

User Manual Fiber Certification Testing

WX Series (WX4500)



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CAUTION

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It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

Operating procedure, practice, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

General Safety Information

WARNING

Do not use the device if it is damaged. Before you use the device, inspect the casing. Look for cracks or missing plastic. Do not operate the device around explosive gas, vapor, or dust.

Always use the device with the cables provided.

Observe all markings on the device before establishing any connection.

Turn off the device and application system power before connecting to the I/O terminals.

When servicing the device, use only the specified replacement parts.

Do not operate the device with the cover removed or loosened.

Use only the power adapter provided by the manufacturer to avoid any unexpected hazards.

CAUTION

If the device is used in a manner not specified by the manufacturer, the device protection may be impaired.

Always use dry cloth to clean the device. Do not use ethyl alcohol or any other volatile liquid to clean the device.

Do not permit any blockage of the ventilation holes of the device.

Environmental Conditions

This instrument is designed for indoor use and in an area with low condensation. The table below shows the general environmental requirements for this instrument

Environmental conditions	Requirements
Operating Temperature	0 °C to 40 °C
Operating humidity	20% to 85% RH non-condensing
Storage temperature	20 °C to 60 °C
Storage humidity	5% to 90% RH non-condensing

EU Declaration of Conformity



We

Psiber Data Pte. Ltd. 3 Science Park Drive #03-09, The Franklin Singapore Science Park 1 Singapore 118223

declare under our sole responsibility that the products

Model / Description

WX4500-FA	1	WireXpert cable certifier 2500 MHz	
WX500-CU	1	WireXpert cable certifier 500 MHz	
WX_AD_VCL_MM1/MM2	/ Multi mode fibre adapter		
WX_AD_EF_MM1/MM2 / Multi mode fibre adag		Multi mode fibre adapter (encircled flux compliant)	
WX_AD_SM1/SM2	1	Single mode fibre adapter	
WX_AD_MM_MPO_KIT/			
SOURCE/PWRMETER	1	Multi mode MPO adapters	

comply with the requirements of the following directives:

EMC directive 2004/108/EC (valid until April 19, 2016) EMC directive 2014/30/EU (valid from April 20, 2016)

RoHS directive 2011/65/EU

Low Voltage Directive 2006/95/EC (valid until April 19, 2016) Low Voltage Directive 2014/35/EU (valid from April 20, 2016)

Applied harmonised standards:

EN 55024 (2003-10): Information technology equipment – Immunity characteristics – Limits and methods of measurement

EN 55022 (2008-05): Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 : Information technology equipment
- Safety - Part 1 : General requirements

Simon Harrison

Simon Harrison General Manager 15/3/16

Date

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Chapter 1: Getting Started

Unpacking the kits

Single Mode Fiber (WX_AD_SM2)







Single Mode Adapters (WX_AD_SM2)

SC-SC Duplex Reference Cords
(WX_AC_SM_REFCORD_SC)
Mating Coupler

SC Cleaning Kit
(WX_AC_SC_CLEANING_KIT)

Multi-Mode Fiber (WX_AD_VCL_MM2)







Multi-Mode Adapters (WX_AD_VCL_MM2)

SC-SC Duplex Cords
(WX_AC_MM_REFCORD_SC)
Mandrels
(WX_AC_MANDREL)
Mating Coupler

SC Cleaning Kit
(WX_AC_SC_CLEANING_KIT)

Encircled Flux Compliant Multi Mode Fiber (WX_AD_EF_MM2)







Multi-Mode Adapters (WX_AD_EF_MM2)

FC-SC Modally Transparent
Reference Cords
SC-SC Tail Cords
(WX_AC_EF_MM_REFCORD_S
C2)

Mating Coupler

SC Cleaning Kit (WX_AC_SC_CLEANING_KIT)

Optional SM/MM/MMEF LC Cord Kits available.

SPECIFICATIONS				
	Single Mode (SM)	Multi-Mode (MM)	Encircled Flux MM	
Wavelengths	1310nm, 1550nm	1300nm		
Connector Type	1. SC	1. SC	1. SC-SC + FC-SC	
(Cable)	2. LC (Optional)	2. LC (Optional)	2. LC-SC + FC-SC	
			(Optional)	
Test Standards	TIA 568 C.3		TIA 568 C.3	
	IEC 14763-3		IEC 14763-3	
		IEC 61280-4-1		
Test Parameters				
Loss	0 to 31 dB, ±0.2 dB	0 to 24 dB, ±0. 2dB		
Length	0 to 20,000m, ±1.5m	0 to 2,000m, ±1.5m		
Output Power	-5 to -9 dBm	-4 to -10 dBm	-16 to -20 dBm	
Receiver Sensitivity	-40 dBm	-34 dBm	-40 dBm	
VFL Wavelength	NA	NA	650 nm	

Chapter 2: Configuring WireXpert

WireXpert User Interface

Touch Screen Layout

The Graphical User Interface (GUI) in version 7.0's firmware has been updated with a more responsive system and quick-access menus.

WireXpert boots up to the SETUP screen. It is categorised into 5 groups:



- 1. The *Status bar* displays the current date, talk set and battery level.
- 2. The *Configuration* group provides selection on number of jumper(s) referencing is set to, and determine single or bi-directional test is performed during an AUTOTEST.
- 3. The *Test Settings* group provides results oriented configurations necessary to perform an AUTOTEST.
- 4. The *Project Settings* group provides non-results oriented configurations before performing an AUTOTEST.
- 5. The *System Settings* group settings provides device, time, localization and device related configurations. The Information group at the top provides hardware information such as the device Information (Local/Remote), name, battery level, etc.

The One Touch Access Buttons



The fundamental philosophy behind the WireXpert User Interface is simplicity in its ease of use. The main functions of the One-Touch access buttons as follows:

AUTOTEST



The "AUTOTEST" button will perform an immediate certification test on the last configured settings. If no settings were configured, default settings will be used.

Test results will be generated automatically after the test is completed.

You will receive any of the following 2 results after the "AUTOTEST":



• Green "PASS" – Good test result in accordance to pre-defined settings.



• Red "FAIL" – Unacceptable results with severe disturbance on one or more test parameters.

You will be given the following option after performing an AUTOTEST:

"Save" test results to device

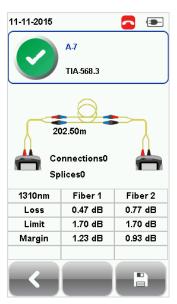
An "AUTOTEST" will fail in the event of missing connection between the Local and Remote units, wrong settings configured, "dirty" end connectors or broken cables.



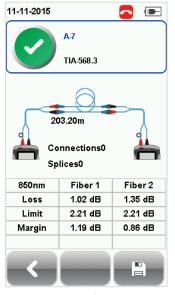
SM Fiber AUTOTEST results



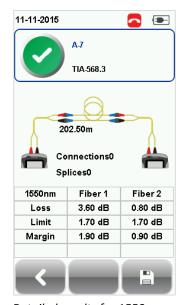
MM Fiber AUTOTEST results



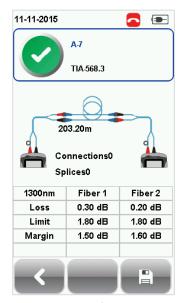
Detailed results for 1310nm



Detailed results for 850nm

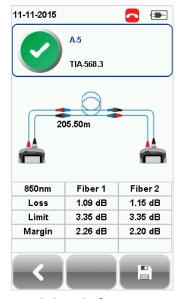


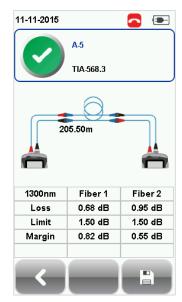
Detailed results for 1550nm



Detailed results for 1310nm





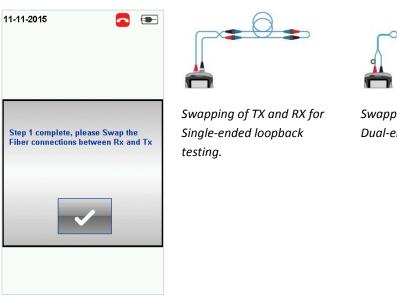


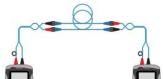
MMEF Fiber AUTOTEST results

Detailed results for 850nm

Detailed results for 1300nm

If Bi-direction is selected, swap the TX and RX connections on both ends when prompted.





Swapping of TX and RX for Dual-ended testing.

SETUP

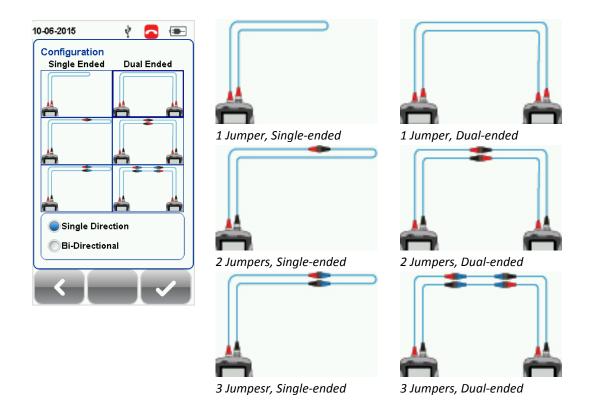


The "**SETUP**" button provides setting options necessary to conduct an AUTOTEST and configure the device.

These options include -

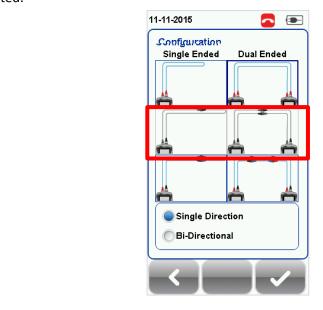
Configuration

Configuration provides selection of the number of jumper(s) is used for setting reference on dual or single ended loopback, and determines if single or bi-directional test is performed during an AUTOTEST.





According to the ISO/IEC standards, the 2-jumpers testing method is not compliant, hence the selection for 2-jumpers configuration will be disabled when an ISO limit is selected.

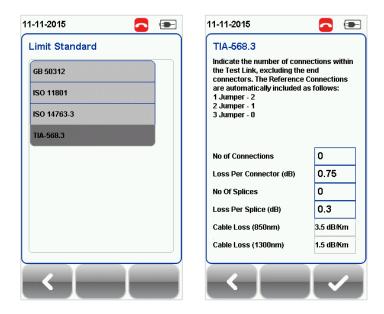


Test Settings

Test Settings provides results oriented configurations necessary to perform an AUTOTEST.

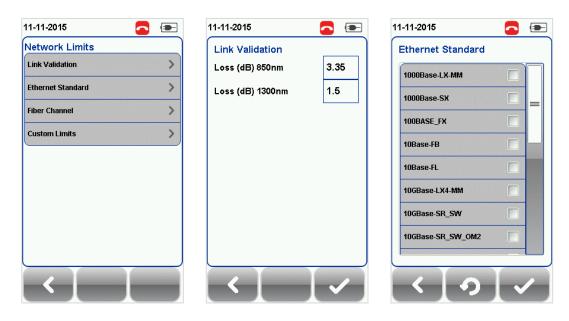
Test Limit

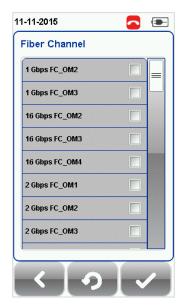
Standard Limits: Choose from a list of standards to determine the performance criteria in a given standard. Enter the value for the number of connections, loss per connection, number of splices and loss per splice

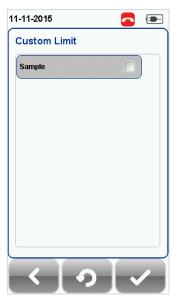


Network Limits: Choose from a list of network limits to determine additional specific network testing criteria such as maximum loss in link validation, Ethernet standard, fiber channel or custom limits. Custom limits can be created using spreadsheet software, saved as *.CSV format and loaded to the device.

Length Limits: Enter fiber length if test criteria requires specific fiber length.



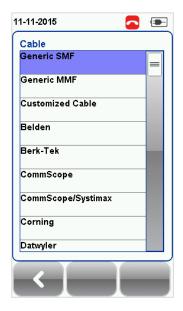


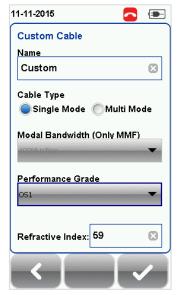


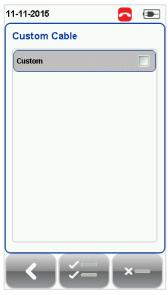
Cable

Press the SETUP button > Test Settings > Cable to choose from a list of cable manufacturers. If unsure of manufacturer, choose "Generic SMF" or "Generic MMF", or "Customised Cable" to create custom cable.

Click "Add" to add or "Manage" to remove customised cable(s) from the customised cable list.







Add customised cable

Manage customised cables

When creating customised cable, determining the cable name, cable type, performance grade and cable's refractive index is required.

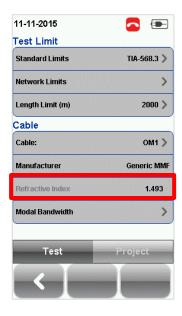


WireXpert introduces the "Manage" button on version 7.0 firmware. "Manage" enables multiple saved items such as sites,

operators, customized cables, customized connectors and results to be selected and deleted simultaneously.

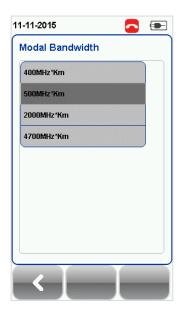
Refractive Index

The refractive index determines the speed light is travelling in the fiber optic. The value is determined by the fiber cable selected.



Modal Bandwidth

Press the SETUP button > Test Settings > Modal Bandwidth to choose the modal bandwidth of the cable under test. Modal bandwidth refers to the signalling rate per distance unit. Select 400MHz*Km for OM1 (62.5/125), 500MHz*Km for OM2 (50/125), 2000MHz*Km for OM3 (50/125) and 4700Mhz*Km for OM4 (50/125).



Project Settings

Project Settings provides non-results oriented configurations before performing an AUTOTEST.

Refer to *User Manual – WireXpert Copper Certification* for more information on Project Settings.

Label Source

Refer to *User Manual – WireXpert Copper Certification* or *User Guide – List Based Testing* for more information.

List Based Testing

List based testing allows creation of label list in the eXport software on PC and then bring the list to WireXpert. It further allows easy selection of labels from the list to help technician select the cables to be tested quickly. This testing method is carefully optimized for typical test work-flow, and it significantly improves productivity.

Refer to *User Manual – WireXpert Copper Certification* or *User Guide – List Based Testing* for more information.

System Settings

Device Type



Press the SETUP button > System Settings 1 > Device Settings > Device Type to set unit as a Local or Remote unit. Device will reboot to take effect.

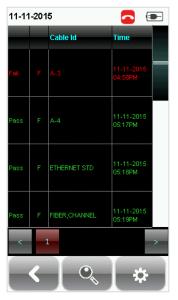
Refer to *User Manual – WireXpert Copper Certification* for more information on System Settings.

DATA



The "**DATA**" button provides archive and data management ability to saved sites and test results. Saved test results can be renamed or deleted in this option.









Manage results

TOOLS



The "**TOOLS**" button provides advanced options for in-depth troubleshooting and advanced WireXpert users. These options include-



Requires: Local and Remote

Set Reference – Establish test conditions and exclude the reference cords from the measurement.



Requires:

- 1. Local or Remote
- 2. Inspection Probe

Inspect Fiber – Performs visual verification of fiber's quality using an external scope probe.



Requires: Local or Remote

About – Displays worldwide contact information.



Requires: Local and Remote

Power Meter – Measures the power loss from a 850/1300nm or 1310/1550nm wavelength light source.



Requires: Local or Remote (MMEF only)

VFL – Visual Fault Locator. Emits light for visual detection of broken fiber location.



Requires: Local or Remote

Light Source – Emits 850/1300nm or 1310/1550nm light source to determine loss on a Power Meter.



Requires:

- 1. Local MM/MMEF
- 2. Remote MPO

MPO/MTP – Switches device to MPO mode to perform single fiber Power Meter test.

Chapter 3: Setting Reference

It is necessary to perform a set reference measurement before each test. If there is a mismatch in firmware versions, WireXpert will require user to perform a set reference.

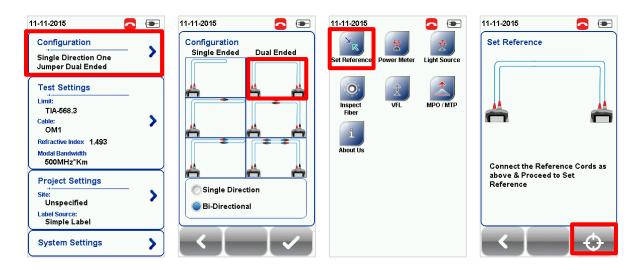
The setup varies depending on the number of jumpers reference is selected.

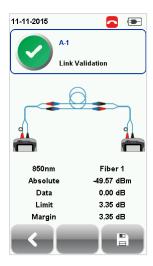
Following procedures are only for MMEF, MM and SM fiber.

For 1 jumper dual-ended,

- 1. Connect FC1 to the Local TX port and SC1 to the Remote RX port.
- Connect FC2 to the Remote TX port and SC2 to Local RX port.Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.

- 3. Press the SETUP button > Configuration and select "One Jumper" from Dual-Ended column. Select Single or Bi direction depending on requirement.
- 4. Press the TOOLS button > Set Reference and press the "ok" button to set reference.

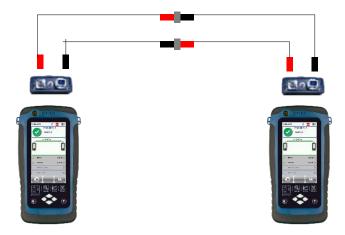




Verification Test

To verify reference has been set correctly, setup the following connection.

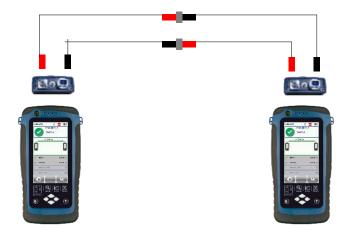
- 1. Connect FC1 to the Local TX port and SC1 to coupler 1.
- 2. Connect SC5 to the Local RX port and SC6 to coupler 2.
- 3. Connect FC2 to the Remote TX port and SC2 to coupler 2.
- 4. Connect SC3 to the Remote RX port and SC4 to coupler 1.



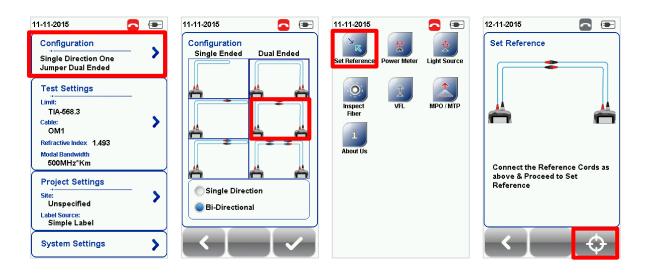
- 5. Press the AUTOTEST button.
- 6. Check that the result passes with the following results;
- Single Mode 0.3 dB
- Multi-Mode 0.3 dB
- EF compliant Multi-mode 0.15 dB

For 2 jumpers dual-ended,

- 1. Connect FC1 to the Local TX port and SC1 to coupler 1.
- 2. Connect SC5 to the Local RX port and SC6 to coupler 2.
- 3. Connect FC2 to the Remote TX port and SC2 to coupler 2.
- Connect SC3 to the Remote RX port and SC4 to coupler 1.
 Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.

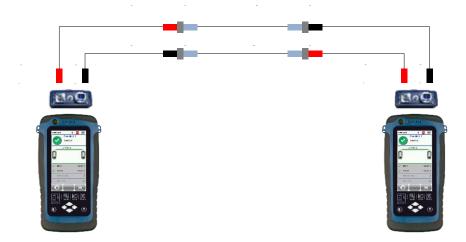


- 5. Press the SETUP button > Configuration and select "Two Jumper" from Dual-Ended column. Select Single or Bi direction depending on requirement.
- 6. Press the TOOLS button > Set Reference and press the "ok" button to begin set reference.

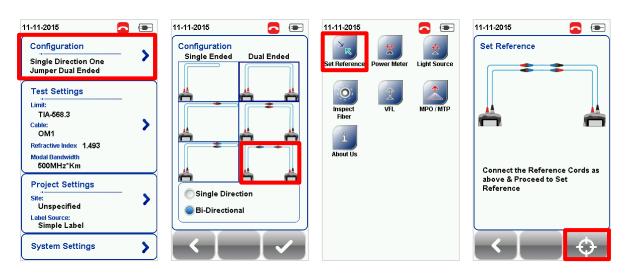


For 3 jumpers dual-ended,

- 1. Connect FC1 to the Local TX port and SC1 to coupler 1.
- 2. Connect SC5 to the Local RX port and SC6 to coupler 2.
- 3. Connect FC2 to the Remote TX port and SC2 to coupler 4.
- 4. Connect SC3 to the Remote RX port and SC4 to coupler 3.
- 5. Connect your jumper's SC end SC7 to coupler 1 and SC8 to coupler 3.
- Connect your jumper's SC end SC9 to coupler 2 and SC10 to coupler 4.
 Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.



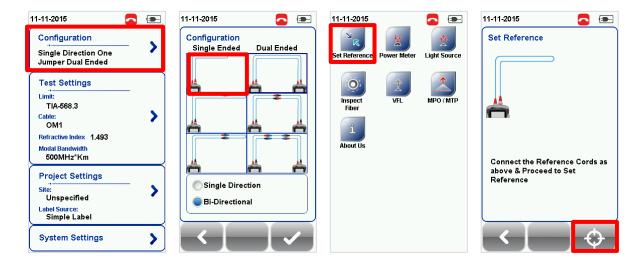
- 7. Press the SETUP button > Configuration and select "Three Jumper" in the Remote Unit.
- 8. Press the TOOLS button > Set Reference and press the "ok" button to begin set reference.



For 1 jumper single-ended loopback,

- 1. Connect the FC and SC ends of the reference cord to the TX port RX port of the adapter respectively.
 - Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.

- 2. Press the SETUP button > Configuration and select "One Jumper" from Single-Ended column. Select Single or Bi direction depending on requirement.
- 3. Press the TOOLS button > Set Reference and press the "ok" button to begin set reference.

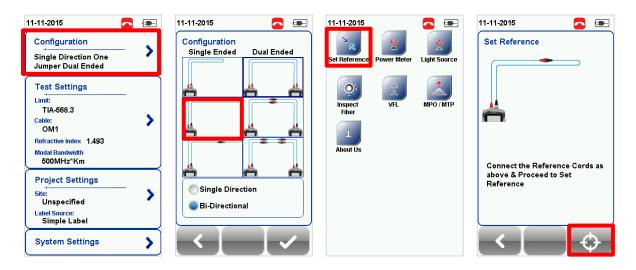


For 2 jumpers single-ended loopback,

- 1. Connect FC1 to the TX port and SC1 to a SC coupler.
- Connect SC2 to the RX port and SC3 to the coupler.
 Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.



- 3. Press the SETUP button > Configuration and select "Two Jumper" from Single-Ended column. Select Single or Bi direction depending on requirement.
- 4. Press the TOOLS button > Set Reference and press the "ok" button to begin set reference.



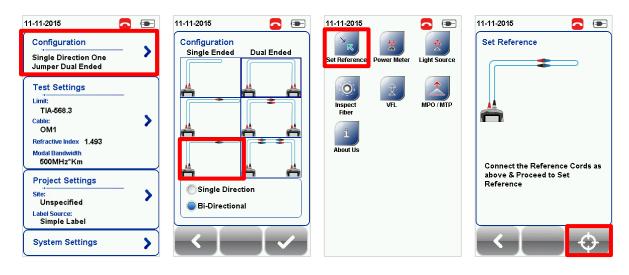
For 3 jumpers single-ended loopback,

- 1. Connect FC1 to the TX port and SC1 to a SC coupler 1.
- 2. Connect SC2 to the RX port and SC3 to another coupler 2.
- 3. Connect your jumper's SC end SC4 to coupler 1 and SC5 to coupler 2.

 Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.



- 4. Press the SETUP button > Configuration and select "Three Jumper" from Single-Ended column. Select Single or Bi direction depending on requirement.
- 5. Press the TOOLS button > Set Reference and press the "ok" button to begin set reference.



6. Check that the Set Reference result is ≤0.15 dB before proceeding. Clean or replace reference cords if necessary, and set reference again if value exceeds 0.15 dB.

Set Reference will fail in the event of-

- Adapter probe mismatch
- Firmware version mismatch
- No connection between Local and Remote units

NOTE

According to the ISO/IEC standards, the 2-jumpers testing method is not a recognised procedure, hence the selection for 2-jumpers configuration will be disabled when an ISO limit is selected.

Chapter 4: Configuring an AUTOTEST

After configuring the system settings, follow these steps to set up an AUTOTEST.

- Press the SETUP button > Project Settings
 - a. Site Create or select a Site
 - b. *Operator* Create or select an Operator
 - c. **Label Source** Select cable labelling scheme. Load labels from USB flash drive if using List Based Testing (LBT).
 - d. AutoSave Enable option for WireXpert to auto save every PASS result.
- 2. Press the SETUP button > Test Settings
 - a. **Test Limit** Select a test limit
 - b. *Cable* Create a custom or select cable from list. Select "Generic" if unsure.
 - c. Modal Bandwidth Choose the modal bandwidth of the cable under test. Leave option unchanged if unsure.

Please ensure you have the following components before conducting the test;

- WireXpert, Local & Remote units (WX4500)
- Single Mode Testing Kit (WX AD SM2) OR
- Multi-Mode Testing Kit (WX AD VCL MM2) OR
- Encircled Flux Multi-Mode Testing Kit (WX_AD_EF_MM2)



Testing Guide for Dual-Ended Testing

- 1. Connect FC1 to the Local TX port and SC1 to coupler 1.
- 2. Connect SC5 to the Local RX port and SC6 to coupler 2.
- 3. Connect FC2 to the Remote TX port and SC2 to coupler 4.
- 4. Connect SC3 to the Remote RX port and SC4 to coupler 3.
- 5. Connect the cord to be tested SC7 to coupler 1 and SC8 to coupler 3.
- 6. Connect the other cord to be tested SC9 to coupler 2 and SC10 to coupler 4. Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.

- 7. Press the AUTOTEST button to begin AUTOTEST.
- 8. If Bi-Direction measurement is selected, swap the position of SC1 and SC6, SC2 and SC4.

- 9. Click "Step 2" to continue test.
- 10. Select "850nm" or "1300nm" for Multi-mode or "1310nm" or "1550nm" for Single Mode to check the Loss, Limit and Margin of the fiber setup at the respective wavelength.

Testing Guide for Single-Ended Loopback Testing

- 1. Connect FC1 to the Local TX port and SC1 to coupler 1.
- 2. Connect SC2 to the Local RX port and SC3 to coupler 2.
- 3. Connect SC4 to coupler 3 and SC5 to coupler 4.
- 4. Connect the cord to tested SC6 to coupler 1 and SC7 to coupler 3.
- 5. Connect the other cord to be tested SC8 to coupler 2 and SC9 to coupler 4. Please ensure the fiber cables are cleaned using the cleaning kit provided in the kit.

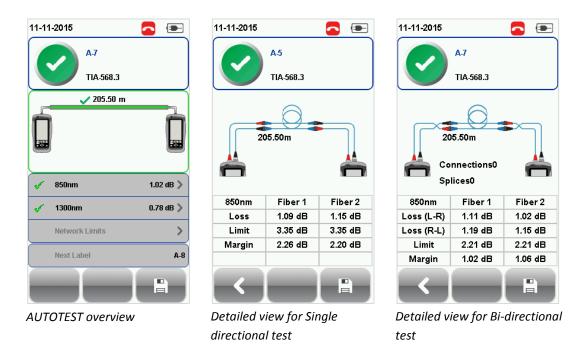
- 6. Press the AUTOTEST button to begin AUTOTEST.
- 7. If Bi-Direction measurement is selected, swap the position of SC1 and SC3.

- 8. Click "Step 2" to continue test.
- 9. Select "850nm Margin" or "1310nm Margin" to check the Loss, Limit and Margin of the fiber setup at the respective wavelength.

Chapter 5: Performing an AUTOTEST

Press the AUTOTEST button once settings and limits have been selected. WireXpert will use the last configuration or factory settings to perform the AUTOTEST if new settings are not configured.

WireXpert will display summarized result with PASS or FAIL once AUTOTEST is completed. Press the "View" details button to view the comprehensive result or the "Save" button to save the results.



Click on the parameter to display a more comprehensive individual result.

In detailed view, loss from the Local to the Remote unit, Limit and Margin will be displayed for each wavelength for both Single and Multi-mode. If Bi-directional test is selected at the configuration settings, test result for loss from Remote to Local will be displayed.

Depending on installation requirements, additional tests in line with the application standard will be performed during an Autotest if Ethernet Standard and/or Fiber Channel is selected. To perform additional application standard test, press the SETUP button > Test Settings > Network Limits.

WireXpert will perform a separate test based on the loss value input if Link Validation is selected.

Managing test result(s)

Test results can be manually saved by pressing the "Save" button after an AUTOTEST is completed. When prompted, enter label name and click "OK" to save.







The "Save" icon will disappear once saving is completed.

To view saved results,

- 1. Press the "DATA" button.
- 2. Select "Fiber" and press the "View" button.
- 3. Select the test results click "View" button to view results.
- 4. Select next page for more results.

To delete a saved result,

- 1. Press the "DATA" button.
- 2. Select "Fiber" and press the "View" button.
- 3. Press the "Manage" button.
- 4. Select result(s) and press the "Delete" button to delete result(s).

To rename a saved result,

- 1. Press the "DATA" button.
- 2. Select "Fiber" and press the "View" button.
- 3. Press the "Manage" button.
- 4. Select result and press the "Rename" button to rename result.

Exporting test results into eXport PC Software

eXport is a data management software designed to work seamlessly with WireXpert.

Refer to *User Manual – WireXpert Copper Certification* for more information on exporting test results into eXport PC Software.

Refer *User Manual – eXport* for more information on how to use the software.

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