

# FBP Probe Microscope

*with* HD1 Display

## User Manual



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**ZP-PKG-0316**

REV 2



## 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

**CE** 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

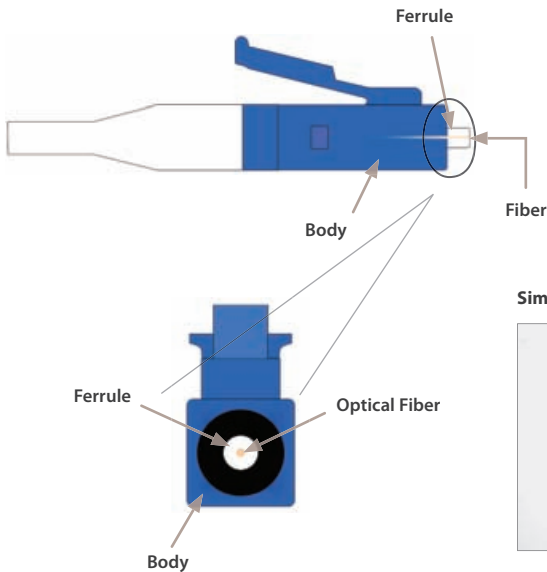
Inspection of fiber optic interconnects is essential for the optimal performance and longevity of fiber optic connectivity. Throughout their lives, fiber connectors must be inspected, analyzed and cleaned to maintain an acceptable level of functionality. By developing and introducing the equipment and 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

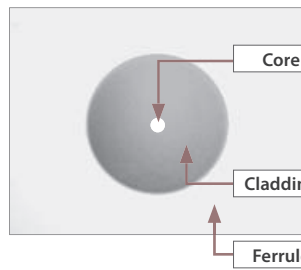
- **Cladding**

*Glass layer surrounding the core, which prevents the signal in the core from escaping*

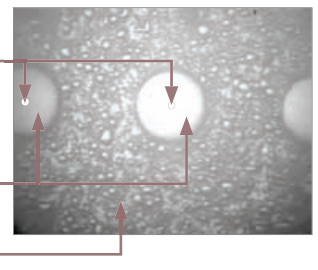
- **Core**

*The critical center layer of the fiber; the conduit that light passes through*

#### Simplex Fiber



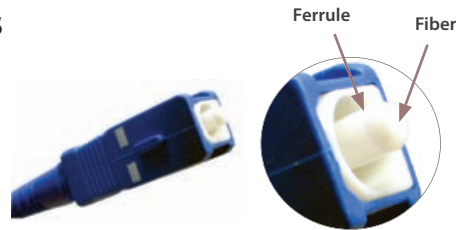
#### Ribbon Fiber



# Simplex, Ribbon & Jewel Fiber Connectors

## Simplex Fiber Connector

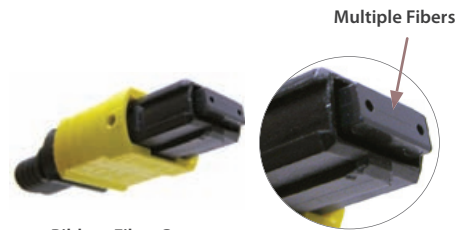
A simplex fiber connector contains a single fiber located in the center of the ferrule. Common types include SC, LC, FC and ST.



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®).



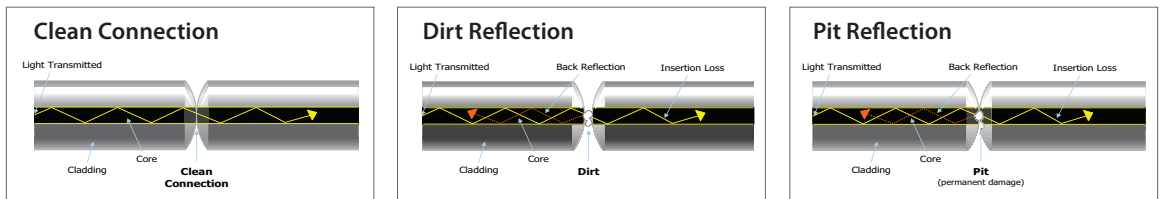
Ribbon Fiber Connector

## 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

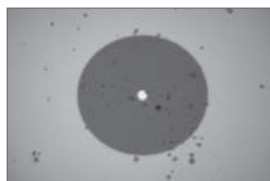
If dirt particles get on the core surface the light becomes blocked, creating unacceptable insertion loss and back-reflection. Furthermore, those particles can permanently damage the glass interface, digging into the glass and leaving pits that create further back-reflection if mated. Also, large particles 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.



Clean Fiber



Dirt Contamination



Pit/Chip Contamination



Scratch



# Scratches

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

# FBP PROBE MICROSCOPE

## Overview

Westover’s **FBP Series Probe** is a portable video microscope used to inspect fiber optic connectivity. While most fiber microscopes are limited to inspecting “male” connectors (e.g., patch cords, pigtails, etc.), the FBP Probe is designed to inspect male connectors, “female” connectors (e.g., bulkhead) and optical devices, such as transceivers. 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 Probes

- Connect with Westover’s portable hand-held display devices (HD1, HD2 and HD3 Displays)
- Connect to USB Image Capture Module (*digital converter*) for use with PC
- Connect to Video Output Module (*external bench-top display*)

### QuickCapture™ Analog Probes

- Used with USB Image Capture Module
- Instantly capture fiber end-face image on PC screen with built-in video capture button
- Inspect and capture image with one hand

Probe Specifications	
Dimensions	14.0 cm x 4.6 cm x 4.4 cm
Weight	180 g
Cord Length	240 cm
Connector	4- or 6-pin Hirose™ male
Camera Type	1/3" CMOS Sensor
Video Output	NTSC or PAL
Light Source	Blue LED, 100,000+ hour life
Lighting Technique	Coaxial
Power Source	From HD1, HD2 or HD3 Display or USB port of PC

Common Probe Models*	
FBP-P1	Analog, Single (Low) Mag., NTSC
FBP-P2	Analog, Single (Low) Mag., PAL
FBP-P5	Analog, Dual (Low & High) Mag., NTSC
FBP-P6	Analog, Dual (Low & High) Mag., PAL
FBP-P505	Analog, QuickCapture™, Dual Mag., NTSC
FBP-P605	Analog, QuickCapture™, Dual Mag., PAL

\* Additional models available.  
See [www.westoverfiber.com](http://www.westoverfiber.com) for details.

# Installation

## Connecting the Probe to the HD1 Display



Step 1



Step 2

1. Locate the 4-pin “female” end on the display.
2. Align the notch-keys of the probe’s coil cord end (“male”) then insert into the “female” end of the display and screw in to tighten and secure.

# Controls

The basic design of the **FBP Series Probe Microscope** incorporates an imaging system, integrated light source, video camera, focus mechanism and magnification control. The probe is fully assembled and is powered by the HD1 Display. The only assembly required by the user is the connection to the display unit and installation of the appropriate barrel and/or the inspection tip. The FBP-P5 analog probe is also equipped with a 4-pin circular *Hirose™* connector with notch-keys which allows for a secure and firm latch-lock connection to the HD1 Display.

## FBP-P5



## Focus Control

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

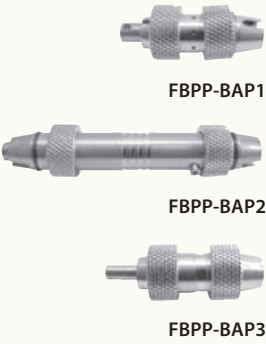
## Magnification Control

The *Magnification Control* (available only on Dual Magnification Probes) allows the user to switch between Low and High magnifications of the fiber end-face image.

# FBPT PROBE TIPS

## Overview

**FBP Probe Microscopes** use a variety of tips and barrel assemblies for inspection. These connector-specific and universal inspection tips are interchangeable, which allow the probe to interface with different types of fiber connectors. A wide range of unique tips is available at Westover and is currently being applied in numerous industry-specific settings (e.g., component/system manufacturers, network service providers, premise networks, military & aerospace). Below are examples of barrel assemblies and inspection tips available at Westover.



**FBPP-BAP1**

**FBPP-BAP2**

**FBPP-BAP3**

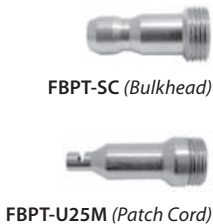
### Barrel Assemblies

The barrel assembly houses the objective lens and works in conjunction with a number of tips.

**NOTE:** *Certain tips are equipped with optics and do not need a barrel assembly (e.g., Long Reach Tips [FBPT-LC-L], Angled Tips [FBPT-SC-A6]).*

## FBPT Tip Categories

### Standard Tips (Bulkhead & Patch Cord)



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

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

### Long Reach Tips



Long reach tips have a 1/2” longer reach than standard tips, and allow the user to inspect the fiber end-faces in tight, hard-to-reach spaces.

### 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.







FBPT-SC-A6

### Angled Tips

Angled tips, identified by "A6," are angled 60° to allow easy maneuvering and inspection of hard-to-reach locations such as transceivers on a printed circuit board (PCB) or bulkheads located in tight spaces.



FBPT-MTP

### RibbonDrive™ Tips

Westover's patented RibbonDrive™ tips are specialty tips that allow inspection of high-density, multifiber array connectors that are mounted within a bulkhead adapter. Each tip mates securely with connectors using a precision-keyed mating adapter interface. The patented "panning knob" allows the user to view each fiber individually in the linear array.



FBPT-A801-2-001-R

### Alignment Guides

Alignment guides enable the inspection of various military & aerospace connectors that use a pin & socket design. In addition to providing an alignment channel for sockets, these alignment guides work in conjunction with a barrel assembly to prevent the pins from breaking.



FMA-U12



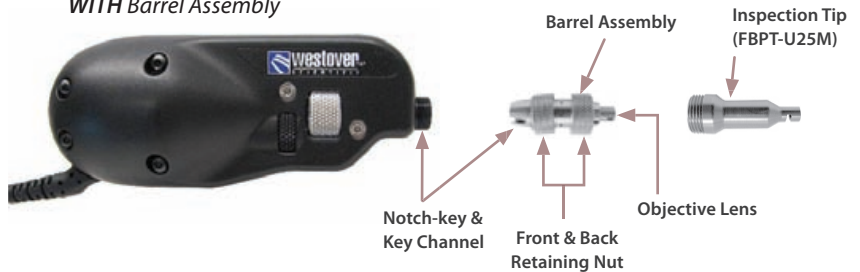
FBPT-UFMA  
(universal flare adapter)

### FMA Adapters

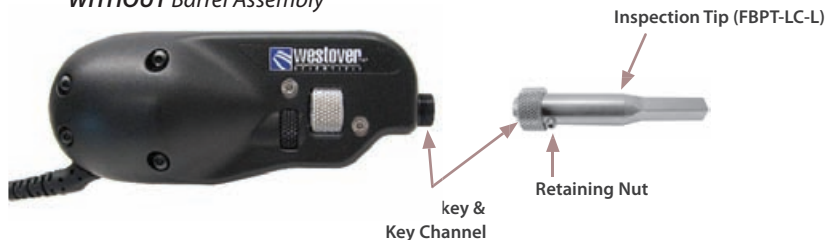
FMA Adapters provide optimized inspection for "male" connector ends and are ideal for inspecting patch cords with multi-fiber ribbon and APC polish connectors. FMA adapters can be utilized by a probe microscope with a universal flare adapter (FBPT-UFMA).

## Tip Assembly

#### WITH Barrel Assembly



#### WITHOUT Barrel Assembly



# HD1 DISPLAY

## Overview

The **HD1 Series Video Display** is a durable, lightweight, ergonomic, drop-tested display unit for use with any NTSC FBP or FBP3 series probe. It features a 3.5" TFT active matrix LCD screen, which produces a bright, clear, and crisp, high-contrast image of the fiber end-face. It can be powered by 100–240V AC or a rechargeable Li-ion battery (the Li-ion battery must be in the display for the unit to operate). The HD1 Display features contrast adjustment, auto-shutoff function (to preserve battery life) and a hanging accessory (for hands-free operation). It is designed to fit comfortably in the user's grip for optimal performance. The display uses a 4-pin *Hirose™* connector, which routes power into the probe and video out of the probe. A conversion cable is also available for 6-pin QuickCapture™ analog probes.

HD1 Display Specifications	
Dimensions	45.7 mm x 43.2 mm x 140 mm
Weight	400 g
Video Display	3.5" TFT LCD
Video Input	NTSC with dedicated connector for Probe or conversion cable
Power Source	Li-ion Battery (Sony® type NP-550) or AC Adapter/Charger (100–240VAC) <b>Note:</b> <i>The battery must be in the display for the unit to operate.</i>
Battery Life	2 hours continuous use
Charging Time	2 hours



# Installation

## Battery Installation

**Note:** The Li-ion rechargeable battery is charged inside the HD1 Display by the power supply. Charge the battery for approximately 2.5 hours before operating for the first time. The battery must be in the display for the unit to operate.

The HD1 Display is powered by either a rechargeable Li-ion battery (Sony® NP-550) OR by the 100–240VAC power supply.

1. Before operating for the first time, charge the battery inside the display by connecting the power supply for approximately 2.5 hours.
2. Attach the cover to lock and conceal the battery pack securely.



Step 1

### Battery Status LED



For the first 5 seconds after the display is turned ON, the **Battery Status** feature indicated by the 4 LED's will illuminate, letting the user know the level of battery life remaining (see table below).

**Total battery life = 2 hours continuous use**

LED	Battery Power Remaining
	75–100%
	50–75%
	25–50%
	5–10%

## Connecting the Probe Microscope

1. Locate the “female” connection on the bottom of the display unit.
2. Align the notch-key configuration of the “male” end of the probe microscope to the “female” end of the display unit and attach; screw in to tighten and secure.



Step 1



Step 2

## Controls

### Auto Shut-down Interval *(shared function control with Contrast Control)*

There are 4 settings that control the length of time the LCD will remain ON after the unit is turned on. This feature helps save battery power by automatically powering OFF after the selected time interval has been reached. At the Infinity setting, the unit will remain ON until all battery power is exhausted or until AC power is disconnected.

Turn the power OFF, then ON to determine/view the level of power remaining (see **Battery Status** previously described in the **Installation** section).

#### To set the Auto Shut-down time interval:

1. **Press & hold down** the **Auto Shut-down Control** button until the desired interval is reached.
2. See the table below for interval setting/reference.

LED	Time Interval											
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I	II	III	IV									



Auto Shut-down Interval AND Contrast Control

### Contrast Control *(shared function control with Auto Shut-down Interval)*

There are 4 presets which control the Contrast settings for the LCD screen. Contrast settings are user-determined to accommodate specific environmental lighting conditions.

#### To adjust Contrast on the LCD screen:

1. **Press** the **Contrast Control** button until a desired, optimal screen is reached.
2. There are 4 preset settings visually distinguishable on the LCD screen.



Contrast 1



Contrast 4

## Hanging / Standing Accessory

For hands-free operation, the Hanging/Standing Accessory can be used in 2 positions:

1. The hook/hanging feature allows the unit to be “hooked” onto an appropriate location/device for convenient stowage.
2. The standing feature allows the unit to be set down on a flat surface.



1. Hanging



2. Standing

## Removable Magnet (*optional*)

The removable magnet allows the unit to be attached to ferrous metal surfaces for hands-free operation.



Removable Magnet  
(FBPP-MA1)

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