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2289

OPTISPEC®

# ME9100 Series
## Bulkhead Inspection Scope




www.microenterprises.net

# Operator Manual

**ME9100** Portable Videoscope

MICRO ENTERPRISES INC.

**ME9100 Series**
**Bulkhead Inspection Video Microscope**

# Operator Manual

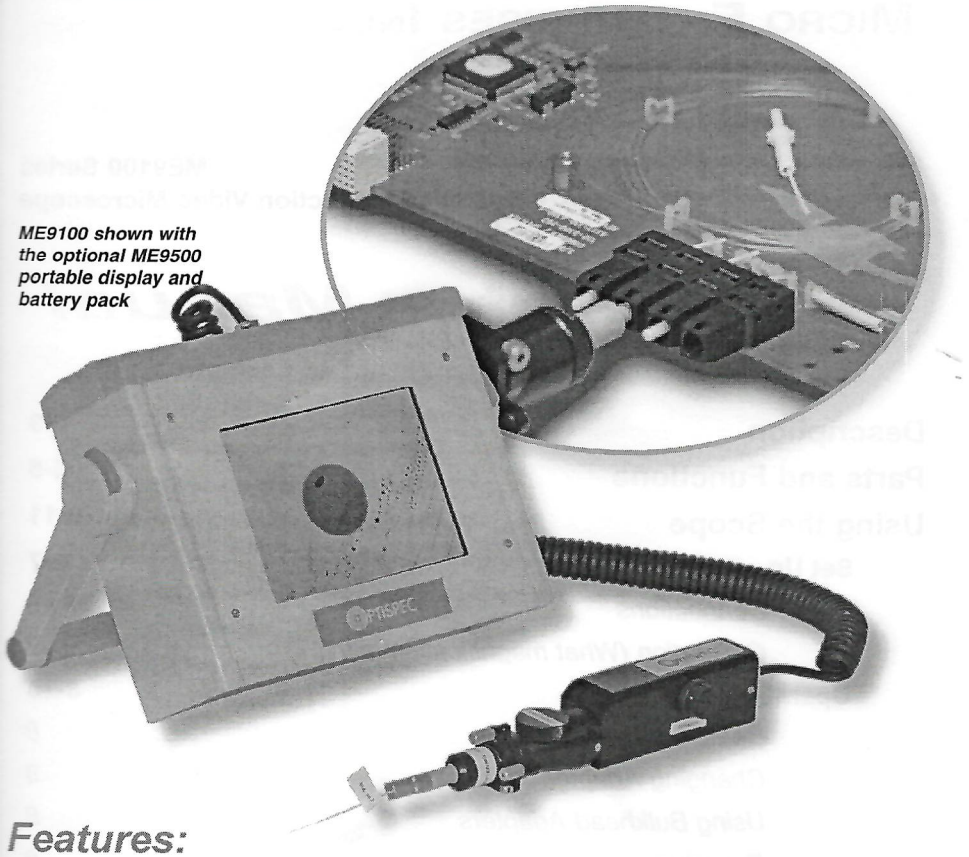

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**Order Information for the OPTISPEC® ME9100 may be found on the price list.**

# DESCRIPTION



*ME9100 shown with the optional ME9500 portable display and battery pack*

## Features:

- High resolution video and CCD camera
- Available with low or high powered objectives
- Variable co-axial LED illumination
- Fully adjustable image with x and y axis control
- Adapters are available for most connectors and bulkheads including Thermoplastic Multi Fiber Connectors
- Optional Right Angle Adapter allows greater accessibility for "hard to get to" bulkhead connectors

Manufactured by Micro Enterprises Inc., the ME9100 Series Video Microscopes are designed for inspecting fiber optic connectors through bulkheads. These instruments are equipped with a specially designed, extra long working distance objective that allows the operator to inspect the end face of a fiber optic connector while mounted inside a system.

It is no longer necessary to dismantle a system to inspect back plane connectors. Simply remove the front panel connector, select the appropriate bulkhead adapter for the ME9100, and plug the scope into the front panel bulkhead. The extra long working distance objective and high powered LED illumination will image the mating connector inside of the bulkhead. The high powered 20x magnification is perfect for resolving light scratches and defects within the cladding. The low powered 8x version is a good choice for other applications such as checking the general condition of the ferrule for moisture, dirt, and cracks.

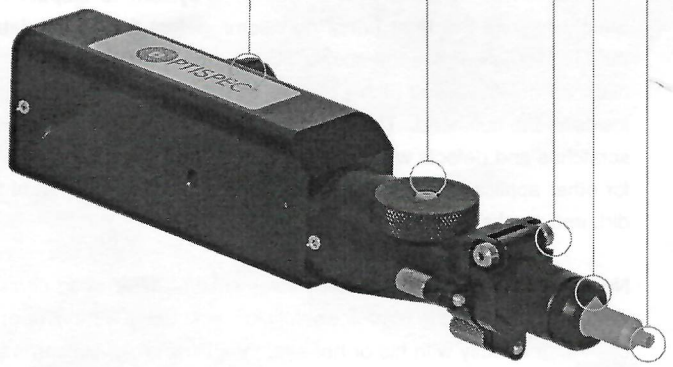
No need to worry about a "live", laser emitting fiber optic connectors. Since this is a video microscope, the operator safely inspects using a monitor or LCD never viewing the connector directly with his or her eye, thus eliminating concerns about laser safety filters and eye damage due to accidental exposure.

Within this manual is all the information needed to operate and maintain the ME9100 Series Video Microscopes. Micro Enterprises Inc. is always designing innovative new products while maintaining and further developing existing ones. Contact us for an up to date listing of adapters and accessories.

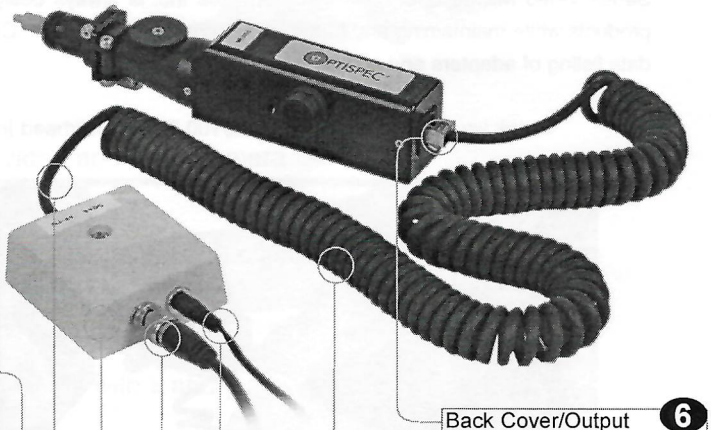
Thank you for purchasing the ME9100 Series Bulkhead Inspection Scope

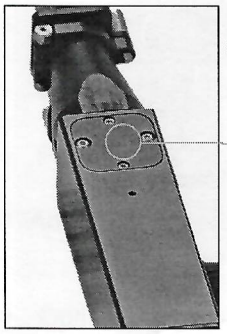


# PARTS & FUNCTIONS



1. Adapter
2. Locking Cap / Sleeve
3. Centering Adjustment
4. Focus Adj. Knob
5. Light Intensity Knob





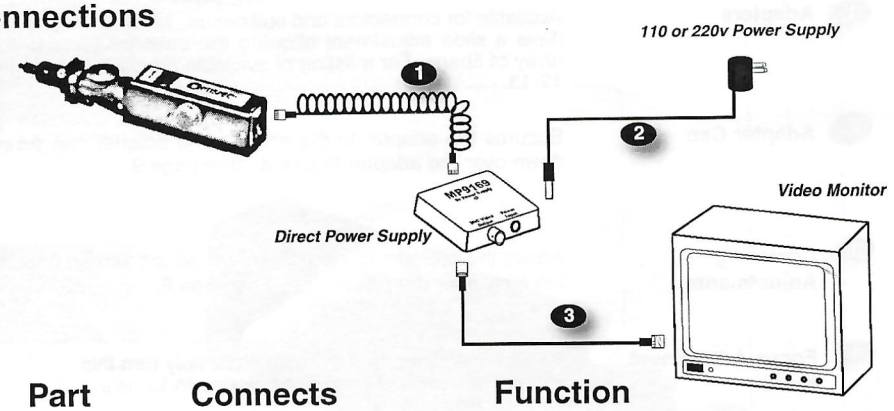
6. Back Cover/Output
7. MP9157 Cable
8. Power Input
9. BNC Output
10. MP9169 Power Supply
11. Input
12. Light Block Assembly

| Parts | Functions |
|---|---|
| 1 **Adapters** | Available for connectors and bulkheads. Multi-fiber adapters have a slide adjustment allowing the operator to scan the array of fibers. For a listing of available adapters see pages 12-13. |
| 2 **Adapter Cap** | Secures the adapter to the scope. The adapter cap screw down over the adapter to lock it. See page 9. |
| 3 **Centering Adjustments** | Allows the operator to center the fiber on the screen or scan the ferrule for dirt and debris. See page 8. |
| 4 **Focus Adjustment Knob** | Adjusts the contrast of the image. Simply turn this knob clockwise and counter-clockwise to focus in and out. See page 7. |
| 5 **Light Intensity Knob** | Adjustment for light intensity of the LED. See page 7. |
| 6 **Back Cover and Output** | Houses the electronics of the scope. There are no user serviceable parts inside. The output connects to the MP9157 video/power cable. |
| 7 **Video/Power Cable** | Delivers power to the scope and carries the video signal from the scope. |
| 8 **Power Input** | Accepts 9v DC power. Charge time for MP9155 battery pack is approximately 1 hour. Estimated run time is approximately 10 hours. |
| 9 **BNC Video Output** | Converts the video signal from the microscope to a BNC connector which will interface directly with most monitors and LCD displays |
| 10 **MP9169** | Direct Power Supply. |
| 11 **Input** | Connects to the MP9157 video/power cable. |
| 12 **Light Block** | Houses the optics for the co-axial illumination. The optics may need periodic cleaning. See page 10 for instructions. |

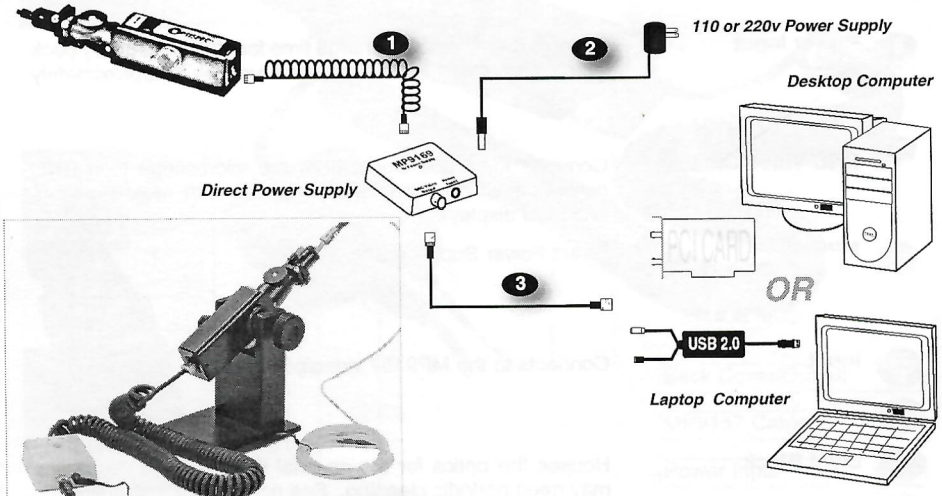
# USING THE SCOPE

## SET-UP

### Connections



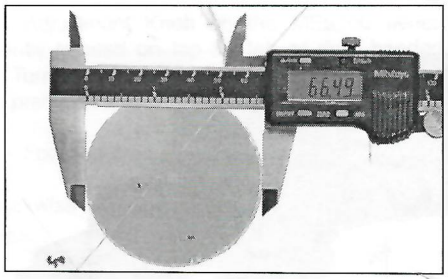

| | Part | Connects | Function |
|---|---|---|---|
| 1 | **MP9157 Power Cord** | Connects the microscope to the direct power supply, battery pack or ME9500. | Carries power to the microscope and transmits the video signal from the scope. |
| 2 | **9v Power supply** | Switching power takes in current from a 110-250v power outlet | Provides power to the microscope. |
| 3 | **BNC Cable** | Analog Video Output direct power supply to the Video Input of the Monitor | Transmits Video Signal from the CCD Camera to the Video Monitor or Computer via frame grabber |

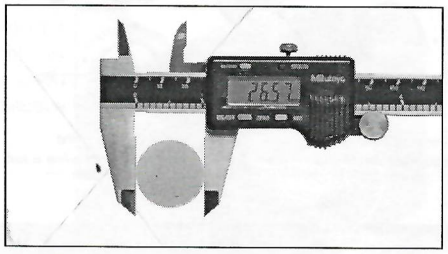


## Calibration

The best method to calculate the exact "total" magnification used on the ME9100 series is to measure the cladding on the video display. Take the measurement in millimeters and divide that amount by the 125 micron cladding. The result is the "total" optical and video magnification being used.

*For example: The two images shown here are a high magnification ME9100 model (top) and a low magnification ME9300 model (bottom). Both scopes using a 9" NTSC format video display measure to be approximately 66.49mm and 26.57mm respectively.*




***Actual size on Display / Cladding dia. (mm) = Total Mag.***

*ME9100/9200 High Mag. Model*

*66.49mm / .125mm = **531.92X***

*ME9300/9400 Low Mag. Model*

*26.57mm / .125mm = **212.56X***

When asking the question, "What magnification are we using?", it is necessary to understand the correlation between optical, video and total magnification. The follow
ing abbreviated information has been provided in an effort to help you better understand your inspection needs and can be obtained in full length by contacting Micro Enterprises Inc.

Optical magnification is primarily achieved through the objective lens. Each lens is characterized by several factors, the two most important being the primary Magnification and the Numerical Aperture (N.A.) which quantifies the resolving power.

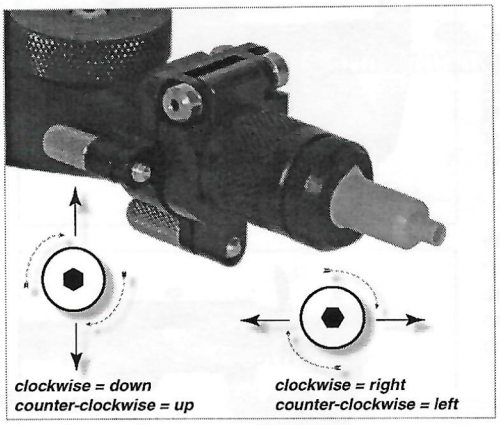
Video magnification can be defined by the ratio of the diagonal size of the monitor's screen divided by the diagonal size of the CCD chip of the video camera. Common specifications affecting the quality of video magnification include: resolution, pixel count, and signal to noise ratio.

Combining the characteristics of the objective lens and the quality of all components in a video system determine the capabilities of a video microscope. Image contrast cannot be generated where none initially exists. In situations such as this there is no advantage to increasing video magnification as no more detail from the sample can be obtained from the objective. This is commonly referred to as "empty magnification".

Taking this into consideration the most important factor when inspecting fine scratches is the objective lens. MEI recommends at least a 20x objective regardless of video magnification or monitor size. For other applications such as checking the condition of the ferrule, the lower 8x magnification will be more practical.

For more information contact Micro Enterprises at support@microenterprises.net and mention the *Optical versus Video Magnification Primer* or download the information from our web site at **www.microenterprises.net**.

### Centering the Image

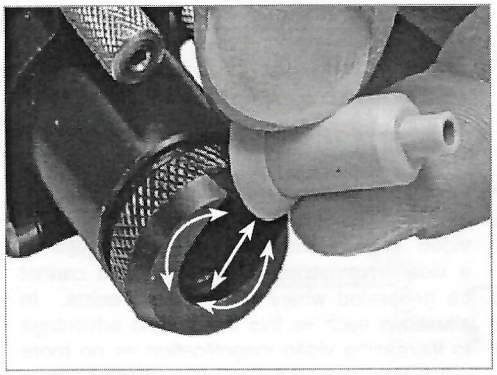



Centering on the ME9100 Series is accomplished by turning the two knobs located in the front of the microscope.

The bottom knob controls vertical travel
In (clockwise)= Down
Out (counter-clockwise)= Up

The side knob controls horizontal travel
In (clockwise)= Right
Out (counter-clockwise)= Left

### Changing Adapters



Within a few seconds the ME9100 series videoscope can be equipped with a new adapter allowing the operator to inspect a wide variety of connectors.

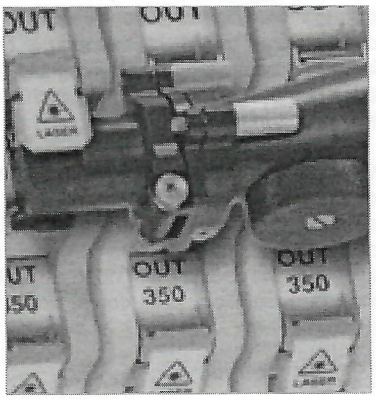
1) Unscrew the adapter cap
2) Slide the adapter out
3) Slide the new adapter in
4) Re-tighten the adapter cap

*Note: make sure the adapter seats properly in the dovetail before tightening the adapter cap*

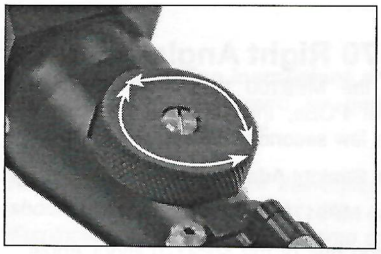
### Viewing through a Bulkhead

Viewing a connector mounted inside a system is made simple by utilizing the extra long working distance objectives within the ME9100 scopes.

1) Remove the front panel connecter.
2) Choose the appropriate bulkhead adapter and attach it to the microscope
3) Plug the scope into the bulkhead.
4) Use the focus, illumination, and centering adjustment to scan the image of the end face for dirt, scratches and other defects.



## Focusing



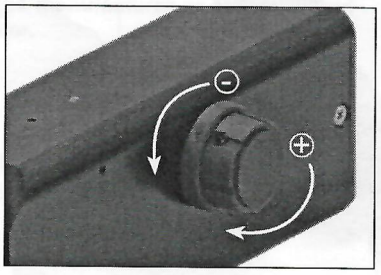
The Focus Adjustment Knob on the ME9100 series is conveniently located on top for left or right handed operators. Turning the knob adjusts the contrast of the image with precision and control.

Clockwise = Focuses the Lens Out

Counter-clockwise = Focuses the Lens In

## Lighting

The illumination on the ME9100 series scopes can be controlled directly on the scope. This extra control allows the operator to control the brightness of the image when inspecting the dark fiber cladding and highly reflective metal or ceramic ferrules.



Clockwise = Increases Illumination

Counter-clockwise = Decreases Illumination

## Charging the MP9189 Battery Pack

Charge time for the battery pack is approximately one hour with a life span estimated at 10 hours.

1) Turn the power switch to the off position.
2) Connect the power input to the 9v power supply.

*Note: The MP9156 Battery Pack will not charge while the power is on.*



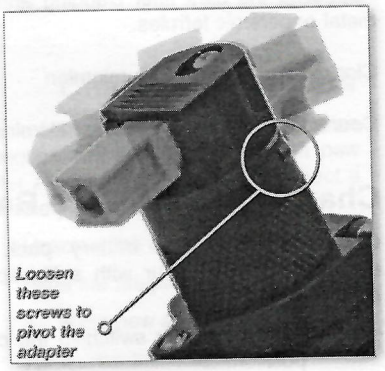
OPERATION CONTINUED

## Using the MP9170 Right Angle Adapter

Designed to allow the ME9100 to inspect bulkheads mounted flat against PCBs, the MP9170 Right Angle Adapter takes only a few seconds to install.

1) Unscrew the Straight Adapter Tube
2) Screw on the MP9170 Right Angle Adapter
3) Rotate the top half of the MP9170 Right Angle Adapter to the desired position.
4) Once in position, lock the top half of the MP9170 Right Angle Adapter into place by tightening two socket head screws.

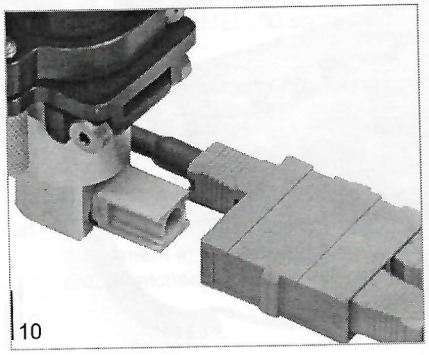





Different types of bulkheads may be inspected by switching adapters.

1) Slide the top of the adapter back and lift the adapter out.
2) When replacing the adapter, make sure the flat part of the adapter lines up with the sliding top of the MP9170 Right Angle Adapter.





# Preventive Maintenance

**CAUTION:**

**The following instructions should only be performed by qualified service personnel.**

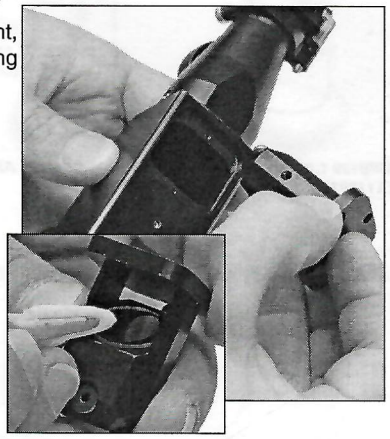
*Note: The back cover of this equipment should never be removed. The LED illumination should last the life time of the microscope. If there is any problem please contact Micro Enterprises Inc for an RMA to return the equipment for factory repair.*

**WARNING:**

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

**There is NO SERVICEABLE EQUIPMENT inside this unit, with exception to the light block assembly and focus assembly, all equipment requiring repair should be sent back to the manufacturer or an authorized dealer.**

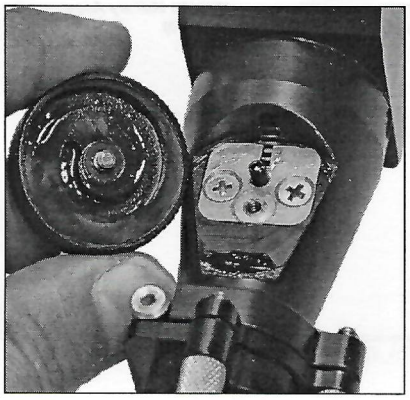
## Cleaning the Light Block Assembly



Depending on the amount of use and the environment, the optics in the Light Block Assembly will need cleaning to ensure performance of the microscope.

1) Remove the assembly by removing the 2 socket head screws on the bottom of the scope.
2) When cleaning optics, use lens cleaner and lens tissue available at most consumer camera stores.
3) Use plastic tweezers and caution not to scratch or damage optics in any way.
4) Try blowing the optical surfaces with a compressed air such as the cans used in electronic assemblies

## Maintaining the Focus Assembly



If the focus is feeling rough or hard to turn it can be cleaned and lubricated in a few short and simple steps.

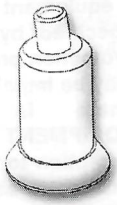
1) To access the focus mechanism, unscrew the top shoulder screw on the Focus Knob using a flat head screw driver.
2) Carefully lift off the Focus Knob and clean any debris out of the helical slot.
3) Using a medium grease, re-lubricate the helical slot.
4) When replacing the knob, be sure the roller pin is inserted into the helical slot before fastening the top shoulder screw.

## CONNECTOR ADAPTERS

### LARGE FORM FACTOR CONNECTORS

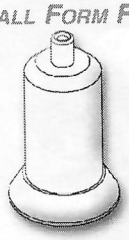


*MP9138 2.5mm*
*(A11596)*

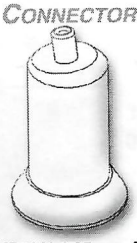


*MP9140 2.5mm APC*
*(A11598)*

### SMALL FORM FACTOR CONNECTORS

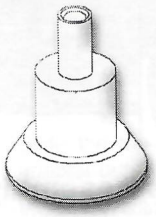


*MP9139 1.25mm*
*(A11597)*

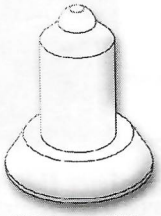


*MP9141 1.25mm APC*
*(A11599)*

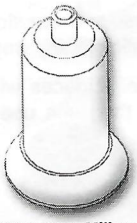
### MILITARY SPECIFICATION CONNECTORS



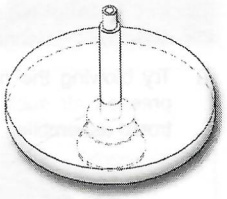
*MP9166 TFOCA Military*
*(A11715)*



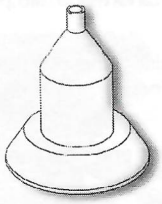
*MP9167 Female Military*
*(A11690)*



*MP9174 1.6mm Military*
*(A11689)*

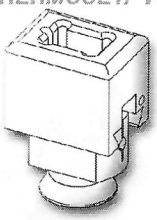


*MP9176 Military Assy.*
*(A11720)*

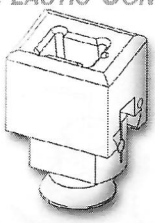


*MP9175 D38999*
*(A11719)*

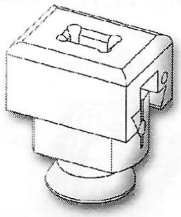
## THERMOSET/ THERMOPLASTIC CONNECTORS



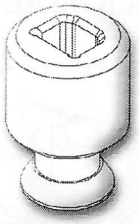
*MP9172 3M MT Adj.*
*(A11709)*



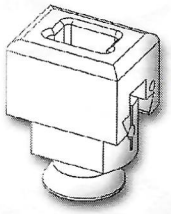
*MP9173 3M MT Adj. APC*
*(A11710)*



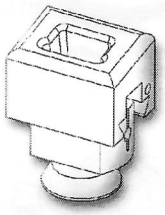
*MP9127 MT Ferrule Adj.*
*(A11592)*



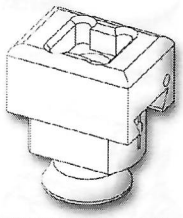
*MP9152 MTRJ*
*(A11589)*



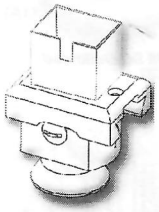
*MP9110 MTP Adjustable*
*(A11608)*



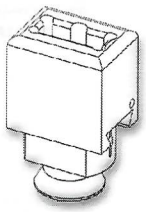
*MP9146 MTP Adj. APC*
*(A11609)*



*MP9149 MP Adjustable*
*(A11683)*



*MP9183 MP Keyed*
*(A11738)*



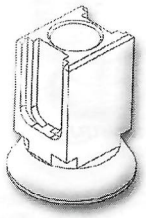
*MP9182 SMC*
*(A11748)**

** This adapter requires MP9119 short tube, see "Additional Adapter Information" at the end of this section for more information.*

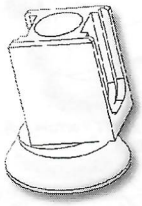
*contact Micro Enterprises Inc. for an updated listing of new adapters*

## BULKHEAD ADAPTERS

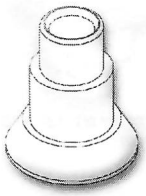
### LARGE FORM FACTOR BULKHEADS



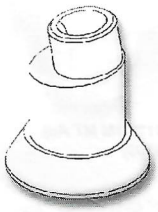
*MP9145 SC Bulkhead (A11602)*



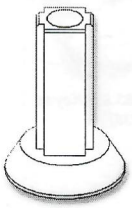
*MP9179 SC APC Bulkhead (A11740)*



*MP9142 FC Bulkhead (A11600)*



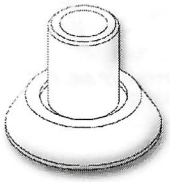
*MP9178 FC APC Bulkhead (A11739)*



*MP9197 E-2000 PC (A11752)*



*MP9188 E-2000 APC (A11739)*

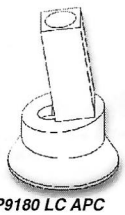


*MP9125 ST Bulkhead (A11591)*

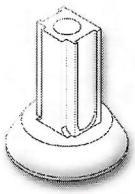
### SMALL FORM FACTOR BULKHEADS



*MP9143 LC Bulkhead (A11601)***



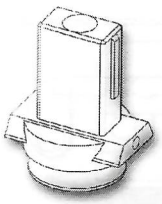
*MP9180 LC APC (A11741)***



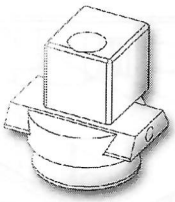
*MP9151 MU Bulkhead (A11588)*

*** when used with MP9119 Short tube MP9143 and MP9180 adapter will be able to inspect F-3000 style bulkhead connectors*

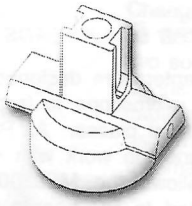
## THERMOSET/ THERMOPLASTIC BULKHEADS



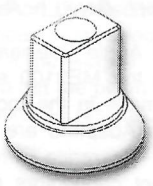
*MP9171 3M MT Bkhd. Adj. (A11711)*



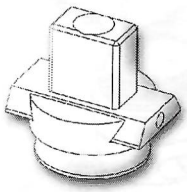
*MP9147 HBMT Bulkhead (A11611)**



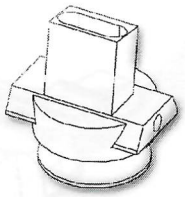
*MP9150 MP Bkhd. Adj. (A11681)*



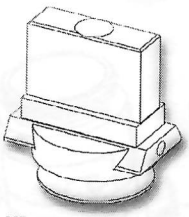
*MP9115 MTRJ Bulkhead (A11590)*



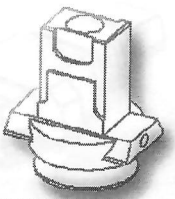
*MP9137 MTP (A11595)*



*MP9185 MTP APC (A11722)*



*MP9181 SMC Bulkhead (A11742)**



*MP9184 MPX Bulkhead (A11734)*

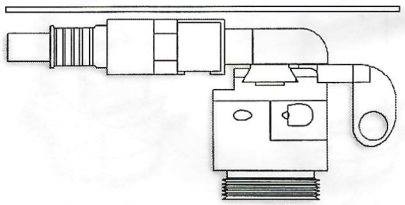
** This adapter requires MP9119 short tube, see "Additional Adapter Information" at the end of this section for more information.*

*contact Micro Enterprises Inc. for an updated listing of new adapters*

# ADAPTERS

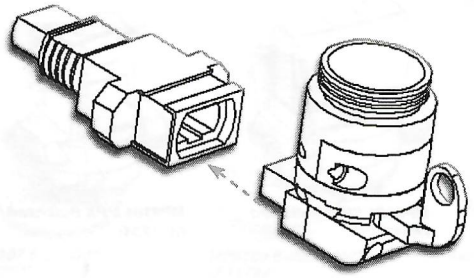
## BULKHEAD ADAPTERS

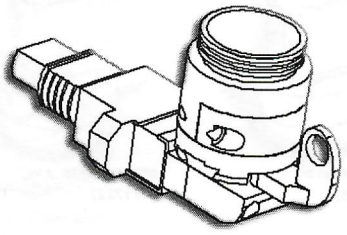
### RIGHT ANGLE ADAPTER BULKHEADS

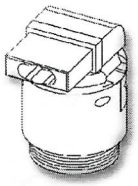


Right Angle Bulkhead Adapters are designed to allow the ME9100 series microscope to inspect bulkheads in the most difficult places. All Right Angle Adapters are designed to work with only 0.05" clearance, which allows the ME9100 to inspect connectors mounted to PC boards and systems.

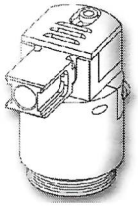
Installation is simple, just unscrew the adapter tube on the ME9100 and screw on the Right angle adapter. Loosen the two socket head screws on the lower part of the tube to allow the adapter to rotate.

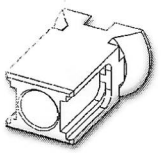






*MP9186 Right Angle SMC adapter*

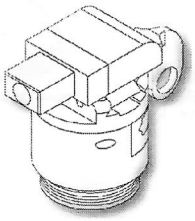




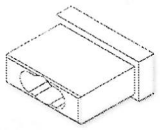
*MP9170 Right Angle Adapter (A11684) Shown here with MP9145r SC Adapter*

***Add an "r" after any part # for Right Angle Versions. Right Angle Versions work with both the MP9170 Right Angle Adapter and the standard straight tip adapter.***

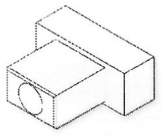
***(for example MP9145r for an SC Adapter to work with the MP9170 Right Angle Adapter)***



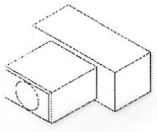
***MP9190 Right Angle Adapter with for Multi-Fiber Connectors. The MP9190 features a lever for precision control when inspection MT style connectors.***



***MP9191 SMC tip for MP9190 R.A. Adapter***

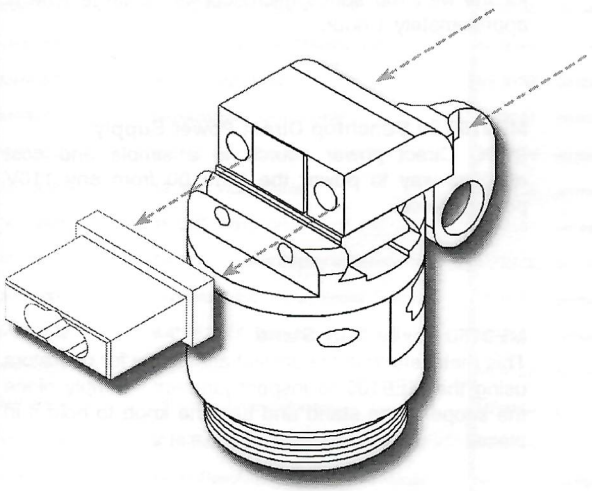


***MP9194 Cisco tip for MP9190 R.A. Adapter***



***MP9192 MTP tip for MP9190 R.A. Adapter***

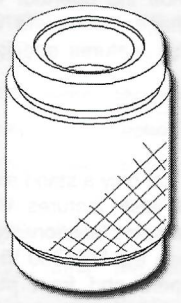
## Changing tips on the MP9190



Changing tips on the MP9190 can be accomplished by unscrewing two socket head screws located on the back of the adapter. Use caution not to get the prism dirty as it may decrease resolution of the image.

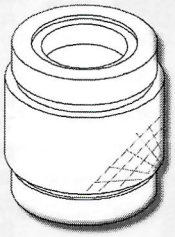
## Additional Adapter Information

Changing the Tube on the front of the ME9100 may be required to inspect some fiber optic connectors. Using the shorter tube extends the working distance of the objective lens allowing it to reach deeply recessed connectors within bulkheads .



***MP9198 Standard Tube***

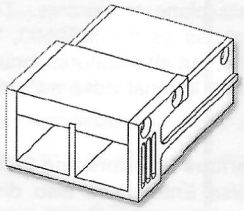
***This tube is standard with all ME9100 series scopes and works with the majority of adapters.***



***MP9119 Short Tube***

***Use this tube with the following adapters:***

***MP9147 HBMT***
***MP9181 SMC Bulkheads***
***MP9197 E-2000***
***MP9188 E-2000 APC***
***MP9143 F-3000***
***MP9180 F-3000 APC***
***MP9182 SMC Jumpers***



***MP9119 HBMT Sleeve***

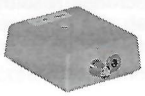
***The HBMT Sleeve slides into the HBMT bulkhead to open the protective flaps. The MP9147 HBMT bulkhead connector fits into the end.***

*contact Micro Enterprises Inc. for an updated listing of new adapters*

# PARTS & ACCESSORIES



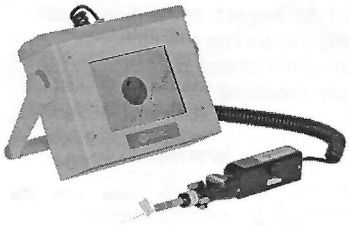
**MP9189 Battery Pack with built-in charger**
9V DC Battery pack provides up to 10 hours of power for the ME9100 series microscopes. Charge time is approximately 1 hour.



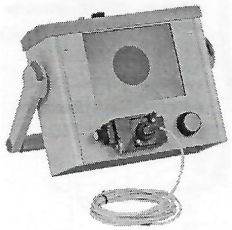
**MP9169 9v Benchtop Direct Power Supply**
9VDC Direct power source is a simple and cost effective way to power the ME9100 from any 110V power source.



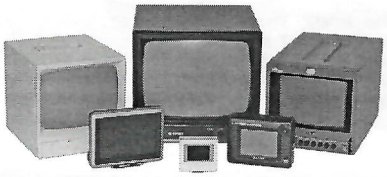
**ME9150 Heavy Duty Stand**
This metal stand is the perfect accessory for operators using the ME9100 to inspect jumpers. Simply place the scope in the stand and turn the knob to hold it in place.



**ME9500 6.4" Display/Battery Combo**
This portable black and white 6.4" TFT LCD display also has a built in battery pack to power a ME9100 for up to 10 hours. Enclosed in a rugged all metal chassis the LCD display pivots to provide the operator with a convenient high resolution image. Complete with built in charger the ME9500 also features additional RCA video input and outputs.



**ME9600 6.4" Video Scope**
The battery powered ME9600 is not only a stand alone portable video microscope but also features input jacks for the ME9100 giving it the same functionality as the ME9500. Operators can use the ME9600 Video Scope to quickly inspect jumpers and front plane connectors, then connect their ME9100 to view the back plane connectors. The ME9600 has the same features as the ME9500, Video In/Out, 10 hour run time, but also features focus and light intensity control for it's internal video microscope.



**Various Monitors and LCD Displays**
Micro Enterprises also distributes a variety of high resolution video monitors and LCD displays.

| Part Number | Ref. Number | Description |
|---|---|---|
| MP9189 | | 9v DC Battery Pack with charger |
| MP9169 | | 9v Benchtop Direct Power Supply |
| MP9150 | | Heavy Duty Stand |
| MP9157 | | Replacement Power Cable |
| MP19018 | | 6' BNC Video Cable |
| MP19025 | | 12' BNC Video Cable |
| MP19125 | | 15' BNC Video Cable |
| ME9500 | | 6.4" LCD Portable Display w/ Battery Pack |
| ME9600 | | Portable Video Display Scope Combo |
| MP19122 | | 6.4" TFT LCD (requires AC Power) |
| MP19157 | | 9" Monochrome Monitor |
| MP19155 | | 12" Monochrome Monitor |
| MP20007 | | 9" Hi-Resolution Monochrome Monitor |
| MP20004 | | 12" Hi-Resolution Monochrome Monitor |
| MP9162 | (A11575) | Replacement Adapter Cap |
| MP9163 | (A11584) | Replacement Focus Knob |
| MP9164 | (A11585) | Replacement Roller Bearing |
| MP9002 | | Optical Block |
| MP9004 | | Bottom Optical Plate |
| MP10169 | | First Surface Mirror |
| MP10176 | | Collector Lens |
| MP9119 | (A11698) | Short Tube |
| MP9198 | | Replacement Standard Straight Tube |
| MP9170 | (A11684) | Right Angle Adapter Assembly |
| MP9199 | | Special HBMT Adapter |
| MP9190 | (A11760) | Right Angle MT Adapter Assy. with Cam |
| MP9191 | (A11746) | SMC Bulkhead Tip for MP9190 |
| MP9192 | (A11758) | MTP Bulkhead Tip for MP9190 |
| MP9193 | (A11753) | Cisc-MTP Bulkhead Tip for MP9190 |

* requires MP9119 Short Tube

**also works with F-3000 Bulkheads when used with MP9119 Short Tube

**CONTACT MICRO ENTERPRISES INC. FOR PRICING AND AVAILABILITY**

| Part Number | Ref. Number | Description |
|---|---|---|
| MP9138 | (A11596) | 2.5mm Universal Connector Adapter |
| MP9140 | (A11598) | 2.5mm APC Universal Conn. Adapter |
| MP9139 | (A11597) | 1.25mm Connector Adapter |
| MP9141 | (A11599) | 1.25mm APC Connector Adapter |
| MP9174 | (A11689) | 1.6mm Military Connector Adapter |
| MP9166 | (A11715) | TFOCA Military Connector Adapter |
| MP9167 | (A11690) | Female Military Adapter |
| MP9172 | (A11709) | 3M MT Adjustable Connector Adapter |
| MP9173 | (A11710) | 3M MT APC Adjustable Conn. Adapter |
| MP9152 | (A11589) | MTRJ Connector Adapter |
| MP9127 | (A11592) | MT Ferrule Adjustable Conn. Adapter |
| MP9110 | (A11608) | MTP Adjustable Connector Adapter |
| MP9146 | (A11609) | MTP APC Adjustable Conn. Adapter |
| MP9149 | (A11683) | MP Adjustable Connector Adapter |
| MP9145 | (A11602) | SC Bulkhead Adapter |
| MP9142 | (A11600) | FC Bulkhead Adapter |
| MP9125 | (A11591) | ST Bulkhead Adapter |
| MP9143 | (A11601) | LC Bulkhead Adapter** |
| MP9151 | (A11588) | MU Bulkhead Adapter |
| MP9150 | (A11681) | MP Adjustable Bulkhead Adapter |
| MP9171 | (A11711) | 3M MT Adjustable Bulkhead Adapter |
| MP9147 | (A11611) | HBMT Adjustable Bulkhead Adapter* |
| MP9137 | (A11595) | MTP Adjustable Bulkhead Adapter |
| MP9115 | (A11590) | MTRJ Bulkhead Adapter |
| MP9175 | (A11719) | D38999 Adapter |
| MP9176 | (A11720) | Military Assembly Adapter |
| MP9178 | (A11739) | FC APC Bulkhead Adapter |
| MP9179 | (A11740) | SC APC Bulkhead Adapter |
| MP9180 | (A11741) | LC APC Bulkhead Adapter** |
| MP9181 | (A11742) | SMC Bulkhead Straight Adapter* |
| MP9182 | (A11748) | SMC Connector Adapter* |
| MP9183 | (A11738) | MP Keyed Connector Adapter |
| MP9184 | (A11734) | MPX Adjustable Bulkhead Adapter |
| MP9185 | (A11722) | MTP APC Adjustable Bulkhead Adapter |
| MP9186 | (A11750) | SMC Right Angle Adapter Assembly |
| MP9188 | (A11751) | E-2000 APC Bulkhead Adapter* |
| MP9197 | (A11752) | E-2000 UPC Bulkhead Adapter* |

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**Norcross, GA 30071**

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**www.microenterprises.net**

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**Monday-Friday, 8:00 am to 5:00 pm EST**

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