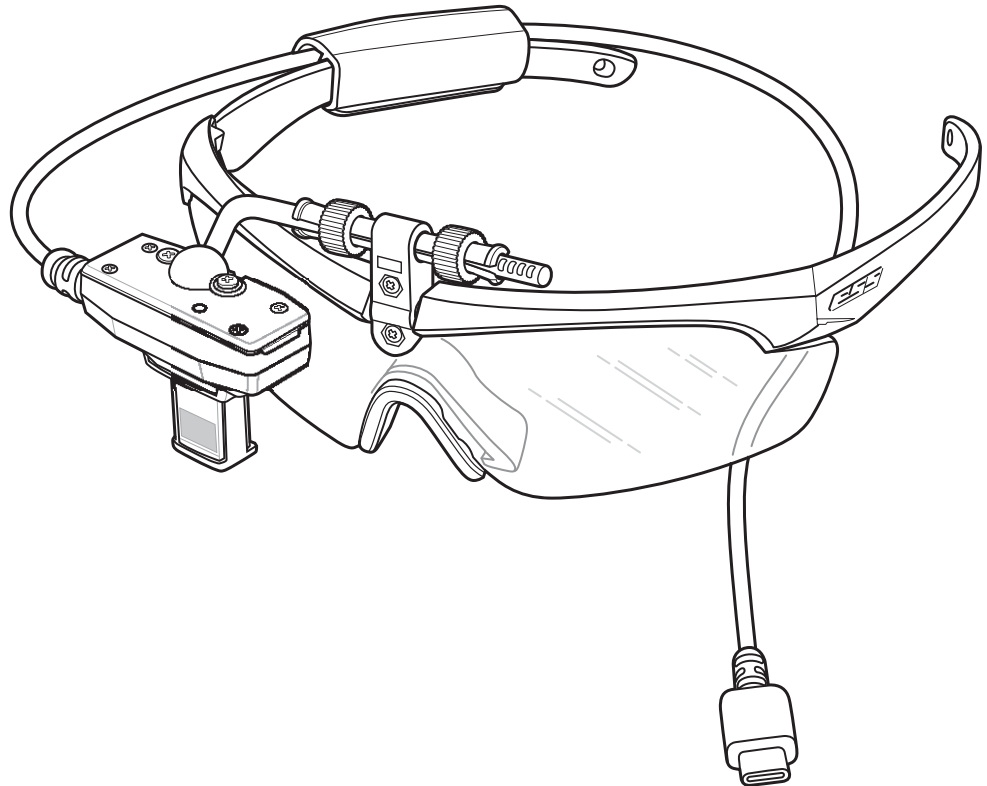


HD4000

Head Mounted Display



Quick Start Guide



ZEBRA

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Revision History

Changes to the original guide are listed below:

Change	Date	Description
-05 Rev A	07/2020	Added Prescription frames.
-04 Rev A	01/2020	Added support for TC5x.
-03 Rev A	12/2019	Minor grammatical update.
-02 Rev A	12/2019	Minor grammatical update.
-01 Rev A	10/2019	Initial release.

Unpacking

1. Carefully remove all protective material from the device and save the shipping container for later storage and shipping.
2. Verify that the following items were received:



NOTE: The HD4000 with Glasses differs from the HD4000 with Prescription Frames.

- HD4000 mounted on Glasses or Prescription Frames with USB Cable.
 - Cable Retention Sleeve.
 - Regulatory Guide.
3. Inspect the equipment for damage. If equipment is missing or damaged, contact the Zebra Global Customer Support immediately.
 4. Prior to using the device for the first time, remove the protective shipping film that covers the optical module.



CAUTION: Do not attempt to repair the Optical Module Assembly; contact Zebra Global Customer Support to report damaged or missing equipment.

Cautions

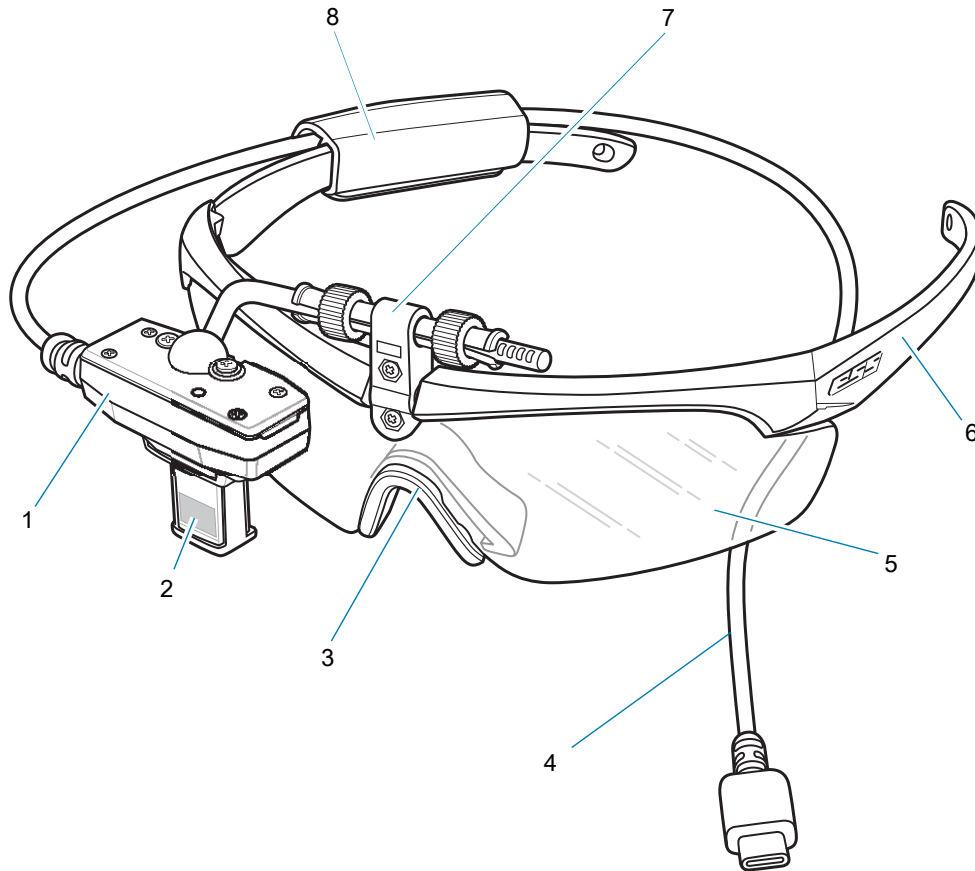
- The lensless prescription frames provide no protection if worn with ordinary prescription eyeglasses. Protective eyewear must be worn over the prescription eyeglasses where it is required.
- Ensure proper adjustment and fit of the optical module. The user must be able to see the full image through the display window without any cropping, as it could lead to focus issues.
- Ensure that there is adequate eye clearance while wearing the glasses or prescription frames.
- Take periodic breaks (approximately every two hours) to prevent straining eyes.
- Proper training, use, and appropriate maintenance are essential for the product to help protect the wearer.
- Always ensure that the complete product is:
 - Suitable for the application
 - Fitted correctly
 - Replaced when necessary.
- Always use both hands to put on and remove the product.
- Incorrect assembly may result in serious injury.

Device Features

NOTE: The HD4000 with glasses and prescription frames are Eye Safety Systems, Inc. (ESS) Crosshair™ and are marked Z87+.

HD4000 with Glasses

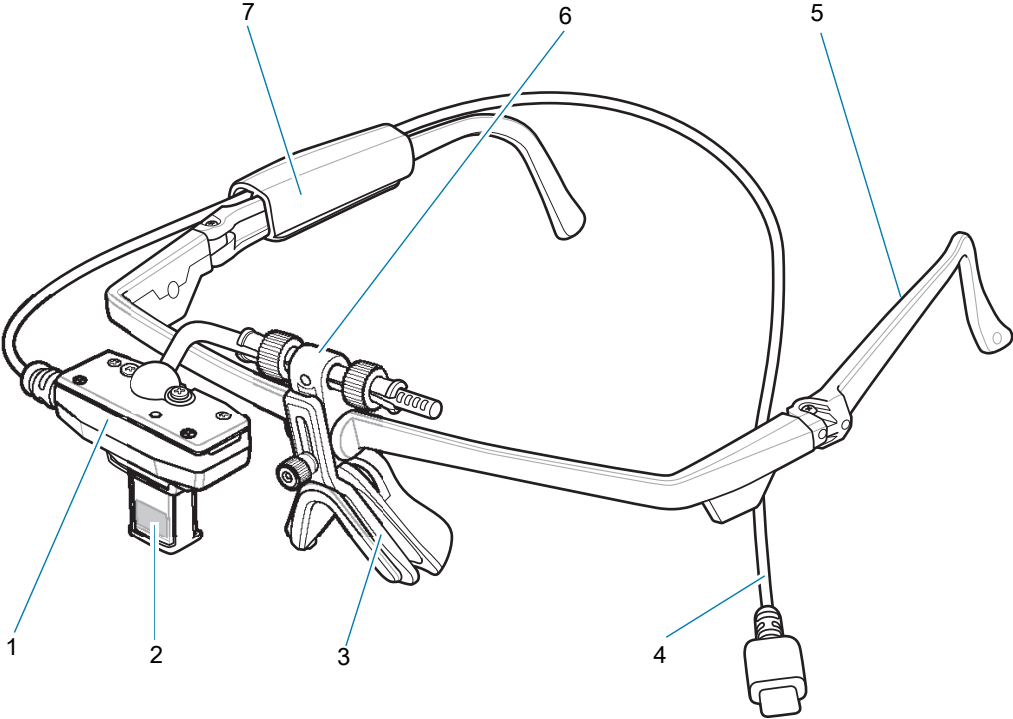
Figure 1 HD4000 with Glasses Features



Number	Item
1	Optical Module Assembly
2	Display
3	Rubber Nose Guard
4	USB C Cable
5	Safety Lenses
6	Glasses Frame
7	Optical Module Mount
8	Cable Retention Sleeve

Prescription Frames

Figure 2 HD4000 with Prescription Frames Features



Number	Item
1	Optical Module Assembly
2	Display
3	Rubber Nose Guard
4	USB C Cable
5	Frame
6	Optical Module Mount
7	Cable Retention Sleeve

Getting Started

! **CAUTION:** Vestibular Effects - Use of the device may cause the user to experience dizziness, headache, nausea, loss of concentration. If you experience any of these effects, discontinue use of the device.

Perform the following steps to setup the device for the first time:

1. Determine dominant eye.
2. Position Optical Module Assembly.
3. If required, switch the Optical Module Assembly.
4. Place the device on head.
5. Route the cable.
6. Adjust Optical Module Mount.
7. Connect to a terminal.

! **CAUTION:** You must use the Optical Module Assembly with the provided Glasses. Using the Optical Module Assembly without Glasses can lead to serious injury.

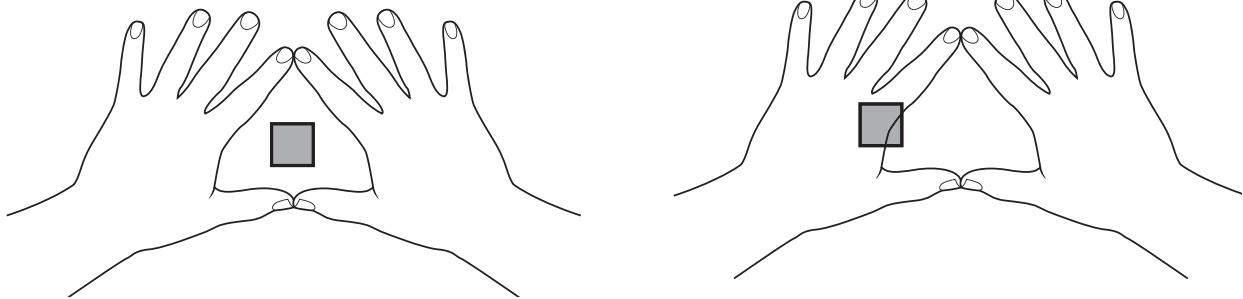
! **CAUTION:** Do not point the exit window of the Optical Module Assembly directly at the sun or other intense light source, as it can damage the internal display.

Determining Dominant Eye

Eye dominance is the tendency to prefer visual input from one eye to the other. Most people are right-eye dominant, however, in a small portion of the population, neither eye is dominant. It is best to use your dominant eye when viewing the display.

To determine which eye is dominant:

1. Place hands together as shown forming a triangle.



2. Keeping both eyes open, focus on any distant object.
3. Maintaining focus on the object centered in the triangle, close your right eye. If the object is still in the triangle, you are left eye dominant.
4. Maintaining focus on the object centered in the triangle, close your left eye. If the object is still in the triangle, you are right eye dominant.

If the object is in the triangle with either eye then you are dominant eye neutral.

5. Repeat test to confirm.

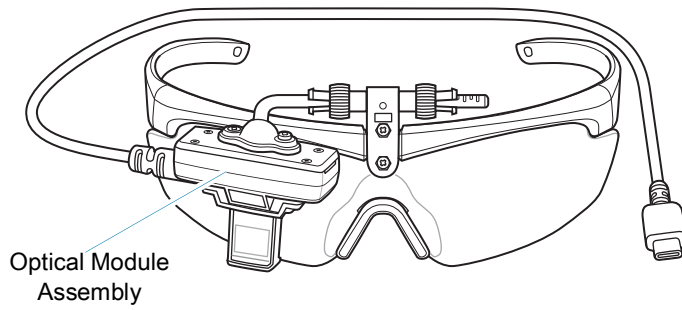
Positioning the Optical Module Assembly

To position the Optical Module Assembly:



NOTE: From the factory, the device is configured for left eye dominant.

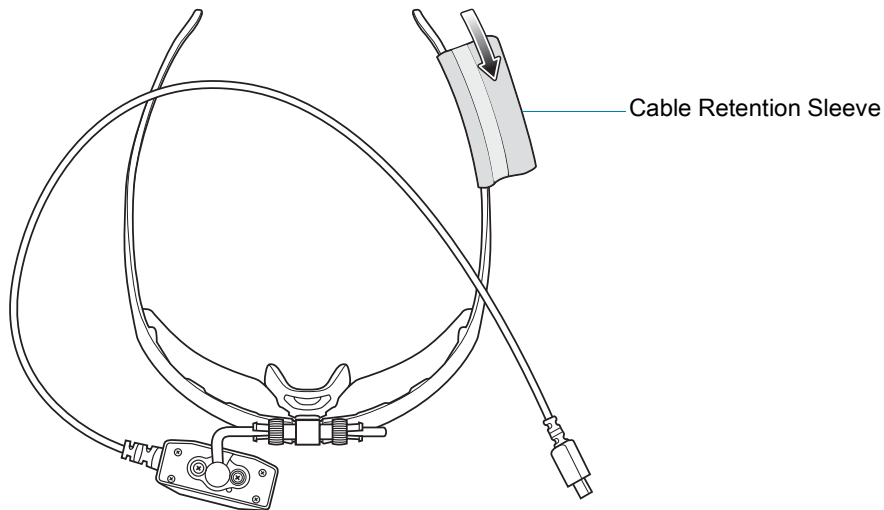
Figure 3 Optical Module Assembly over Glasses



1. Slide the Cable Retention Sleeve onto the left arm of the glasses until snug.



NOTE: The flap should be on the outside of the glasses arm.

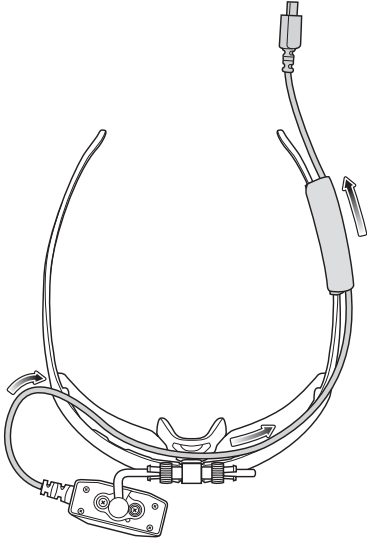


2. Route the cable over the Optical Module Assembly onto the left arm of the Glasses frame.



NOTE: For balance, it is recommended to route the cable to the opposite side of the mounting.

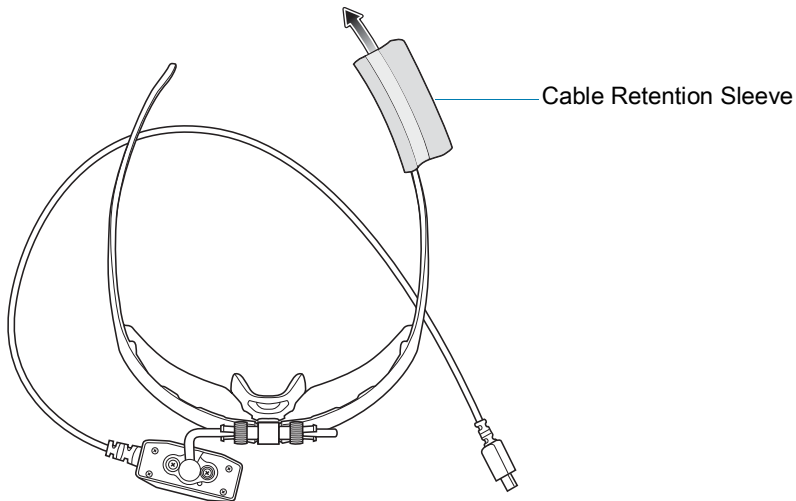
3. Place the cable securely into the Cable Retention Sleeve, and close the Velcro flap.



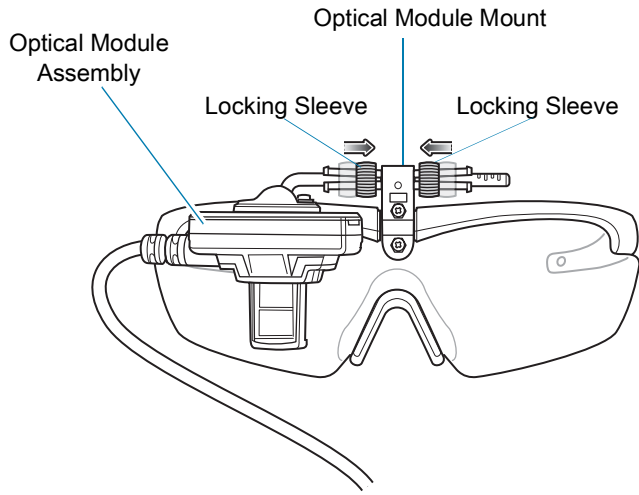
Switching the Optical Module Assembly

To switch the Optical Module Assembly position from over the right eye to the left eye:

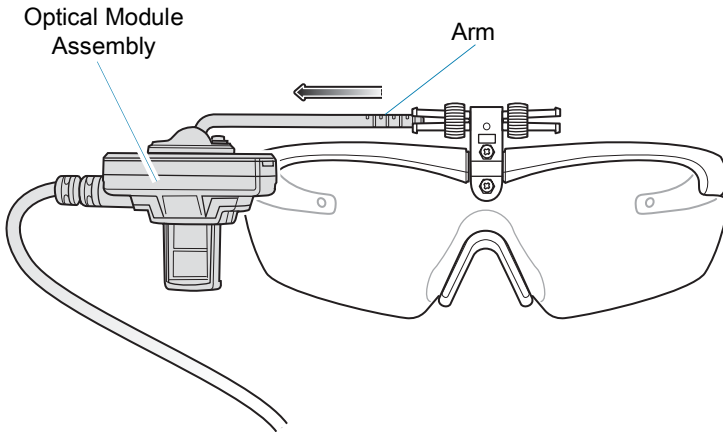
1. Remove the Velcro flap on the Cable Retention Sleeve to release the cable, and slide the sleeve off the Glasses arm.



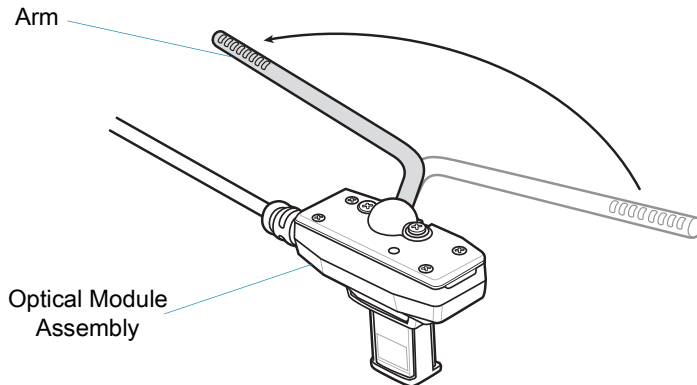
2. On the Optical Module Assembly, slide both the Locking Sleeves towards the center of the Glasses until they hit the hard stop.



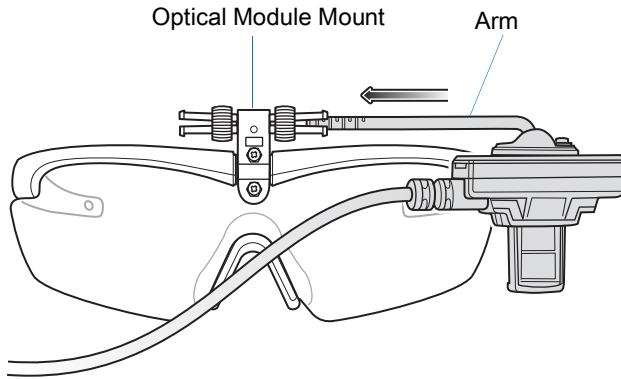
3. Slide the Optical Module Assembly and the arm all the way out of the right side of the Optical Module Mount. Ensure that the Locking Sleeves do not slide off the Optical Module Mount.



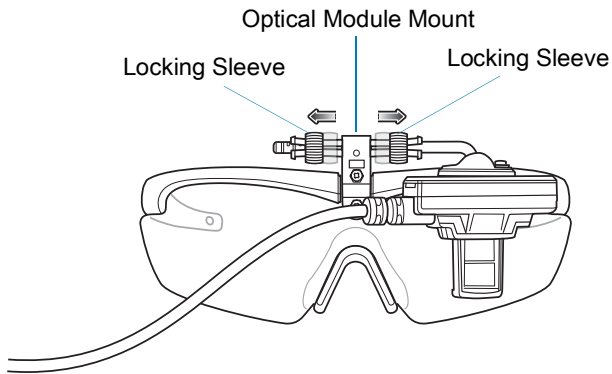
4. Rotate swivel arm 180°.



5. Insert the Optical Module Assembly and the arm into the left side of the Optical Module Mount.



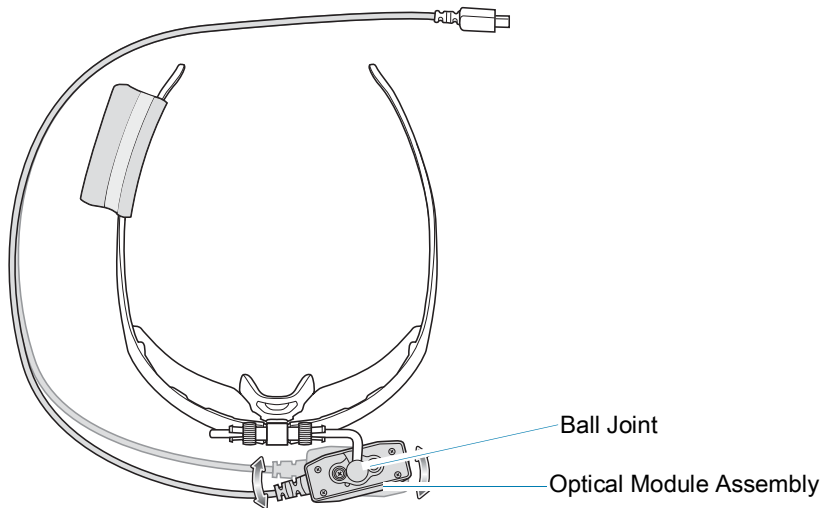
6. Pull the Locking Sleeves apart to secure the Optical Module Mount.



7. Adjust the Pupillary Distance (PD) and slide one or both plastic sleeves towards the outside of the Optical Module Mount.

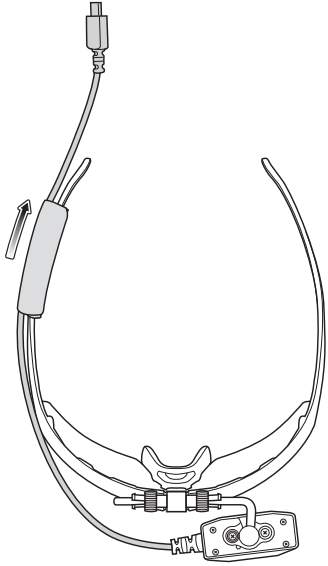


NOTE: There are grid lines on the arm that you can use for reference when you adjust PD.



8. Adjust the Ball Joint by rotating the Optical Module Assembly into the correct orientation.
9. Slide the Cable Retention Sleeve onto the right arm of the Glasses, and slide until snug.

10. Route the cable over to opposite (right) side of the Optical Module Assembly.



11. Place the cable securely into the Retention Cable Sleeve, and close the Velcro flap.



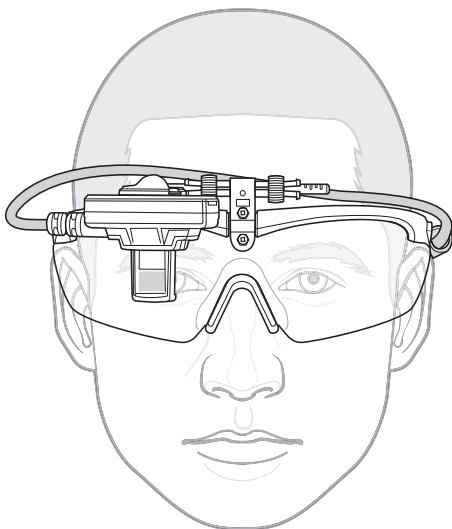
NOTE: The flap should be on the outside of the Glasses arm.

Placing the Device on Head and Adjusting Display

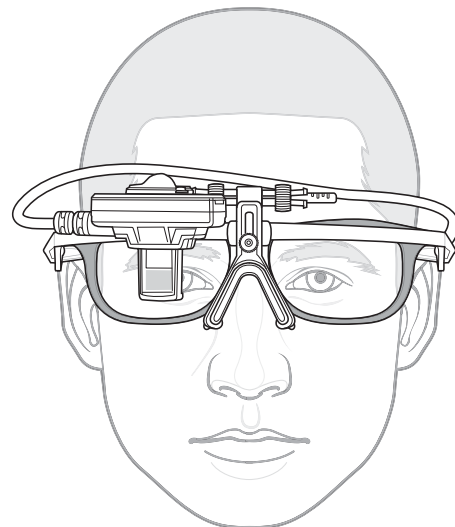
If you are using the glasses, make sure the device is balanced on your head like a pair of eyeglasses. If you are using a prescription frame, ensure that the frame sits comfortably over your eyeglasses.

Figure 4 Wearing the Device

Glasses



Prescription Frame



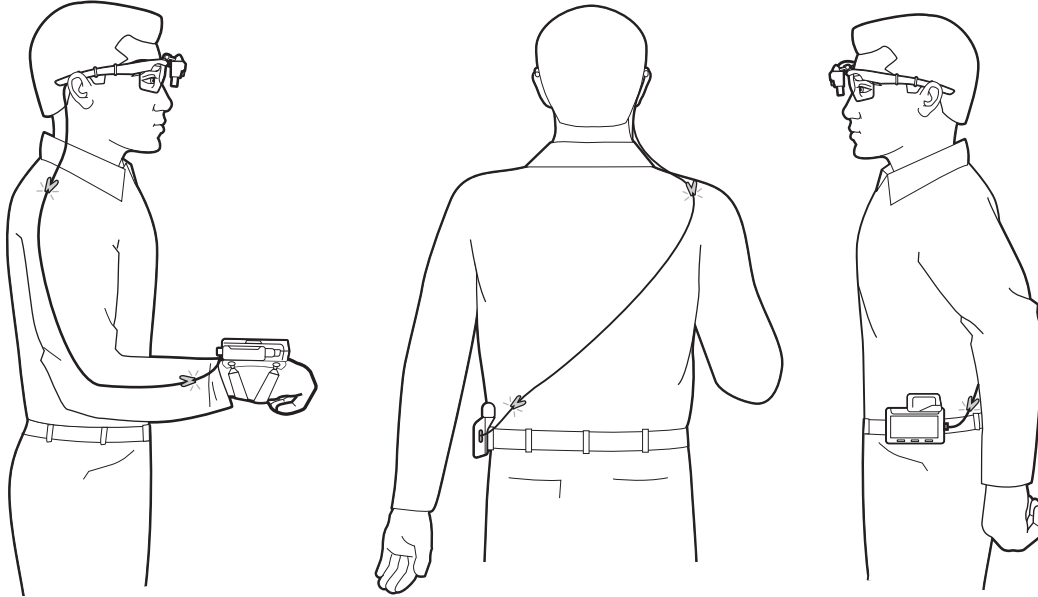
After you wear the device, if it is not at the correct angle you may not be able to see all of the display text. Adjust the display until you see the start-up logo, and see as much as possible on the displayed screen.

Routing the Cable to a Device

When using the device with a mobile computer, route the cable down to the shoulder, and secure the cable to clothing with a cable clip.

- If using a hip mounted mobile computer, route the cable down your back and to your hip.
- If using a wrist mounted mobile computer, route the cable to down your arm to your wrist. Secure the cable to clothing with a second cable clip.

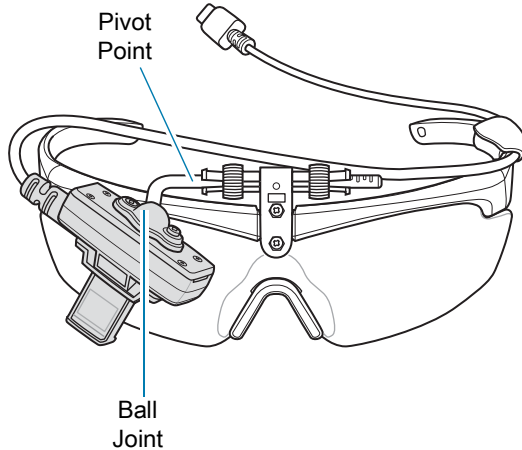
Figure 5 Route Cable to Device



Adjusting the Optical Module Assembly

When adjusting the Optical Module Assembly, hold Optical Module Mount when moving it up and down.

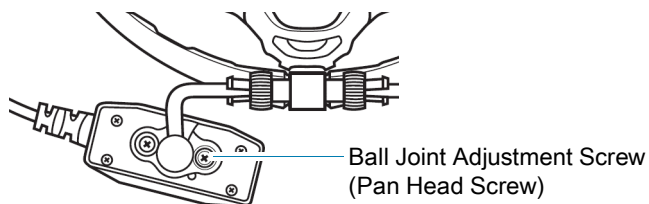
Figure 6 Adjust Optical Module Assembly



The Optical Module Assembly pivots and rotates, allowing you to properly position the Optical Module Assembly, and to move the Optical Module Assembly when you do not need to use it.

Use the pivot point to rotate the Optical Module Assembly. The ball joint allows for fine tuning the position of the display for viewing.

1. Loosen the Locking Sleeves.
2. Place the device on your head, and then adjust for best viewing angle.
3. Hold the Optical Module Assembly with one hand, and rotate at the pivot point.
4. Hold the Optical Module Assembly with one hand, and rotate the Optical Module Assembly at the ball joint for the best viewing angle.
5. Occasionally, due to normal wear, tension adjustment may be required to maintain stiffness to the ball joint. Tighten the Ball Joint Adjustment Screw to the desired level of stiffness.

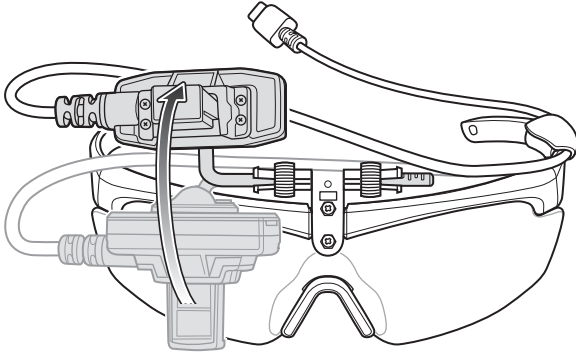


6. Pull apart the Locking Sleeves to ensure the Optical Module Assembly remains in position.

Positioning Optical Module When not in Use

You can move the Optical Module Assembly away from your face when it is not being used for long periods of time.

1. Grasp the boom and rotate up and away from the face.



2. Pull apart the Locking Sleeves to ensure the Optical Module Assembly remains in position.

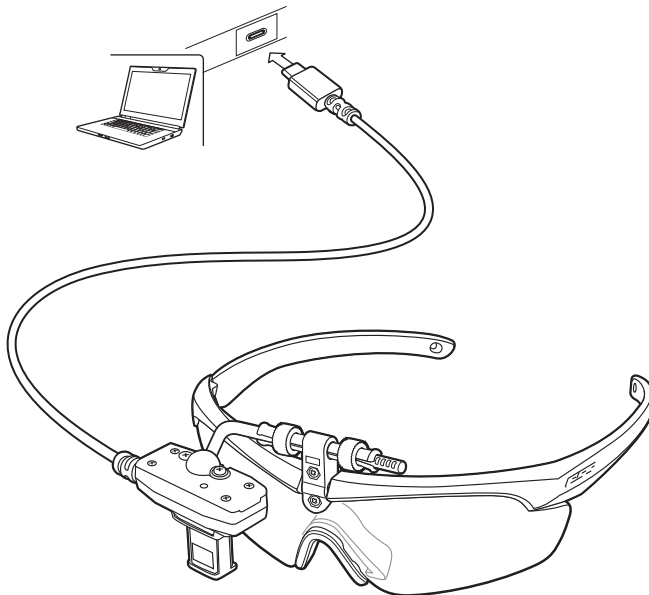
Connecting the Device

As soon as you connect the HD4000 to a Zebra powered device, it will turn on.

Device power, radio, and application processing require a connection to a device running Android, or a computer running Windows 10.

Connect the device to a host computer using the attached USB cable.

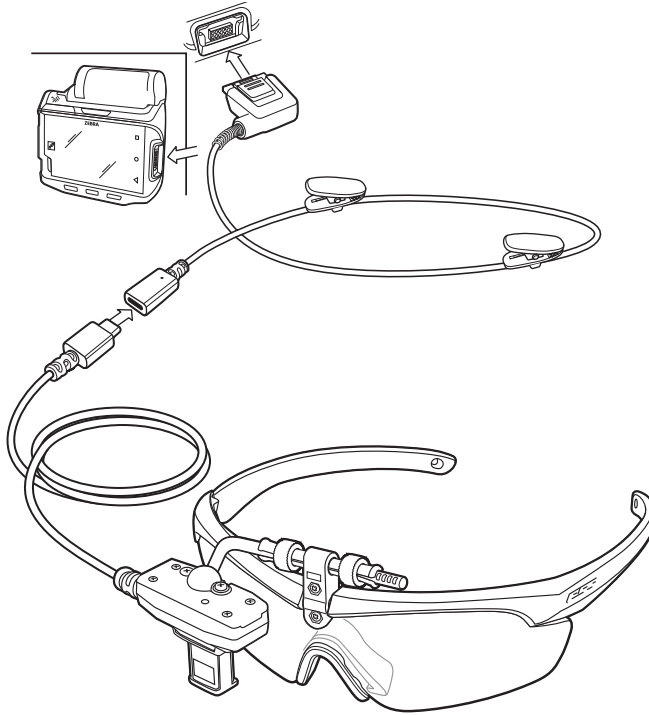
Figure 7 Attached USB Cable



Connect the device to a mobile computer using an optional USB adapter cable.

NOTE: Via appropriate USB cables, the HD4000 is compatible with other Zebra products, once certified, such as mobile computers (for example: WT6000, TC7X, and TC5X), and tablets (for example: ET5X and L10). The compatible USB (Type C) cables are sold separately.

Figure 8 USB Adapter Cable



Device Cleaning Instructions

To clean the device:

1. Remove the Cable Retention Sleeve, and discard the sleeve.

NOTE: For hygiene concerns, do not reuse the Cable Retention Sleeve.

2. Disassemble the Optical Module Assembly from the Glasses frames.
3. Wipe the USB Cable, Glasses frames, Lenses, and the Optical Module Assembly.

CAUTION: Do not use Alkyl wipes. Use only Ethanol wipes to clean the device. Do not apply liquid directly to the device. Be gentle when wiping the lenses.

4. Allow the device to air dry.
5. Reassemble the Optical Module Assembly back onto the Glasses frames.
6. Add a new Cable Retention Sleeve.

Replacement Parts

For ESS replacement parts, contact Eye Safety Systems, Inc. *(ESS).

Eye Safety Systems, Inc.

Toll Free: +1 877.726.4072

International: +1.208.726.4072

Fax: +1 208.726.4563

Email: csinfo@esseyepro.com

Eye Safety Systems Canada Forces, St-Laurent, Canada

Toll Free: +1 877-625-5396

Email: forces@oakley.com

Website: www.esseyepro.com



NOTE: The 5 pack Cable Retention Sleeves (Part Number HD4000-GA1-CS5) are sold by Zebra Technologies.

Zebra Cables for HD4000

The following table specifies Zebra cables that are compatible with the HD4000.

Table 1 Zebra Cables for the HD4000

Item	Part Number
USB Cable - WT6000	CBL-NGWT-USBHD-01
USB Cable - TC7X	CBL-TC7X-USBHD-01
USB Cable - TC5X	CBL-TC5X-USBHD-01

Troubleshooting

The following table provides typical problems that might arise and the solution for correcting the problem.

Table 2 Troubleshooting the HD4000

Issue	Cause	Solution
No display on the screen.	Proper SDK is not loaded.	Ensure that the proper SDK is loaded. Go to www.zebra.com/hd4000-info for software downloads.
No display on the screen.	USB C cable is not plugged in properly.	Unplug and replug the USB cable to the Zebra device.
HD4000 not turning on when connected to a Zebra device.	Zebra device is not in USB host mode.	The Zebra device must be in USB host mode.
Only partial screen visible.	Optical Module Assembly is not positioned properly.	Reposition the Optical Module Assembly.

Specifications

The following table details the devices' specifications.

Table 3 HD4000 Specifications

Item	Description
Performance Characteristics	
Operating System	Android 5.0 and higher Microsoft Windows 10
Output	Universal Serial Bus (USB) 2.0 high speed
Physical Characteristics	
Display	Monocular Resolution: 640 x 400 Focal Distance: 2 m ± 0.5 m fixed Field of View: 20.3° diagonal Full color display Max Brightness: > 300 cd/m ²
Sensor Technologies	3-axis accelerometer 3-axis gyro 3-axis magnetometer
Cable	USB 2.0 High Speed Length: 98.4 cm ± 1 cm /38.74 in ± 0.30 in Connector: USB C plug NOTE: To connect the device as a client to an Android mobile computer, the mobile computer must be in USB host mode.
Weight	< 30 g/1.05 oz (without cable)
Dimensions	H 46.3 mm X W 48 mm X D 21.3 mm H 1.82 in X W 1.89 in X D 0.84 in
User Environment	
Operating Temperature	-20°C to +50°C / -4°F to +122 °F
Storage Temperature	-30°C to +70°C / -22°F to +158 °F
Drop	5 ft/1.5 m (to concrete)
Sealing	IP67
Electrostatic Discharge	Air: +/- 8 kV Contact: +/- 4 kV
Camera	
Interface	USB UVC (Video Device Class)
Resolution	640 x 400, 5 MP fixed focus
Frame Rate	15 FPS

Table 3 HD4000 Specifications (continued)

Item	Description
Compression	JPEG
Focal Distance	Infinite (> 2 m)
Field of View	65.20°

