

FiberChek™

Fiber End-face Inspection & Analysis

User Manual



ZP-PKG-0291

REV 0



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CERTIFICATION

Tested Equipment

All pre-qualification tests were performed internally at Westover Scientific, Inc., while all final tests were performed externally at an independent, accredited laboratory. This external testing guarantees the unerring objectivity and authoritative compliance of all test results. Westover Scientific's Commerce and Government Entities (CAGE) code under the North Atlantic Treaty Organization (NATO) is 0L8C3.

FCC Information

Electronic test equipment is exempt from Part 15 compliance (FCC) in the United States.

European Union



Electronic test equipment is subject to the EMC Directive in the European Union. The EN61326 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment. This unit has been tested and found to comply with the limits for a Class A digital device.

Independent Laboratory Testing

This unit has undergone extensive testing according to the European Union Directive and Standards.

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1 INTRODUCTION

Video inspection of fiber optic termini is essential for the optimal performance and longevity of fiber optic connectivity. Throughout its life, fiber connectors must be inspected, analyzed and cleaned to maintain an acceptable level of functionality. By developing and introducing the equipment and software to inspect, analyze and clean fiber connectors, Westover Scientific is able to provide a comprehensive solution to the performance and preservation of fiber optic interconnects.

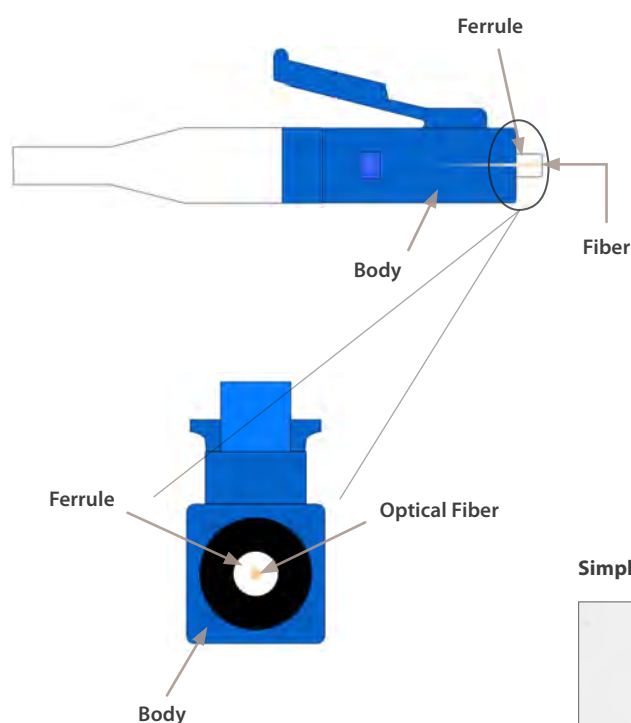
This manual will cover the basic terms and concepts of fiber optic connectivity followed by the operational and functional use of FiberChek™.

1.1 Key Terms & Concepts

1.1.1 Fiber Connectors

Fiber connectors enable fiber-to-fiber mating by aligning the two optical fibers. Fiber connectors come in various types and have different characteristics for use in different applications. The main components of a fiber connector are detailed below:

Fiber Connector (Simplex)



- **Body**

Houses the ferrule which secures the fiber in place. Utilizes a latch and key mechanism that aligns the fiber and prevents the rotation of ferrules of two mated connectors.

- **Ferrule**

Thin cylinder where the fiber is mounted and acts as the fiber alignment mechanism; the end of the fiber is located at the end of the ferrule.

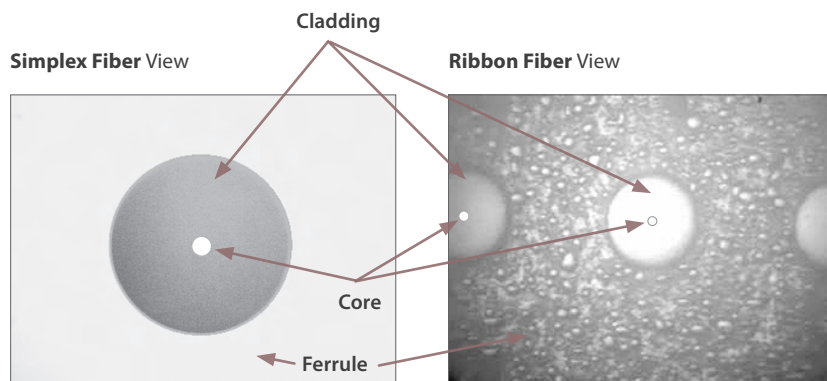
- **Fiber**

- **Cladding**

Glass layer surrounding the core which prevents signal in the core from escaping.

- **Core**

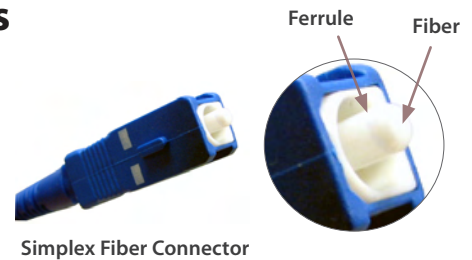
The critical center layer of the fiber. It is the conduit by which light passes through.



1.1.2 Simplex, Ribbon & Jewel Fiber Connectors

Simplex Fiber Connector

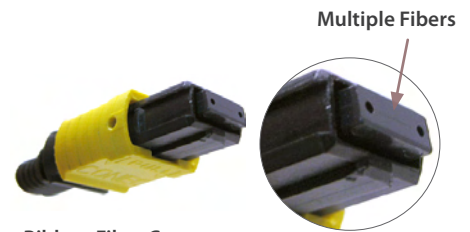
A simplex fiber connector contains a single fiber located in the center of the ferrule. Common types include SC, LC, FC and ST.



Simplex Fiber Connector

Ribbon Fiber Connector

A ribbon fiber connector contains multiple linear fibers (4, 8, 12, 24, 48 or 72) in a single connector to provide high-density connectivity. The most common configuration is MPO (also called the MTP®).



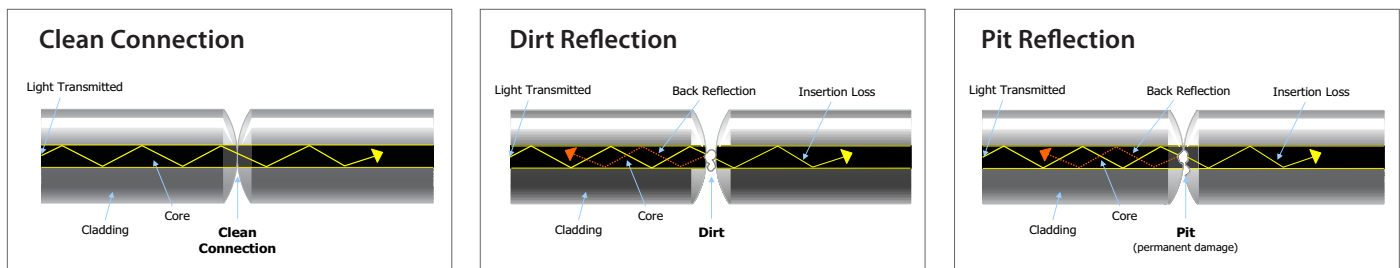
Ribbon Fiber Connector

Jewel Fiber Connector

A jewel fiber connector is a simplex fiber with a polyimide coating/layer around the cladding and is designed for exceptional environments such as military, oil & gas, avionic and/or high-temperature settings.

1.1.3 Dirt & Contamination

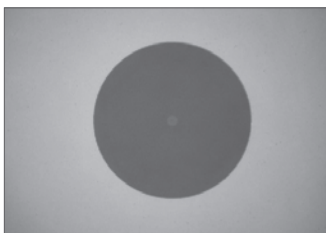
If dirt particles get on the core surface the light becomes blocked, creating unacceptable insertion loss and back-reflection. Furthermore, those particles can permanently damage the glass interface, digging into the glass and leaving pits that create further back-reflection if mated. Also, large particles of dirt on the cladding layer and/or the ferrule can introduce a barrier that prevents physical contact and creates an air gap between the fibers. To further complicate matters, loose particles have a tendency to migrate.



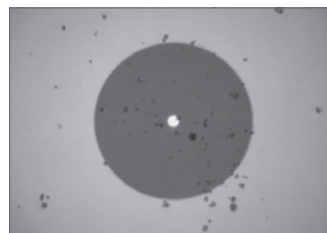
1.1.4 Scratches

Scratches are typically created during polishing, cleaning or mishandling fiber connectors. Scratches that touch the core are problematic because they create unacceptable back reflection.

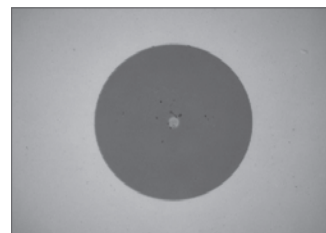
Clean Fiber



Dirt Contamination



Pit/Chip Contamination



Scratch



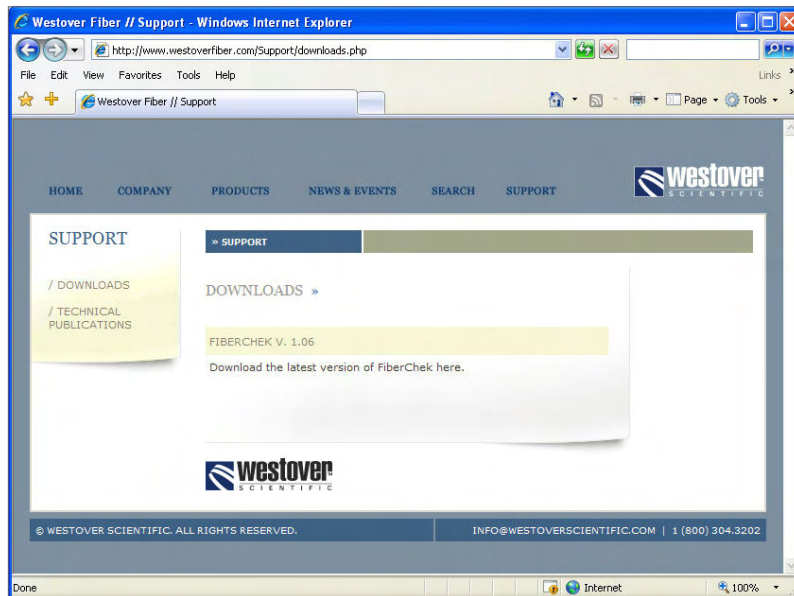
1.2 Software Overview

FiberChek™ is a simple and efficient software application that determines the acceptable and/or unacceptable levels of fiber optic performance through automated inspection and analysis. Used in conjunction with Westover's FBP Probe Microscopes and image capture modules, FiberChek™ provides PASS or FAIL results by analyzing defects (Contamination, Pit/Chip and Scratches) found on the fiber surface. *Failure criteria* for grading and testing the fiber can be defined by the user and are stored/saved as **Profiles**. In addition to testing, FiberChek™ allows the user to save or print inspection results and/or images.

FiberChek™ Download/Source

<http://www.westoverfiber.com/Support/downloads.php>

FiberChek™ Download Site



The various insightful tools available in FiberChek™ make it a powerful application by which fiber end-face images are examined, analyzed, saved and archived. Moreover, the naming or archiving scheme is user-defined, making the documentation and record keeping process manageable and entirely customizable to fit your needs.

This manual covers the installation procedures for FiberChek™ as well as related USB drivers for Westover's Video Probe Microscopes. It also introduces the basic tools for set-up and instructions for key operational procedures.



Note: FiberChek™ operates on a **fixed Dialog window** and **CANNOT be resized** or maximized to fit the entire screen.

Features

- Automated analysis of fiber end-face
- PASS / FAIL indication of analyzed fiber end-face
- User-defined *failure criteria*
- Freeze and capture fiber end-face images
- Save and archive test results and/or images
- Generate detailed results/report of analyses
- Print test results and/or images

2 INSTALLATION

2.1 System Requirements

Listed below are the minimum system requirements you must have:

- PC with Pentium® II 266 MHz CPU or higher
- Windows® 98, 2000, ME or XP operating system
- 30 MB of hard drive space for application software
- One open USB port
- 128 MB RAM

2.2 Essential Parts

Listed below are the essential parts needed for operation:

- **FiberChek™ software**
(runs exclusively with Westover Scientific microscopes)
- **USB Image Capture Module**
- **FBP Series Analog Probe Microscope**
- **User Manual**

Quick Start

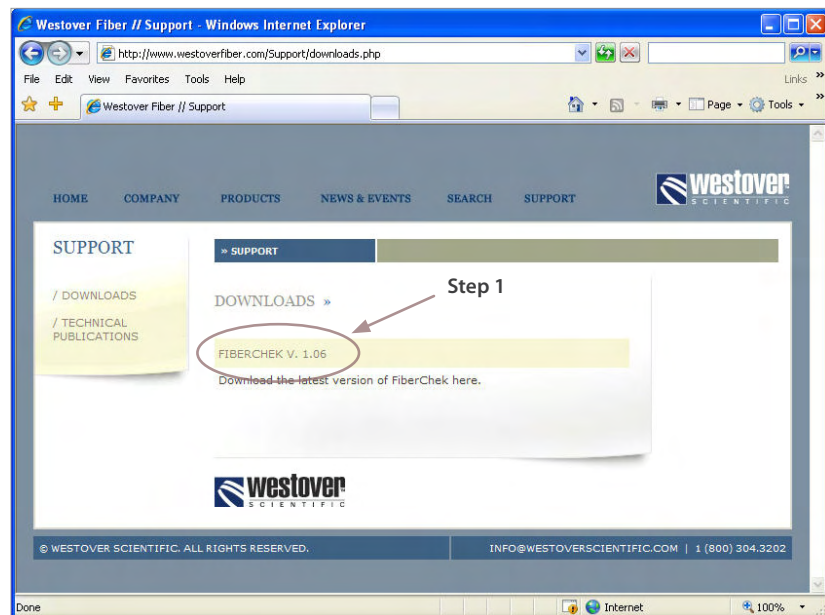
- 1. Download Software:** Download FiberChek™ and Driver installation files from Westover web site:
<http://www.westoverfiber.com/Support/downloads.php>
- 2. Install Software:** Run **setup** file for software (FiberChek™).
- 3. Plug in USB Image Capture Module:** Connect the USB Image Capture Module to the probe microscope and plug in the module's USB cable to an open USB port on the computer.
- 4. Install Hardware:** Install Westover USB Video Capture Driver. Follow the **Advanced** method and search for the hardware driver in the **Westover USB Installation Disk** folder.
- 5. Calibrate:** Calibrate the system with a pristine connector or artifact.
- 6. Test/Inspect:** Open FiberChek™ to inspect & analyze the connector. Save and/or print results.



2.3 Software Download (FiberChek™ & USB Driver Installation Files)

Software Download

Download Site



1. Go to:

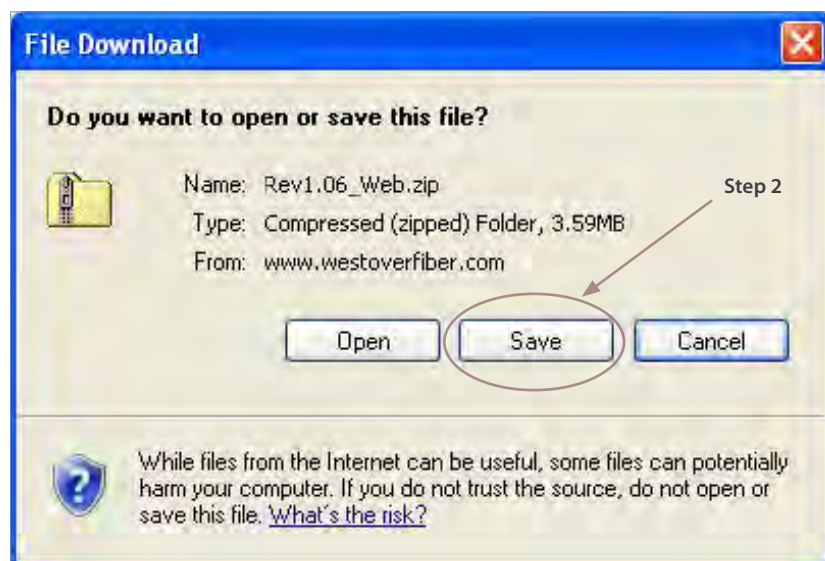
<http://www.westoverfiber.com/Support/downloads.php>

from your internet browser

(MS Internet Explorer 6+ preferred) and select the current version of the software to initiate download.

Software Download

File Download

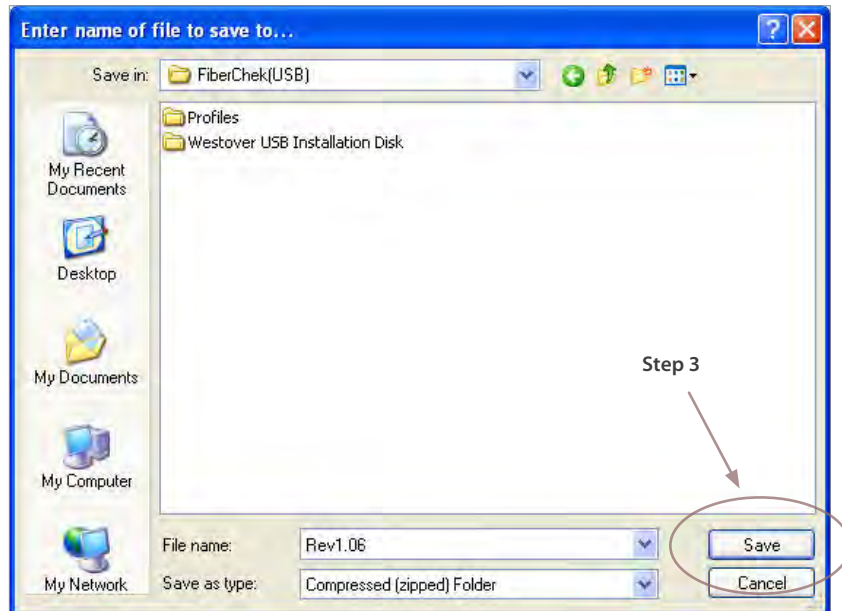


2. At the **File Download** dialog, select **Save** to save the installation files to a designated user-determined folder/directory.

Note: You can select **Open** to download directly into a default temporary folder (computer-defined), however this method is not recommended.

Software Download

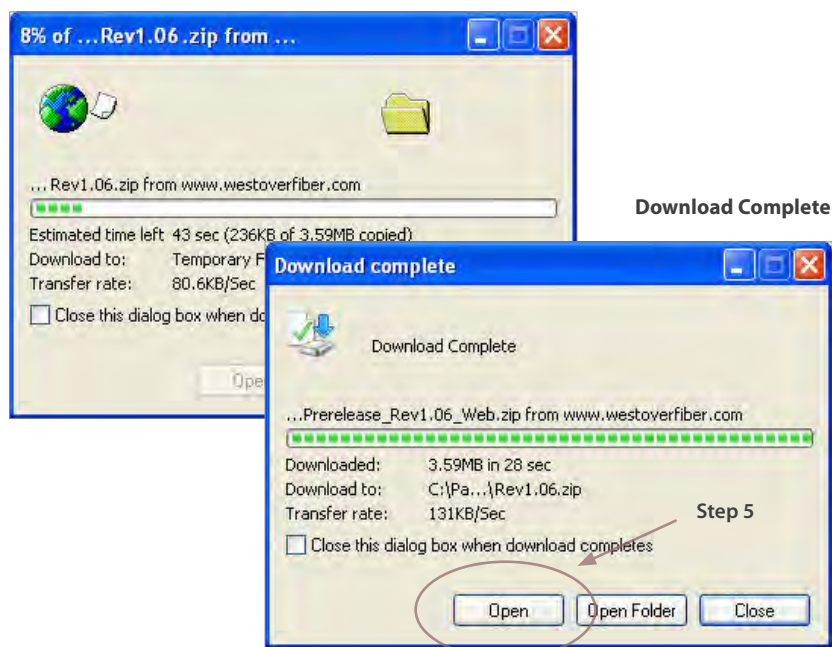
Download Destination Location



3. Choose/select the folder/directory you would like to save the installation files into and click **Save**.

Software Download

Downloading Zip Files



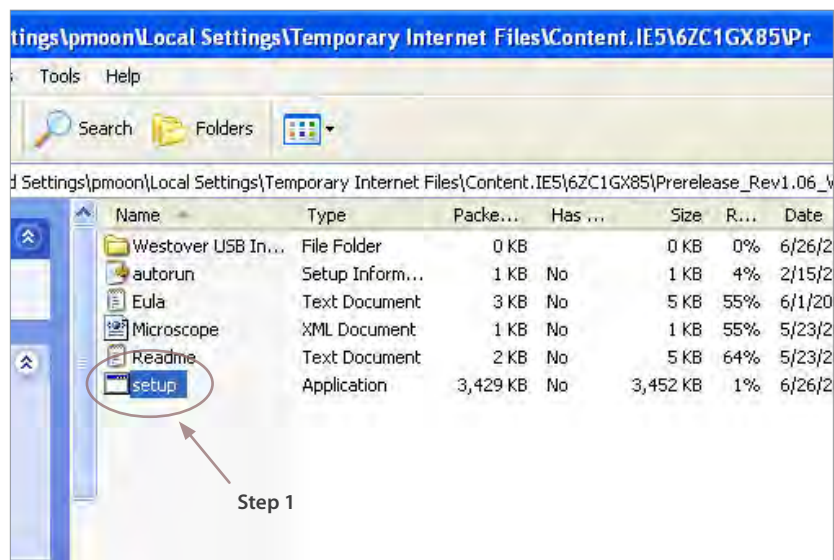
4. Allow all files to download.
5. After completion of download, select **Open** to unzip and extract the **.zip** file to the designated folder/directory. Continue to **Software Installation**.

2.4 Software Installation

! **DO NOT connect the Image Capture Module to the USB port on your computer at this time. You will be given instructions to do this after you have installed the FiberChek™ software. Please install the software first.**

Software Installation

Run Setup File



1. From the user-determined folder/directory where the installation files are saved, open the **setup** file.

Software Installation

Security Warning

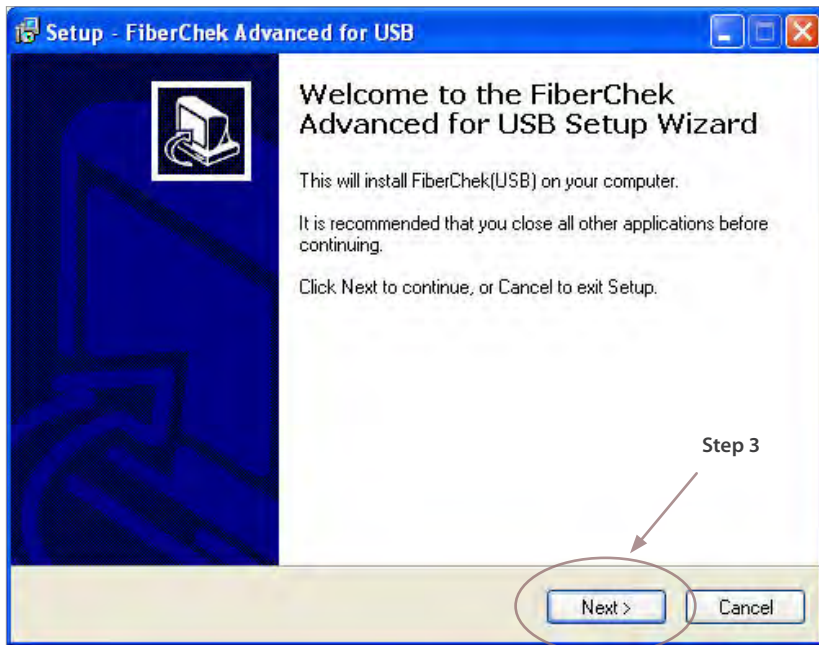


2. At the **Security Warning** dialog, select **Run** to initiate installation.

Note: This default Microsoft® Windows® warning message can be bypassed since all downloaded/published Westover installation files are safe and should be trusted.

Software Installation

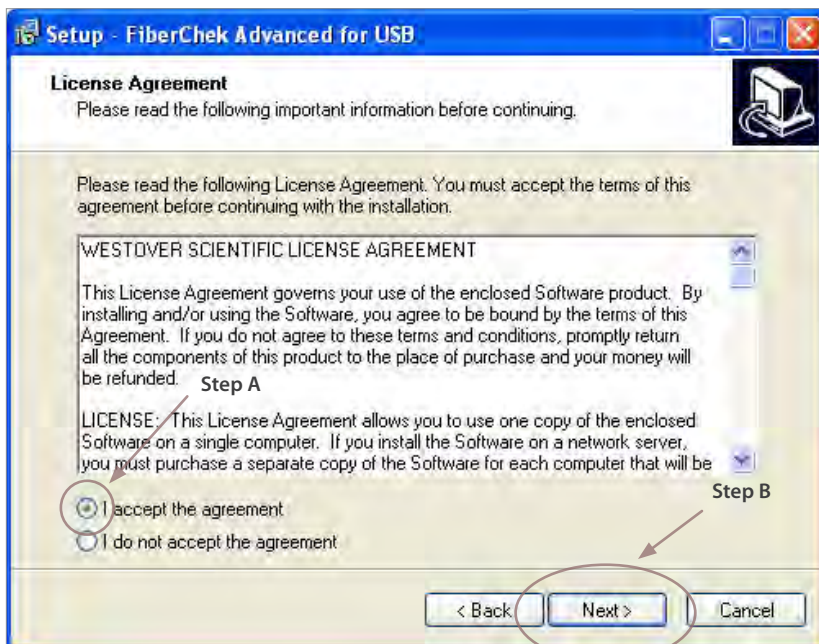
Welcome Screen



3. At the **Welcome** screen, select **Next >** to continue.

Software Installation

License Agreement



4. At the **License Agreement** dialog, please read the license agreement and select:

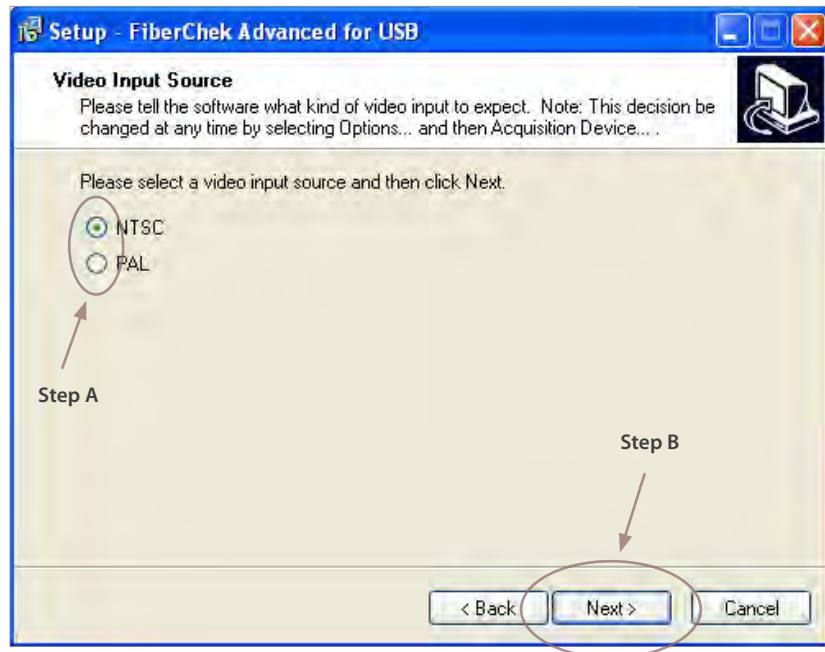
A. I accept the agreement; then

B. Next >

Note: If you do not accept the license agreement the installation process will terminate and FiberChek™ will not be installed on your computer.

Software Installation

Video Input Source



5. At the **Video Input Source** dialog, select:

A. NTSC or PAL; then

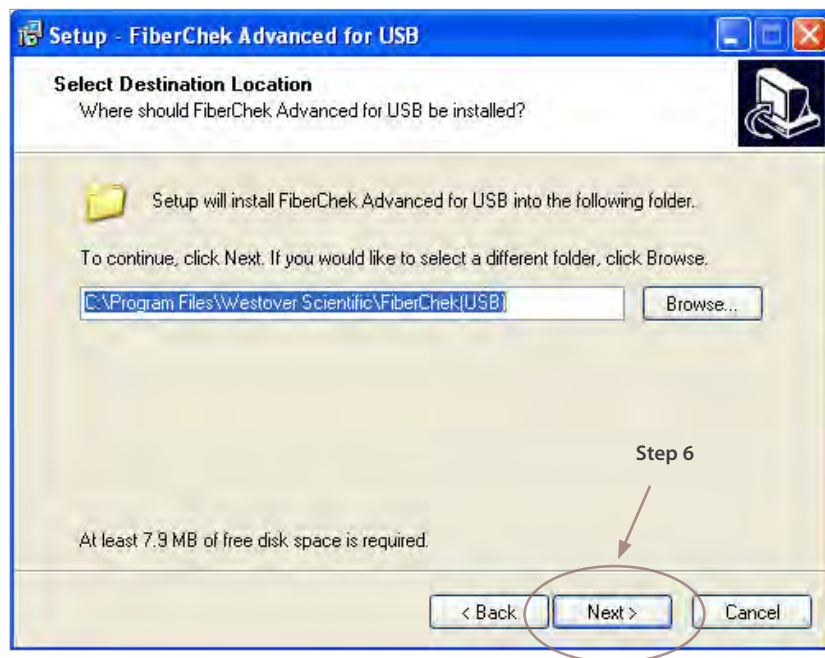
- **NTSC**
(Select if using a designated NTSC probe microscope.)
- **PAL**
(Select if using a designated PAL probe microscope.)

B. Next >

Note: You will be given the option to change this setting (NTSC or PAL) after installation via **Options > Acquisition Device** menu.

Software Installation

Select Destination Location

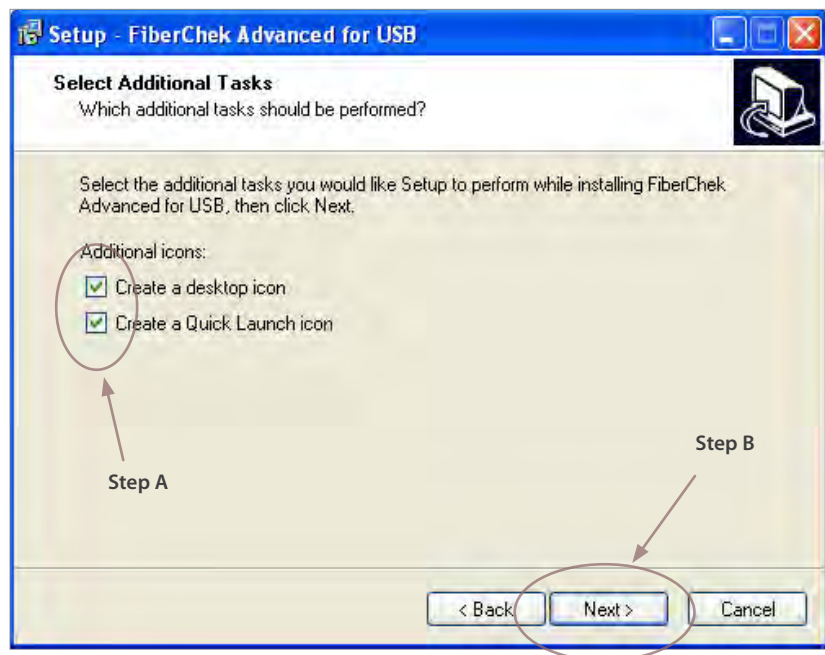


6. At the **Select Destination Location** dialog, select **Next >** to accept the default destination location:

**C:\Program Files\Westover Scientific\
FiberChek(USB)**

Software Installation

Select Additional Tasks



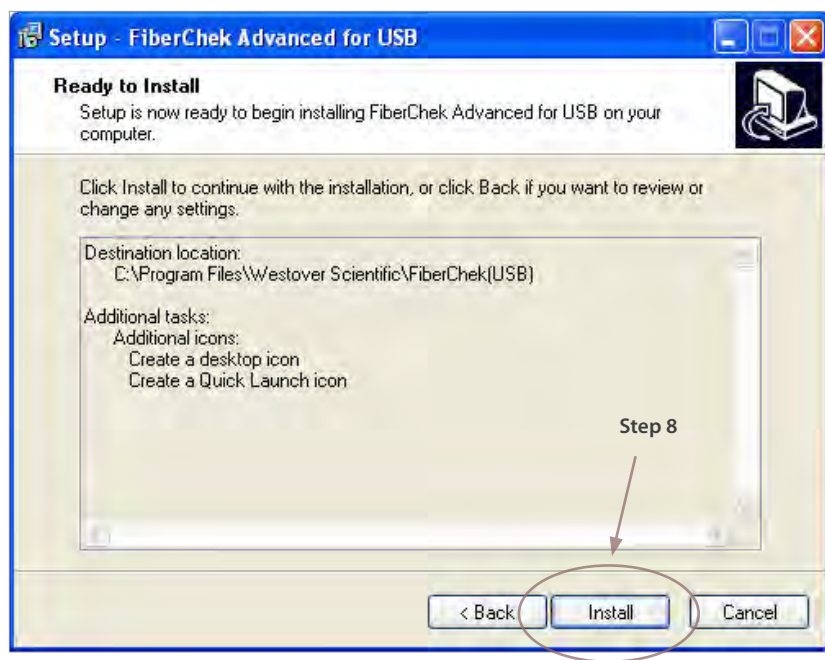
7. OPTIONAL: At the **Select Additional Tasks** dialog:

A. Select the **Create a desktop icon** and/or **Create a Quick Launch icon** box for shortcuts to FiberChek™; then

B. **Next >** to continue.

Software Installation

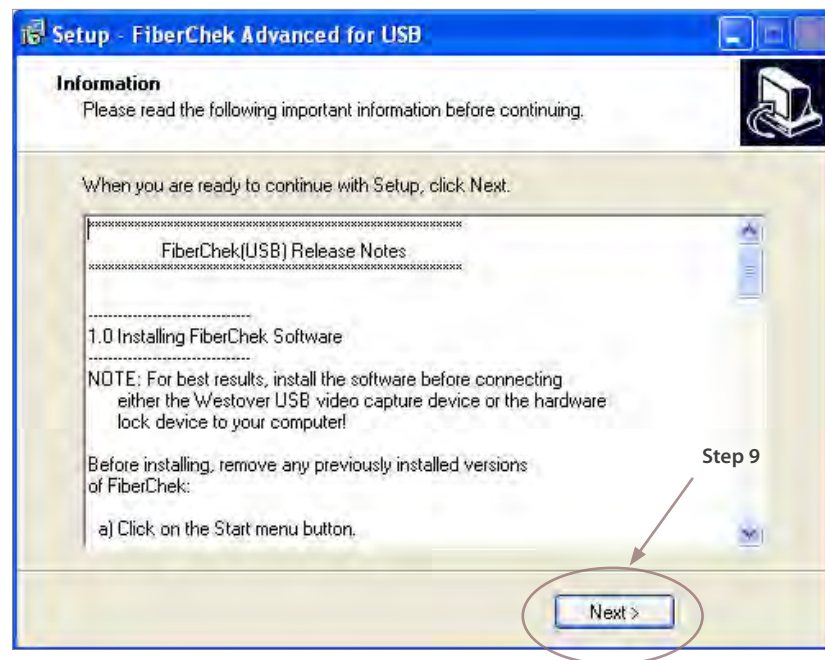
Ready to Install



8. At the **Ready to Install** dialog, verify *Destination location* and *Additional tasks* settings and select **Install**.

Software Installation

Information

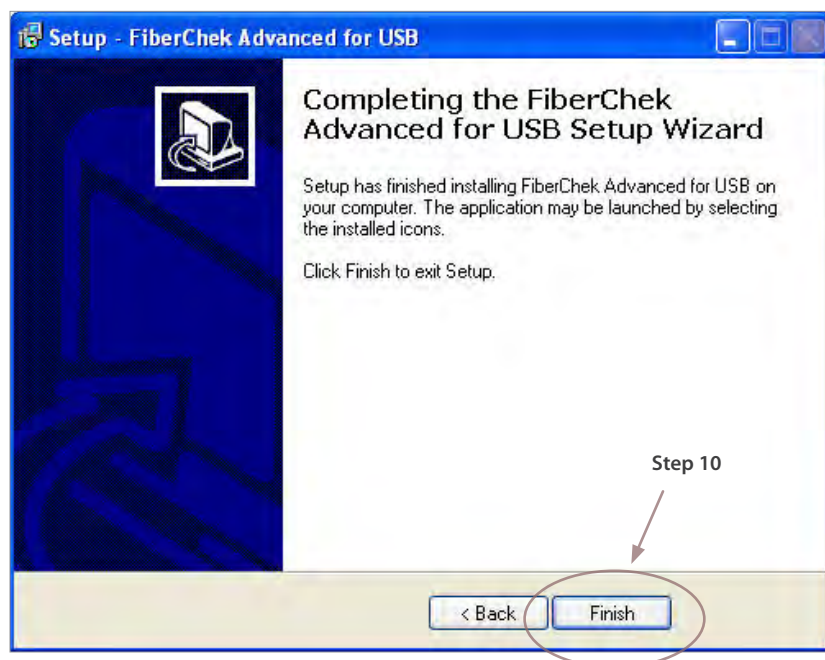


9. At the **Information** dialog, please read the Release Notes then select **Next >** to continue.

Note: You can access the **Release Notes** anytime after installation from the downloaded installation files.

Software Installation

Installation Complete



10. FiberChek™ has now been installed. Select **Finish** to complete installation and proceed to **Hardware Installation**.

2.5 Hardware Installation

 Please note that the following procedures demonstrate installation on a **Windows® XP (SP2)** operating system.

Hardware Installation

Plug in the USB cable of the Image Capture Module



1. **Plug in** the USB cable of the Image Capture Module (with microscope attached) into an open USB port on your computer. For Windows® XP users a **Found New Hardware Wizard** screen will automatically appear.

Hardware Installation

Found New Hardware Wizard



2. At the **Found New Hardware Wizard** screen, select:

A. No, not this time; then

B. Next >

Hardware Installation

USB Video Capture Hardware Wizard



Note: If you encounter any problems or have any questions regarding download and/or installation, please contact Westover Scientific Technical Support (see **Contact Information** on page 31).

3. At the next **Found New Hardware Wizard (USB Video Capture)** dialog, select:

Note: If you are installing the software/hardware from the downloaded installation files, follow the **Advanced** procedures.

If you are installing the software/hardware from a disk/CD in your local CD drive, follow the **Recommended** procedures.

Advanced Procedures

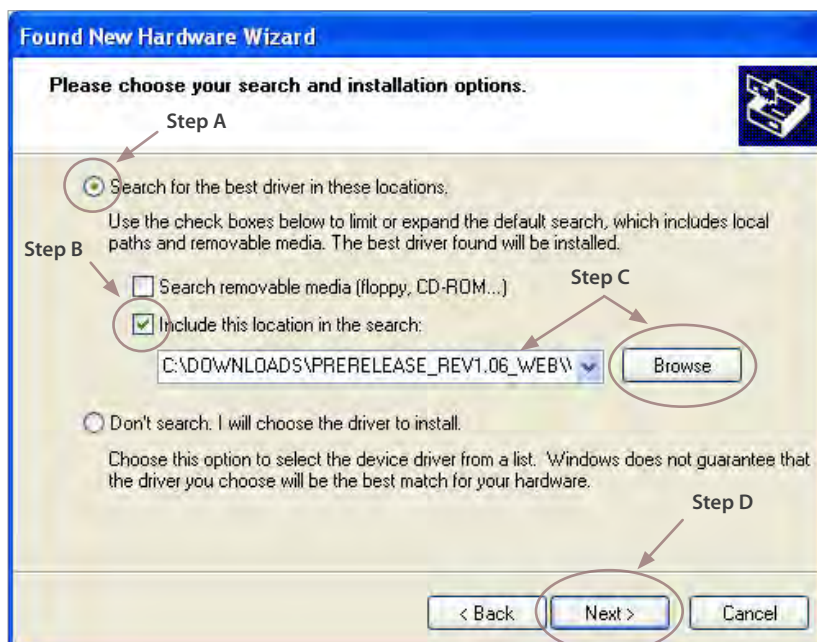
- A. Install from a list or specific location (Advanced);
- B. Next >

Recommended Procedures
(must have FiberChek™ CD)

- A. Install the software automatically (Recommended); then
- B. Next >
- C. Skip to Step 5

Hardware Installation

Search and Installation Options

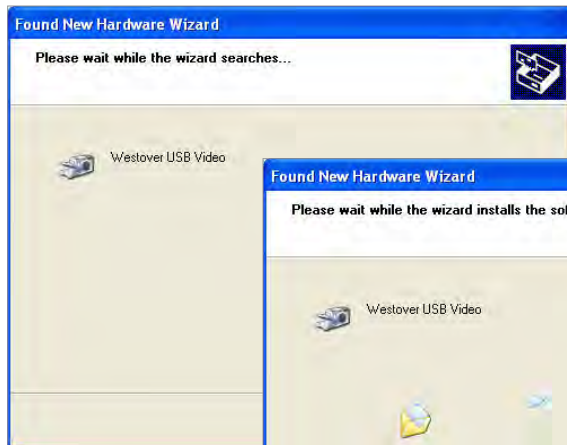


4. At the next **Found New Hardware Wizard** (Please choose your search and installation options.) Search and Installation Options dialog, select:

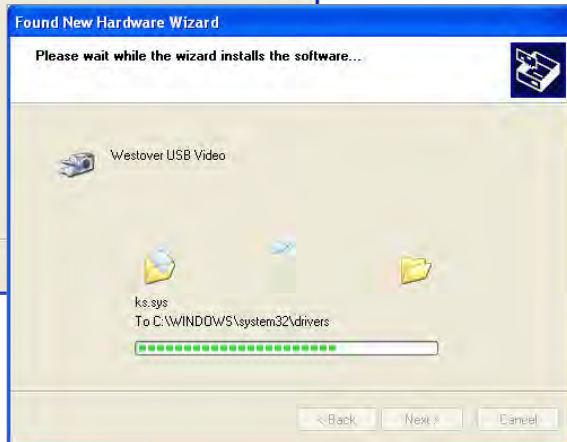
- A. Search for the best driver in these locations;
- B. Include this location in the search;
- C. Browse to find the /Westover USB Installation Disk folder; then
- D. Next >

Hardware Installation

Search for Driver



Install Driver



5. Allow the Hardware Wizard to search then install the **Westover USB Video** driver.

Hardware Installation

Caution



6. At the **Caution** dialog, select **Continue Anyway** to bypass caution message.

Note: This default Microsoft® Windows® caution message can be bypassed since all downloaded/published Westover installation files are safe and should be trusted.

Hardware Installation

Installation Complete



7. At the next **Found New Hardware Wizard (Installation Complete)** dialog, click **Finish** to complete installation.

3 TROUBLESHOOTING

3.1 Software Error Messages

⊗ Driver Not Installed

If you get the error message,

"Unable to access the Westover USB Video Capture device: the driver appears not to be installed."

the USB Image Capture Device has not been plugged in.

Have you plugged in the USB Image Capture Device and installed the driver?

When you plug the image capture device into an open USB port for the first time, Windows® Found New Hardware prompt will appear automatically to guide you through the installation process.

⊗ Driver Partially Installed

If you get the error message,

"Unable to access the Westover USB Video Capture device: the driver appears to be only partially installed."

the driver for the USB Image Capture Device has not been completely installed.

Have you completely installed the driver for the USB Image Capture Device?

Driver Installation: Follow the steps below to complete driver installation:

1. Plug in the USB Image Capture Device into an open USB port on your computer
2. Click the **Start** button, select **Settings** and select and open the **Control Panel**
3. From the **Control Panel** select and open **Add/Remove Hardware**
4. Follow the default steps until you get to the list of hardware devices the Windows® recognizes;
Select **USB Video Capture** and click **Next >**;
5. Continue to follow Windows® default installation steps

Note: The USB Image Capture Device driver is located in the "Westover USB Installation Disk" folder of the downloaded installation files.

⊗ Missing Driver

If you get the error message,

"Unable to access the Westover USB Video Capture device: the driver appears to be missing."

the driver for the USB Image Capture Device has been uninstalled from your computer.

Has the driver for the USB Image Capture Device been installed?

Follow the steps below to re-install the driver:

1. Plug in the USB Image Capture Device into an open USB port on your computer;
If the **Found New Hardware** wizard automatically appears, follow the default steps to re-install the driver;
If the **Found New Hardware** wizard does not appear, go to Step 2 of **Driver Installation** above

3.2 Troubleshooting Blank Screens

You may be able to quickly diagnose your problem depending on what you see in the FiberChek™ window.

What do you see in the FiberChek™ main window?

⊗ Blank Black Screen with “No Image”

A blank screen with the words “No Image” indicates that FiberChek™ is unable to detect or communicate with the USB Image Capture Device.

Are you running another program that uses the USB Image Capture Device?

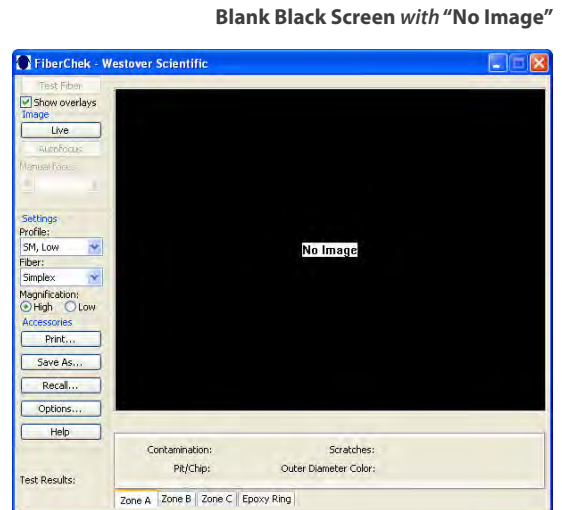
Only one program at a time can use the image capture device. You will not be able to view live video images if you open FiberChek™ while another program is already using the image capture device. However, you will be able to open and view previously saved image files. To resolve this problem, close the program(s) using the image capture device and restart FiberChek™.

Have you correctly installed the driver for the USB Image Capture Device?

If no, exit FiberChek™ and install the device driver.

Is the USB Image Capture Device connected to a USB port on your computer?

If no, exit FiberChek™ and connect the device to an open USB port on your computer.



⊗ Blank Black Screen

A blank black screen indicates that the USB Image Capture Device is functioning but there is a problem with the camera or the illumination.

Is the microscope connected to the USB Image Capture Device?

If no, connect the microscope and restart FiberChek™.

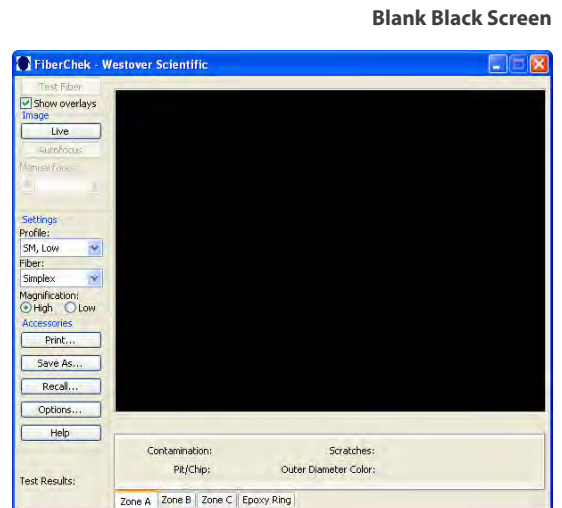
Is the Probe LED turned on?

If no, remove any connector from the Probe tip and point the Barrel Assembly on the palm of your hand. If there is no light shining on your hand, there may be a hardware problem with the Probe or a power issue with the USB port on your computer. Please contact Westover Technical Support (see **Contact Information** on page ??) for assistance.

If the microscope illumination is on but you are still getting a blank black screen, please verify that the most current version of the video card driver in your computer is installed. Video card drivers are available for download via the computer manufacturer's web site.

Did the computer just come out of Standby or Hibernation?

The VGA drivers of certain computers are known to have problems when coming out of suspend power mode. Please upgrade and/or install the most current version of your video driver.



Note: If you encounter any problems or have any questions regarding download, installation, operation or troubleshooting, please contact Westover Scientific Technical Support (see **Contact Information** on page 31).

4 OPERATION PROCEDURES

4.1 FiberChek™ Overview

FiberChek™ is a simple and efficient software application that determines the acceptability of optical fiber end-faces through automated inspection and analysis. It identifies and characterizes defects and their location relative to the fiber core and provides a PASS or FAIL result according to the preconfigured *failure criteria*.

Settings for **failure criteria** can be pre-programmed by the user to recognize and analyze various defects that are present on or around the fiber. These user-defined criteria settings are within the Profiles (see **Section 4.4 Profiles**) properties. As different types of contamination are located and identified, FiberChek™ measures the size of each individual defect and determines the PASS or FAIL result of the fiber according to the parameters pre-configured for each Profile setting.

Since defects on or near the core surface typically affect the transmission of light the most, they must be examined most aggressively. FiberChek™ defines the concentric areas around the core as Zones (see **Section 4.4.2 Zones**). These Zones allow the user to establish *failure criteria* by evaluating various defects including Contamination, Pit/Chip and Scratches.

In addition to testing, FiberChek™ also allows the user to save or print images and/or test results.

Used in conjunction with Westover's FBP Probe Microscopes and image capture modules, FiberChek™ is an effective and sensible solution for automated inspection and analysis of optical fiber end-faces.

Automated Process

1. Acquires the fiber image
2. Analyzes the image
3. Finds defects and their location to fiber core
4. Measures and evaluates the defects within each specified Zone
5. Determines whether each defect within the Zones are acceptable according to the preconfigured failure criteria for each Zone
6. Displays the results as PASS or FAIL
7. Saves or prints all relative results in designated directory or printer, respectively

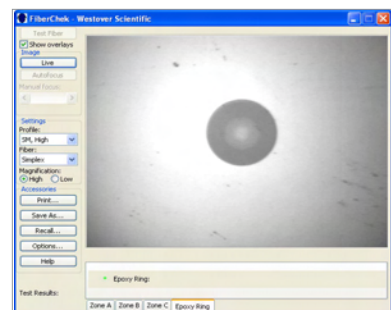
1. Plug In



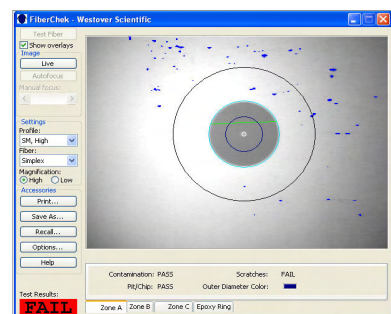
2. Open



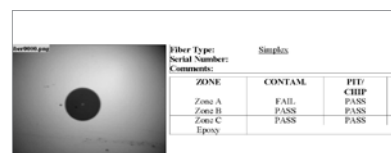
3. Focus



4. Test



5. Save and/or Print



4.2 Menu Overview

Test Fiber

Freezes image and runs an analysis of the connected fiber according to the relevant **Profile** setting configured by the user. The **Test Results** are displayed (**PASS or FAIL**) at the bottom left-hand corner.

Note: With Westover's **QuickCapture™ Series Probe Microscopes**, a factory-installed **QuickCapture™** button performs the same function as the "Test Fiber" button. This button also allows the user to toggle between a "live" and "frozen" image.

Freeze / Live

This option allows the user to toggle between a "live" or "frozen/captured" image of the fiber.

Profile

This drop-down menu lists the stored inspection profiles that have been pre-programmed in FiberChek™ as well as any other user-defined profile settings that are created and saved.

Fiber

This menu displays the various types of fiber. It is essential that the type of fiber selected matches the type of fiber to be inspected.

Magnification

Note: This feature only applies when using Westover's dual magnification probe microscopes.

A factory-installed *Magnification Control* on the probe microscope performs this switch between "high" and "low" magnification. Select the magnification type to correspond with the probe setting to optimize the image display.

Print...

This option opens the Print dialog that allows the user to send the image to a designated printer.

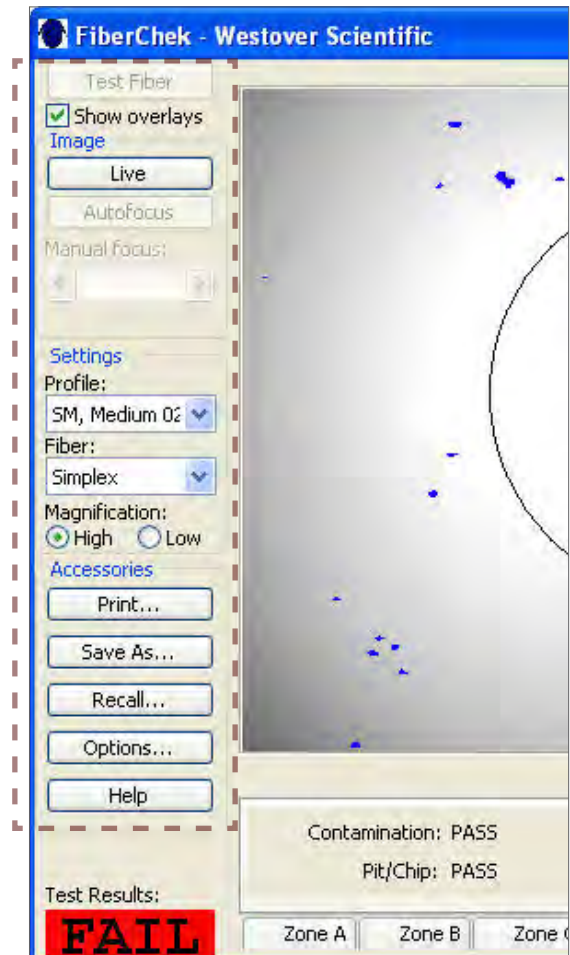
Save As...

After an image is "frozen" or a fiber end-face has been inspected/tested, this option allows the user to save the fiber image as a **.png** (stores all relative information, image and results, and is the recommended file type), **.bmp**, **.jpg** or **.xml** (see **Section 4.5 AutoSave** for details on file formats).

Recall...

This option opens the directories/folders where fiber end-face images are archived and reanalyzes every saved results according to the Profile setting currently selected.

Main Menu



Options...

This menu contains sub-menus which include:

- Calibrate...
- Profiles...
- AutoSave...
- Password Protect...
- Acquisition Device...
- Company Information...
- Extract Archive...

Note: These sub-menus will be explained in the following sections.

Help

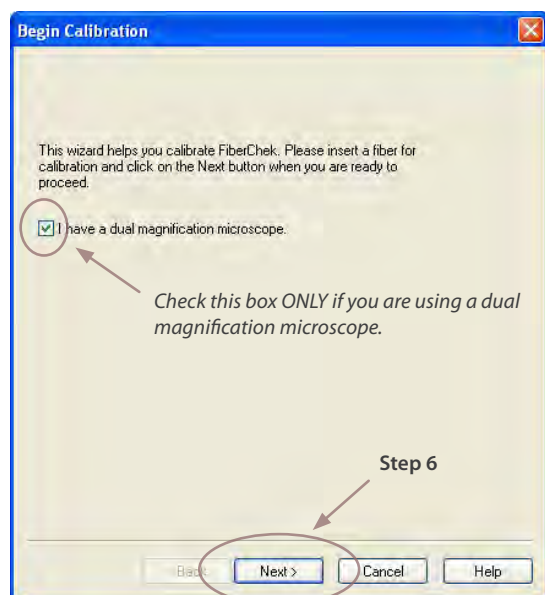
This option opens the software's Help menu.

4.3 Calibrate

You must calibrate the system before testing a fiber end-face.

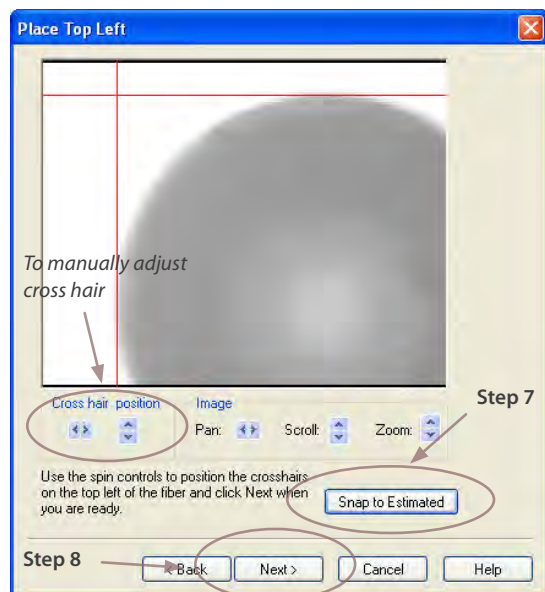
Note: You will need a calibration artifact or a fiber connector with a pristine 125 micron (μ) cladding that has nominal epoxy ring or edge chipping.

Begin Calibration To Calibrate...

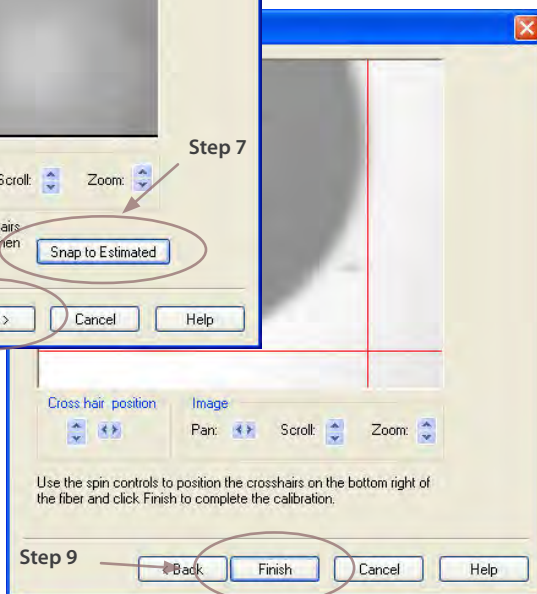


1. Connect a pristine artifact/fiber connector to the microscope.
2. Select fiber type (see Fiber Type table below).
3. Select **Options...** from main menu.
4. Select **Calibrate...** from Options menu.
5. From **Begin Calibration** menu select **I have a dual magnification microscope**, if appropriate, then click **Next >**.
6. From the **Calibration** window, adjust focus to desired image then click **Next >**.
7. Start at the system's default cross hair position by clicking **Snap to Estimated**.
8. FiberChek™ will automatically estimate the edges of the fiber for the **Top Left**, however at times manual adjustments to cross hair position may be required (use arrows under **Cross hair position**). Click **Next >**.
9. The same as above applies to the **Place Bottom Right** dialog. Click **Finish**.

Place Top Left



Place Bottom Right



Fiber Type	
Simplex	Single Fiber (Ceramic Ferrule)
Ribbon	Multi Fiber
Jewel	Ruggedized Single Fiber with Polyimide Coating

4.4 Profiles

Profiles contain the analyses parameters by which PASS/FAIL criteria are determined within FiberChek™. For each Profile property, the user can:

- Name the Profile;
- Define the fiber type;
- Determine the number of Zones;
- Password Protect the configured setting;
- Define the diameter for the core and cladding of the fiber type;
- Define sensitivity levels for Contamination, Pit/Chip and Scratches;
- Define allowable epoxy ring gap;
- Identify and categorize Zones by color and size;
- Program failure criteria for each defect type (Contamination, Pit/Chip and Scratches) within each Zone; and
- Define failure criteria for individual particles by size or count.

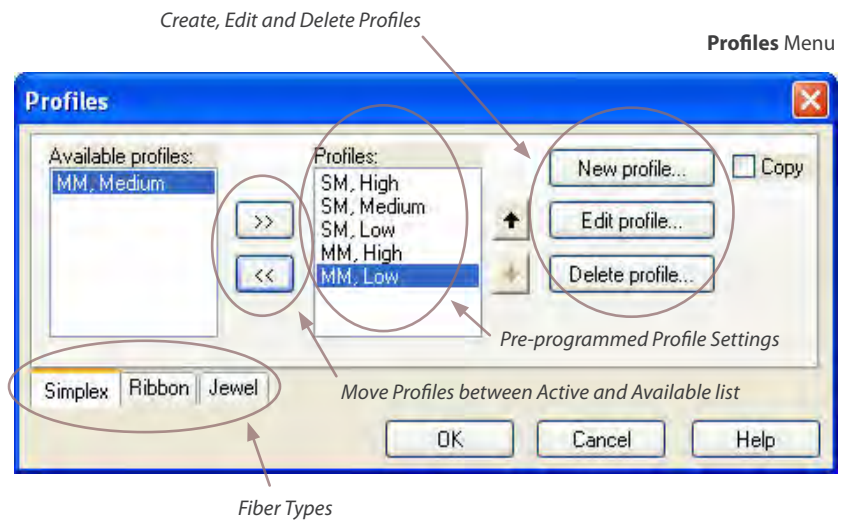
A set of pre-programmed factory Profiles are included with FiberChek™. These settings are in accordance to industry surveys and consensus.

New Profiles can also be created based on user-defined parameters.

Profile Terms	
SM	SingleMode
MM	MultiMode
High	Factory Post Polish
Medium	Patch Cord In-use
Low	Field Termination Coarse Polish

To get to the Edit Profile menu...

1. Select **Options...** from the main screen.
2. Select **Profiles...** from the Options menu.
3. From the Profiles menu, highlight the desired Profile and select **Edit profile....**

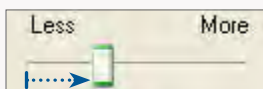


4.4.1 Edit Profile Menu

Existing Profiles can be edited or new Profiles can be created and stored. A fiber's PASS/FAIL outcome is dependent on the parameters that have been configured in the Profiles settings. To add or edit Profile parameters, select "New Profile" or "Edit Profile" from the Profile menu. Descriptions of each parameters are listed below:

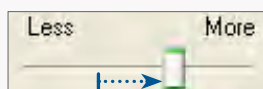
- A.** Create an exclusive Name for the Profile.
- B.** Password Protect to secure access to predetermined Profile settings.
- C.** Determine the number of Zones (0–6) for analysis.
- D.** Define the fiber's Cladding and Core diameters.
- E.** Adjust (Less <> More) the sensitivity levels for individual parameters (Cladding Dirt, Cladding, Ferrule Dirt). Sensitivity levels are explained below.

Sensitivity Levels



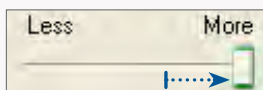
Coarse Polish

Used when evaluating connectors that are terminated and polished by hand in field use.



In-service Connectors

Used when evaluating factory terminated and machine polished connectors that are in field use.



UPC Post-polish

Used when evaluating factory terminated and machine polished connectors.

- F.** Find scratches in the cladding zone or to disable the criteria altogether as well as sensitivity scale.
- G.** Choose the failure criteria limits for epoxy ring.

Edit Profile Menu

Edit Profile

A Name: **C** Number of zones:

B Password Protect...

D Simplex Fiber

Cladding diameter: um

Core diameter:

☒ Single mode (9.0um) ☐ Multi mode (50.0um)

☐ Multi mode (62.5um) ☐ Other: um

E Contamination and Pit/Chip Sensitivity

Cladding Dirt:

Cladding:

Ferrule Dirt:

F Cladding Scratches

☒ Find scratches

☐ Find dark scratches

☐ Find no more than scratches total

Sensitivity:

G Epoxy Ring Criteria (check it if it applies)

☒ Fail if epoxy ring gap is more than um

OK Cancel Help

Name:

Outer Diameter Color:

Individual Contamination

☐ Fail if any particle is more than um

☐ Fail if any particle is more than um

Combined Contamination

☐ Fail if diameter sum is more than um

☐ Fail if area sum is more than um

☒ Fail if more than scratches

☐ Exclude those less than um

☐ Exclude those less than um

Contamination Pit/Chip

Zone A Zone B Zone C

4.4.2 Zones

Each fiber is divided into a series of concentric circles (a "bullseye" pattern) known as **Zones** which define the PASS/FAIL criteria.

- ▶ **Zone A**, known as the **Core** zone, is the area surrounding the core (the default setting identifies this zone in dark blue);
- ▶ **Zone B**, known as the **Cladding** zone (light blue), surrounds the majority of the fiber cladding;
- ▶ **Zone C**, known as the **Ferrule** zone (black), identifies a portion of the ferrule near and around the fiber.

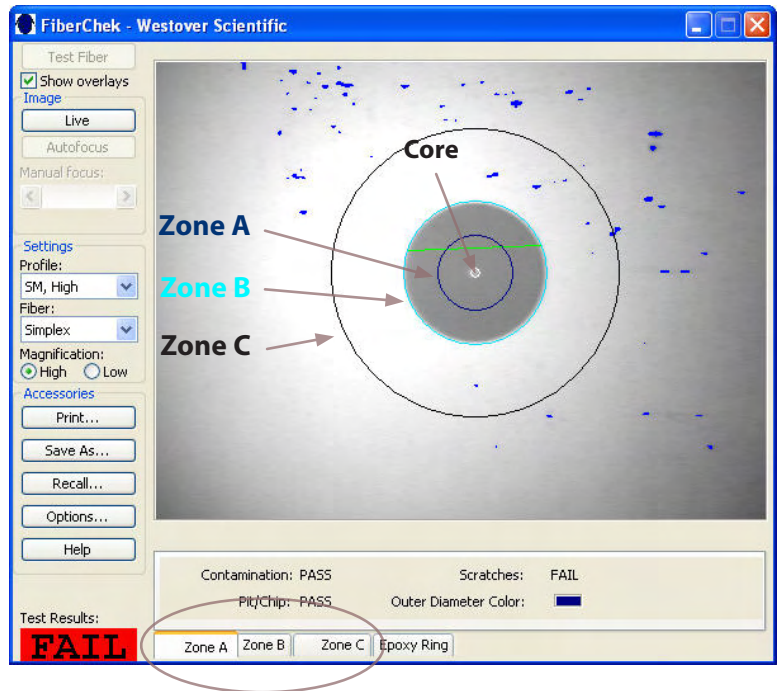
In addition to the zones, FiberChek™ also identifies the actual **Core** of the fiber (shown in white). The diameter of the Core is determined by selecting the appropriate Core diameter in the **Edit Profile** menu (see **Section 4.4 Profiles**).

Analyses results for each Zone can be viewed by selecting the corresponding tab for each Zone located at the bottom of the main menu.

Zone	Common Term
Zone A	Core Zone
Zone B	Cladding Zone
Zone C	Ferrule Zone

Failure Criteria are configured for each Zone of the fiber.

SingleMode Fiber (Zones)



4.4.3 Defect Categories

Each Zone contains three defect categories:

- **Contamination**

- When inspection of **contamination** within a specific Zone equals **PASS**, results are shown in **BLUE**
- When inspection of **contamination** within a specific Zone equals **FAIL**, results are shown in **RED**

- **Pit / Chip**

- When inspection of **pit/chip** within a specific Zone equals **PASS**, results are shown in **YELLOW**
- When inspection of **pit/chip** within a specific Zone equals **FAIL**, results are shown in **RED**

- **Scratches**

- When inspection of **scratches** within a specific Zone equals **PASS**, results are shown in **GREEN**
- When inspection of **scratches** within a specific Zone equals **FAIL**, results are shown in **RED**

Note: Failure criteria are defined for each Zone and defect category.

Setting Failure Criteria

Contamination Menu

► Contamination

Individual Contamination Particle Criteria

- A.** Select and assign failure criteria based on the **diameter** (μ) and/or **area** (μ^2) of any **individual contamination** particle.

Combined Contamination Particle Criteria

- B.** Select and assign failure criteria based on the **sum total of diameter** (μ) and/or **area** (μ^2) of all contamination particles combined.
- C.** Select and assign failure criteria based on the **quantity** of contamination particles found.
- D.** Select and assign **exclusion criteria** based on any individual contamination particle less than the specified **diameter** (μ) and/or **area** (μ^2).

► Pit/Chip

Pit/Chip Menu

Individual Pit/Chip Particle Criteria

- A.** Select and assign failure criteria based on the **radial extent** [for defects that lie on the perimeter of the cladding, **radial extent** is the measurement from the outside edge of the defect to the point closest to the center] (μ), **diameter** (μ) and/or **area** (μ^2) of **individual pit/chip** particles.

Combined Pit/Chip Particle Criteria

- B.** Select and assign failure criteria based on the **sum total** of **radial extent** (μ), **diameter** (μ) and/or **area** (μ^2) of all pit/chip defects combined.
- C.** Select and assign failure criteria based on the **quantity** of pit/chip defects found.
- D.** Select and assign **exclusion criteria** based on any individual pit/chip defect less than the specified **radial extent** (μ), **diameter** (μ) and/or **area** (μ^2).

► Scratches

Scratches Menu

Scratch Criteria

- A.** Select and assign failure criteria based on the **quantity** of scratches found.
- B.** Select and assign failure criteria based on the **width of any individual scratch** more than specified distance (μ).

4.5 AutoSave

The **AutoSave** feature allows the user to save the captured image and/or the inspection results each time the **Test Fiber** button is selected.

Note: Inspection results saved as **.png** type will display all of the fiber images and results within the same directory. To view individual reports for specific fibers, designate separate folders/directories for each fiber.

Types of files that can be saved:

Recommended

- **Portable Network Graphic (.png)**
image + inspection result (in text format)

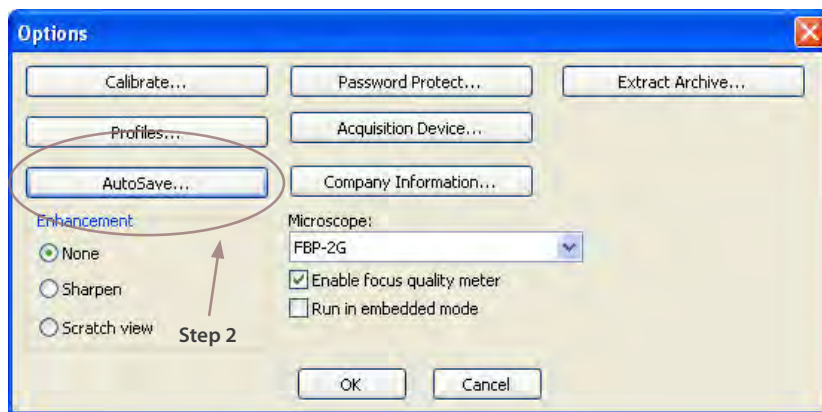
Other File Types

- **Bitmap or JPEG (.bmp or .jpg)**
image only
- **XML (.xml)**
inspection result in text format only

Sample Portable Network Graphic (.png) Printout of Inspection Results

FIBER END-FACE MULTI-IMAGE INSPECTION REPORT						
Dept.: User ID: Date/Time: 8/9/2006 11:43 AM						
Fiber Type: Simplex		Test Result: FAIL		Profile: SM_Low		
Comments:						
ZONE	CONTAM.	PIT/CHIP	SCRATCHES	INNER DIAMETER	OUTER DIAMETER	
Zone A	FAIL	PASS	PASS	0	66	
Zone B	PASS	PASS	PASS	66	125	
Zone C	PASS	PASS	PASS	125	250	
Epoxy			PASS			

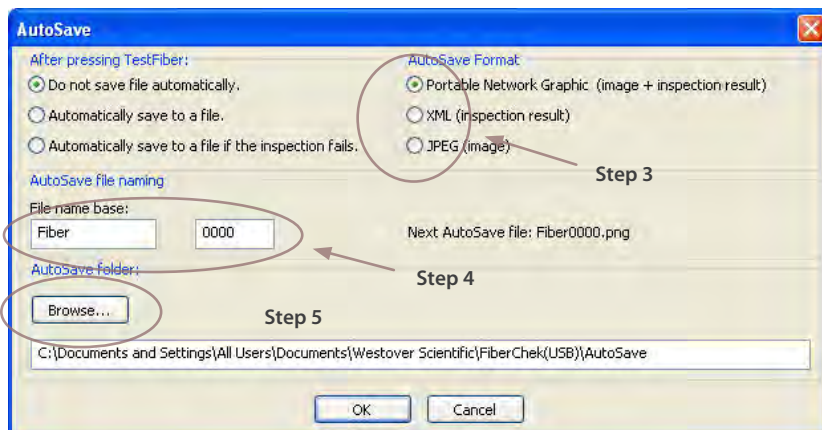
Options Menu



To AutoSave...

1. Navigate from the main menu to **Options...** and select **AutoSave...**
2. Select from the three options for AutoSave:
 - **Do not save file automatically.**
 - **Automatically save to a file.**
 - **Automatically save to a file if the inspection fails.**
3. Select from the three AutoSave Formats:
 - **Portable Network Graphic (recommended)**
image + inspection result
 - **XML**
inspection result only
 - **JPEG**
image only
4. Select a file name base and starting extension (for each test, FiberChek™ will increase the number by 1).
5. **Browse...** to select the directory/folder for autosaved images/results. This will be the **default folder** where all information will be saved into and/or extracted out of.

AutoSave Menu



4.6 Password Protect

This option allows the user to **Password Protect** the **Options** dialog. After you add password protection FiberChek™ will prompt you for the password before allowing any changes.

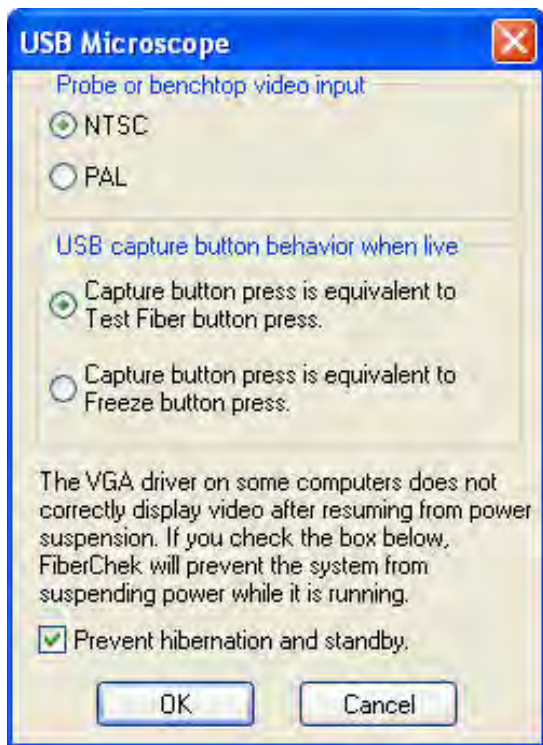
Password Protect Menu



4.7 Acquisition Device

This option allows the user to adjust certain options related to the choice of probe microscope.

Acquisition Device Menu



4.8 Microscope Options

This drop-down list allows the user to select the type (model) of microscope connected to the computer. FiberChek™ adjusts the microscope illumination accordingly.

Note: The most common model is the FBP-2G.

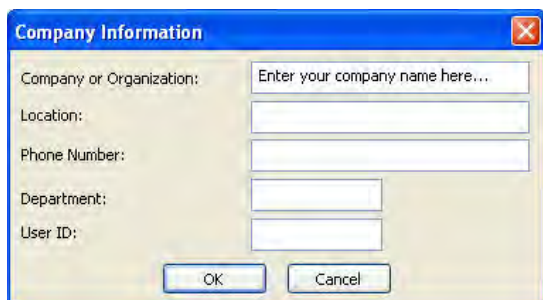
Microscope Options



4.9 Company Information

This option allows the user to define company information (set fields) that will be printed and displayed on a printed report.

Company Information Menu

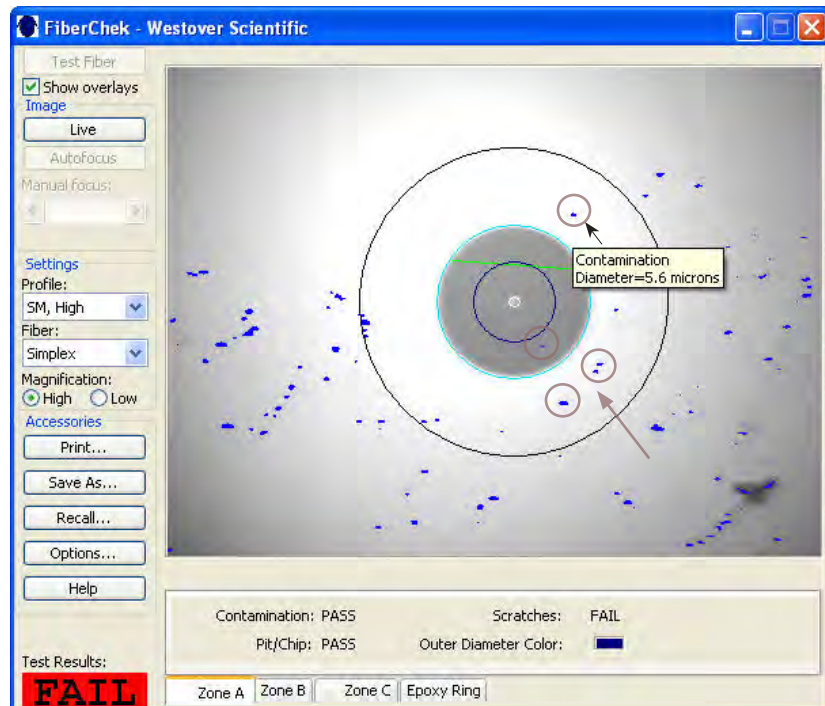


4.10 Extract Archive

This option automatically scans and extracts all inspection results saved in the designated AutoSave folder/directory (see Section 4.5 AutoSave) as .png files and creates an .xls (Excel) spreadsheet report file that summarizes all fibers, zones, scratches and particles. The file is then displayed with whatever application is associated with the .xls extension (normally Microsoft® Excel).

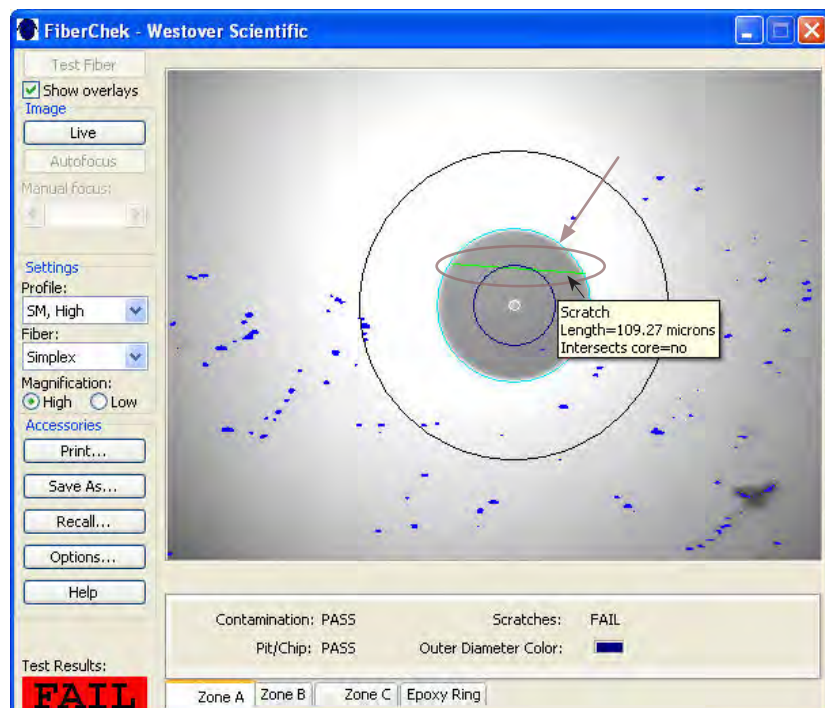
4.11 Test a Fiber

Contamination (shown in blue)



Note: As you move the mouse around the tested fiber end-face image, pop-up 'bubble' information relating to that specific defect or location will be displayed.

Scratch (shown in green)



To test a fiber...

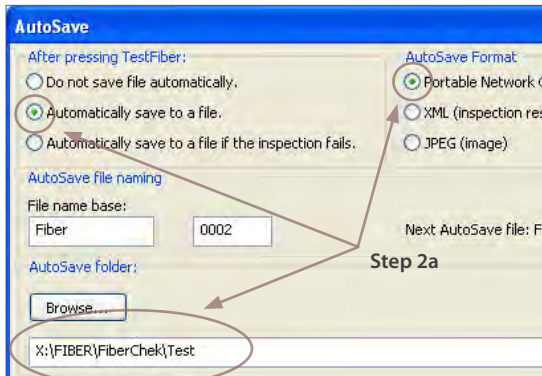
1. Attach the fiber connector to the probe tip.
2. Plug in the USB Image Capture Module (with probe microscope attached).
3. Open FiberChek™ (the fiber image should automatically be recognized and displayed).
4. Adjust focus with the focus control knob on the probe microscope to view fiber end-face.
5. Select the appropriate pre-configured Profiles setting.
6. Select the appropriate Fiber type.
7. Select the magnification type that corresponds to the magnification level on the microscope being used.

Note: When using a dual-magnification probe microscope, choose the magnification setting that corresponds to the magnification setting on the probe for optimal results.

8. Click **Test Fiber**. If the option to save automatically was chosen in the AutoSave menu, the results (image and/or inspection results) will be automatically saved in the designated directory (see [Section 4.5 AutoSave](#)).
9. To Save or Print the image, see the next section on saving and printing inspection results.

4.11.1 Saving Inspection Results

AutoSave Menu

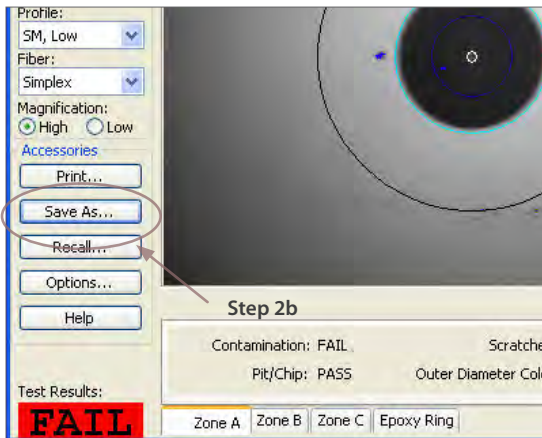


To save inspection results...

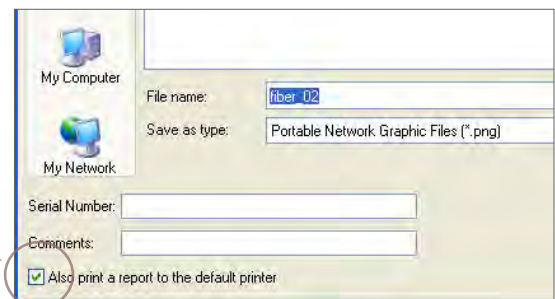
1. Test the fiber by following the testing procedures.
2. **a.** If the **Automatically save a file.** option was selected in the **AutoSave** menu, the designated file (result) will be automatically saved in the pre-determined folder.
b. If the option to save automatically after each test was not selected in the **AutoSave** menu, click the **Save As** button from the main menu and save as either .png (*recommended*), .bmp, .jpg or .xml file.

Note: When you **Save As** from the main menu, you will also be given the option to print (**Also print a report to the default printer**) the inspection results for just that particular test (see below).

Main Menu



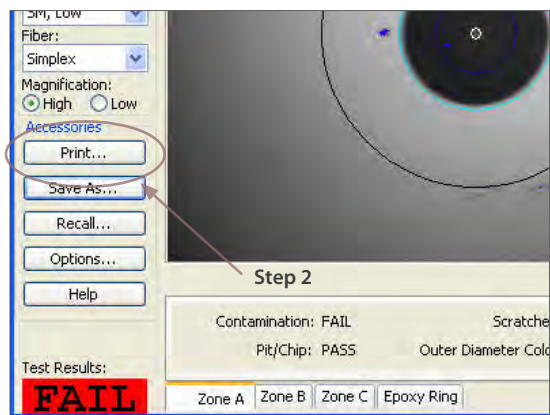
Save As Menu



Check this box
to print current
inspection result
directly to the
default printer.

4.11.2 Printing Inspection Results

Main Menu



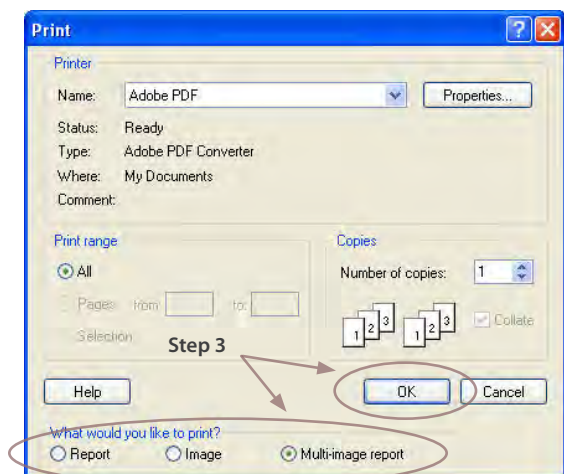
To print inspection results...

1. Test the fiber by following the testing procedures.
2. At the Main menu, select **Print**.
3. At the Print menu, choose what you would like to print from the three options and click **OK**.

- **Report** - prints inspection results and fiber image with overlay for that particular test (see below for sample).
- **Image** - prints just the image with overlay for that particular test.
- **Multi-image report** - prints inspection results with fiber image of that particular test plus all saved/archived image/results in the **designated folder** (default selected in **AutoSave menu** or **Browse to select**).

- **Normal** - prints all inspection results at normal size, without page limits.
- **Condensed** - prints all inspection results at reduced size, on one page.

Print Menu



Sample: Printout of Inspection Result (text) and Fiber Image
when choosing **Report** option.

FIBER END-FACE INSPECTION REPORT

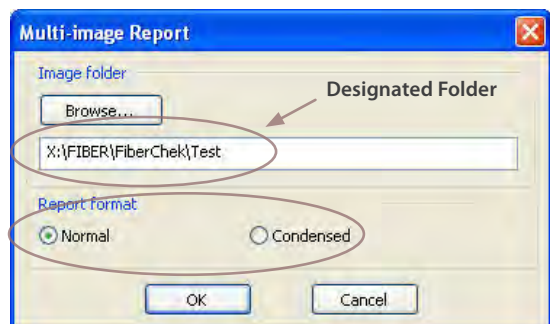
Dept.:
User ID:
Date/Time: 8/9/2006 10:21 AM

Fiber Type: Simplex
Serial Number:
Comments:

Test Result: FAIL
Profile: SM_Low

ZONE	CONTAM.	PIT/CHIP	SCRATCHES	INNER DIAMETER	OUTER DIAMETER
Zone A	FAIL	PASS	PASS	66	
Zone B	PASS	PASS	PASS	125	
Zone C	PASS	PASS	PASS	125	250
Epoxy			PASS		

Multi-image Report Menu





Contact Information

TOLL FREE

► Customer & Technical Service **800-304-3202**

Local & International

► Customer & Technical Service **425-398-1298**

► Fax **425-398-0717**

► E-mail **info@westoverscientific.com**

► Web site **www.westoverfiber.com**

Westover Scientific customer service business hours are 7:00 a.m. – 5:00 p.m. Pacific Standard Time. After hours, you may leave a telephone message. Your call will be returned the following business day.

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Warranty Information

Statement of Limited Product Warranty

All Westover Scientific probe microscopes are warranted to be free of all defects in material and workmanship for a period of 12 months (1 year) from the date of delivery. The warranty does not apply to any instrument that has become worn, defective, damaged or broken due to abuse, misuse, tampering, or unauthorized repairs. Under this warranty, Westover Scientific will repair or replace, without charge to the purchaser, any part which upon our examination, appears to be defective in materials or workmanship.

Returned Goods Policy for Repair or Replacement Parts

To return goods for repair or replacement, please contact Westover Scientific Service Dept. by one of the numbers above. Please be prepared to supply the following information:

- Your name, return shipping address and telephone number
- Catalog/Model number of the item(s) you are returning
- Serial Number(s), if applicable
- Description of the product's problem or reason for the return
- Date the item was purchased

A Westover Representative will issue you a Return Materials Authorization (RMA) number. Please label the outside of your shipping container with this number. For any additional information, please call Customer Support: 1-800-304-3202 or 1-425-398-1298.

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