

OZ4-HD

1080P HD Pan & Tilt Mainline Camera

OPERATION & MAINTENANCE MANUAL
P/N CMA00001-MAN, Revision: Original 10.2024



We're Always Here To Help

Thank you for purchasing our CCTV pipeline inspection equipment! We truly appreciate your business and are confident that our products will meet your pipeline inspection needs. Should you require further assistance, please do not hesitate to reach out to us through one of the weblinks listed below. Your satisfaction is our priority, and we are here to support you every step of the way!

To find your local CUES Regional Sales Manager or Dealer:	https://cuesinc.com/dealers
CUES's Service & Support:	https://cuesinc.com/pages/contact-us
CUES's Return Material Authorization:	https://cuesinc.com/pages/parts
CUES's Purchasing Terms & Conditions:	https://cuesinc.com/pages/purchasing-terms-and-conditions
CUES's Terms & Conditions:	https://cuesinc.com/pages/cues-terms-and-conditions-of-sale
CUES's Parts Department:	https://cuesinc.com/pages/parts



Table of Contents

CHAPTER 1 - Introduction

Introduction	1
--------------------	---

CHAPTER 2 - System Description

System Description	2
Features & Benefits	3

CHAPTER 3 - Equipment Overview

Camera Housing	4
Mounting Fork	4
Camera Lighting	4
Camera Controller	4
Built-in Sonde	4
Optional Equipment - Inclinometer	4

CHAPTER 4 - Setting Up The System

Initial HD System Bootup	5
Setting the Equipment Configuration	5
Viewing Camera Diagnostics	6

CHAPTER 5 - Functional Checkout; Camera Controller

Functional Checkout of Camera Operation	7
Testing OZ4-HD Camera Operations	7
Lights On/Off	7
Pan and Tilt	7
Iris Up/Down	7
Shutter Up/Down	7
Zoom In/Out	7
Manual Focus	7
Automatic Focus	7
Home	8
SondeTest	8
Inclinometer Test	8
Micrometer Laser Function Test	8
Using the OZ4-HD with CUES's GraniteNet Software	9

CHAPTER 6 - After the Inspection

Maintaining the OZ4-HD	10
Replacing LED Assemblies	11

CHAPTER 7 - Logitech Controller Operations

Game Pad Functions	15
--------------------------	----

CHAPTER 8 - Troubleshooting OZ4-HD Video

Testing OZ4-HD Video	18
----------------------------	----

CHAPTER 9 - HD System Description

HD Truck Upgrade Components & Descriptions	22
--	----

OZ4-HD

1080P HD Pan & Tilt Mainline Camera

This manual includes setup, operation, troubleshooting, and maintenance instructions for the CUES OZ4-HD Camera. OZ4-HD is a 1080p full high-definition pan & tilt mainline camera. Designed to meet the highest industry standards, the OZ4-HD camera offers video with a level of detail that can detect and address potential pipeline issues with superior accuracy.

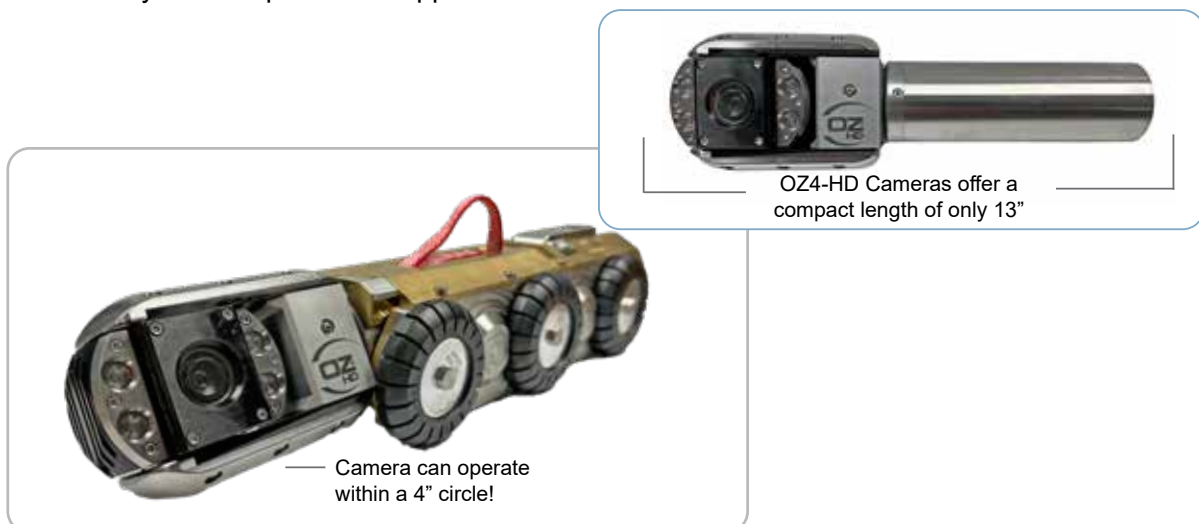
The instructions provided in this manual are for multi-conductor systems. Multi-conductor cable is approximately ½" in diameter and contains 8 to 12 conductors, depending on the age of the system. If you have any questions or are uncertain about your specific system, please contact CUES using one of the weblinks listed on the previous page.

The OZ4-HD Camera is a unique pan, tilt, and zoom inspection camera designed to pan 285 degrees and rotate 360 degrees with 10x optical and 16x digital zoom ranges to provide total up/down and side-to-side views during pipeline inspections. Manual focus is provided, as well as manual iris and manual shutter, to ensure the highest picture quality in unusual or special conditions.

OZ4-HD is designed to be backward compatible with existing CUES equipment and to run on any K2 Summit-based CUES television inspection system. This is possible with a CUES HD Truck Upgrade Package that includes a smart relay system, allowing the OZ4-HD to be compatible with the CUES K2/Summit system, transporters, cable, reel, etc.

The OZ4-HD, when used with a steerable Compact Pipe Ranger (CPR), can inspect sanitary and storm sewers ranging from 6" (relined) through 30". The camera connects directly to the CPR transporter without any additional cables or adapters. When the OZ4-HD is installed on the CPR transporter, it produces a compact assembly only 19.5" long with superior pulling power and the ability to negotiate difficult entry conditions and standard 45- and 90-degree sweeps and turns.

The OZ4-HD can be fitted to most other CUES transporters via an adapter tube kit MZ904. This kit comes in multiple application-specific versions. Contact Sales or Customer Service for determine the specific version of kit for your transporter and application.





Get the finest FULL HD video inspections and backward-compatibility with existing CUES equipment!

The OZ4-HD optical zoom pan-and-tilt camera system offers built-in directional field replaceable lighting for 6" to 30" pipe to produce the highest quality image to enhance the details of your CCTV inspection. The OZ4-HD camera provides up to 160:1 optical/digital zoom, automatic focus, remote focus, and iris control to assure the best quality video within varying pipe conditions. This compact zoom pan and tilt camera can operate within a 4" circle! The robust design of the OZ4-HD camera includes protective forks for the camera head to protect it during insertion and retrieval and to shield it from roots and other obstructions in the pipe.

The OZ4-HD utilizes a high-sensitivity HD imager, eliminating the need for an external lighthouse in normal use. This allows operators to change the sensitivity of the camera at their fingertips and provides easy operation at the controller. There's no need to remove the camera to install an external lighthouse if the pipe material or pipe diameter changes.



Camera Head Axial Rotation: 360 degrees
Rotation Optical Viewing Angle: 400 degrees



Lateral Pan: 285 degrees
Pan Viewing Angle Range: 331 degrees

OZ4-HD

1080P HD Pan & Tilt Mainline Camera

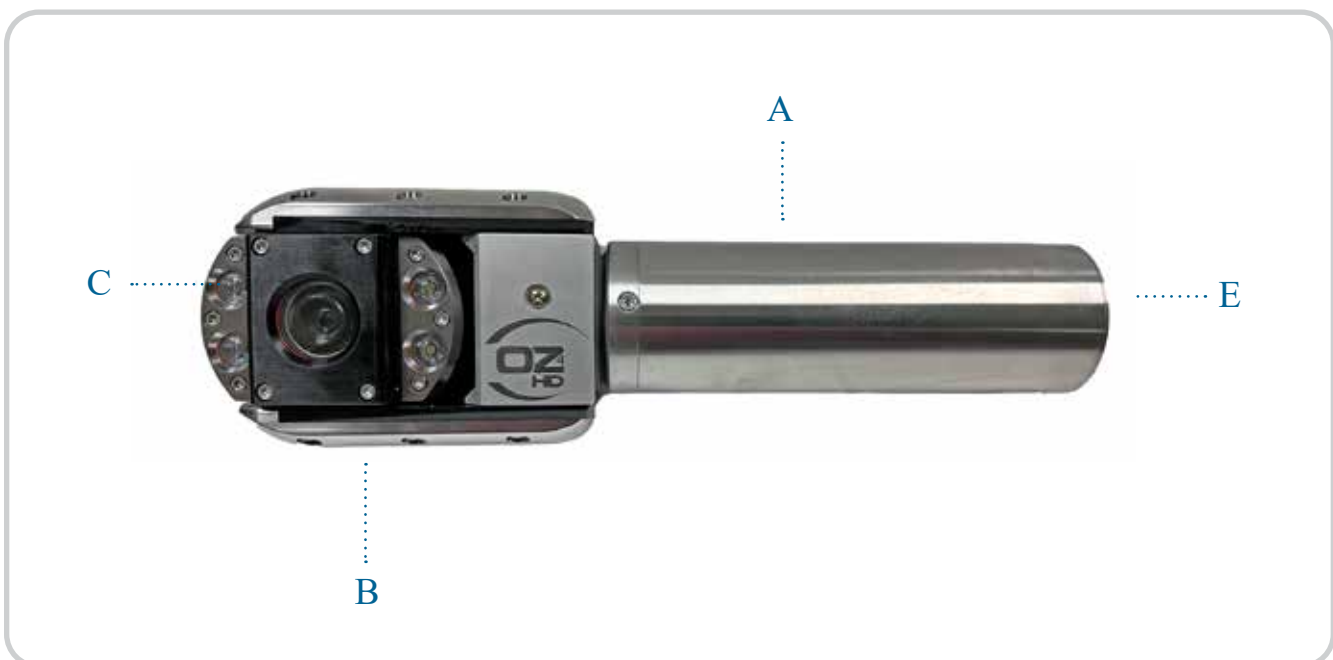
FEATURES	BENEFITS
10X optical zoom, 16X digital. Total 160:1 zoom capability	Enhances image details from faraway distances for inspection and assessment
Full HD resolution; (1920 x 1080p)	Higher image resolution means sharper pictures with maximum detail
0.1 Lux sensitivity @ F1.8 1/4 to 1/30 second shutter speed	Increased sensitivity provides brighter pictures with reduced lighting requirements
360 x 285 degree pan and rotate viewing capability	Detailed lateral inspection up to 250 feet without having to traverse the lateral
Four field replaceable lights	Internal lights move the camera head, providing optimum illumination in all pipeline conditions
Back light compensation; available	No spotlight reflection blooming in image
Auto-tracking white balance	Perfect color under all conditions
Auto-focus	Quickly focus on an area of interest
Manual override of focus, iris, and shutter	Flexible for unusual or special conditions
Pan, rotate, zoom, and focus homing	Quick and easy to reorient to the current location
400-degree rotation optical viewing angle / 331 degree pan viewing angle range	View minute defects and voids around the entire diameter of the pipe wall
Compatible with up to 4000' multi-conductor cable	Camera works in existing CUES multi-conductor TV inspection systems up to 4000'
Compatible with CUES's current K2 Summit Systems	Quickly add HD to existing CUES trucks; Inexpensive upgrade kits are available
Overall length of 13", a head length of 5.3", and a camera barrel diameter of 2.5"	Can be used in pipelines as small as 5"
Optical-grade sapphire camera window	Helps prevent image distortion
Includes an internal diagnostic system	Continually monitors camera functions, including run time, serial number identification, camera head temperature, humidity, light supply voltage, and camera input voltage
Built-in Sonde	Included w/ OZ4-HD

3 OZ4-HD Camera Overview

- A. **Camera Housing** - The camera mechanics and electronics are housed in a high-strength, damage-resistant, aluminum housing with stainless steel tube.
- B. **Mounting Fork** - The mounting fork is the forward-most portion of the camera and includes the mounting fork, camera head, and lighting. The mounting fork rotates 360 degrees with an optical viewing angle of 400 degrees and allows the camera head to pan mechanically 285 degrees with a pan viewing angle of 331 degrees.
- C. **Camera Lighting** - The lighting is integrated into the camera and includes (2) ea. 5-watt cluster LEDs, for a total of 10 watts.
- D. **Camera Controller (not shown)** - The controller provides remote control of the camera assembly and includes a joystick to move the camera head in four directions: up/down/left/and right.
- E. **Sonde** - A sonde, built into the camera housing, comes standard on OZ4-HD cameras. A sonde helps accurately locate the camera in metallic and non-metallic pipes. The sonde can operate with any constant tone 512 Hz locator/receiver and can be turned ON/OFF remotely by activating/deactivating the internal lights.

OPTIONAL EQUIPMENT

- F. **Inclinometer** - An optional pipe grade verification system is available to detect and record variations in pipe angle from true horizontal. The inclinometer can read and transmit pipe grade variations of +/- 5 degrees from horizontal with an error of +/- 0.1 degree.



4.1 INITIAL HD SYSTEM BOOT UP

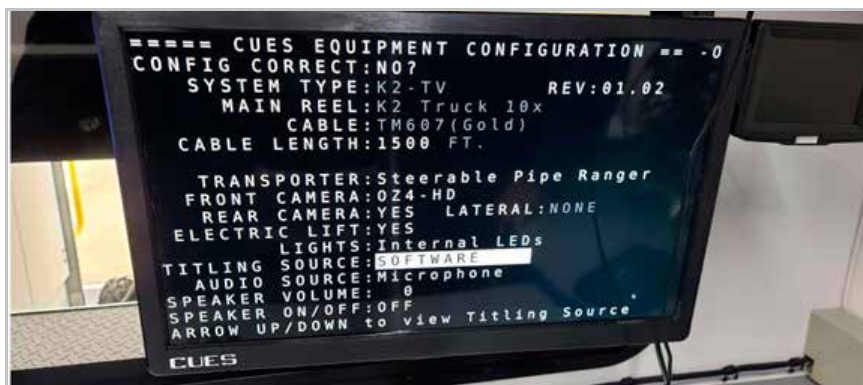
Check that the HD truck monitors are set for HDMI, not AV. The equipment in an HD truck can be powered up in any order. Turn on the K2, DEC, and Gnet PC (the ROUTER has no power switch, and powers up automatically once the truck AC mains become active). If this is the first time powering up, check that the HDMI SPLITTER and the Elgato HDMI Frame Grabber are powered up, by verifying that their Power LEDs are illuminated. At this point, the HD system should boot up into the CONFIG screen on the K2' Main Monitor, after momentarily displaying a Linux 'splash-screen'. Booting up the HD system to the CONFIG screen takes approximately the same amount of time as booting up a non-HD system.

4.2 SETTING THE EQUIPMENT CONFIGURATION

While the CONFIG screen is displayed, all downhole equipment is de-energized. To prevent equipment damage, make equipment and cable changes only if the K2' CCU is off, or if the CONFIGURATION SCREEN is being displayed on the K2' monitor.

At this time, connect all downhole equipment as desired (e.g., transporter, camera, lift, etc.). Update the CONFIG screen with any equipment changes by using the ENTER and UP/DOWN arrow keys on the keyboard. Select the OZ4-HD camera type for HD inspections. If CUES's GraniteNet Software is to be used for inspection, set the CONFIGURATION screen Titling Source to SOFTWARE, if necessary.

To power the system, move out of the CONFIG screen (tab to the 'CONFIG CORRECT?' Line, select YES, and hit the ENTER key). HD video should appear on the monitor(s) after a few seconds. HD video takes slightly more time to appear on the monitors than SD video, due to DEC overhead to acquire the H.264 signal and convert it to HDMI. Verify that clear, high-resolution HD video appears on the K2' monitor. This confirms that the OZ4-HD's internal HD camera module is working correctly. If the system fails to display video, proceed to Chapter 8.0 for troubleshooting options.



CONFIGURATION SCREEN showing the new Front Camera option: OZ4-HD. Otherwise, this screen is identical to any other K2-based CUES CONFIGURATION screen.

The operator can now operate the equipment through its paces above ground, to check that everything is working properly. Refer to Section 4.3 to check the Camera Diagnostics. Refer to Chapter 5 to go through all necessary tests to verify that the OZ4-HD camera is fully functional.

4 Setting Up the System

4.3 VIEWING CAMERA DIAGNOSTICS

The camera is equipped with an internal diagnostics system to continually monitor the camera functions.

1. To view the diagnostics at any time, press the Diagnostic button on the Logitech Gamepad controller. (See Chapter 7 for information on how to use the Logitech controller.)
2. To view the light supply voltage, turn the lights ON. The light voltage will be displayed on the K2' monitor for approximately 10 seconds.

The OZ4-HD diagnostics are displayed in the following order:

- Serial Identification Number
- Operating Hour Meter
- Camera Type
- Lights Limit HIGH/LOW (always HIGH on OZ4-HD)
- Autoexposure ON/OFF
- Relative Humidity (see below)
- Temperature
- Light Voltage
- Camera Voltage

NOTE: Camera functions are inoperable while viewing the diagnostics.

IMPORTANT! The OZ4-HD includes a humidity sensor designed to indicate if the camera is leaking or has significant water intrusion. Always ensure that the relative humidity display is below 80%. If the humidity display goes over 80% at any time during use, contact CUES Customer Service.

FUNCTIONAL CHECKOUT OF CAMERA OPERATION

It is important to perform this checkout prior to placing the OZ4-HD in the pipe. This checkout is designed to uncover possible functional problems while the camera is still on the surface. Before performing the functional checkout, ensure that all equipment is connected as described in the "Setting Up The System" chapter.

The primary functions of the OZ4-HD Camera are controlled with a Logitech Gamepad Controller. The Logitech Gamepad should be connected to a USB port of the K2' CCU, either wired or wirelessly. For more information on the Logitech and its use, see Chapter 7.

5.1 TESTING OZ4-HD CAMERA OPERATIONS

The primary functions of the OZ4-HD Camera are:

- A Lights On/Off
- B Pan and Tilt
- C Iris Up/Down
- D Shutter Up/Down
- E Zoom In/Out
- F Manual Focus
- G Automatic Focus
- H Home

Use the Logitech Gamepad Controller to verify these functions are working before starting an inspection:

- A. **Lights:** Press the Lights button and the ON/OFF (1/0) buttons simultaneously to turn the camera lights on and off.
- B. **Pan and Tilt:** Use the controller joystick marked CAMERA to pan and tilt (rotate) the camera head. Left and right on the joystick initiates a pan. Up and down on the joystick initiates a tilt (rotate).

Note: The OZ4-HD pan motor drive system has been redesigned. At the pan limits (fully right or left) and while the joystick is engaged, or while Homing, the camera will emit a 'ticking' sound at a slow rate. This is normal and not cause for alarm, and the camera will not be damaged.)

- C. **Iris:** Press the Iris button, and the +/- buttons. As the Iris varies, the HD video on the K2' monitor should vary in brightness.
- D. **Shutter:** Press the Shutter button, and the +/- buttons. As the Shutter varies, the HD video on the K2' monitor should vary in brightness.
- E. **Zoom:** Press the Zoom button and the +/- buttons simultaneously to zoom the camera in and out.
- F. **Manual Focus:** Press the Focus button, and the +/- buttons. As the Focus varies, the HD video on the K2' monitor should move in and out of focus.
- G. **Automatic Focus:** Press the Focus button and the ON (1) button simultaneously to initiate an Auto-Focus. The K2' monitor image should blur momentarily, then adjust into sharp focus.
- H. **Home:** The camera head is in the 'HOME' position whenever it is in-line with the camera body. Use the CAMERA joystick to pan/tilt the camera head away from HOME. Then press the CAMERA joystick straight down. The camera head should move back to the HOME position automatically.

Changes to IRIS or SHUTTER made while the camera is at HOME are automatically stored. These stored values are then re-asserted each time the camera returns HOME, until another change is initiated by the operator. Check this by adjusting the IRIS for a brighter or dimmer image while the camera is at HOME, then pan away, at which time the camera will be in Automatic Exposure. Now press the HOME button and when the camera returns HOME, the image should return to the brightness previously set. Finally, readjust the IRIS to the operator's preference, if necessary, then pan and HOME to verify. This ends the test.





5.2 SONDE TEST

OZ4-HD cameras include a sonde as standard equipment. To test the sonde, a sonde receiver is required, such as the Cues Accupoint Locator. The sonde works at 512 Hz, so set the test receiver to 512 Hz, which is an industry-standard operating frequency.

The sonde turns on and off with the camera lights. So, turn the camera lights on to turn the sonde on. Then turn on the sonde receiver, and set it to detect 512 Hz, if necessary. Finally, place the sonde receiver in the vicinity of the camera, and the receiver should indicate that it detects the camera sonde signal, either by emitting an audible sound, or on its display, or both. Turn off the camera lights and the sonde receiver should indicate that it no longer detects a 512 Hz signal. This completes the OZ4-HD sonde verification.

5.3 INCLINOMETER TEST

First, verify that the OZ4-HD camera being tested has an inclinometer included. The part number on the camera should be CMA00001-1 or CMA00001-3. Set the K2' titling to display Inclination (simultaneously hit <shift> and F3 on the K2' keyboard). Calibrate the camera by laying it on a horizontal surface and simultaneously hitting <CTRL> and the i-key on the K2' keyboard; the inclination should display zero degrees. Then lift the front of the camera up above the rear; the inclination reading on the display should increase, up to a maximum of positive 5 degrees. Now reverse the inclination and verify that the display increases to a maximum of negative 5 degrees. This completes the test.

5.4 LASER FUNCTION TEST

First, verify that the OZ4-HD camera being tested has the laser feature for micrometer measurement. The part number on the camera should be CMA00001-2 or CMA00001-3. The laser diodes turn on and off with the camera lights. So, turn on the camera lights and verify the laser diodes are illuminated. Then turn the lights off and verify the laser diodes are extinguished. This completes the test.

5.5 USING THE OZ4-HD CAMERA WITH CUES'S GRANITENET SOFTWARE

The OZ4-HD Camera works with industry standards such as NASSCO's Pipeline Assessment Certification Program (PACP), ensuring seamless integration into existing inspection protocols. This compatibility enables adherence to stringent industry requirements for pipeline assessment and certification.

CUES's GraniteNet condition assessment software offers HD video support, ensuring uninterrupted performance when using the OZ4-HD Camera. Additionally, compatibility extends to a variety of third-party software products, enabling users to leverage HD video capabilities across different platforms with ease. This versatility enhances workflows and achieves objectives efficiently, regardless of the software being used.

For GraniteNet operating instructions, please refer to the GraniteNet Basic or Advanced User Manuals.



6 Post Inspection

AFTER THE INSPECTION

After the inspection, retrieve all the equipment and turn all the components to the OFF (0) position BEFORE shutting down the generator. This will help protect the equipment when the generator is started up for the next use.

MAINTAINING THE OZ4-HD CAMERA

Cleaning -

To keep the OZ4-HD camera clean, use a damp cloth to wipe down the front of the camera and lens. Any other maintenance **MUST** be performed by CUES. If there are any problems with the OZ4-HD camera, contact CUES Customer Service/Technical Support. Attempting to perform any other maintenance will void the warranty.

Lightbulb Replacement -

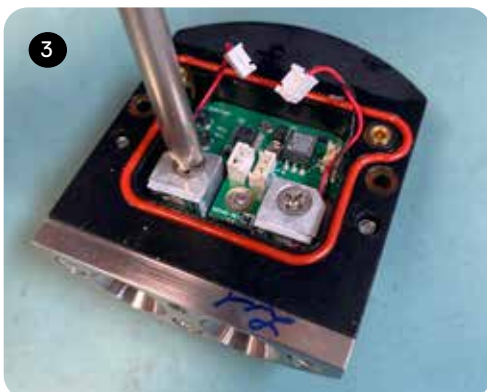
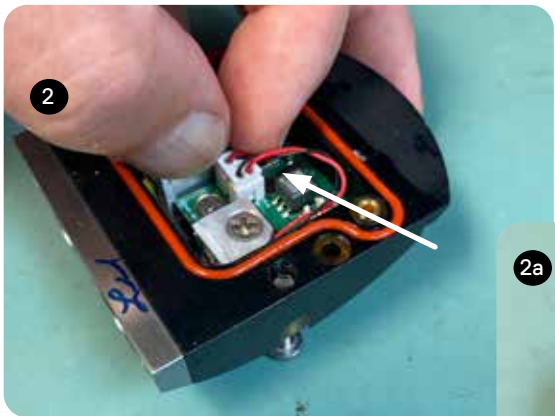
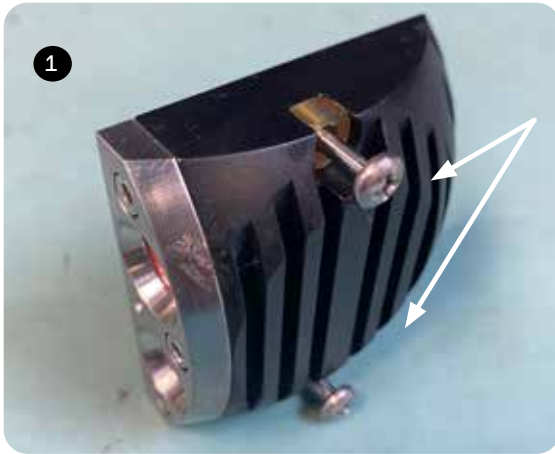
For LED lightbulb replacement, refer to the applicable procedure on the following pages.



LED LIGHTBULB REPLACEMENT

Replacing LEDs on the MZ302 Lighthouse Assembly

1. To remove the lighthouse module assembly from the camera body, loosen the 2 captive screws.
2. On the inner side of the lighthouse module assembly, carefully grasp and unplug the (2) white plug connectors as shown.
3. Using a #2 Phillips screwdriver, remove the (2) captive screws (P/N 103021) that secure the LED assemblies to the lighthouse.



LED LIGHTBULB REPLACEMENT

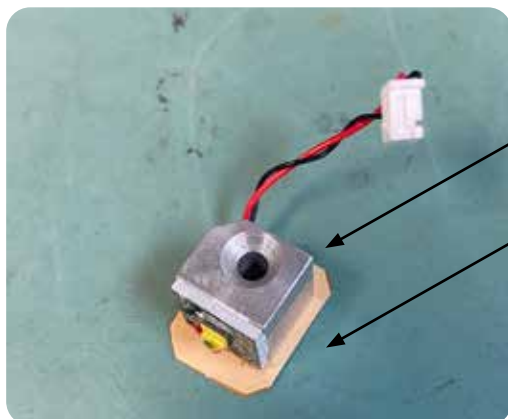


4. Using needle-nose pliers, carefully grasp the back side of the LED assembly and the inside of the plastic shoulder washer as shown. Slowly pull the LED assembly back and upwards to remove.

* See important note below.



- * **IMPORTANT NOTE:** In the event the thermal pad is removed with the LED assembly (shown below), ensure that the thermal pad is replaced in the lighthead assembly before inserting the new LED assembly(s).



LED Assembly P/N: CZ328
Thermal Pad P/N: CZ086 (part of CZ328)

Ensure that the thermal pad is placed in the lighthead assembly prior to inserting the new LED assembly!

5. Using needle-nose pliers, replace the LED(s) with CUES P/N CZ328 only. Do not force the LED assembly(s) into the lighthouse housing as damage may occur.
6. Before securing, ensure that the thermal pad P/N CZ086 is under each LED and is flush with the light-head assembly (the arrows on the picture at the left are pointing to the beige-colored thermal pad underneath the LED assembly).
7. LED assembly: flat washer, split washer, and then the captive screw. Using a #2 Phillips screwdriver, secure the LED assembly with the Phillips head screws (P/N 103021). The LED assembly should be aligned as shown.



**LED BLOCKS -
CORRECT ALIGNMENT**



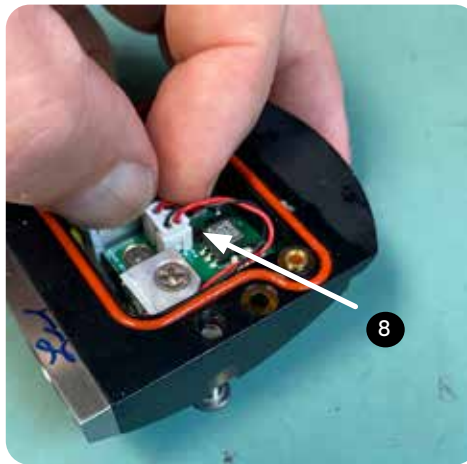
**LED BLOCKS -
INCORRECT ALIGNMENT**



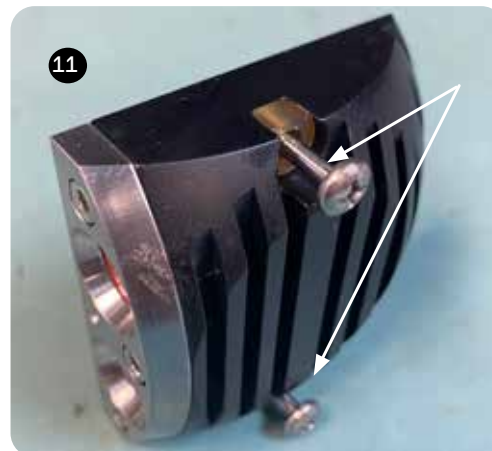
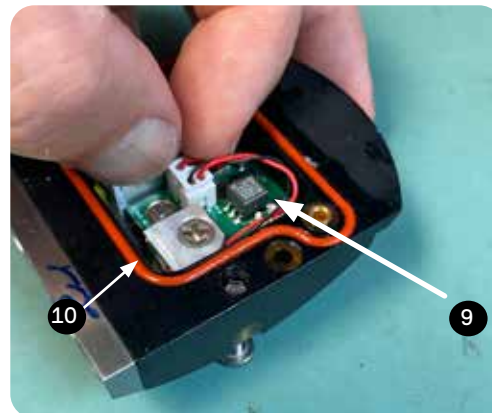
6 Post Inspection

LED LIGHTBULB REPLACEMENT

8. Insert the (2) white plug connectors back into the 2-pin housing as shown.

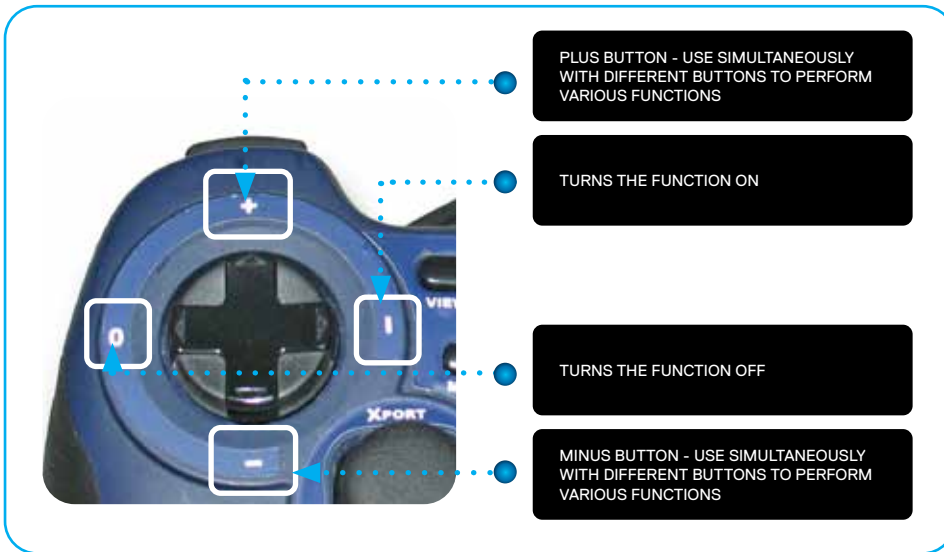


9. Ensure that the plug connector wires are routed around the screw heads as shown.
10. Remove and replace the o-ring. Before inserting the new o-ring, clean the o-ring groove and ensure that the mating surface on the camera head is clean. Ensure that the o-ring is in the proper position, and then reinstall the lighthouse module assembly to the camera body by fastening the captive screws (not shown).
11. Reinstall the lighthouse module assembly to the camera body (not shown) by fastening the captive screws.




CUES LOGITECH GAME PAD FUNCTIONS

Refer to the instructions below if using a CUES transporter/camera. If using a LAMP II OR CURRAHEE CUTTER, refer to CUES's Quick Card P/N's LM912 & CK912)



7 Logitech Controller Operation

CUES LOGITECH GAME PAD FUNCTIONS



WHILE PRESSING THE IRIS BUTTON, SIMULTANEOUSLY PRESS THE PLUS / MINUS BUTTONS TO OPEN/CLOSE THE IRIS

WHILE PRESSING THE SHUTTER BUTTON, SIMULTANEOUSLY PRESS THE PLUS OR MINUS BUTTONS TO SHUTTER FAST/SLOW TO ENABLE VISIBILITY IN LOW-LIGHT CONDITIONS

WHILE PRESSING THE FOCUS BUTTON, SIMULTANEOUSLY PRESS THE PLUS OR MINUS BUTTONS TO FOCUS THE CAMERA NEAR/FAR. ALSO, PRESS THE FOCUS BUTTON AND THE "ON" BUTTON SIMULTANEOUSLY TO AUTO-FOCUS

WHILE PRESSING THE ZOOM BUTTON, SIMULTANEOUSLY PRESS THE PLUS OR MINUS BUTTONS TO ZOOM THE CAMERA IN/OUT



USE THE JOYSTICK TO MOVE THE TRANSPORTER. PRESS TO STOP THE TRANSPORTER.

USE THE JOYSTICK TO MOVE THE CAMERA. PRESS TO MOVE THE CAMERA TO THE HOME POSITION.

WHEN MOVING THE JOYSTICKS, NO VOLTAGE WILL BE APPLIED UNTIL THE OPERATOR HAS MOVED THE JOYSTICK APPROXIMATELY 20% AWAY FROM THE CENTER. THIS MAKES IT SO THAT THE TRANSPORTER DOESN'T HAVE ANY VOLTAGE APPLIED UNTIL THE OPERATOR ACTUALLY WANTS TO MOVE THE TRANSPORTER.

WHILE PRESSING THE REEL BUTTON, SIMULTANEOUSLY PRESS THE PLUS OR MINUS BUTTON TO MOVE THE REEL FASTER / SLOWER SPEED
 PRESS THE REEL AND "ON" BUTTONS SIMULTANEOUSLY FOR PAYOUT MODE
 PRESS THE REEL AND "OFF" BUTTONS SIMULTANEOUSLY FOR RETRIEVE MODE



WHILE PRESSING THE LIGHTS BUTTON, SIMULTANEOUSLY PRESS THE PLUS OR MINUS BUTTON TO ILLUMINATE THE EXTERNAL LIGHTS BRIGHTER OR DIMMER
 PRESS THE LIGHTS AND ON / OFF BUTTONS TO TURN THE INTERNAL LIGHTS ON/OFF

PRESS IN COMBINATION WITH THE DPAD 1 TO TURN CRUISE CONTROL ON
 PRESS IN COMBINATION WITH THE DPAD 0 TO TURN CRUISE CONTROL OFF
 PRESS IN COMBINATION WITH THE DPAD + TO RAISE THE CRUISE CONTROL VOLTAGE
 PRESS IN COMBINATION WITH THE DPAD - TO LOWER THE CRUISE CONTROL VOLTAGE

PRESS TO DISPLAY THE INTERNAL DIAGNOSTICS SYSTEM.

TROUBLESHOOTING OZ4-HD VIDEO

Chapter 8 describes an alternative means to test the OZ4-HD video. It is not normally necessary to perform this test if the camera and HD system are working correctly. But if not, this test can verify truck-to-camera connectivity, and that the camera is providing HD video output independent of the DEC.

For this test, you will need a separate computer (e.g., laptop), loaded with an application called ONVIF. The ONVIF application may be downloaded from <https://sourceforge.net/projects/onvifdm/>. This procedure also requires access to a working CUES HD system, such as an HD TV Truck or Base Station, to power the OZ4-HD.

EQUIPMENT REQUIRED TO CHECK OZ4-HD VIDEO:

- a) A working CUES HD Truck system
- b) A computer or laptop with ONVIF application loaded (Set computer Ethernet interface for DHCP)
- c) Ethernet cable

Step 1:
Configure the equipment per Chapter 4 and verify that the camera is powered up.

To do this, select 'RUN DIAGNOSTICS' on the K2' MAIN MENU. A screen with three choices should appear; select 'DISPLAY POWER SUPPLY STATUS?' and hit ENTER.

Power Supply status information should appear on the monitor; verify that the CAMERA 'Load' voltage is approximately 50V and that the 'Source' current is roughly 0.25 amps.

```
===== CUES MAIN MENU ===== -0
BEGIN?
SET UP RUN-TIME DISPLAY?
SET UP INSPECTION?
CONFIGURE REELS?
SET UP REMINDER ALARMS?
DEFINE COMMENTS?
WRITE FREE-FORMAT SCREEN?
FREE-FORMAT WITH RUN-TIME?
SET UP CAMERA PARAMETERS?
VIEW HELP TEXT?
CONFIGURE EQUIPMENT?
RUN DIAGNOSTICS?
UTILITIES?
COPYRIGHT?
<ENTER> to run diagnostics
```

```
===== CUES DIAGNOSTICS ===== -0
TEST CABLE CONTINUITY?
TEST CONTROLLER FUNCTIONALITY?
DISPLAY POWER SUPPLY STATUS?
<ENTER> to display power supply status
```

```
===== CUES POWER SUPPLY STATUS =====
-----
SETPOINT   SOURCE   SOURCE   LOAD*
VOLTAGE   VOLTAGE  CURRENT  VOLTAGE
CAMERA:   +50.0V  +48.1V  +0.250A  +48.1V
LIGHTS:   +82.0V  +80.6V  +0.220A  +80.6V
LT MOTOR: +0.0V   +0.0V   +0.000A  +0.0V
RT MOTOR: +0.0V   -0.0V   -0.000A  -0.0V
-----
* Calculated load voltage
```

Step 2:

Using an Ethernet cable, connect the Computer or Laptop ETH Port to the Router Port 4 (Port 4 is normally not used).

Step 3:

Open a DOS Command Window, and Ping the camera's IP address, 172.25.0.100.

The command is: ping 172.25.0.100

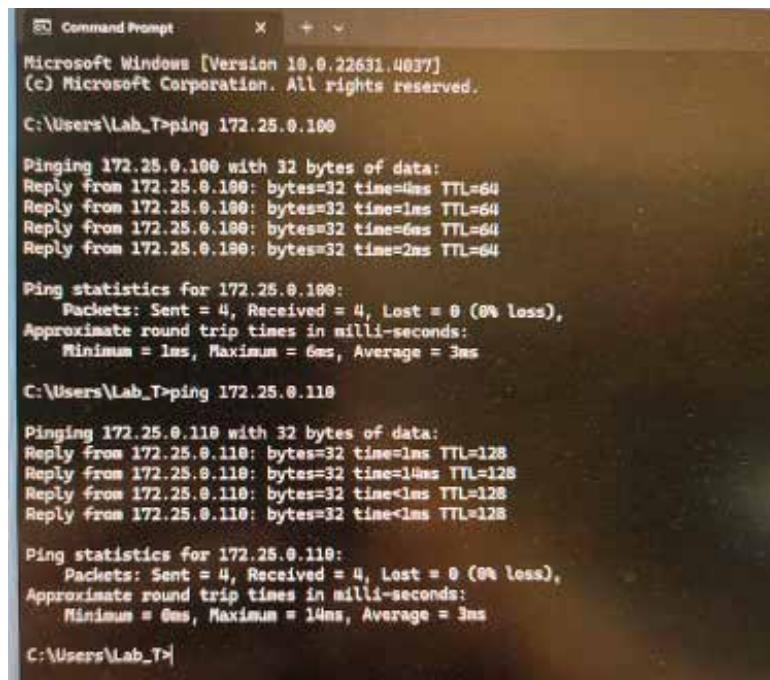
Verify that the ping is successful.

Step 4:

Next, ping the OZ4-HD Camera Body Coprocessor's IP address, 172.25.0.110.

The command is: ping 172.25.0.110

Verify that the ping is successful.



```
Microsoft Windows [Version 10.0.22631.4037]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lab_T>ping 172.25.0.100

Pinging 172.25.0.100 with 32 bytes of data:
Reply from 172.25.0.100: bytes=32 time=4ms TTL=64
Reply from 172.25.0.100: bytes=32 time=1ms TTL=64
Reply from 172.25.0.100: bytes=32 time=6ms TTL=64
Reply from 172.25.0.100: bytes=32 time=2ms TTL=64

Ping statistics for 172.25.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 6ms, Average = 3ms

C:\Users\Lab_T>ping 172.25.0.110

Pinging 172.25.0.110 with 32 bytes of data:
Reply from 172.25.0.110: bytes=32 time=1ms TTL=128
Reply from 172.25.0.110: bytes=32 time=14ms TTL=128
Reply from 172.25.0.110: bytes=32 time<1ms TTL=128
Reply from 172.25.0.110: bytes=32 time<1ms TTL=128

Ping statistics for 172.25.0.110:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 14ms, Average = 3ms

C:\Users\Lab_T>
```

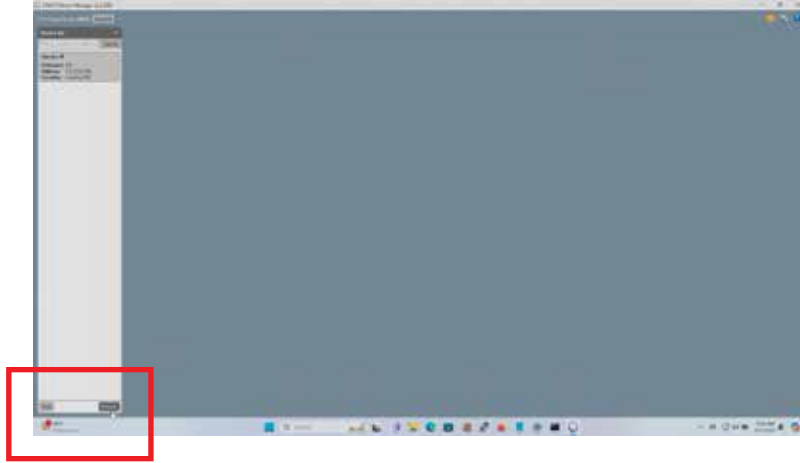
At this point, if both pings are successful, this establishes that the computer can successfully communicate with the OZ4-HD IP electronics and that the Gold Cable is working properly.

8 Troubleshooting OZ4-HD Video

TROUBLESHOOTING OZ4-HD VIDEO

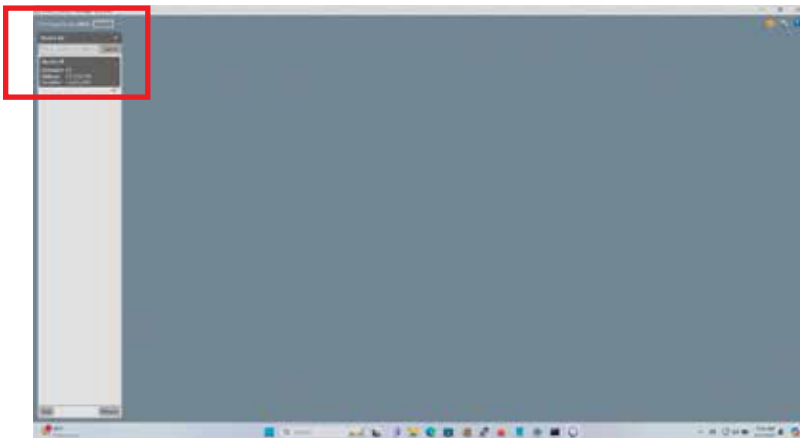
Step 5:

Open the ONVIF application. Press the REFRESH button that's located in the lower left corner of the display. This instructs ONVIF to go and 'find' any IP devices on the network.

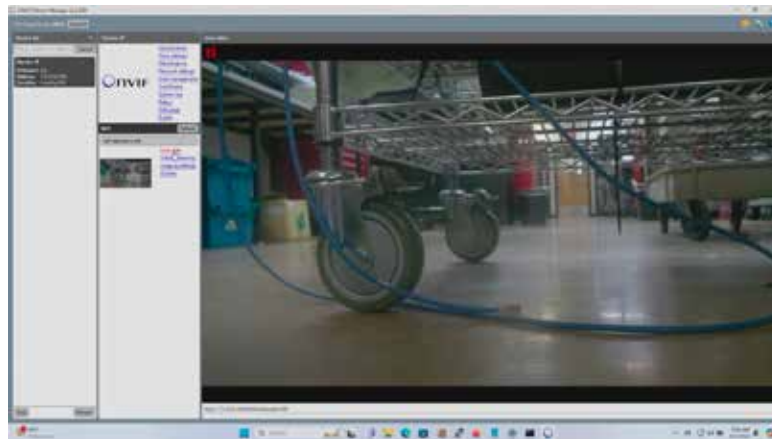
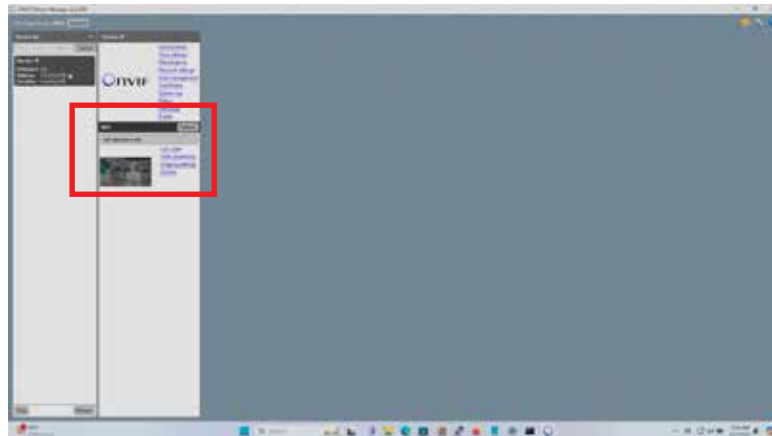


Step 6:

Press the button that's located in upper left corner that displays IP address 172.25.0.100. This instructs ONVIF to try to connect to OZ4-HD camera and display its video stream.



Next, find the video 'thumbnail' and click on the 'Live Video' link. If the window opens and the video is live and looks good, then the video portion of the OZ4-HD camera is working.



NOTE: If any of these steps fail, close ONVIF and recycle power on the K2 and DEC, following the directions in Chapter 4. Then repeat steps 1-6 above. If there is still no live video in ONVIF, this implies that the OZ4-HD camera is malfunctioning, and CUES Customer Service should be contacted for further assistance. If, however, there is live video in ONVIF, it indicates that the HD system is malfunctioning, that a truck cable has failed, or that a piece of equipment hasn't been properly energized. In that case, carefully recheck all truck cables and interconnects and verify that all equipment is in its properly energized state. If that does not resolve the issue, then contact CUES Customer Service for additional assistance.

HD TRUCK UPGRADE - RETRO COMPONENTS & DESCRIPTIONS

SMART RELAY

- ◆ Allows legacy analog and HD cameras to be interchanged
- ◆ Automatically detects analog or digital signal and accommodates video and data (digital only)
- ◆ Plug and Play, no manual switching required beyond the K2 setting



ROUTER & DIGITAL EXTENDER CHASSIS (DEC)

ROUTER

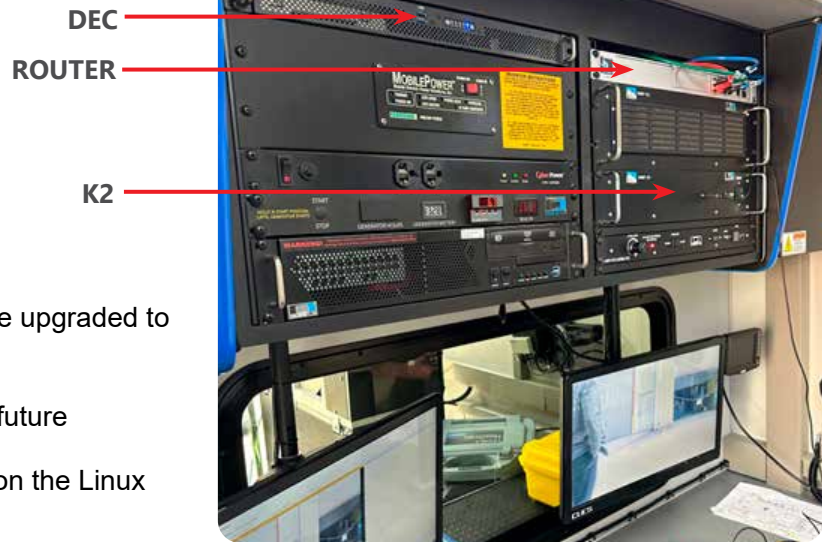
- ◆ Provides three secure networks on the truck:
 - ◆ CUES truck network
 - ◆ GraniteNET
 - ◆ Customer
- ◆ Provides wireless and internet access when configured accordingly

DEC

- ◆ Handles HD video for K2' & distributes it to GraniteNet & monitors
- ◆ Upscales analog video to HD
- ◆ Emulates certain K2' functions
- ◆ Powerful computer serving as a platform for future smart control functionality



EXAMPLE OF HD TRUCK UPGRADE



LINUX OS

The K2/Summit Windows OS will be upgraded to a Linux OS.

- ◆ A much more robust platform for future enhancements.
- ◆ All software updates will now be on the Linux platform.

CUES RECORD OF REVISIONS

This Record of Revision page is designed to ensure that users have access to the most up-to-date information regarding CUES’s products. As CUES’s products evolve over time, updates to procedures, specifications, and features may be necessary. These changes will be updated in each user manual, as needed. This revision page serves as a record of these changes, allowing users to track modifications and ensure they are following the latest instructions. The latest change level and the rationale for any change(s) will be explained in tabular format on this page to allow users to be better equipped should the need arise to call CUES regarding technical information.

Original Manual	Revision	Change Description
OZ4-HD Camera	08.2024	Initial preliminary release



CUES's equipment is designed to be easy to use during day-to-day operation. However, it is powered electrically and thus must be operated with care and safety. Do not attempt to operate any CUES equipment without having thoroughly read through the appropriate operating instructions and/or been through training by authorized CUES personnel.

Care was taken in the design of this product and in the production of this document and related materials. However, CUES makes no warranty for the use of its products and assumes no responsibility for any errors or omissions in this document or for incidental or consequential damages resulting from the use of the products or the information contained in this document. Specifications may change without notice.

All rights are reserved. No part of this publication may be reproduced, stored in any information system, or transmitted by any means, manual, electronic, or mechanical without the prior written permission of CUES.

Copyright © 2024 **CUES**®

All rights reserved. No part of this publication covered by the copyright hereon may be reproduced or used in any form by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems - without the expressed written permission of **CUES**®.

Violators will be prosecuted.

Styles and specifications are subject to change without notice. Printed in the United States of America.

Innovation for over

60
Years

CUES is the world's leading manufacturer of closed-circuit television video (CCTV) inspection, rehabilitation, pipe profiling equipment and asset inspection/decision support software. For over 60 years, CUES has provided innovative pipeline inspection technology and solutions to enable accurate condition assessment and proactive maintenance programs for buried infrastructure.

In addition to inspection equipment, CUES also designs, manufactures, and sells a broad range of pipeline rehabilitation and profiling equipment. These include chemical grouting systems for sewer line pipe joints capable of using a wide variety of grouting products. CUES also manufactures lateral reinstatement cutting systems which enable the reinstating of laterals in mainline sewers after they have been relined with any of a wide variety of liner materials. Pipe profiling is accomplished via Laser for Sonar based systems.

CUES has the most locations and dealers available to serve you! To find a local CUES facility, find the operating hours for a particular location, or to contact us at your most convenient stocking location, please log onto our website at www.cuesinc.com for more information.

