AFL Telecommunications
A Fujikura Business

Test & Inspection

TURBOTEST 400
Fiber Optic Certification Test Set
User's Guide

NOYES
Test & Inspection

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Fiber Optic Certification Test Set
User's Guide

NOYES
Test & Inspection

Limited Warranty

One Year Limited Warranty

All Noyes products are warranted against defective material and workmanship for a period of one year from the date of shipment to the original customer.

Any product found to be defective within the warranty period would be repaired or replaced by Noyes.

In no case will Noyes liabilities exceed the original purchase price of the product.

Exclusions

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

• Unauthorized repair or modification

• Misuse, negligence, or accident

CE Information

These instruments have been designed and tested to comply with the relevant sections of any applicable specifications including full compliance with all essential requirements of all applicable EU Directives.

Returning Equipment

To return equipment, please contact Noyes to obtain additional information and a Service Request (S.R.) number. To allow us to serve you more efficiently, please include a brief description specifying the reasons for the return of the equipment.

AFL Telecommunications

Noyes Test & Inspection
16 Eastgate Park Road
Belmont, NH 03220
Tel: 800-321-5298
        603-528-7780
Fax: 603-528-2025

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Safety Information

Important Safety Information

⚠ **WARNING!** Use of controls or adjustments other than those specified herein may result in hazardous radiation exposure.

CLASS 1 LED PRODUCT

Model T410 is a CLASS 1 LED product.

CLASS 1 LASER PRODUCT

Model T420 is a CLASS 1 LASER product.

⚠ **CAUTION!** To avoid serious eye injury, never look directly into the optical outputs of fiber optic network equipment, test equipment, patch cords, or test jumpers. Always assume that optical outputs are on.

① **NOTICE!** The T400 contains no user serviceable parts. Except for changing batteries and cleaning optical ports, this instrument must be returned to Noyes or authorized agents for repair and calibration.

CAUTION! Proper care in handling should be taken when using any precision optical test equipment such as the T400. Scratched or contaminated optical connectors can impact the performance of the instrument. It is important to keep the dust caps in place when the unit is not being used.

Section 1: General Information

Thank you for purchasing a Noyes TURBOTEST 400 Series Fiber Optic Certification Test Set. The purpose of this guide is to explain how to use and maintain your Main and Remote units of either T410 multimode model or T420 singlemode model.

Please check our web site at **www.AFLtele.com (click on Products >Noyes Test & Inspection)** for updates to this manual, software updates, and additional application information. If you have any questions about the T400 units and recommended accessories, or if you need technical or sales support, please contact Noyes Customer Service.

Contacting Noyes Customer Service

You may call Noyes Customer Service between 8 a.m. and 5 p.m., United States Eastern Time, as follows:

Tel: 800-321-5298 (North America)
603-528-7780
Fax: 603-528-2025
Web: www.AFLtele.com (click on Products > Noyes Test & Inspection)

Unpacking and Inspection

These instruments have been carefully packed in accordance with standard shipping procedures. Examine the equipment for damage that may have occurred during shipment. If you find any damage, or if any of the following items are not included, please contact Noyes.

The T400 package includes:

- T400 Main unit
- T400 Remote unit
- WinTEST software
- Serial cable

- (2) Adapter caps
- (2) AC adapters
- User's guide
- Carry case

Feature Overview

The TURBOTEST 400 models T410 (multimode) and T420 (singlemode) are designed to quickly test (AutoTest) loss and length of fiber links, then provide PASS/FAIL results based on your selected standards. Using the supplied WinTest 400 Software, certification reports can be created based on the latest fiber standards or user defined rules.

Once a testing standard has been selected, it is only moments after pressing the AutoTest key before PASS/FAIL results are displayed. AutoTests are based on length, propagation delay, dual wavelength loss results and user supplied data, such as, the number of splices and connections.

The Main Unit stores test results for up to 1000 fibers in user defined files. To speed the testing process, the Main Unit can automatically increment fiber numbers.

The Main Unit can also operate like a traditional optical power meter to measure power or loss at 850, 1300, 1310, and 1550 nm. In addition, the Main Unit functions as a stabilized light source at 850 and 1300 nm or as a 2 kHz tone generator for fiber identification applications

Recommended Accessories

Fiber optic test jumpers are required to interface the Main and Remote Units to the fiber under test. Test jumpers must have the same core and cladding size as the fiber under test. The connector at one end of the test jumper must interface to the transmit port on the units. The connector on the other end can be terminated with the same or a different type connector. Test jumpers with a variety of lengths and connector styles are available from Noyes.

A supply of optical cleaning pads and isopropyl alcohol or a connector-cleaning cartridge is recommended to clean the optical connectors on the T400 and test jumpers. A supply of fiber optic cleaning swabs or a can of filtered compressed air is recommended for cleaning connector adapters.

Section 2: Functional Description

Main Unit

AC Adapter Port - this is the interface for the AC power adapter

Modular Adapter Cap

Serial Port - used for data transfer to a PC and software updates

Optical Transmit Port (Tx2) - modular adapter

Optical Receive Port (Rx1) - accepts NOYES thread-on modular adapter caps.

Display - used to show various screens and setup menus, test results, and test wavelength.

Backlight Icon - When displayed, press F2 key to turn display backlight On/Off.

Function Keys - the label shown on the display above the key indicates the current function assigned to this key. Press the soft key to activate the command.

Exit Key - press to return to the previous menu/ screen.

Power Key - press to turn the instrument on or off.

Menu Key - press to display the Main Menu.

UP and DOWN Keys - used for menu navigation and to change parameter value.

Auto Test Key - press to start an AutoTest .

Figure 2-1. Main Unit

Remote Unit

AC Adapter Port - this is the interface for the AC power adapter

Modular Adapter Cap

Serial Port - used for data transfer to a PC and software updates

Optical Transmit Port (Tx1) - modular adapter

Optical Receive Port (Rx2) - accepts NOYES thread-on modular adapter caps

Test Pass/Fail Indicators - based on selected test rule.

Active Transmit Port Indicator

Ready Indicator - ready to start AutoTest

Active Autotest Indicator - AutoTest in progress

Low Battery Indicator - when on, batteries require replacement

Power Key - press to turn the instrument on or off

▼ Rx1   Tx2 ▲

TURBOTEST 400 Remote

Pass /Fail   Pass /Fail

Tx1 Active ※
Ready
Autotest
Low Battery ▱

Model T410
850 & 1300 nm Multimode LED

◉ Power

√NOYES
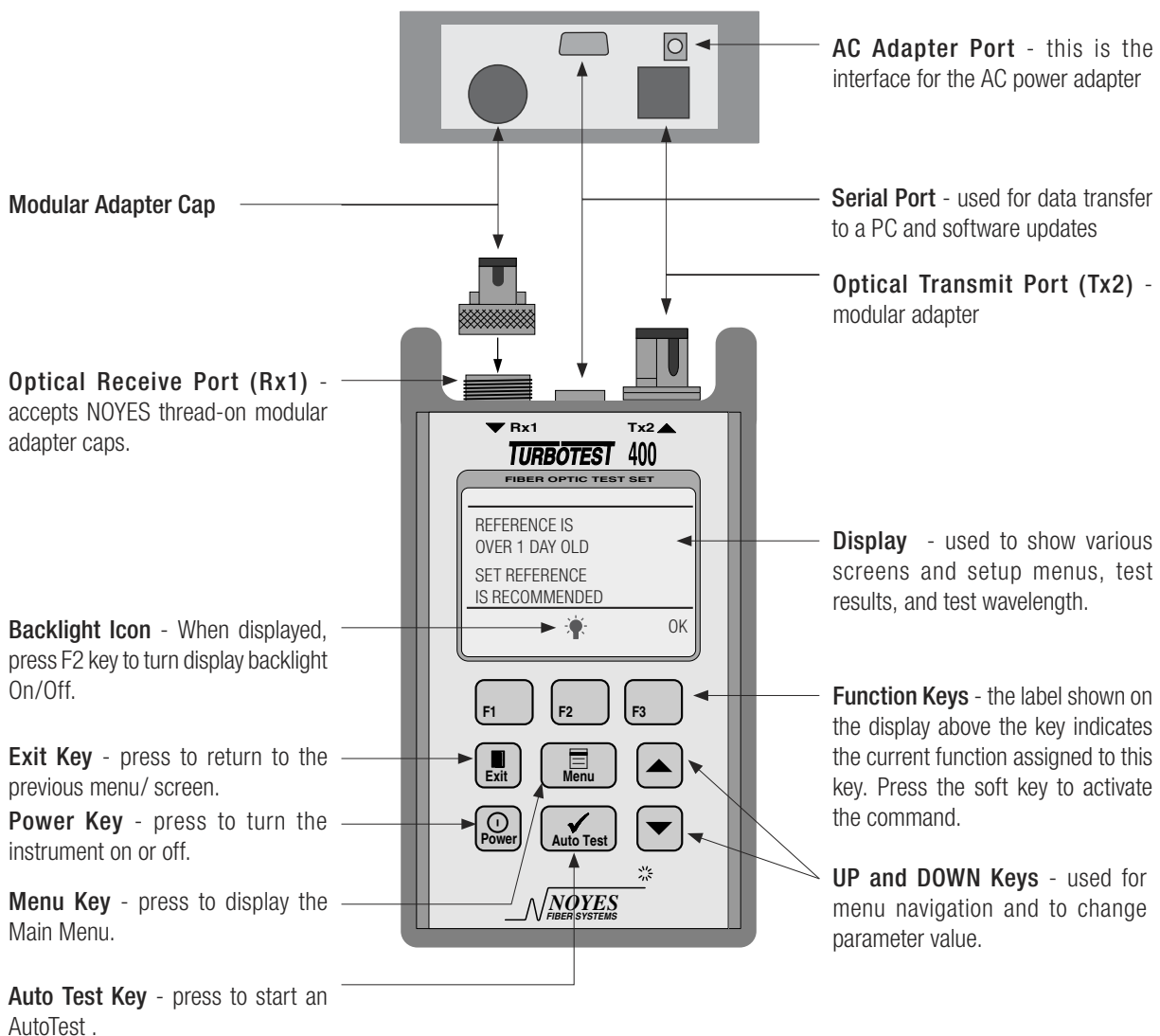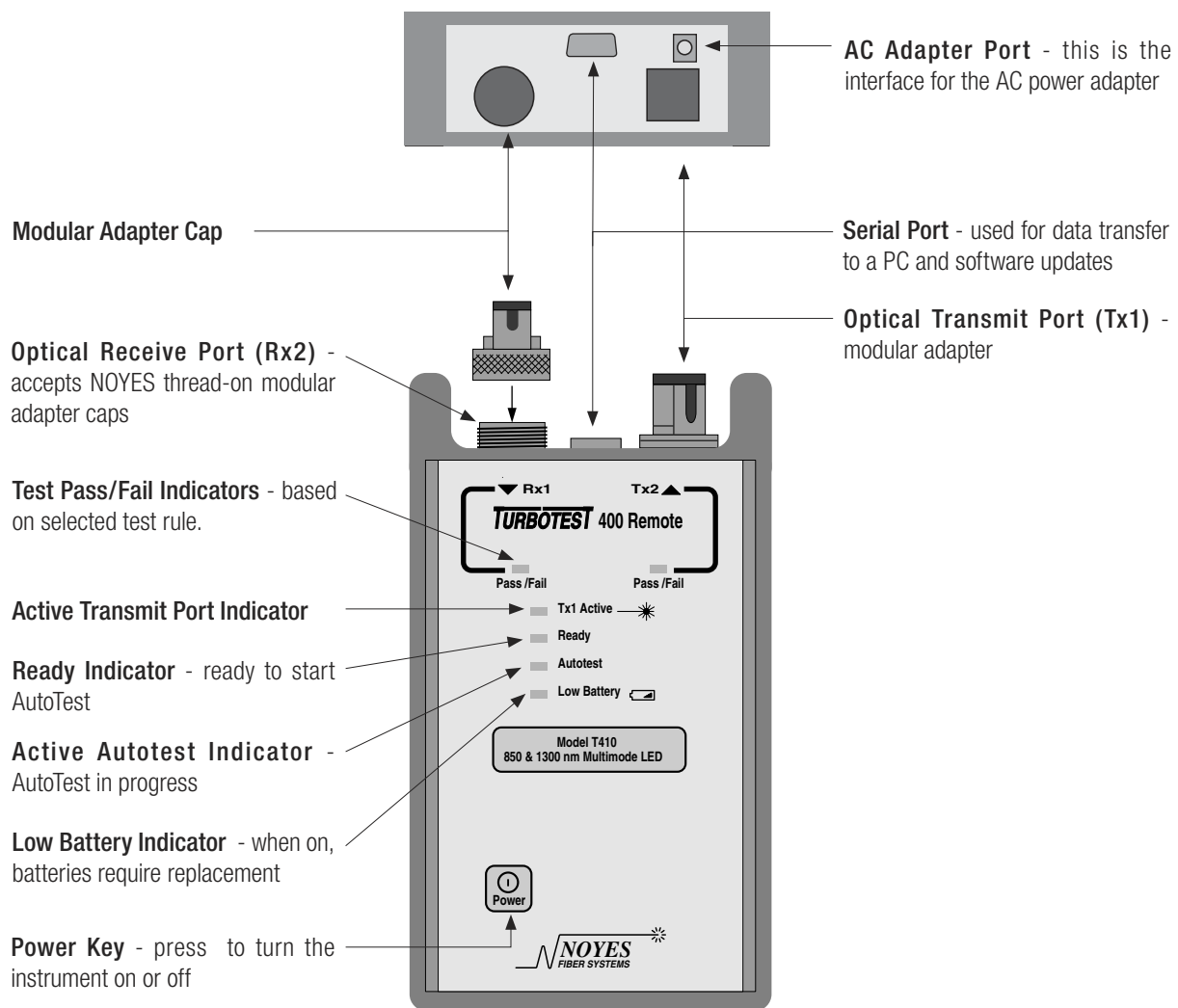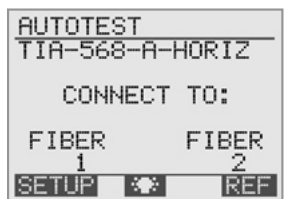FIBER SYSTEMS

Figure 2-2. Remote Unit.

Section 3: Setup and Operation

This chapter describes how to set the Main and Remote Units for operation, and to program user preferences.

```
AUTOTEST
TIA-568-A-HORIZ

    CONNECT TO:

FIBER          FIBER
  1              2
SETUP   ◆◆   REF
```

The SETUP (F1) and REF (F3) keys on the AutoTest screen provide the most used setup options for conducting AutoTests.

```
MAIN MENU
  REFERENCE
  FILE
  OPTIONS
  CONNECT TO PC
  POWER METER
  ABOUT T410
           SELECT
```

The Main Menu provides access to the various other setup menus and functions.

Setting an AutoTest Reference

Before conducting AutoTests the Main and Remote Units must first be referenced. This procedure should be done on a daily basis before testing.

1   Clean the test jumper(s) to be used, then choose a reference method:

- AutoTest Referencing: Connect the test jumpers to the Main and Remote Units (Figure 3-1).

  OR

- Loop-back AutoTest Referencing: Connect the test jumper to the Main Unit (Figure 3-2). Use this reference method if the Remote Unit is not available.

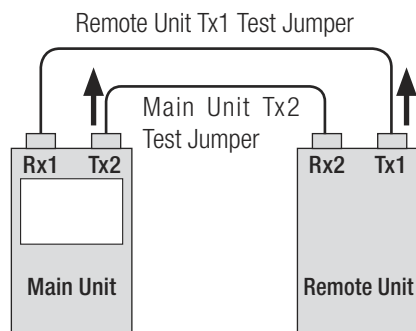Remote Unit Tx1 Test Jumper

Main Unit Tx2 Test Jumper

Rx1   Tx2   Rx2   Tx1

Main Unit   Remote Unit

Figure 3-1. AutoTest Referencing
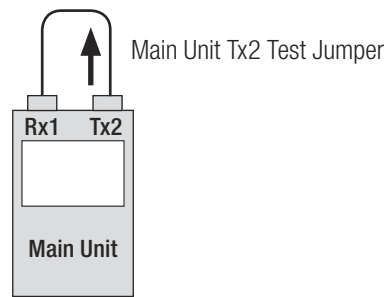
Main Unit Tx2 Test Jumper

Rx1   Tx2

Main Unit

Figure 3-2. Loop-back AutoTest Referencing

2   From the AUTOTEST screen press REF (F3). The Main Unit will display the current reference levels at both wavelengths.

3   Press SET REF (F3).

4   The new reference levels will be displayed.

  • If the new reference levels are acceptable (T410: -20 ±1 dBm , T420: -10 ±1 dBm), then press SAVE (F3).

    OR

  • If the new reference levels are not acceptable, try cleaning the connectors again, then press RETRY (F1).

Saving Test Results

This section describes how to identify and save AutoTest results. Each AutoTest will generate test results for two fibers at both wavelengths. AutoTest results can be labeled with meaningful alphanumeric names and saved in user defined files. A maximum of 40 files can be stored.

to create a new file

Each file name can have up to 8 characters (letters or numbers). The default name is FILE01.

1   From the MAIN MENU select FILE, then NEW.

2   Use the arrow keys (F1 & F2) and the SELECT (F3) key to enter characters. Use the MAIN MENU key as a backspace. Press EXIT when finished.

    OPTIONAL: To enable the auto file name increment feature enter digits as the last two characters in the file name.

to open an existing file

To open an existing file to add, review, or retest previously saved results perform the following steps.

1   From the MAIN MENU select FILE, then OPEN.

2   Highlight the desired file, then press SELECT (F3). The file will open and the unit will be ready to conduct an AutoTest.

to create a fiber name

Each fiber to be tested can be identified by a name and number. The default names and numbers are FIBER 1 for Side 1 and FIBER 2 for Side 2. The Main Unit can store test results for up to 1,000 fibers (500 AutoTests).

NOTE: Each fiber name can be up to 8 characters (letters or numbers) in length.

1   From the AUTO TEST screen press SETUP (F1).

2   Highlight the Side 1 fiber name (e.g. FIBER), then press CHANGE (F3).

```
TEST SETUP
TIA-568-A-HORIZ


        FILE01
Side 1 → FIBER    FIBER  ← Side 2
          1         2
                  CHANGE
```

3   Use the arrow keys (F1 & F2) and the SELECT (F3) key to enter characters. Use the MAIN MENU key as a backspace. Press EXIT when finished.

OPTIONAL: To make Side 2 fiber name different from Side 1 name highlight the Side 2 fiber name. Press CHANGE (F3), then perform step 3 again.

to specify starting fiber numbers

The fiber numbers (Side 1 and Side 2) auto increment from the numbers displayed below the fiber names. These numbers can be set to any value from 1 to 999.

NOTE: If initial numbers are adjacent (e.g. 11 and 12, or 101 and 102), then they will auto increment by 2. Otherwise numbers are auto incremented by 1.

EXAMPLE 1: Adjacent Fiber Numbers

Auto Test	Side 1	Side 2	
1	11	12	Set by user
2	13	14	Auto incremented by 2
3	15	16	Auto incremented by 2

EXAMPLE 2: Non-Adjacent Fiber Numbers

Auto Test	Side 1	Side 2	
1	200	300	Set by user
2	201	301	Auto incremented by 1
3	202	302	Auto incremented by 1

1   From the AUTO TEST screen press SETUP (F1).

2   Highlight the Side 1 fiber number, then press the + (F2) key to increment, or the - (F1) key to decrement both fiber numbers. Hold either key for fast adjustment.

OPTIONAL: To independently change the Side 2 fiber number, highlight it and use the F1 or F2 keys to change.

OR

3   Highlight either number, press CHANGE (F3), then use the F1, F2 and ARROW keys to create the desired starting numbers for Side 1 and Side 2.

to review test results

NOTE: Be sure that the desired file is already open as previously described.

1   From the MAIN MENU select FILE, then REVIEW RESULTS. The current file name and saved tests will be displayed.

2   Highlight the desired fiber numbers, then press VIEW (F1). The first Review screen will display the test rule, pass or fail, loss margin and the length of the tested fibers. To view the additional test results use the ARROW keys to navigate to the other screens. Depending on the type of test, either one way (uni-directional) or two-way (bi-directional), 8 or 12 screens of test results will be available for viewing.

to delete selected files or all files

1   From the MAIN MENU select FILE, then DELETE.

2   A list of files will be displayed.

  • Highlight the desired file, then press DELE (F3).

  OR

  • To delete all files press ALL (F1).

3   Press YES (F1) to confirm deletion, or NO (F3) to cancel the deletion.

to display file and fiber storage statistics

1   From the MAIN MENU select FILE, then STATISTICS. The following statistics will be displayed.

FILES   Number of files stored.

FIBERS USED   Number of fiber test results stored.

FIBERS FREE   Number of additional fiber test results that can be saved.

PCT. FREE   Percentage of memory free for storage of additional test results.

Selecting AutoTest Rules

The Main Unit can compare test results with AutoTest rules based on industry standards, or up to four user-defined rules. To pass, all parts of the chosen rule must be met. For a complete list of AutoTest rules refer to Section 7.

to choose an AutoTest rule

1   From the AUTOTEST screen press SETUP (F1) then CHANGE (F3).

2   Scroll to choose a rule from:

   • Predefined Standards: To use a predefined standard, use the ARROW keys to scroll to the desired rule. Select it by pressing SELECT (F3).

   OPTIONAL: Press VIEW (F1) to display its test parameters.

   NOTE: Some predefined standards require that the number of connections (mated connector pairs) and splices be specified. The Main Unit will prompt you to enter in this information when required. The unit will assume that the number of connections and splices in each fiber under test are the same.

   • User-defined Standards: To specify a user-defined standard, scroll to USER-1, USER-2, USER-3 or USER-4 and press EDIT (F1). Use the ARROW keys to highlight the parameter to be changed, then use the - (F1) or + (F2) key to adjust the selected parameter. When the value is set, press EXIT.

   • No Standard: If you do not want your unit to perform Pass/Fail analysis, scroll to and select NO RULE.

Selecting AutoTest Direction (one-way or two-way)

AutoTest direction is selectable for one-way (uni-directional) or two-way (bi-directional) measurements. The default setting is one-way (uni-directional).

1   From the MAIN MENU select OPTIONS.

2   Highlight the DIR: line, then press - (F1) or + (F2) to select the direction.

Setting the Index of Refraction

The index of refraction can be defined from 1.4500 to 1.5500. The default setting is 1.4910 for T410 models and 1.4680 for T420 models.

1   From the MAIN MENU select OPTIONS.

2   Highlight the INDEX: line, then press SELECT (F3).

3   Use the F1 and F2 keys to select digits, and the ARROW keys to increase or decrease the values or press F3 again to apply the default value. Press EXIT when done.

General Setup Options

To change the following Main Unit options perform the following steps.

1   From the MAIN MENU select OPTIONS. Screen 1 will appear listing the following options. Use the ARROW keys to highlight the parameter to be changed, then use the - (F1) or + (F2) key to adjust the selected parameter.

CONTRAST	Controls the contrast of the display screen
SOUND	Toggles sound on and off
POWER SAVE	Toggles the Main Unit power save feature (automatic shut-off after a period of disuse) on and off
DIR	AutoTest Direction. Refer to Section 3.4 for setup information.
INDEX	Fiber index of refraction. Refer to Section 3.5 for setup information.

2   Press the either ARROW keys until options screen 2 displays the following.

TIME	In 24 hour format. To change it, press SELECT (F3), scroll through the fields using the F1 and F2 keys, and increase or decrease them using the ARROW keys. Press EXIT when done.
DATE	In day, month, year format. To change it, press SELECT (F3) and change the fields as in the TIME function, above.
LANGUAGE	(future) English is currently the only option.
LENGTH	Length Units. Toggle between FEET and METERS using the - (F1) or + (F2) key.

Connecting to a PC

To connect the Main Unit to a PC for file transfer using the WinTest 400 software, perform the following steps.

1   Using the supplied serial cable, connect the Main Unit to the serial port on the PC.

2   Run WinTest 400 software.

3   From the WinTest 400 File menu select Receive All Files.

   NOTE: Refer to Section 6.0 for more information on software setup and operation.

4   From the Main Unit's MAIN MENU select CONNECT TO PC. The Main Unit will connect with WinTest 400 and begin file transfer.
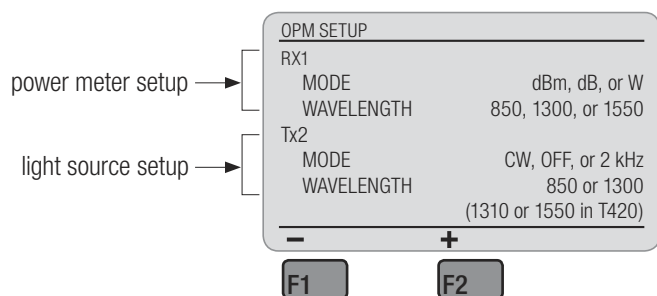
Using the Main Unit as a Power Meter

To use the Main Unit as an optical power meter and light source, or to use the Main Unit as an optical power meter with a separate light source, perform the following steps.

power meter referencing

1   Clean and connect the test jumper to the Main Units receive port (Rx1) and the Light Source's output port.

2   From the MAIN MENU select POWER METER, then press REF (F2).

3   Press and hold the F2 key to set the reference. The screen will display "Reference Set".

power meter setup

1   From the POWER METER screen select SETUP (F1) to display the following screen.

2   Using the ARROW keys highlight the parameter to be changed, then use the - (F1) or + (F2) key to adjust the selected parameter.

3   Press EXIT to enter parameters and return to the POWER METER screen.

Using the Remote Unit as a Light Source

Perform the following steps:

1   The unit must be ON with the Tx1 Active indicator blinking.

2   Press and hold down the Power switch until Ready and Tx1 Active indicators are On continuously (approximately 5 seconds).

3   Tx1 is now transmitting 1300 nm at about -20 dBm CW from the T410, or 1550 nm at about -10 dBm CW from the T420.

4   Press and then release the Power switch to turn off the transmit source and unit.

About the T410 or T420 Units

To view general information about the Main and Remote Units follow the steps below. Three screens of information relating to the Main and Remote Units can be displayed.

NOTE: To view information about your Remote Unit (screen 2) you must link the Remote to the Main Unit using test jumpers or by connecting both units to a working fiber link.

1 From the MAIN MENU select ABOUT THE T410 or ABOUT THE T420. Screen 1 of 3 will appear listing the following information about the Main Unit.

VER   Software version of the Main Unit.

SN   Factory supplied serial number of the Main Unit.

BATTERY   Main Unit. If connected to an AC adapter then AC ON is displayed. If powered by alkaline batteries a life expectancy percentage value will be displayed.

NOTE: When the battery life reaches about 5%, the Main Unit will flash LOW BAT in the upper right corner of the AutoTest screen. Refer to Section 5 for battery replacement procedures.

2 Press the DOWN ARROW key. Screen 2 of 3 will appear listing the software version and serial number of Remote Unit if connected. If connected to an AC adapter, then AC ON is displayed. If powered by alkaline batteries a life expectancy percentage value will be displayed.

NOTE: When the battery life reaches about 5%, the Low Battery LED on the Remote Unit will turn on. Refer to Section 5 for battery replacement procedures.

3 Again, press the DOWN ARROW key. Screen 3 of 3 will appear listing contact information for Noyes.

Section 4: AutoTest Procedures

This section describes how to perform AutoTests using the Main and Remote Units or the Main Unit with a far end loop-back test jumper.

NOTE: The loop-back procedure calculates the average loss of two fibers and thus is not recommended for fiber certification.

Conducting an AutoTest

NOTE: To make bi-directional loss measurements, the Main Unit must be setup to perform "two-way" tests (refer to section "Selecting AutoTest Direction). Refer to Figures 4-1 and 4-2 when conducting the following procedure. The Main Unit will prompt you to swap test jumpers (Figure 4-2)

1   Set the AutoTest Reference. If this already has been done, skip to step 2.

2   Select an AutoTest rule.

3   Enter a file name.

4   Enter starting fiber names and numbers.

5   Connect to the fibers under test (Figure 4-1)

NOTE: Once the AutoTest reference has been set do not disconnect the test jumper from the Main or Remote Unit transmit ports (Tx2 and Tx1).

6   Conduct the test.

  • Press the AUTOTEST key. The Main Unit will connect with the Remote Unit, conduct the test and display the results. Use the ARROW keys to view the additional result screens. Depending on the type of test, either one-way (uni-directional) or two-way (bi-directional), 8 or 12 screens of test results will be available for viewing.

  • Press SAVE (F3) to save the test results.

    OR

  • Press the AUTOTEST key again to retest the two fibers.

7   To test additional fibers reconnect the Main and Remote Units to the next fiber pair then repeat step 6. The fiber numbers will increment automatically.
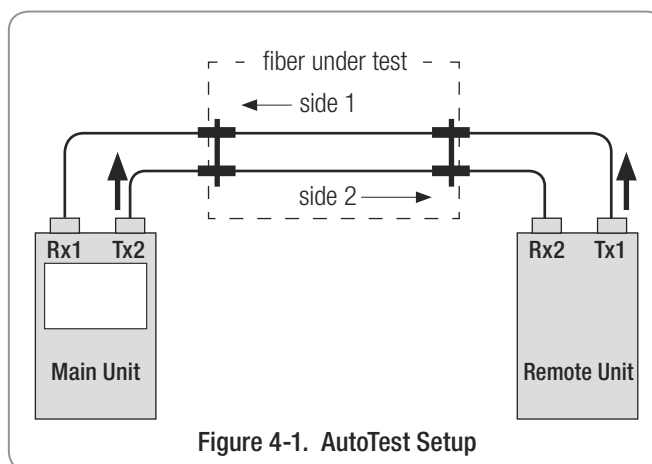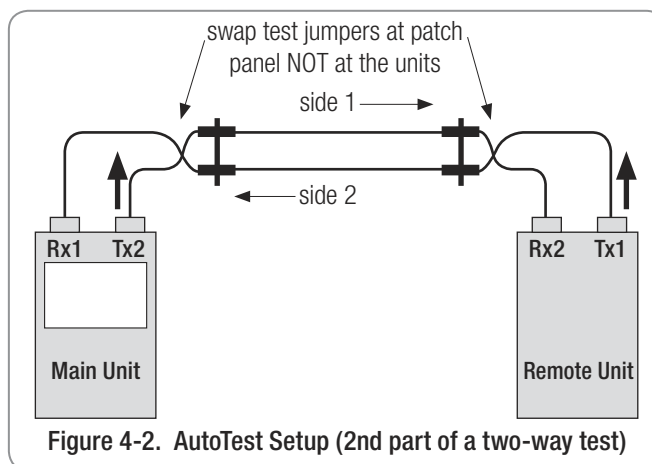

Figure 4-1. AutoTest Setup

Figure 4-2. AutoTest Setup (2nd part of a two-way test)

Conducting a Loop-Back AutoTest

NOTE: The loop-back procedure calculates the average loss of two fibers and thus is not recommended for fiber certification.

1 Set a Loop-Back AutoTest Reference. If this has already been done, skip to step 2.

2 Select an AutoTest rule.

3 Enter a file name.

4 Enter starting fiber names and numbers.

5 Connect to the two fibers under test to the Main Unit and the far-end test jumper (Figure 4-3)

   NOTE: Once the loop-back AutoTest reference has been set do not disconnect the test jumper from the Main Unit transmit port (Tx2).

6 Conduct the test.

   • Press the AUTO TEST key. The Main Unit will conduct the test and will display the results. Use the ARROW keys to view the additional test result screens.

   • Press SAVE (F3) to save the test results.

      OR

   • Press the AUTO TEST key again to retest the two fibers.

7 To test additional fibers reconnect the Main and the far-end test jumper to the next fiber pair then repeat step 6. The fiber numbers will increment automatically.
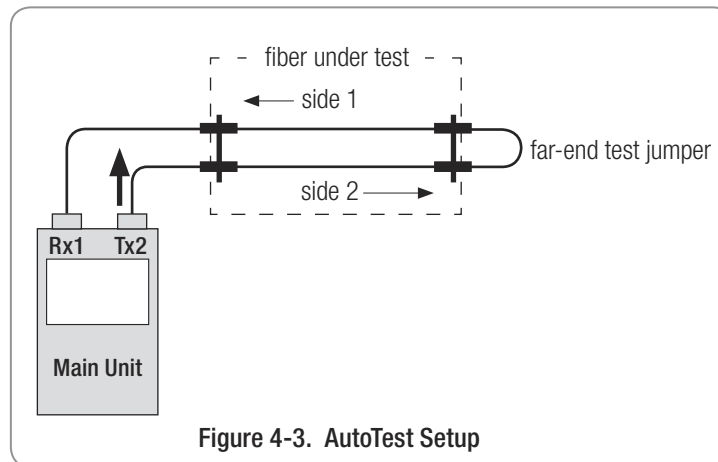

Figure 4-3. AutoTest Setup

Section 5: Maintenance

Repair and Calibration

Repair of these units in the field is NOT recommended. If repair is necessary, please contact Noyes. Calibration of the Main and Remote Units are recommended every 12 months. Please contact Noyes for proper calibration.

Cleaning Optical Ports

CAUTION: Before conducting the following procedures be sure to have the unit(s) turned OFF.

Optical ports must be kept free from dirt or other contaminates to ensure accurate measurements and operation. A supply of optical cleaning pads and isopropyl alcohol or a connector-cleaning cartridge is recommended to clean the optical ports.

cleaning transmit ports (Tx1 & Tx2)

1 Remove the dust cap on the adapter (refer to Figure 5-1).

2 Remove two screws holding the adapter.

3 Pull the adapter away from the modular adapter mount.

4 Dampen an optical wipe with the alcohol and gently wipe the exposed ferrule on the adapter mount. Then dry the ferrule using a new optical wipe.

5 Using a can of compressed air (held vertically), blow out any contaminants from the adapter.

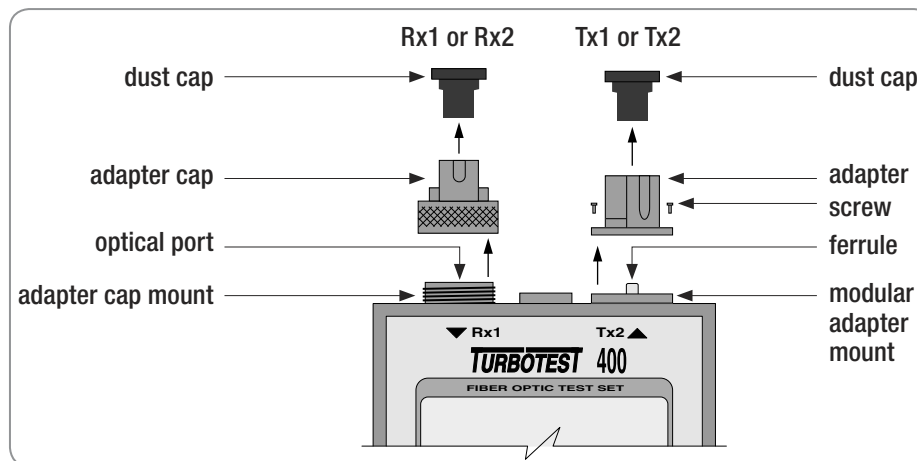6 Replace the adapter and screws. Position to fit adapter over the ferrule and alignment pin.

Figure 5-1. Cleaning Optical Ports.

7   Replace the dust cap.

cleaning receive ports (Rx1 & Rx2)

1   Remove the dust cap on the adapter cap (Refer to Figure 5-1).

2   Unscrew the adapter cap from the adapter cap mount.

3   Dampen an optical wipe with the alcohol and gently wipe the optical port on the adapter mount. Then dry the optical port using a new optical wipe.

4   Using a can of compressed air (held vertically), blow out any contaminants from the adapter cap.

5   Replace the adapter cap.

Replacing Batteries

When Main Unit flashes LOW BAT in the upper right corner of the AutoTest screen, or when the Remote Unit low battery LED is active, perform the following steps on that unit.

1   Starting from the bottom, remove the protective rubber boot from the unit.

2   On the back side of the unit perform the following (Figure 5-2):

  • Insert a small flat-bladed screwdriver in front of the compartment lever.
  • Rotate the screwdriver.
  • Lower the top of the screwdriver down to lift the compartment cover.

3   Replace the batteries in the unit with 4 new AA alkalines. Be sure that the orientation of the batteries correspond with the label in the compartment.
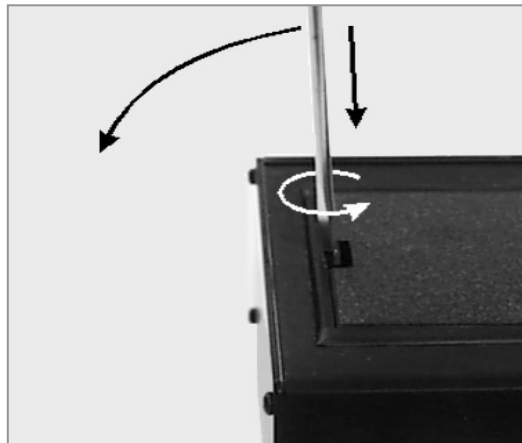
4   Replace the cover and rubber boot.

Figure 5-2. Removing Battery Compartment Cover.

Section 6: WinTest 400 Software

WinTest 400 is a Windows based application that provides the ability to transfer stored AutoTest results files from a TURBOTEST 400 Main Unit. Once the files have been transferred, certification reports can be generated for the tested optical fibers listing AutoTest results, along with company, operator, and job information.

NOTE: WinTest 400 is not licensed software, you are free to copy it as needed. When documenting fiber installations, contractors may find it useful to provide a copy of the software and test results to the customer.

Software Setup

This section describes WinTest 400 system requirements, installation procedures, and basic setup information.

system requirements

To use WinTest 400 you need the following hardware and software:

- A 400 MHz (or faster) personal computer or laptop with an 800 x 600 (or larger) display

- Windows 9X, NT 4.0, 2000, or XP

- At least 32 megabytes (MB) of RAM

- CD-ROM drive

installing WinTest 400

1   Start Windows. If Windows is running, quit all applications.

2   Insert CD into the CD-ROM drive. (Note: normally the D: drive.)

3   If the Install does not start automatically, from Windows either:

- select Start > Run > enter D:\setup.exe > click OK

- double-click the My Computer icon on the desktop, double-click the CD-ROM icon, and double-click Setup.exe.

4   Follow the on-screen instructions. A message appears when the installation is complete.

5   Choose OK.

Getting Started

This section provides you with a quick overview of WinTest 400 operation. As shown below, WinTest 400 displays test results transferred from the Main Unit and provides fields for entering company, user, and job information.

NOTE: If you wish to have the same header information (company and user information) appear in all the files transferred from the Main Unit, then before transferring close the current file (if one is open), enter the required information into the appropriate fields. If the desired header information is saved as default refer to Section "To create a fiber name" for insertion. Otherwise, the files will be transferred without the header information and will need to be inserted when the file is opened.

file name

header information

AutoTest results
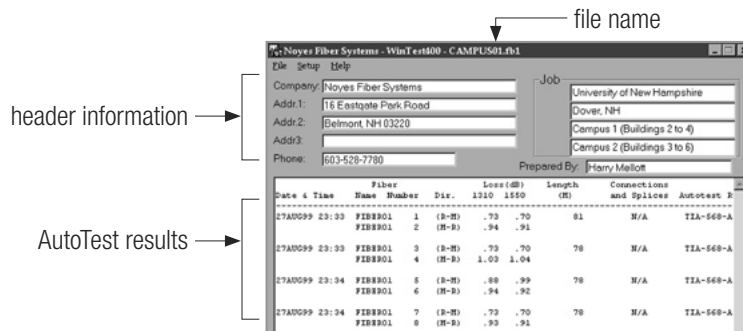
to receive files from the Main Unit

1 Using the supplied serial cable, connect the Main Unit to an available COM Port on the PC.

2 If WinTest is not running, from the Windows Start Menu select Programs > WinTest 400.

3 From the WinTest 400 Setup menu select the appropriate COM Port from the list. Refer to your PC operations manual if you are unsure what communication port to select.

4 If there is a file open, select File > Close.

5 In the header fields, enter the information that you want to appear on all of the files you are about to transfer from the Main Unit. You can enter the default header by selecting File > Load Default Header.

6 From the WinTest 400 File menu select Receive T400 Files.

7 From the Main Unit's MAIN MENU select CONNECT TO PC.

8 WinTest 400 will establish connection with the Main Unit and display the Receive Files screen. Click Receive Files.

9 The Select T400 Data Folder screen will appear.

• To save the files in the default WinTest 400 folder click OK.

  OR

- To create a new folder, select the drive and folder where the new folder is to be created, then click New Folder, enter the name of the new folder, and then click OK.

to open, print and save files

1 To open TURBOTEST 400 AutoTest files, select File, locate the file that you wish to view, then click Open. Test results will appear in the lower part of the screen. Header information (if previously entered) will appear in the top part of the screen.

2 To print the open file, select File, then Print. Select the appropriate printer, if it is not already selected. Enter the number of copies, then click OK.

3 To edit the header information in the open file, tab to the fields you want to change (or click with mouse) and enter or edit text as desired.

4 To save the open file, select File, then Save (to save as the same file name) or Save As (to save as new file name). If Save As is selected, enter a new file name or folder, then click Save.

to edit or enter the default header information

1 From the WinTest 400 File menu select Edit Default Header.

2 Enter the required information in the appropriate fields, then click OK.

3 Select File, then Load Default Header to insert the default header into the opened file.

Installing New Main and Remote Unit Software

WinTest 400 provides the ability to install new TURBOTEST 400 software via the units serial ports. New TURBOTEST 400 software may contain new features, new AutoTest rules, or bug fixes. The latest TURBOTEST 400 unit software, as well as the latest version of WinTest 400, will be posted on our web site (www.noyes-fiber.com). Or you may request the software by contacting Noyes.

TURBOTEST 400 Main and Remote Unit software will normally be installed at the same time. In some cases, however, new software may be released for only one unit. Check the Readme.txt file found with your new software, or call Noyes Technical Support, for specific instructions. Files containing new TURBOTEST 400 software will be named T4xx_MAIN_Vyyy.mot or T4xx_REMOTE_Vyyy, where XX will indicate TURBOTEST 400 model and yyy will indicate software version number.

to install new software

NOTE: The TURBOTEST 400 software download feature is designed so that the AutoTest results saved in the Main Unit are not lost during an upgrade. However, it is recommended that all AutoTest tests be transferred to your PC before you install new software in the Main Unit.

NOTE: It is recommended that the Turbotest 400 Main and Remote Units be operated from AC power when performing the following procedures.

1 Using the supplied serial cable, connect the Unit to an available COM Port on the PC.

2   If WinTest is not running, from the Windows Start Menu select Programs, then WinTest 400.

3   From the WinTest 400 Setup menu select the appropriate COM Port from the list. Refer to your PC operations manual if you are unsure what communication port to select.

4   Put your Main or Remote Unit in the Connect to PC mode as follows:

- Main Unit: Press the Power key to turn on the unit. From the MAIN MENU select CONNECT TO PC.

  OR

- Remote Unit: Press the Power key to turn on the unit. When the Tx1 Active LED is flashing, press and hold the Power key again (for about 4 seconds) until the Ready LED is on.

5   From the WinTest 400 Setup menu select Install New T400 Software

6   From the Open menu browse and select the file containing the new Main (or Remote) Unit software, then click OPEN. WinTest 400 will establish connection with the Main (or Remote) Unit and begin software installation.

NOTE: Do not disconnect the serial cable or depower your TURBOTEST 400 units or PC until software installation is done.

Section 7: Specifications

TURBOTEST 400 Specifications

Transmit Port Specifications

Model	T410	T420
Emitter type	LED	Laser
Emitter classification	Class I	Class I (FDA 21 CFR 1040.10 & 1040.11; EN 60825-1:1994)
AutoTest wavelengths	850 / 1300 nm	1310 / 1550 nm
Power (average)	-20 dBm (62.5 µm) [1]	-10 dBm (singlemode)[1]
Spectral width (FWHM)	30-60 / 100-140 nm [1]	<10 / <10 nm
Modular adapter	Removable for easy cleaning	
Adapter	SC or ST	

receive port specifications

Model	T410	T420
Detector type	Germanium (Ge)	
Calibrated wavelengths	850, 1300, 1310, 1550 nm	
Power measurement accuracy (25° C)	±0.25 dB @ -20 dBm [2]	±0.25 dB @ -10 dBm
Length measurement range	11 dB / 5 km	11 dB / 20 km
Length measurement accuracy	±2% ±1.5 m	
Modular adapter cap	Removable for easy cleaning	
Adapter cap	SC or ST	

general specifications

Model	T410 & T420
display	LCD with back-light
Serial cable	Standard 9-pin to 9-pin (straight-through cable)
Power (each unit)	4 AA alkaline batteries (AC adapters available)
Battery life (typical)	16 hr (8 hr with back-light on)
Operating temperature	0° to +50° C
Weight (each unit)	1.8 lb (0.8 kg)
Size H x W x D (each unit)	7.4 x 4.4 x 2.2 in (18.8 x 11.2 x 5.6 cm)

[1] Typical

[2] -10 dBm @ 1550 nm

Specifications are subject to change.

Model T410 Multimode AutoTest Rules

Multimode Commercial Building (Premises) Cabling Standards

Rule	T410 Name	Total Loss @ 850 nm (dB)	Total Loss @ 1300 nm (dB)	Length (m)	Fiber Loss @ 850 nm (dB/km)	Fiber Loss @ 1300 nm (dB/km)	Loss per connector (dB)	Loss per splice (dB)
TIA/EIA-568-A, horizontal cables, 50 or 62.5 µm fiber	TIA-568-A-HORZ	2	2	90	N/A			
TIA/EIA-568-A, backbone cables, 50 or 62.5 µm fiber	TIA-568-A-BACK	N/A		2000	3.75	1.5	0.75	0.3
TIA/EIA-568-B, horizontal cables, 50 or 62.5 µm fiber (preliminary)	TIA-568-B-HORIZ	2	2	90	N/A			
TIA/EIA-568-B, backbone cables, 50 or 62.5 µm fiber (preliminary)	TIA-568-B-BACK	N/A		2000	3.5	1.5	0.75	0.3
ISO 11801 (International standard) all cables, 50 or 62.5 µm fiber	ISO-11801			2000	3.5	1	0.75	0.3
EN 50173 (European standard) all cables, 50 or 62.5 µm fiber	EN-50173			2000	3.5	1	0.75	0.3

Multimode Application Standards

Rule	T410 Name	Total Loss @ 850 nm (dB)	Total Loss @ 1300 nm (dB)	Length (m)	Delay (ns)
10 Mb/s Ethernet (850 nm) on 62.5 µm fiber	10BASE-FL-62.5	12.5	N/A	2000	10000
100 Mb/s Ethernet (1300 nm) on 62.5 µm fiber	100BASE-FX-62.5	N/A	11	2000	N/A
FDDI (1300 nm) on 62.5 µm fiber	FDDI-62.5		11	2000	
Low cost FDDI (1300 nm) on 62.5 µm fiber	FDDI-LC-62.5		7	500	
Gigabit Ethernet SX (850 nm) on 62.5 µm, 160 MHz-km fiber	1000SX-62.5-160	2.38	N/A	220	
Gigabit Ethernet SX (850 nm) on 62.5 µm, 200 MHz-km fiber	1000SX-62.5-200	2.60		275	
Gigabit Ethernet LX (1300 nm) on 62.5 µm, 500 MHz-km fiber	1000LX-62.5-500	N/A	2.35	550	
Gigabit Ethernet SX (850 nm) on 50 µm, 400 MHz-km fiber	1000SX-50-400	3.37	N/A	500	
Gigabit Ethernet SX (850 nm) on 50 µm, 500 MHz-km fiber	1000SX-50-500	3.56		550	
Gigabit Ethernet LX (1300 nm) on 50 µm, 400 MHz-km fiber	1000LX-50-400	N/A	2.35	550	
Gigabit Ethernet LX (1300 nm) on 50 µm, 500 MHz-km fiber	1000LX-50-500		2.35	550	

Model T420 Singlemode AutoTest Rules

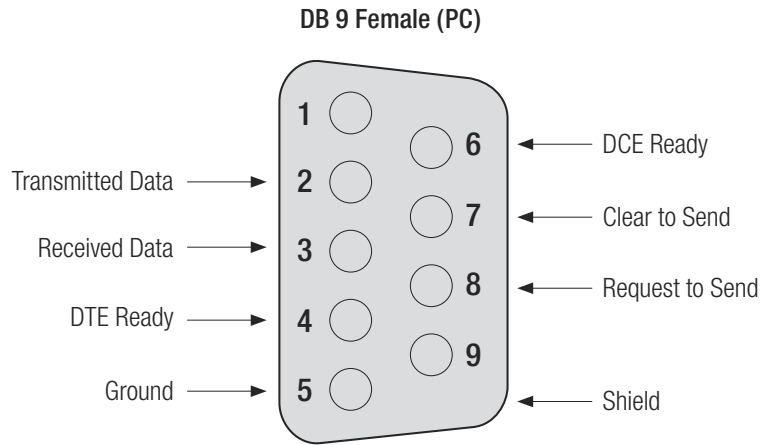### Singlemode Commercial Building (Premises) Cabling Standards

Rule	T420 Name	Total Loss @ 1310 nm (dB)	Total Loss @ 1550 nm (dB)	Length (m)	Fiber Loss @ 1310 nm (dB/km)	Fiber Loss @ 1550 nm (dB/km)	Loss per connector (dB)	Loss per splice (dB)
TIA/EIA-568-A, inside plant, singlemode fiber	TIA-568-A-IN				1.0	1.0	0.75	0.3
TIA/EIA-568-A, outside plant, singlemode fiber	TIA-568-A-OUT				0.5	0.5	0.75	0.3
TIA/EIA-568-B, inside plant, singlemode fiber (preliminary draft)	TIA-568-B-IN				1.0	1.0	0.75	0.3
TIA/EIA-568-B, outside plant, singlemode fiber (preliminary draft)	TIA-568-B-OUT	N/A		N/A Note 1	0.5	0.5	0.75	0.3
ISO 11801 (International Standard) inside plant, singlemode fiber	ISO-11801				0.5	0.5	0.75	0.3
EN 50173 (European Standard) inside plant, singlemode fiber fiber	EN-50173				0.5	0.5	0.75	0.3

Note 1:   While all of the commercial building (premises) cabling standards above limit their scope to cable lengths under 3km, they do not set specific limits on singlemode fiber cable length. Therefore the T420 does not use length as a criteria in singlemode autotest rules.

Singlemode Application Standards

Rule	T420 Name	Total Loss @ 1310 nm (dB)	Total Loss @ 1550 nm (dB)	Length (m)
Gigabit Ethernet LX (1310 nm) on singlemode fiber	1000LX-SM	4.57	N/A	5000

Serial Cable

DB 9 Female (PC)

Transmitted Data → 2

Received Data → 3

DTE Ready → 4

Ground → 5

1

6 ← DCE Ready

7 ← Clear to Send

8 ← Request to Send

9

← Shield

NOTE: For connection to a PC, a standard straight through serial cable is required. The connector on the Turbotest 400 end must be a 9-pin male.

AC Adapter

T400 Requirements: 10 to 13 V $=\!=\!=$ @ 400 mA $=\!=\!=$

Available Adapter: 12 VDC @ 1.2 A with country specific line cord

Polarity of Adapter Jack

Thank you for choosing Noyes Test & Inspection

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