

FBE Probe Microscope

with HD2 Display

User Manual



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ZP-PKG-0313

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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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INTRODUCTION

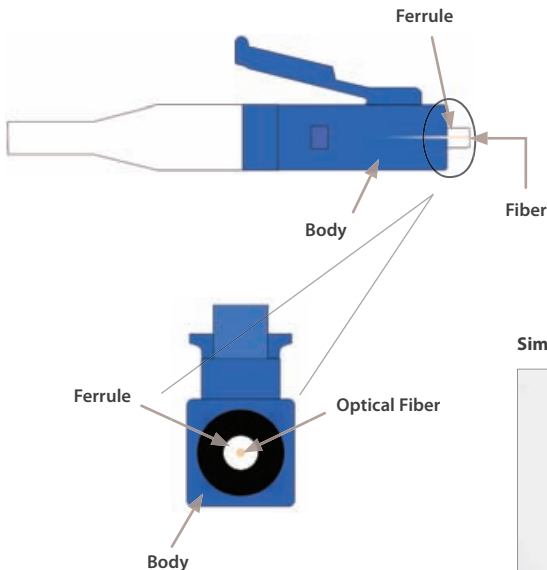
Video inspection of fiber optic interconnects is essential for the optimal performance and longevity of fiber optic connectivity. Throughout its life, fiber connectors must be inspected, analyzed and cleaned to maintain an acceptable level of functionality. By developing and introducing the equipment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

Key Terms & Concepts

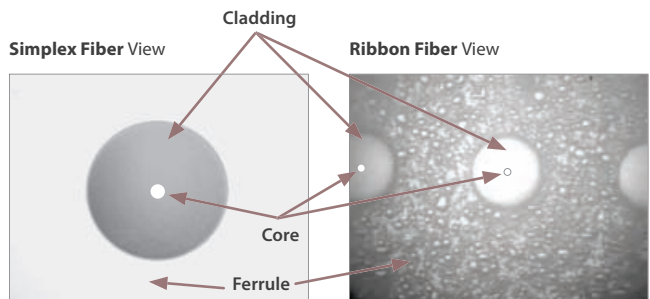
Fiber Connectors

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)



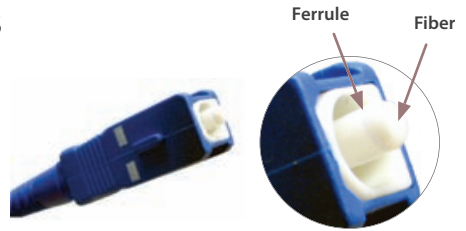
- **Body**
Houses the ferrule that secures the fiber in place; utilizes a latch and key mechanism that aligns the fiber and prevents the rotation of ferrules of two mated connectors
- **Ferrule**
Thin cylinder where the fiber is mounted and acts as the fiber alignment mechanism; the end of the fiber 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; the conduit by which light passes through



Simplex, Ribbon & Jewel Fiber Connectors

Simplex Fiber Connector

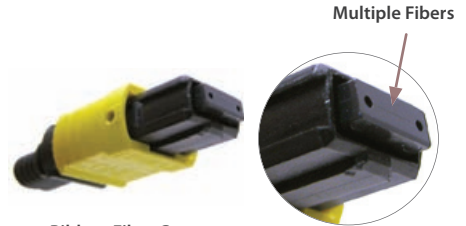
A simplex fiber connector contains a single fiber located in the center of the ferrule. Common types include SC, LC, FC and ST.



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®).



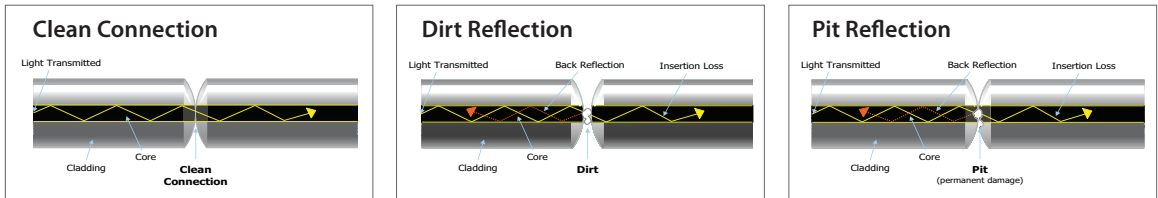
Ribbon Fiber Connector

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.

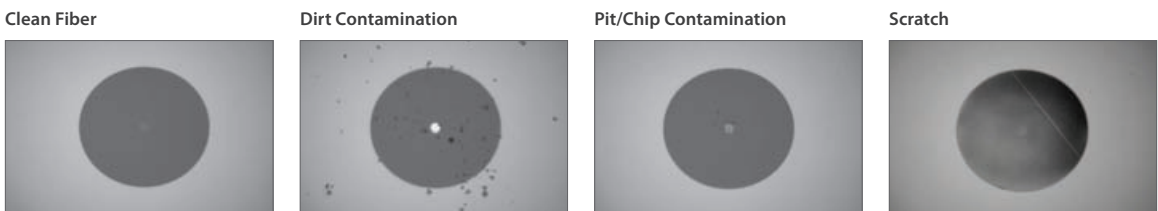
Dirt & Contamination

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.



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.



FBE PROBE MICROSCOPE

Overview

Westover’s **FBE Probe Microscope** is a portable video microscope with an integrated HD2 Display that is used to inspect fiber optic connectivity. While most fiber microscopes are limited to inspecting “male” connectors (e.g., patch cords, pigtails, etc.), the FBE Probe is designed to inspect both male and “female” (e.g., bulkhead) ends of an optical interconnect. The probe is specially designed to fit and operate comfortably and easily in-hand, allowing the user to inspect hard-to-reach connectors that are installed on the backside of patch panels or inside hardware devices. This eliminates the need to access the backside of patch panels or disassemble hardware devices prior to inspection.



Analog Probe

- Hardwired to Westover’s HD2 Display
- Focus control for adjusting focus on fiber end-face image
- Requires appropriate inspection tip

HD2 Display

- 3.5” TFT LCD display
- Ruggedized, drop-tested enclosure with an integrated table stand
- Power-saving **GripSwitch™** feature designed for comfortable handling provides instant-ON when pressed and turned OFF when released
- Removable battery pack that accepts either rechargeable NiMH (*nickel metal hydride*) or standard alkaline batteries (8 “AA”)
- 6-hour run time on continuous-ON mode, *dramatically longer run time when using the GripSwitch™*
- Low battery warning LED
- AC adapter (power supply 100–240VAC/12VDC) for alternate power source
- Brightness control
- Socket for 1/4-20 UNC tripod mount

Probe Specifications	
Dimensions	140mm x 46mm x 44mm
Weight	180 g
Cord Length	183cm coil
Camera Type	1/3” CMOS Sensor
Video Output	NTSC
Light Source	Blue LED, 100,000+ hour life
Lighting Technique	Coaxial
Power Source	From HD2 Display

HD2 Display Specifications	
Dimensions	150mm x 140mm x 60mm
Weight	422g (w/8 “AA” batteries)
Video Display	3.5” TFT LCD
Connectors	AC power input
Power Source	8 “AA” Rechargeable NiMH or standard alkaline batteries or AC Adapter (100–240VAC/12VDC)
GripSwitch™	‘Instant-ON’ energy saver
Run Time	<ul style="list-style-type: none"> • 6 hours continuous • Extended runtime with use of GripSwitch™



FBE Probe Microscope

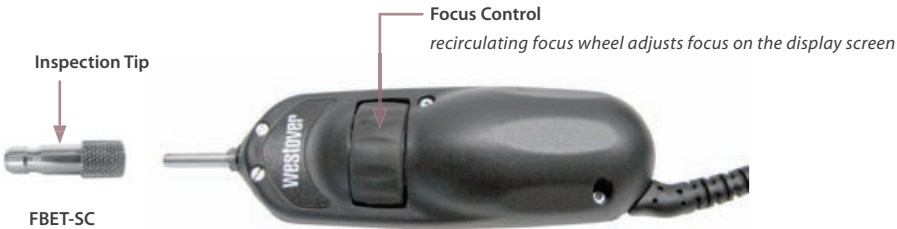
The basic design of the FBE probe microscope incorporates an imaging system, integrated light source, video camera and focus mechanism. The probe is fully assembled and is powered by the HD2 Display device. The only assembly required by the user is the installation of the appropriate inspection tip.



The FBE probe allows the inspection of “male” ends of fiber optic termination or installed fiber connectors quickly and easily. The practical use of the FBE probe eliminates the need to disassemble hardware devices prior to inspection while providing a clear image of the fiber end-face on the 3.5” LCD display.

Focus Control

The Focus Control on the probe allows the user to adjust focus of the live fiber end-face image on the display manually.



HD2 Display

The HD2 Display combines performance, versatility and value. It incorporates a variety of features that enable portability and efficiency. The HD2 Display features a 3.5" TFT LCD screen and an innovative GripSwitch™ that saves battery life by providing instant-ON functionality when the unit is held in-hand and turning OFF when set down. A continuous-ON feature is also available for hands-free operation. With its durable design and ruggedized enclosure, the HD2 ensures excellent performance in real-life field applications.

Battery Installation



1. Insert 8 "AA" batteries into the battery pack.
2. Align the 'positive' and 'negative' ends (contacts) on the bottom of the battery tray to their respective ends inside the HD2 Display and insert the tray into the compartment on the top left-hand side of the display.
3. Attach the cover to securely lock and conceal the battery pack.

Controls



AC Power Input
alternative AC power source input

Power Selector

- **On Mode**
for continuous ON
- **GripSwitch™ Mode**
designed to save battery life

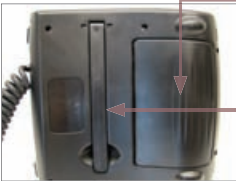


Table Stand
allows the display to be placed on a flat surface for hands-free operation



Brightness Control
adjusts brightness of the display screen

Tripod Socket
allows the display to be mounted on a tripod stand for hands-free operation

PROBE TIPS

The **FBE Probe Microscope** uses a select group of inspection tips. These tips are interchangeable, which allows the probe to interface with different types of fiber connectors. Below are three common types of FBET tips available at Westover.

FBET Tip Categories*



FBET-SC (*Bulkhead*)



FBET-LC (*Bulkhead*)



FBET-U25M (*Patch Cord*)



FBET-U12M (*Patch Cord*)



FBET-SCA

Standard Bulkhead Tips

Standard bulkhead tips allow the user to inspect the fiber end-face on the “female” ends of the bulkhead (e.g., inside hardware devices or on the back side of patch panels.)

Standard Patch Cord Tips

Standard Patch Cord tips allow inspection of “male” ends of a fiber connection (e.g., patch cords, pigtails, etc.). “Universal” tips include the FBET-U25M, compatible with 2.5mm ferrules (e.g., FC, SC, ST) and the FBET-U12M, used to inspect 1.25mm ferrules (e.g., LC, MU).

APC Tips

APC tips are designed with an angle that complements the end-face of an APC polish fiber connector. This allows the entire fiber image to stay in focus during inspection.

* FBE Probes are only compatible with FBET tips.

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