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GRANDWAY OPTICAL INSTRUMENTS SERIES

User's Guide to the FHP3P01

PON Power Meter

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1. Inroduction

1.1 Summery

FHP3P01 is a portable, high quality PON optical power meter. It is specifically designed to meet the rapid growth of FTTx market with PON (Passive Optical Network) technologies. It is capable to measure all three signals (1310nm, 1490nm and 1550nm) that carry voice, data and video, so-called triple-play applications along a single fiber. FHP3P01 can measure not only 1490nm and 1550nm optical signal, but also accurately detect and measure the upstream burst at 1310nm sent from an ONU while the ONU is in the idle mode. The simple operation and accurate measurement make FHP3P01 becomes an ideal tool for PON (suitable for APON, BPON, EPON and GPON application) installation/acceptance test to ensure that they meet required standards, and service activation and troubleshooting.

1.2 Main Function and Specifications

- Cost efficient palm size designed for field and lab testing
- Support P/F measurement and normal measurement
- Easy-to-use interface with large color TFT display for easy visibility and LED indicators.
- Simply connect-and-display the results of all three wavelengths (1310/1490/1550nm) of PON signals with two optical ports
- Detect and measure the upstream burst at 1310nm
- Support APON, BPON, EPON and GPON networks
- Pass, Fail and Warning indicators for easy view of signal condition
- User definable threshold value (up to 10 sets)
- Auto power shut off
- Low battery warning
- USB interface
- Real-time clock
- Unit runs either by Ni-MH/Lithium battery for more than 20 hours continuously work or AC/DC adapter

1.3 Specification:

Connector Type	FC/PC SC/PC ST/PC		
Measurement Range (Continuous Datastream)	1310nm	1490nm	1550nm
	-40dBm~+10dBm	-50dBm~+15dBm	-50dBm~+20dBm
Burst measurement range (1310nm bursted signal)	-32dBm~+10dBm		
Spectral Passband	1310nm	1490nm	1550nm
	1260nm~1360nm	1480nm~1550nm	1539nm~1565nm
Insertion Loss	1.5dB		
Accuracy ①	±0.5dB		
Linearity	±0.2dB		
Data Storage	1000Sets		
Display	2.8 inch TFT LCD		
Refresh Rate of Display	2.5Hz		
Threshold	10 sets(configured via PC-based software)		
Auto Power-off	Yes		
Number of Ports	2(1 for ONU,1 for OLT&.Video)		
Operating Temperature	-10 to +50°C		
Relative Humidity	0%~95%,non-condensing		
Power Supply	1.2V*4pcs Ni-MH AA; 12V AC/DC Adapter; 3. 2v∗2pcs lithium battery+2pcs fake battery		
Battery life	>20 hours		
Dimension	190mm*105mm*55mm(L*W*H)		
Net Weight	700g		

NOTE: ① Valid at 1550nm,CW,23±3°C,Relative Humidity≤70%,with an FC connector.

2. Warranty

One Year Limited Warranty

Grandway products are warranted against the defective components and workmanship for a period of one year from the date of delivery to the original customer. Any product found to be defective within the warranty period would be returned to Grandway authorized service center for repair, replacement and calibration.

Exclusions

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

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

Returning Product

To return product, you may contact Grandway to obtain additional information if necessary.
To serve you better, please specify the reasons for the return.
All delivery and mails should be sent to the following address:

Grandway Customer Service
6F, Xin'an building No. 99 Tianzhou Road
Shanghai, 200233 P.R. China

Contact Us

Tel: 0086-21-54451260/61/62/63
Fax: 0086-21-54451266
E-mail: overseas@grandway.com.cn
Website: www.grandway.com.cn

3. Safety Information

Warning!

lithium battery must use with pairs(one lithium battery + one fake battery) and charge with special external charger in accessory ,while charging user must not put fake battery on the charger, this will cause the damage of the charger, GRANDWAY will not be responsible for any probelm caused by using unproper operation!

Caution

- Never look directly into optical outputs or a fiber while the equipment is on.Invisible laser beam may damage your eyes.
- Do not short-circuit the terminal of AC adapter / charger and the batteries.Excessive electrical current may cause personal injury due to fumes,electric shock or equipment damage.
- Connect AC power cord with the equipment and wall socket properly. While inserting the AC plug, make sure there is no dust or dirt on the terminals and both plugs are fully seated. Incomplete engagement may cause fuming, electric shock or equipment damage and may result in personal injury.
- Do not operate the equipment near hot objects, in hot environments, in dusty/ humid atmosphere or when condensation is present on the equipment. This may result in electric shock , product malfunction or poor performance.

3.1 Discharged batteries

Remarks:

1) When the battery power is almost out, there will be a warning of indicator keeps blinking, then please replace the batteries or use AC adapter to charge batteries.

2) Please make sure that you have turned the instrument on before charge the batteries, unplug the AC adapter when the batteries are fully charged.

3) Please make sure the batteries are well placed before charge them.

4) To eliminate the possibility of acid leakage, please take out the batteries if the unit will not be used for a long time.

3.2 AC operation

If the instrument is mainly used at one location, e.g. in a laboratory or test department, the AC adapter can be used to power it instead of batteries. There is a DC input jack on the left side of the FHP3P01 instrument casing into which the output cable of the AC adapter is plugged. And when the AC adapter is plugged in, the AC Indicator on the LCD will be displayed.

Note:
1 Power is supplied by the AC adapter even if battery is fitted. And the battery indicator is not displayed on the screen when AC adapter is plugged.
2 Make sure that the operating voltage of the AC Adapter / Charger is the same as the local AC line voltage.

4. Preparing for Operation

Unpacking the instrument

Packing material

We suggest that you keep the original packing material. Using the original packing material is your guarantee of protecting the instrument during transit.

Checking the package contents

The standard accessories of FHP3P01 are as follows:

- Main unit
- Quality Check Report
- External charger for lithium battery
- Carrying Case
- User's Guide
- 4*Ni-MH Batteries or 4* lithium battery(2 of them is fake battery)
- CD(software)

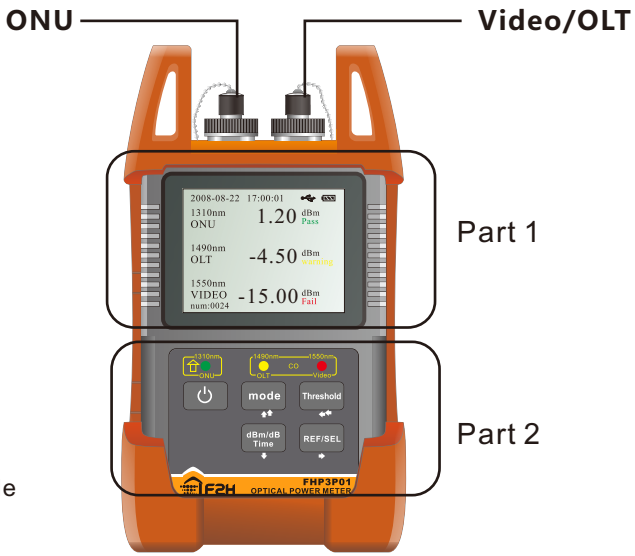
Optional accessories: AC Adapter

Checking for damage in transit

After unpacking the instrument, check to see whether it was damaged in transit. This is particularly likely if the outer casing is clearly damaged. If there is damage, do not attempt to operate the instrument or to repair it without authorization. Doing so can cause further damage and you may lose your warranty qualification.

5. Operation

5.1 Layout



The front panel is divided to two parts:

Part I – LCD Display

Part II- Key Matrix

The tester shows test result on LCD screen, and in the meanwhile indicates different status in part 2 by LED.

Tester connector types: FC/PC,SC/PC, ST/PC

5.2 Key's Functions

	**Power Switch** – Press the key to Power On the unit. While the unit is in the state of power on, if pressing down the key and release quickly (less than 2 seconds), the unit will switch to auto power off; if pressing down the key for longer than 2 seconds, the unit will shut down. If the unit is in threshold setup, time setup and backlit setup menu, the key becomes ESC key to exit the menu.
	**Mode Key** – test mode. It is used to switch the test mode - P/F test mode and normal test mode. When the unit is in time setup, threshold setup and backlit menu, the key is used to increase value.
	**Threshold** – It is used to set threshold. Pressing it down for more than 2 seconds enters threshold setup menu. In threshold setup menu, press and release the key quickly (less than 2 seconds) to switch wavelength. In time setup menu, this key functions as <left> arrow key.
	**dBm/dB/Time** – unit switching key. Press and release the key quickly (less than 2 seconds) to switch unit between dB and dBm; pressing the key down for more than 2 seconds enters to time setup menu. In time setup menu, threshold setup and backlit setup menu, the key is used to decrease value.
	**REF/SEL** – It is used for reference value setup and selection. If pressing it down for more than 2 seconds, the instrument will take current light intensity as reference to do measurement. If pressing and release the key quickly (less than 2 seconds), then the key will function as <right> arrow key.

5.3 Definitions

LEDs

Not only the instrument will display measured optical power value on LCD screen, but also under P/F test mode its three LED indicators will function with following meanings:

The three LED indicators represent upstream 1310nm (ONU), downstream 1490nm (OLT) and 1550nm (Video) respectively. The RED color indicates Fail, ORANGE color is Warning and GREEN color means Pass.

Thresholds

The definitions for the three states (Fail, Warning and Pass) are described as below:

If assuming the instrument's measuring upper limit as **Limit1** and lower limit as **Limit2**, the "Pass" threshold value in instrument's internal setup are Threshold1, Threshold2 as Warning threshold and Threshold3 as Fail threshold, **also Limit2 < Threshold3 < Threshold2 < Threshold1 < Limit1**. P value represents measured optical power, then:

1.If **P < Limit2**, means the power is Low, the LED will indicate in **RED**;

2.If **Limit2 < P < Threshold3,** means Fail, the LED will indicate in **RED**;

3.If **Threshold3 < P < Threshold2**, means Warning, the LED will indicate in **ORANGE**;

4.If **Threshold2 < P < Threshold1**, means Pass, the LED will indicate in **GREEN**;

5.If **Threshold1 < P < Limit1**, means Fail, the LED will indicate in **RED**;

6.If **P > Limit1**, means the power is High, the LED will indicate in **RED**.

5.4 Quick Operation

1.Connect the instrument to the optical link under test.

2.Press Power On key to turn on the instrument.

3.Pressing down Threshold key and REF/SEL key at same time enters to Backlit setup menu. Using ▲ and ▼ keys to adjust backlit to a suitable brightness then press Power key again to save the backlit setup and exit Backlit setup menu.

4.Pressing Time key for more than 2 seconds enters to time setup menu. Using ▲, ▼, ◄, ► and REF/SEL keys to setup time. After the setup, press Power key (less than 2 sec) to save the setting and exit.

5.Pressing Threshold key for more than 2 seconds enters to threshold setup menu. Select one group of threshold from the preset list and press Power key (less than 2 sec) to exit.

6.Press Mode key to select a test mode, and then the instrument will execute the test automatically and display the test results on the LCD screen.

7.Power Off. After completing the test, pressing Power key for more than 2 seconds to shut down the instrument.

5.5 Detail Operation

5.5.1 Powering On the Instrument

Press the Power key to turn on the instrument. It will automatically go to test menu. In test menu, press Power key and release quickly (less than 2 seconds) to activate or deactivate Auto shut down function. The auto shut down function means the instrument will shut down automatically if the instrument has not been operated for a certain period of time. The time period can be set. The default is 10 min.

5.5.2 Test mode switch:

In the test menu, press Mode to switch between normal test mode and P/F test mode.

1.Normal test mode

Normal test mode means do not setup threshold value but display optical power directly. In this mode, the LED indicators will not light. The results are displayed in two units: dB and dBm using dB/dBm key to switch. See Fig. 1.

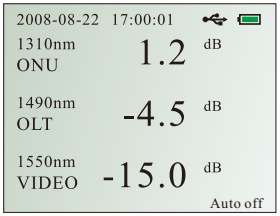


Fig.1 Normal Test Mode Menu (dB)

Unit dBm is to display the actual power

Unit dB is to display a power value relative to reference value. In this mode, reference value needs to be preset correctly.

2.P/F test mode

P/F test mode means the measured light power comparing to preset threshold value to determine if the measured light power meets user's requirement or not. LCD will display the optical power and current state. The LED indicators below the LCD display will also change color to match the current state of measured light. This test mode is very useful in some special cases required. See Fig. 2.

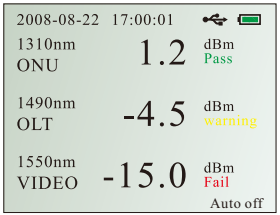


Fig.2 P/F Test Mode Menu

5.5.3 Threshold Setup

The user can setup the value. The steps are as following:

In the test menu, pressing Threshold key for more than 2 seconds enters to threshold setup menu – see Fig. 3

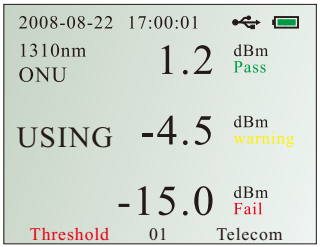


Fig.3 Threshold Setup Menu

In this menu, left side displays wavelength and right side displays threshold value. Top line indicates system information (date & time) and bottom line indicates the information of threshold including threshold symbol, threshold number and name. In this menu, press and release Threshold key quickly (less than 2 seconds) to switch the wavelength among 1310nm, 1490nm and 1550nm. Press ▲ (Mode) key to view previous record, ▼ (dBm/dB) key to view next record, REF/SEL key to validate the current threshold value. After above operation, all P/F mode test results will base on this threshold value.

Note: The threshold value can only be preset by PC software. See PC software section for detail.

After finishing the setup, press Power key (less than 2 sec) to exit the setup menu.

5.5.4 Time Setup

Pressing Time key for more than 2 seconds enters to time setup menu, see Fig. 4.

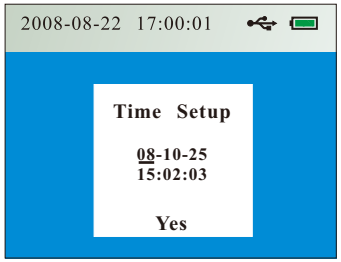


Fig.4 Time Setup Menu

In the time setup menu, the Threshold key becomes <left> arrow key and REF/SEL key becomes <right> arrow key - using them to move cursor. When cursor moves to a number, the user can use ▲ (Mode) key to increase value and ▼ (dBm/dB) to decrease value. When cursor moves to "Yes" and press REF/SEL key for more than 2 seconds, the "Yes" will flash, means the instrument accepts the time change. During the time setup, the user can press Power key (less than 2 sec) to exit time menu and back to test menu, then the system time setup remains unchanged.

5.5.5 Unit Switch

When the instrument is in normal test mode, pressing dBm/dB can switch unit between dBm and dB. Here, the unit dBm is the actual power and unit dB is a power value relative to reference value. Refer to next section about “Reference value setup”.

When the instrument is in the P/F test mode, pressing dBm/dB key will automatically exit P/F test mode and switch to normal test mode. Its unit will be in dB.

5.5.6 Reference Value Setup

In the test menu, press REF/SEL key for more than 2 seconds, then the LCD will display REF in red (see Fig. 5). This means the instrument choose the current light power as reference value. The test results afterward are the values after comparing to this reference value. Now, the unit will be in dB and LED below LCD display will not light.

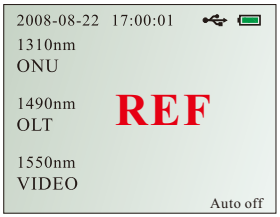


Fig.5 REF Value Setup Menu

In the test menu, press and release REF/SEL key quickly (less than 2 seconds), then current reference value will appear on LCD display. See Fig. 6.

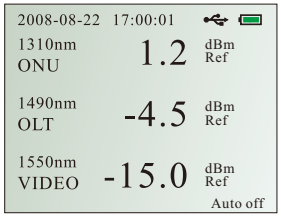


Fig.6 View REF Value Menu

5.5.7 Backlit Setup

Pressing Threshold and REF/SEL keys at same time enters to backlit setup menu. See Fig. 7.

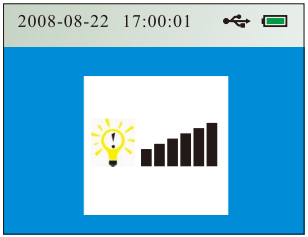


Fig.7 Backlit Setup Menu

In this menu, press ▲ (Mode) key to brighten the backlit and ▼ (dBm/dB) key to weaken the backlit. After completing the setup, press Power key (less than 2 sec) to save the setting, exit and back to the test menu.

5.5.8 Description of Memory Record Function

Description of Interface:
At the main interface, it shows the current recording number on the left bottom of the page;
Displaying: num : xxxx(xxxx means the current recording number, the maximum number up to 1000 pieces).
As you may refer to the picture 8,it means there are 24 pieces of test recording inside.

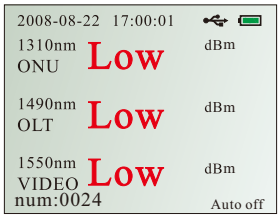


Fig.8

Press the **"mode"** button for longer than 3 seconds to save the current testing value, as you may refer to the picture 9,the recording number automatically adds 1when the interfaces shows "Save".

Fig.9

At the "record view" interface(refer to picture 10), the characters on top of horizon line are "total number of recording" and "wavelength"(from left to right). The characters under horizon line are "the number of recording" and the optical power value in accordance to the corresponding wavelengths
On the bottom of the page you may see the main menu

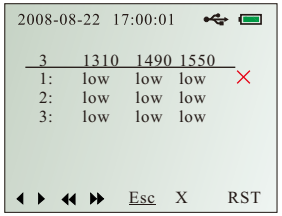


Fig.10

Description of button

Simultaneously press **"Mode" and "Threshold"** to enter the "record view" interface,press the "⏻" shortly to exit it, refer to picture 10 for this interface.

At the "record view" interface,you may see the main menu on the bottom of the page,they are (from left to right):

◄ ► ◄◄ ►► ESC X RST

There is an underline when you selected the menu (the "ESC" has been chosen in picture 10),press "Threshold" shortly to move the underline from left to right , after the underline moved to your ideal menu,press "REF/SEL" shortly to execute it.

Description of every individual menu:

◀ : Page up to the last 10 recording
▶ : Page down to the next 10 recording
◀◀ : Page up to the last 100 recording
▶▶ : Page down to the next 100 recording
ESC: Exit the "record view" interface (same as press "⏻")
X: Select one or more than one recording to delete
RST: Reset the recording memory,this operation is not reversible and it'll take 5 seconds to complete with power supply can not be disconnected,otherwise it may damage the chip of tester.

At the "record view" interface,press "mode" button to move "X" upward one step,press "dBm/dB" button to move "X" downward one step.
In picture 10,the interfaces explains that there are totally 3 testing result inside,"low" means the saving power value is lower than the value from threshold setting.In picture 11, "high" means the saving power value is higher than the value from threshold setting.The digital means the power value of corresponding wavelength.

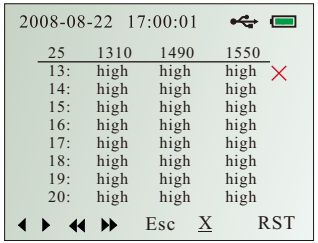


Fig.11

6. Remarks

1.When battery power is not enough, the battery indicator will flash. Please immediately use the attached AC/DC adapter or charge the instrument/battery.

2.While charging, the instrument does not allow the user to power off. If pressing Power Off key, the charger head will flash. After the battery gauge shows “full”, means the battery is fully charged, remove the charger.

3.Before charging the instrument, please make sure the rechargeable battery pack is installed.

4.If do not use the instrument for long time, please remove the battery pack to avoid battery decompotion.

5.Due to existence of strong interference in some working environment, sometime short lines or disorder may appear on LCD screen, this is normal and not going to affect the instrument. The display will back to normal if reboot the unit or switch menu to refresh the display.

7. Advice:

1)Please use the dust-proof cap to secure the connector to be scratched or contaminated everytime when the product is not in operation.

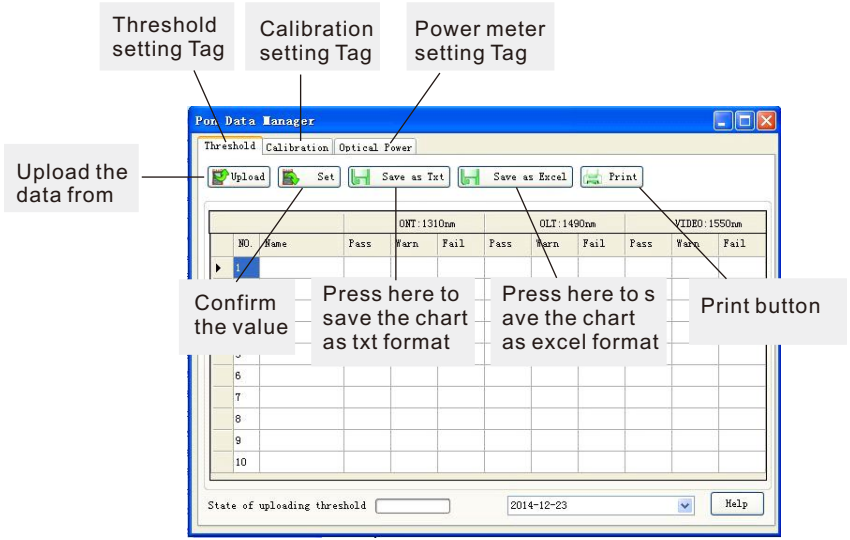
2)Make sure that the operating voltage of the AC adapter/charger is the same as the local AC line voltage

.

3)Please always stay the optical connectors away from oil, dirt and other contamination to ensure the proper operation,

4)Always be careful when you are intend to plug in and pull out the connectors because optical interface is extremely sensitive.

8. Software Interface



Calibration

1. Power FHP3P01 by battery, switch on the meter, connect to PC by USB patchcord.
2. set standard laser source value “-10dBm” for 1490nm channel, connect laser source with OLT/Video port ,check the certain error.
3. Open the software showed in fig1 ,display the interface in fig2 ,select “Calibration” Tag.

Figure 1

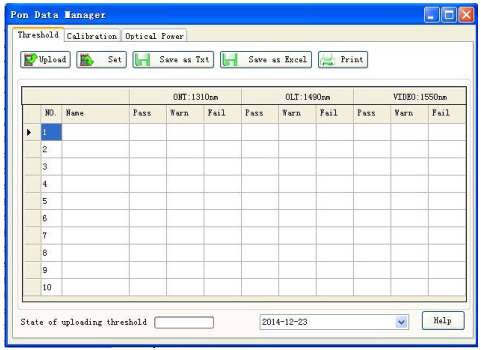


Figure 2

4. Set the proper value in the relevant box,value can not be blank(blank default as “0”,adjust range is ±10dB),then push the “calibration”button,wait for seconds,display the window in fig4.

5. After calibration please check whether value on FHP3P01 has been changed ,the same procedures as the other wavelengths.

Caution :do not connect the wrong port:1550/1490nm must connect with OLT/Video port , 1310nm pulse connect with ONU port .

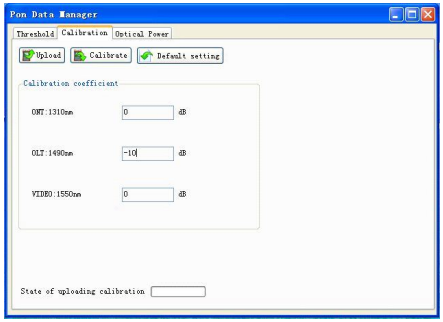


Figure 3

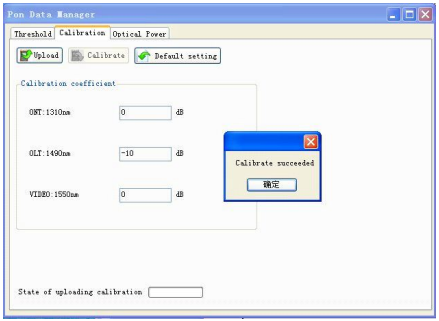


Figure 4