Measurement
Devices

OptoTest
Test Solutions for Fiber Optics

LASER
COMPONENTS®

OPL-PRO
Instruction Manual

Rev 8

LASER COMPONENTS®

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Overview

The OPL-PRO is the companion software of the OptoTest OP8XX and OP9XX Series test equipment. It offers the following features and functions:

Configuration of following measurements:
Unidirectional IL measurement
Automated Bidirectional IL measurement (with supported instruments)
Unidirection RL measurement (with supported instruments)
Manual Bidirectional RL measurement (with supported instruments)
Single wavelength, dual, triple, or quad wavelength measurements

User selectable parameters for:
Averaging reference measurement for better accuracy
Pass/fail condition for IL in either direction for either wavelength
User prompts

Support of part number and sequencing serial number.

Storage of the measurement data to EXCEL file for further processing or report generation.

Measurement log for auditing purposes.

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Installation

OPL-PRO is shipped or downloaded as a self-extracting executable OPLPRO.EXE.

Upon execution the software is extracted and installed into C:\program files\OptoTest\OPLPro. Included in the installation are sample configuration files.

USB Driver Installation

To operate the OP Series Equipment from the computers' USB bus, the USB driver needs to be installed. By executing the DRIVER.EXE the necessary files will be copied to C:\OptoTest\Driver.

When the OP Series Equipment is first connected to the computer via the USB cable, the operating system will inform you that a new USB device has been connected and eventually starts the Hardware Update Wizard.

Follow these steps:

Use the option "Install from a list or specific location" that allows you to select the location of the driver yourself.

Use the browse button to locate the directory **C:\OptoTest\Driver** and proceed with the installation.

Windows XP

Some installations of Windows XP will prompt with an incompatibility warning, select "Install Anyway".
The wizard will recognize the "OptoTest OP-USB" extract the driver files into the windows system directory.

Startup

At startup OPL-PRO checks for and lists all available OptoTest USB devices, if more than one instrument or module is connected a list of available devices is presented as follows:
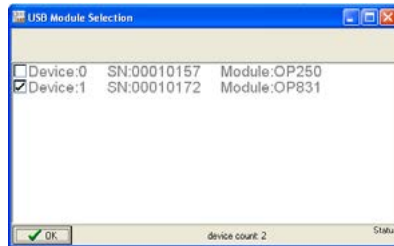
NOTE: Although other OP devices are recognized the OPL-PRO only communicates with the OP8XX and OP9XX series of instruments. The USB module selection automatically selects the first available compatible unit.

NOTE: If only one OP Series Equipment instrument is present on the USB port this window is not displayed.

Configuration Files

At startup following configuration files are required:

c:\program files\optotest\OPLPRO\ini\OPxxx.INI   Structured text file that stores the overall settings of the OPL-PRO application.

c:\program files\optotest\OPLPRO\config\defaultParameters.xls   EXCEL spreadsheet file that stores a basic set of measurement configurations.

Other files required for proper operation of the application
c:\program files\OPLPRO\optotest\images\   Bitmaps for buttons used in application

Configuration File

The configuration file is in EXCEL format and can be modified easily using any version of EXCEL or compatible applications. Each row in the configuration file defines a measurement sequence for one particular cable type. A typical listing is shown below.

OPL-PRO Advanced *Cable Test Solution*   Version   1.01

ID	Configuration Setup	Partnumber	Wavelength A WL[nm]	ILmax [dB]	Wavelength B WL[nm]	ILmax [dB]	Retests [#]	Direction A-B	Direction B-A	SNPrefix	SN Start	SNPostfix	Instructions to user
1	A-B Dual Wavelength	FCPC	1310	0.2	1550	0.2	5	X		PC	10101	ZX	clean before measure
2	B-A Dual Wavelength	FC-APC	1310	0.2	1550	0.2	5		X	APC	10101	CC	clean before measure
3	BiDi Dual Wavelength	FCPC-MM	1310	0.2	1550	0.2	5	X	X	PCMM	10101	RB	clean before measure
4	BiDi 1310 Wavelength	FC-UPC	1310	0.2	0		5	X	X	UPC	10101	PL	a special instruction here

Field Description

Column	Header	Description
A	ID	Consecutive number
B	Configuration Title	This text is displayed as the configuration title and should be used to identify the configuration
C	Part number	The "part number" is displayed in the part number field on the screen and can be used to identify part or assembly numbers
D	Channel	Set to 0 – reserved for multi channel applications
E	Wavelength A[2]	Wavelength[1] in [nm] of the first wavelength to be used to measure the insertion loss.
F	IL max	Pass/Fail limit for insertion loss
G	Wavelength B[2]	Wavelength[1] in [nm] of the second wavelength to be used to measure the insertion loss. Place a zero in this column if this is a single wavelength measurement.
H	IL max	Pass/Fail limit for insertion loss for the 2nd wavelength, leave blank if it is a single wavelength measurement.
I	Retests	Number of retests allowed for this sequence, a fail condition will trigger a retest. Set retest to 0 if no retests allowed.
J	Direction A-B	Mark with an X to execute the measurement in that direction. Enter "OPM2" for an OP831 with an external detector. This will use the A-B source in conjunction with the external OPM. For FTTX measurements enter IL or ILRL to instruct the unit to measure at 13/15.
K	Direction B-A	Mark with an X to execute the measurement in that direction. Enter "OPM2" for an OP831 with an external detector. This will use the B-A source output in conjunction with the external OPM. For FTTX measurements enter IL or ILRL to instruct the unit to measure at 14/16.
L	Serial number prefix	The serial number prefix will precede the numeric serial number that automatically increments.
M	Serial number start	Numeric start for the serial number automatically incrementing.
N	Serial number postfix	The serial number postfix will follow the numeric serial number that automatically increments.
O	Instructions to user	This comment will be displayed to the user at the start of the measurement.
P	Log Temp	An "X" in this cell notifies OPLPro to log the temperature in the datafile.
Q	RL max	Pass/Fail limit for the return loss (Note: used only for the OP930)

1) Note that the selected wavelength needs to be supported by the instrument in use.

2) Note that for the OP930-FTTX tri/quad wavelength units entering 1310 in column E will instruct the software to measure IL or RL at both 1310nm and 1550nm. Entering 1550 into column G will instruct the software to perform the measurements with the 1490nm and 1625nm sources.

Selecting the Parameter File
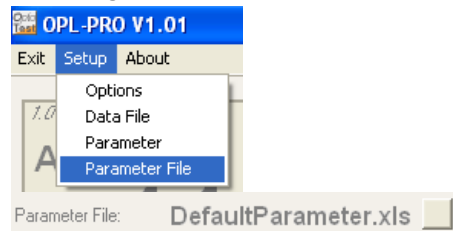
To select or change the parameter file use either the Setup | Parameter File menu

Or the button next to the parameter file label.

Changing the Configuration

The content of the parameter file as well as selecting the particular configuration is done with the Setup | Parameter menu or by clicking the button next the configuration label.
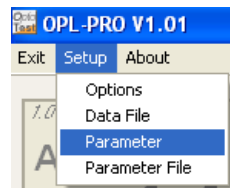
Select the configuration for the measurement to be executed and click the accept button. By double clicking a configuration, a more comprehensive view of the particular configuration is displayed. That view also allows temporarily changing parameters.
NOTE: Those changes are not stored into the configuration EXCEL file.

C:\OptoTest\Delphi\OPL8-Pro\config\DefaultParameter.xls

Selected Configuration: BiDi Dual Wavelength

Parameter File

ID	Configuration Setup	Partnumber	WL[nm]	ILmax [dB]	WL[nm]	ILmax [dB]	Rete	Direction	Direction	SNPrefix	SN Start	SNPostfix
1	A B Dual Wavelength	FCPC	1310	0.2	1550	0.2	5	X		PC	10101	ZX
2	B-A Dual Wavelength	FC-APC	1310	0.2	1550	0.2	5		X	APC	10101	CC
3	BiDi Dual Wavelength	FCPC-MM	1310	0.2	1550	0.2	5	X	X	PCMM	10101	RB
4	DiDi 1310 Wavelength	FC-UPC	1310	0.2	0		5	X	X	UPC	10101	PL
5	BiDi 1550 Wavelength	FC-UPC	1550	0.2	0		5	X	X	UPC	10101	PL
6	A-B 1310 Wavelength	FC-UPC	1310	0.2	0	0	5	X		UPC	10101	PL
7	A-D 1550 Wavelength	FC-UPC	1550	0.2			5	X		UPC	10101	PL
8	B-A 1310 Wavelength	FC-UPC	1310	0.2	0	0	5		X	UPC	10101	PL
9	B-A 1550 Wavelength	FC-UPC	1550	0.2			5		X	UPC	10101	PL
10	DiDi Wavelength no supported	FCPC	050	0.2	1400	0.2	5	X	X	PC	10101	ZX
11	Dual Wavelength no switch	FCPC	1310	0.2	1550	0.2	5			PC	10101	ZX
3	BiDi Dual Wavelength	FCPC-MM	1310	0.2	1550	0.2	5	X	X		0	
12	Bogus	XXXX	XXXX	XX	XXXX	XX	X	X	X	XX	XXX	XX

Exit   Accept

Creating/Editing Configurations

As stated above creating and editing existing configurations is as simple as altering a cell in Excel. To access the current configuration file through OPLPro select *Edit Parameter in Excel* under the **Setup** menu. This opens Excel and loads the current configuration file for editing. An Excel configuration file is shown below:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	OPL5-PRO Component Test Solution						Version		2						
2					Wavelength A	Wavelength B									
3	ID	Configuration Setup	Partnumber	CH	WL[nm]	WL[nm]	ILmax [dB]	Rlmax[dB]	Retests [#]	Measurement	X-SNAut	SNPrefix	SN Start	SNPostfix	Instructions to user
4	1	ILRL Dual Wavelength	FCPC	1	1310	1550	0.2	-45	5	ILRL	J		10101		clean before measure
5	2	ILRL APCDual Wavelength	FC-APC	1	1310	1550	0.2	-45	5	ILRL	J		10101		clean before measure
6	3	IL Dual Wavelength	FCPC-MM	1	1310	1550	0.2	-45	5	IL	J		10136		clean before measure
7	4	IL 1310 Wavelength	FC-UPC	1	1310	0	0.5	-45	5	IL	J		10003		a special instruction here
8	5	IL 1550 Wavelength	FC-UPC	1	1550	0	0.35	-45	5	IL	J		10109		clean before measure
9	6	1310 Wavelength	FC-UPC	1	1310	0	0.5	-45	5	ILRL	J		10101		clean before measure
10	7	1550 Wavelength	FC-UPC	1	1550	0	0.5	-45	5	ILRL	J		10101		clean before measure
11	8	B-A 1310 Wavelength	FC-UPC	1	1310	0	0.5	-45	5	ILRL	J		10101		clean before measure
12	9	B-A 1550 Wavelength	FC-UPC	1	1550	0	0.2	-45	5	ILRL	J		10101		clean before measure
13	10	BiDi Wavelength no supporte	FCPC	1	850	1480	0.2	-45	5	ILRL	X	PC	10102	ZX	clean before measure
14	11	Dual Wavelength no switch	FCPC	1	1310	1550	0.2	-45	5	ILRL	X	PC	27	ZX	clean before measure
15	12	MM 850	OC001	1	050	0	0	-45	5	ILRL	X	PC	10101	ZX	clean before measure
16	13	MM 1300	OC002	1	1300	0	0	-45	5	ILRL	X	PC	10101	ZX	clean before measure
17	14	MM 85/1300	OC003	1	850	1300	0.1	-45	9999	ILRL	X	PC	10104	ZX	clean before measure

To customize a configuration it is recommended that the user edits the default parameter file supplied with OPL-Pro, but before altering any portion of this file be sure to make a back up copy of the original. The original parameter file can be found in the "Config" directory inside the root OPL-Pro directory that the user specified during installation. The name of this file is DefaultParameter.XLS.

Configuring OPL-Pro to test with external sources

OPLPro allows the user to configure data logging for external sources. To configure the software for this function the user must specify the wavelength at which the measurements will be made and notify the software that any external source will be used. To do this, "EXT" must be placed in the "Channel" column of the parameter file for this specific configuration and to specify the wavelength the wavelength must be entered into the "Wavelength A" column.

Data File

All data files are stored in EXCEL (filename.XLS) format.
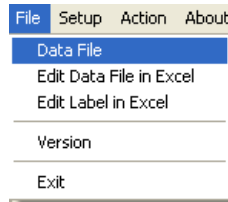
To assign the data file or create a new data file use the File | Data File menu.

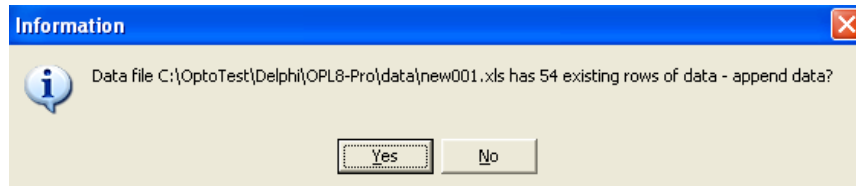If the data file specified already exists, the option is presented to append the data to the existing data file or to overwrite the content of the existing data file.

NOTE: If "No" is selected at this point, there will be no further prompting.
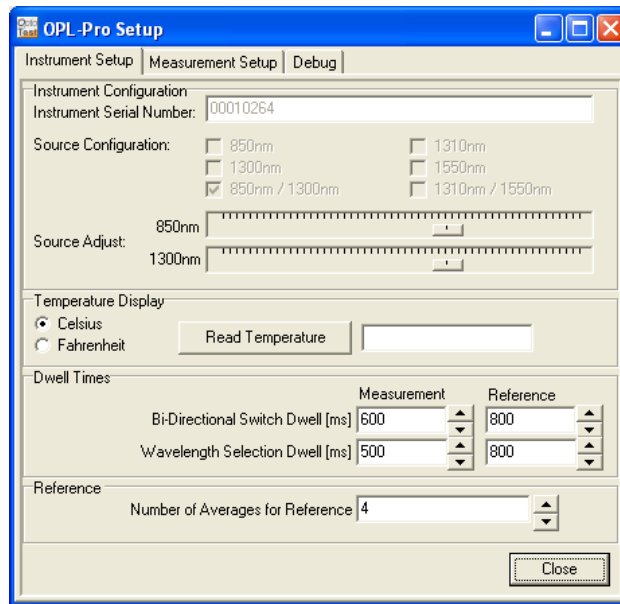
File Structure

OPL-Pro will output all necessary test information into an Excel file, which can be used to create professional test reports. It outputs the date, time, serial number, direction of test (1 for A-B, 2 for B-A), absolute power reading, relative power reading (IL), temperature, and the name of the parameter file used.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2														
3		Date	Time	SN	Dir	Abs	IL850	wavelength	Dir	Abs	IL1300	wavelength	temperatur	parameter/config
4		7/13/2006	2:08:29 PM	PC10101Z	1	-14.5466	-0.00018	850	1	-11.5197	0	1300	28.37	DefaultParameter.xls.MM 85/1300
5		7/13/2006	2:08:33 PM	PC10101Z	1	-14.5455	-0.00127	850	1	-11.523	0.003245	1300	28.37	DefaultParameter.xls.MM 85/1300
6		7/13/2006	2:08:42 PM	PC10101Z	1	-14.5451	-0.00164	850	1	-11.5197	0	1300	28.37	DefaultParameter.xls.MM 85/1300
7		7/13/2006	2:08:45 PM	PC10101Z	1	-14.5447	-0.002	850	1	-11.5197	0	1300	28.37	DefaultParameter.xls.MM 85/1300
8		7/13/2006	2:08:50 PM	PC10101Z	1	-14.5444	-0.00236	850	1	-11.5214	0.001622	1300	28.37	DefaultParameter.xls.MM 85/1300
9		7/13/2006	2:08:53 PM	PC10101Z	1	-14.5444	-0.00236	850	1	-11.5197	0	1300	28.37	DefaultParameter.xls.MM 85/1300
10		7/13/2006	2:08:55 PM	PC10101Z	1	-14.544	-0.00273	850	1	-11.523	0.003245	1300	28.54	DefaultParameter.xls.MM 85/1300
11														

The data always starts on the third row and second column. During the testing process the user can monitor the testing progress via the text box below the LOG spreadsheet in OPL-Pro. The name of the data file is also displayed here.

Options

The general options of OPL-PRO are accessible through **Setup | Options**.

Instrument Setup:

Instrument Serial Number:	Serial number of the unit
Source Configuration:	Shows the source configuration
Source Adjust:	Allows adjustment of the power level of the source, a setting all the way to the left will TURN OFF the source
Temperature Display:	Switches the OP8XX display between Celcius and Fahrenheit.
Dwell Times:	Allows the adjustment of the dwell times for the bidirectional switching as well as the wavelength switching for both the measurement process and the referencing process. The dwell time is the time the instrument waits and lets the source, switch and power meter settle before taking a measurement. By

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	shortening the times to less than **500 milliseconds** the insertion loss measurement will become less accurate however the overall measurement time will be shorter.
Reference:	Set the number of averages to be taken for a reference cycle. The default setting is four.

All those settings are being retained in the OPXXX.INI file and need to be set only once.

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Measurement Setup

Precision:	The user can define the precision of the IL measurements.
DUT Length:	This specifies the maximum length of the DUT and configures the OP930 pulsing rate accordingly. (Note: This only applies to the OP930 with return loss measurements.)
Serial Number Configuration:	Checking the "Auto Increment" box will automatically increment the serial number of the cable under test and record that in the test report. The two boxes labeled "A:" and "B:" correspond to the way a serial number will be reported when both sides of a cable are tested. The user can place values here that will designate which side is tested by adding the postfix entered into the box by the user.

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Data Processing	Snap Shot: This allows for the user to "wait" until the Real-time update stabilizes, then when the user presses the [Test] button the data from the Auto-Update boxes will be recorded in the data file.
	Measurement Delta: This value can be altered in the INI file and specifies the maximum change from one test to the next. If the current test's value is this much greater than the previous then the software will automatically take another measurement to make sure the measurement value is correct.
	Measurement Loops: This is the amount of automatic retests the software will take if the "delta" value is greater than the one specified.
Data Display:	Real-time Display:
	Insertion Loss Update: The values in these two boxes designate the duration between updates.
	Return Loss Update: This value designates the time between the RL updates.
	(Note: If both IL and RL are to be measured then the total time for IL and RL measurements for both wavelengths is close to the sum on these three values. Real update times depend on the computer and the OptoTest unit connected to the computer.)
Data Reporting:	Report Pass Only: With this box checked the software will only export to the test report the measurements that are within the specification (limits) defined for the measurement type.
	Data Path and File: This displays the path and filename of the test report.
Label Printing:	Label Definition Start Row: This value designates the row where the data will be output to.
	Label Template File: This specifies the file and directory of the Template file for the label.

OPL-Pro Appearance

OPLPro has a setting that allows the user to view a more compact display. Clicking **Collapse** under the **Setup** menu will force OPLPro into compact mode and will look somewhat like this:

This displays only the left column of OPLPro, the current IL measurement and takes out of view the spreadsheet on the right displaying the past measurements.

To get out of this view and back to the full view, click on **Expand** under the **Setup** menu.

Log

The log reflects all the activity during a measurement session for auditing purposes. Each event is time stamped and all essential information is captured so that measurements or changes can be reconstructed if needed. The log can be cleared **Clear Log** or stored **SaveLog** with a **right mouse click.**

Time	Serial	Dir	Ref[dBm]	IL[dBm]	WL[nm]	Pass/Fail	Parameter/Config
10:52:17 AM	Reference Avg	A-B	-15.513		1310		
	Reference Avg	A-B	-14.663		1550		
10:52:30 AM	Reference Avg	A-B	-15.508		1310		Clear Log
	Reference Avg	A-B	-14.664		1550		SaveLog
	Reference Avg	B-A	-15.300		1310		
	Reference Avg	B-A	-14.575		1550		
10:52:46 AM	PCMM10101RB	A-B	-15.508	-0.008	1310	PASS	DefaultParameter.xls.BiDi Dual Waveler
10:52:47 AM	PCMM10101RB	A-B	-14.664	-0.016	1550	PASS	DefaultParameter.xls.BiDi Dual Waveler
10:52:48 AM	PCMM10101RB	B-A	-15.300	0.077	1310	PASS	DefaultParameter.xls.BiDi Dual Waveler
10:52:49 AM	PCMM10101RB	B-A	-14.575	0.012	1550	PASS	DefaultParameter.xls.BiDi Dual Waveler

AutoUpdate Feature

| 850nm | **-0.005** | dB | ☑ |
| 1300nm | **-0.002** | dB | ☑ |

IL
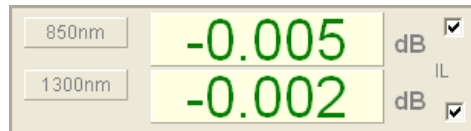
The Automatic Update feature allows the user to see the real-time insertion loss (and return loss if the module supports RL measurements). If the OptoTest module being used supports RL measurements another display will be shown below the IL display. The user can choose which measurements are to be displayed by checking or un-checking the boxes to the right of each display. Since RL measurements are simultaneous, the user can choose to either have the RL displayed for both wavelengths or for neither.

The OP815D (Duplex Test Systems) will display the real-time insertion loss measurements for both channels. The autoupdate measurements on the top correspond to channels one and the measurements on the bottom correspond to channel 2.

(Note: For the FTTX tri/quad wavelength OP930s, only the 1310nm/1550nm set of wavelengths can be viewed in the AutoUpdate screen.)

Measurement Result and Control

| **Ref** | Executes a reference cycle. |
| **Next** | Advances to the next serial number. |
| **Retest** | If a test fails a retest is prompted until reaching the set limits of retests. |

Referencing

To reference for insertion loss measurements then all one needs to do is connect the reference cable from the front panel optical out port to the optical detector and press reference. After this process is completed the user can begin to take insertion loss measurements.

To reference for both return loss and insertion loss measurements with the OP930 one must connect an APC to PC cable or an APC to APC cable that is coupled to a PC polished connector to produce a sufficient reflection for the OP930 to see and then click on the reference button. The following screen will pop up.

Return Loss Reference

Next — Establish Reference Reflection at end of Reference Cable

Skip this step

Done
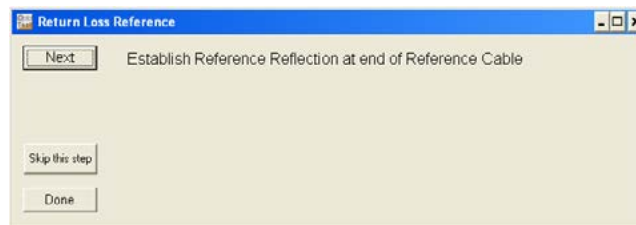
Once a reference reflection is established at the endface of the fiber click on [Next].
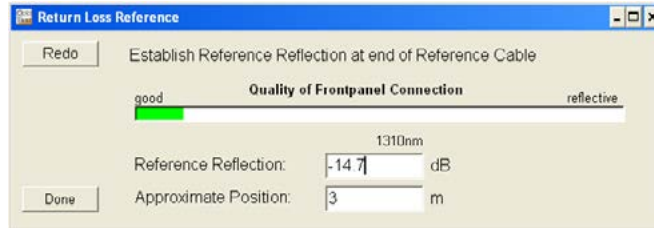
The unit will find the reflection at the endface and also evaluate the quality of the front panel connection. If the bar turns red then the front panel reflection is too high and could affect the return loss measurements.

The user will then be prompted to connect the open endface of the reference cable to the optical power meter to reference for insertion loss.

Measurement Hotkeys

OPL-Pro has preset hotkeys which allow for a faster measurement and testing process. Pressing these buttons will execute an action.

[N] Pressing the "N" button will advance the software to the next cable. It is the equivalent of clicking [Next].

[Space] Pressing the spacebar is the equivalent of clicking [Test].

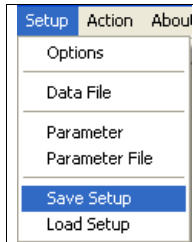[R] Pressing the "R" button is the equivalent of clicking on [Ref].

[8] Pressing [8] will increment the serial number.

[2] Pressing [2] will decrement the serial number
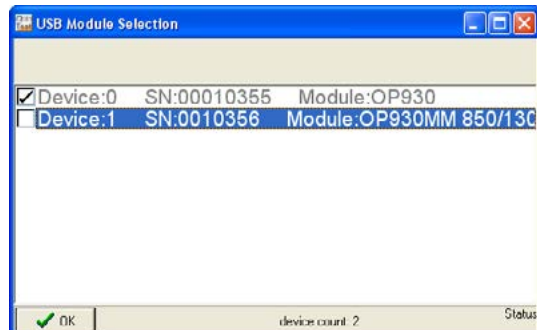
Loading/Saving Settings

The user may save the settings of their test and measurement session for future sessions, or the user can load settings of a past sessions.

Setup Action About Options Data File Parameter Parameter File Save Setup Load Setup	**Saving Settings:** To save a session's settings for future use simply click on **Save Setup** under the **Setup Menu**. Here one can specify the file name to save the settings in. **Loading Settings:** To load the settings click on **Load Setup** under the same menu and select an existing INI file to load the settings.

Operating a Single mode and Multimode Unit

When a single mode OP930 and a multimode OP930 are connected to the same computer the instrument to be operated is selected at the time when starting up the OPLPro.

If more than one OP930 is connected the dialog screen will list the connected instruments by serial number and product identification. Select the unit to be operated and continue with the startup process of OPLPro.

USB Module Selection

☑ Device:0   SN:00010355   Module:OP930
☐ Device:1   SN:0010356   Module:OP930MM 850/130

✓ OK   device count: 2   Status-

Notes on measuring ILRL with an OP930FTTX system

Configuring OPLPro to measure ILRL is a bit different than for a typical dual wavelength system. The OP930FTTX system can be viewed as two dual wavelength systems switched together. One a 13/15 source and the other a 14/16 source. Due to the fact that the unit is switched together the ILRL real-time update is only performed for the 13/15 side of the unit.

Setting up the correct configuration

The configuration file must be setup correctly for OPLPro to correctly measure IL and/or RL at all four wavelengths. The following is an excerpt of a correct FTTX configuration.

ID	Configuration Setup	Partnumber	Channels	WL[nm]	ILmax [dB]	WL[nm]	ILmax [dB]	Retests [#]	Direction A-B	Direction B-A
8	FTTX IL	OC008	1	1310	0.5	1550	0.5	5	IL	IL
9	FTTX ILRL	OC009	1	1310	0.5	1550	0.5	5	ILRL	ILRL

This excerpt only shows the first 11 columns of the configuration file. The first configuration row shows how it would be setup for simple IL measurements, while the second configuration row shows how the system would be setup for IL and RL measurements. The IL pass criteria in the 6th column is applied to both 13/15 measurements, just as the IL pass criteria in column 8 applies to both 14/16 measurements. For RL pass criteria the value entered into column Q refers to the RL pass criteria applied to the 13/15 source and the value entered into column R is applied to the 14/16 sources.

Notice that the column that designates wavelength A has 1310 entered and the column that designates wavelength B has 1550 entered, these values don't designate the wavelengths that will be measured for an FTTX system, but rather the 1310 enter means that measurements will be taken using the 13/15 source, and the 1550 entered into the Wavelength B column instructs the system to make measurements at 14/16. The measurements to be perform are entered into the "direction" columns ("Direction A-B" and Direction "B-A"). "Direction A-B" corresponds to the 13/15 side of the unit, while "Direction B-A" corresponds to the 14/16 side of the unit. If IL is to be measured then enter IL into both of these columns as in the configuration above labeled "FTTX IL," and if IL and RL is to be measured then enter ILRL into the two columns.

Label Printing

Label printing through OPLPro is supported as follows:

1. A template file is setup based on the file: TemplateLabel.XLS
2. Change the template layout and row, column assignments using EXCEL

3. Setup the printing options such that the label is printed to the label printer. Most label printers come with support for standard Windows printing:

    Printer options to be set in Printer Setup are
    Printer Selection: select label printer
    Set label printer specific options such as label size and printing style
    Fit to 1 page
    Margins, usually all set to 0

4. Save the printing options and run a test print to make sure the printing options are set correctly and the label is printed as expected.

5. Save the Template file under a different filename.

6. Load the template file in OPLPro with

    Setup | Label Template

7. The row and column assignment, the measurement results, and parameters that are to be printed are selected in the spreadsheet in the lower section of the template file. The assignment also can be changed within OPLPro with :

    Setup | Setup Label

Test Report Setup for C:\OptoTest\Delphi\OPLPro\config\TemplateLabel1.5x.75_ILRL.xls

	col	row
IL 1310nm	1	4
IL 1550nm	2	4
RefA [dBm]		
RefB [dBm]		
RL 1310nm	1	5
RL 1550nm	2	5
Date	1	1
Time		
SN	1	2
user 1		
user 2		
user 3		
user 4		
user 5		
user 6		
user 7		
user 8		
user 9		

	make this the print a...	
1	[Date]	OptoTest
2	[SN]	OP10101-Vers1.2
3	1310	1550
4	[IL 1310nm]	[IL 1550nm]
5	[RL 1310nm]	[RL 1550nm]

The pointers in the far left column correspond to data that can be output to the label. The column and row designations for each pointer tell OPLPro where that data should be placed in the spread sheet.

Example template file:

make this the print area

1	**2/25/2007**	*Opto***Test**
2	PC10102ZX	**OP10101-Vers1.2**
3	**1310**	**1550**
4	0.44 dB	0.40 dB
5	26.34 dB	16.86 dB
	1	2

Label Cols		3.00 0.23		6.00	
Field	**Description**	**0.31**	**col**	**row**	
Field0	IL 1310nm	0.44 dB	1	4	
Field1	IL 1550nm	0.40 dB	2	4	
Field2	RefA [dBm]	45.00			
Field3	RefB [dBm]	43.00			
Field4	RL 1310nm	26.34 dB	1	5	
Field5	RL 1550nm	16.86 dB	2	5	
Field6	Date	2/25/2007	1	1	
Field7	Time	Time			
Field8	SN	PC10102ZX	1	2	
Field9	user 1				
Field10	user 2				
Field11	user 3				
Field12	user 4				
Field13	user 5				
Field14	user 6				
Field15	user 7				
Field16	user 8				
Field17	user 9				
Field18	user 10				

Warranty Information

OptoTest Corp. warrants this product to be free from defects in material and workmanship for a period of one year from date of shipment. During the warranty period we will, at our option, either repair or replace any product that proves to be defective. To exercise this warranty contact OptoTest Corp. Headquarters. You will be given prompt assistance and return instructions. Repairs will be made and the instrument returned, transportation prepaid. Repaired products are warranted for the balance of the original warranty period, or at least 90 days.

NOTE: Do not send instruments for any reason without contacting OptoTest headquarters first.