Function

The FTE-7000A may be equipped with a Loss Test Set which includes the power meter and CW source. On the home screen, touch the LTS icon or use the left or right button to highlight the LTS icon and press SELECT. All OTDRs will support the stable Light Source, though not all OTDRs will support the Power Meter.

NOTE:

All OTDRs will support the stable Light Source, though not all OTDRs will include the Power Meter.

NOTE:

The touchscreen operation will be used to guide the user through Loss Test Set operation.

12.2 LTS File/Help Icon Menu

Home

Touch the home icon to exit the LTS function and return to the home Screen.

Quick Save

Quick Save: Touching this icon will save the value on the display to the active project folder with an LTS label and files will be automatically incremented to the next numbered suffix.

Project Management

Project Folder: Opens the project management screen. For a full description of project management operation, please refer to "Chapter 9" of this user's guide.

File Management

File Manager: To open file manager touch the file manager icon. For a full description of project management operation, please refer to "Chapter 10" of this user's guide.

Help

Press the menu button, use the left and right buttons to highlight the help icon and press select to view the context sensitive help information.

Chapter 12 Loss Test Set

12.3 Power Meter Operation

Set Power Meter Wavelength

The Power Meter wavelength being tested is indicated in the bottom left of the display. To change the wavelength, touch the indicated value below Power Meter and a list of calibrated wavelengths will be displayed. Touch the wavelength to be tested and begin the test. Available wavelengths are 850/1300/1310/1490/1550/

1625nm for standard OTDRs and PON OTDRs. The CWDM OTDR has the standard wavelengths calibrated plus 1431-1611nm.

NOTE:

In the bottom right portion of the screen is reference indicator, this is where a reference may be set as well as setting the units of measure.

Set Reference

Connect the reference cable/s to the appropriate ports and touch reference in the bottom right of the display, touch the Set Reference tab and a non-volatile reference value will be displayed below the reference indicator in the bottom right of the display.

Set Measurements Units

The power meter displays measurements in dB (Relative) or dBm (Absolute) units of measure. dB measurements are used with a set reference as described above. dBm measurements do not take into account the reference and display the absolute power value received by the detector.

12.4 Light Source Operation

Selecting Light Source Wavelength

The light source is located in the top left portion of the display. Touch the source indicated or the OFF indicator and a list of available sources will be displayed. Touch the desired wavelength to turn on that light source, or Disable to shut the light source off.

Selecting Light Source Modulation

Modulation is located in the top right portion of the display. Touch the modulation value indicated and the list of available modulation values will be displayed. Touch the desired value to modulate the source or touch CW for a continuous wave. The available modulation values are CW, 270Hz, 1000Hz and 2000Hz.

Chapter 12 Loss Test Set

12.5 LTS Project Management

To save loss measurements to a project, touch the project management icon, highlight the project to be used and touch it again to open the projects folder. A list of files associated to that folder will be displayed. OTDR files are preceded with trace icon, the LTS file will have an LTS icon and scope files will be preceded by a target icon. To return to the LTS screen exit the file management screen by drawing down the file management menu, touching file to open the drop-down menu and touch the exit tab. For a full description of project management operation, please refer to "Chapter 9" of this user's guide.

12.6 LTS File Management

To open file manager touch the file manager icon. To save a file using the file manager, with the test data on the display, open the file management, open the drop-down menu under file by touching the file tab and touch save. Name the file as desired with the on-screen keyboard. Touch the file tab with Save highlighted press SELECT. Use the on-screen keyboard to enter a file name. For a full description of project management operation, please refer to "Chapter 10" of this user's guide.

NOTE:

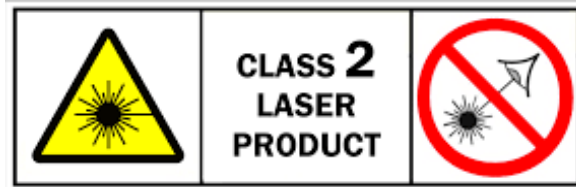
File names will be saved exactly as entered using this method. To have the files saved with incrementally number suffixes, use the file manager to save the base file name with the suffix number as the first file to be save in a sequence and then use the Quick Save icon moving forward. Example: Use file manger to save the file test as test.001 and when you use quick save for the next test, the file name will be test.001.

12.7 Exiting Lost Test Set

Touch the Home icon to exit the loss test set function and return to the home screen

Chapter 13 Visual Fault Locator

13.1 VFL Safety



Caution

This Visual Fault Locator is classified as a Class II laser system and must be used with all commensurate safety precautions. Never view the light emanating from the fiber directly. Place a white piece of paper at the end of the fiber and look for the presence of a red spot on the paper.

13.2 VFL Description

The Visual Fault Locator emits visible (red) light at the 650 nm wavelength. Its intended function is to allow an operator to identify the exact location of a break, micro bend, or other discontinuity in a fiber optic cable. As the radiation is visible, light emanating from a break or micro bend enables the user to locate the exact position of a fault even at very short distances that would not be detectable by conventional means such as an Optical Time-Domain Reflectometer, (OTDR). It is also useful for identifying a particular fiber in a cable by exciting the fiber to be located with visible radiation.

13.3 VFL Operation

The Visual Fault Locator is accessed from the Home screen.

The fiber to be tested is connected to the VFL port of the OTDR by means of a standard 2.5 mm fiber optic connector. The source may be used in one of its two modes, Modulated or Continuous. In the modulated mode the laser is turned on and off at a 6 Hz rate. The laser is on for approximately one third of the cycle. This mode is helpful in permitting the user to identify the source radiation in the presence of high levels of ambient light. It also aids in conserving battery life.

The usable range for fault location depends on many factors, the type of fiber, the type of cable, the overall loss.

To activate the VFL, tap the VFL icon to cycle through the available states of off, Continuous and Modulated.

Section 14 Maintenance

14.1 Battery Replacement

To replace the batteries, remove the OSA from the protective boot by pulling the bottom of the boot down and back allowing the bottom of the unit to be lift out. The battery door is located on the back side of the unit. Replace the batteries with only high quality AA NiMH batteries. Spare battery packs are available with a charging unit for extended battery operation. If you install NiMH batteries that are dead or less than 1 volt each, charge these batteries for one (1) hour before using the OSA. For proper maintenance, batteries require a monthly recharge.

Warning

To Prevent Fire or Shock Hazard:

- Do not install battery types other than those specified by the manufacturer
- Do not use the charger without the batteries installed
- Do not expose the battery charger to rain or excessive moisture
- Do not use the AC adapter when there are signs of damage to the enclosure or cord
- Ensure that you are using the correct charger for the local line voltage
- Do not use any other charger than the one provided with this instrument.

Failure to follow these caution statements may void the warranty of this equipment.

Note

For maintenance, batteries require a monthly recharge.

14.2 Calibration and Verification

Periodic verification of the Optical Spectrum Analyzer is recommended to ensure that your instrument remains within specification. Although not imperative, we recommend a calibration and verification once a year to make certain the instrument is functioning properly and performing to its rated specifications. Consult the factory for service.

14.3 Optical Spectrum Analyzer Adapter Replacement

The Optical Spectrum Analyzer is supplied with two easily interchangeable adapters per port, SC/FC. To change an adapter, remove the two screws that hold the adapter in place, pull the adapter straight up from ferrule. It is suggested that you clean the exposed ferrule with appropriate cleanser and lint free wipe anytime you replace the ferrule.

Note

In order to maintain a low loss fiber connection, care should be taken to adequately clean the ferrule of any connector to be connected to the OSA. In the event that the port needs to be cleaned, first step is to be certain the instrument is off. We suggest the use of isopropyl alcohol and foam swabs specifically designed for cleaning connectors accepting 2.5mm ferrules.

Note

When replacing the adapter with one that does not have a chained protective cap, use the small screw in place of the larger screw that retains the end of the chain to the adapter base.

Section 15 Specifications

DWDM Channel Analyzer Specifications	
Wavelength Range	98 Channel 196.25 THz - 191.45 THz (1527.6 nm to 11566.31 nm) Channel 14-62.5
Channel Spacing	96 Channel 50GHz or 100GHz
Wavelength Accuracy	±0.1nm
Channel Power Range	+10dBm to -50dBm
Absolute Accuracy	±1 dB
Max Composite Power	+28 dBm
PDL	±0.15dB
Optical Rejection Ratio	40dBc (@50GHz)
Measurement Time	< 1/2 Second
Readout Resolution	0.01dB
Return Loss	>40dB
Optical Interface	Universal (FC/SC) UPC or APC
Graphical Display	bar graph, table view and 6 GHz line graph
Display	4 in. Touch color TFT
Dimensions	7.62" L x 3.88" W x 1.56" H (194mm L x 99mm W x 40mm H)
Weight	1.6 lbs
Battery	Li-ion - 12 hours operating time (typ)
Power	100-240 universal US, GB, EU, AU Mains, 15V, 1.2A
Environmental	Operation -10°C to 50°C
Accessories Included	Universal power supply with mains for US, UK, CE and AU. Interchangeable FC and SC adapters, CertSoft Software Suite, USB cable, manual on CD, rubber boot and Stylus

Specifications are subject to change without notice

Section 16 Warranty and Repair

16.1 Warranty Information

This product, including all mechanical, electrical, and optical parts and assemblies are unconditionally warranted to be free of defects in workmanship and material for a period of one (1) year from the date of delivery.

This warranty does not apply to expendable parts such as batteries or optical panel connectors, nor to any instrument or component which has been subjected to misuse, alteration, or fiber connector damage. It is the customer's responsibility to understand all the instructions and specifications prior to operating this instrument. This warranty does not extend to any loss or damage consequent to the failure of the warranted product.

16.2 Repair Information

If repair is required, simply call the factory for return instructions and a return authorization number (RMA).

Section 17 Trouble Shooting Guide

Symptom	Possible Cause	Solution
LCD dark	Power not on	Press ON/OFF key
	Batteries require recharging	Recharge batteries
	Batteries are missing, in backwards or need replacement	Check polarity, replace batteries, or contact factory for servicing
LCD white	Power cycled too quickly	Turn off wait 10 seconds – turn on
Instrument locked Up	Unexpected Operational Mode	Turn off (hold ON/OFF button in for 1 second) wait 10 seconds – then depress On/Off again button to turn the unit on.
Activity indicator does not change to standby or active mode	Power cycled too quickly	Turn off wait 10 seconds – turn on
Low or no power being displayed	Defective cord or dirty connector	Replace or clean cord
	Fiber Output port requires cleaning	Clean and inspect port
	Angle polish mated with UPC polish	Examine connector ends for damage. Use UPC Connectors ONLY!
USB hookup to PC not functioning properly	USB baud rate not set properly or too quick for computer	Set port baud rate properly or decrease Baud rate in instrument and certification software
	PC drivers not set properly	Un-install & re-install certification software and drivers

Section 18 Version Control

Through a program of continuous improvement, we upgrade the features and performance of the instrument in an on going process. The instrument firmware version is accessible at “turn-on” on the bottom right-hand corner of the display. The version changes and approximate release dates are as follows.

- V1.1.3.0 - 8/2017 - Original release
- V 2.0.0.0 - 8/3/20 -
 - Added 6.25ghz slice line graph mode
 - New file format supporting data for 784 slices and stats for up to 100 channels
 - Added power meter
 - Added VFL
 - Added home screen with access to VFL, PM, OSA, Scope
 - Added min/max/avg stats for OSA