

HD System Operations

OPERATION & MAINTENANCE MANUAL
P/N OPS00001-MAN, Revision: Original 12.2024



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Readers interested only in how to operate an HD truck may proceed directly to section III.

Note: This document is not a substitute for CUES training, but rather an augmentation to it. Never attempt to operate a Cues system without having gone through proper CUES training first.

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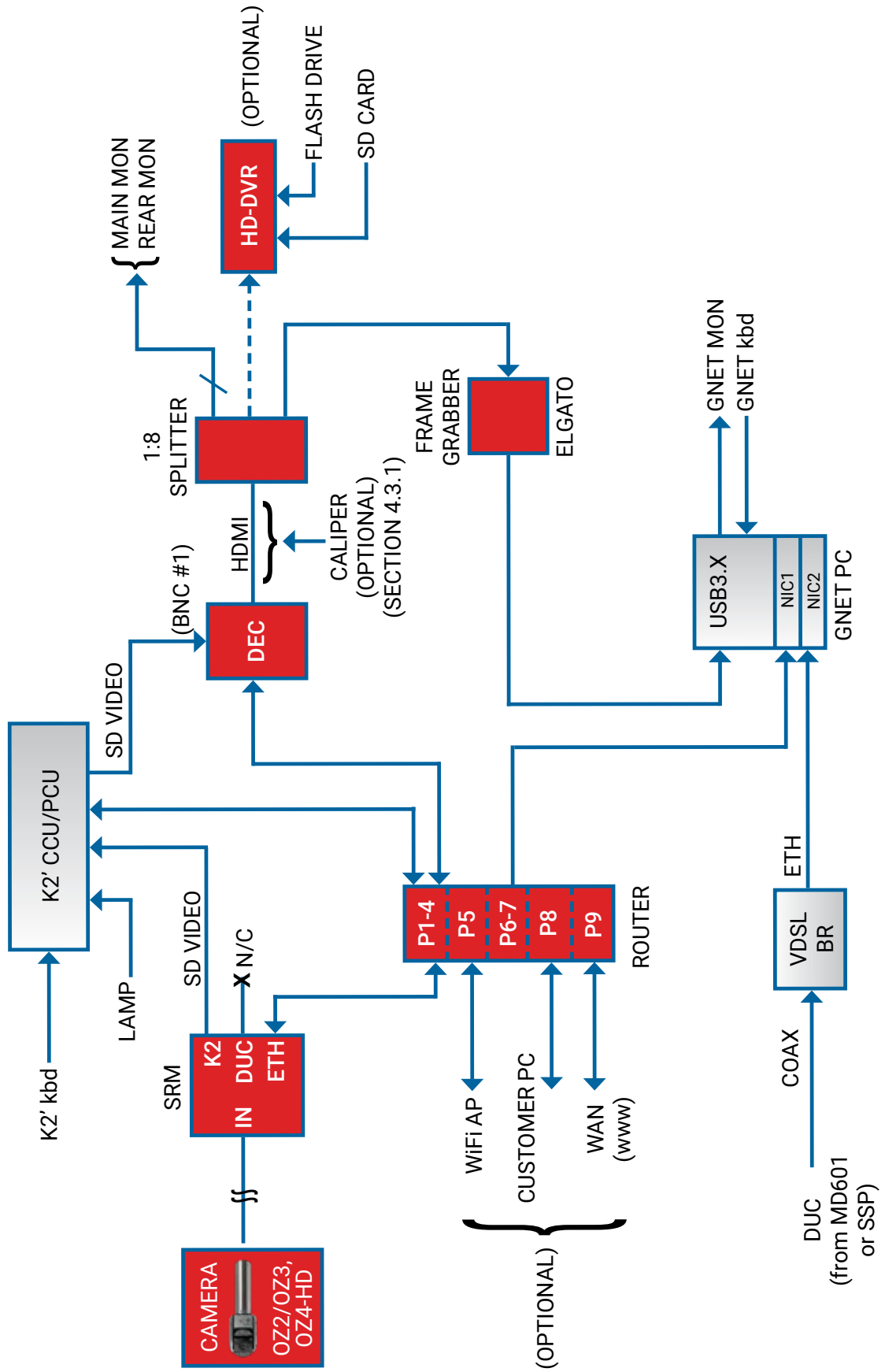
HD System – General Information

This chapter explains the fundamentals of the CUES HD system. It also describes the similarities and differences of the new HD system with other CUES Analog TV Inspection products.

- ◆ Refer to the K2/K3 Software Manual, P/N MK901, for detailed information on the K2 system.
- ◆ Refer to P/N KIT00001-INST for detailed instructions on how to connect an HD Truck.
- ◆ Refer to the OZ4-HD Camera User Manual, P/N CMA00001-MAN, for HD camera information.
- ◆ Refer to the GraniteNet Advanced User Manual, the GraniteNet Basic User Manual, and GraniteNet Quick Guides for detailed information on how to set up and use GraniteNet Asset Inspection Software.



CUES HD TV SYSTEM (Simplified Diagram)



System Overview

The block diagram on the opposite page highlights what has been added (in RED) to a standard CUES TV system to add HD video.

Along with a downhole HD Front-facing Camera (OZ4-HD), CUES's HD trucks now include the following additional HD-specific components:

- ◆ Smart Relay Module (SRM)
- ◆ Network ROUTER
- ◆ Digital Extender Chassis (DEC)
- ◆ 1:8 HDMI Splitter
- ◆ HDMI Frame Grabber (Elgato)
- ◆ (optional) HD-DVR
- ◆ (optional) HD HD Caliper

The new CUES HD system provides full seamless compatibility with all current K2-based CUES TV systems (OZII, OZIII, LAMP, DUC, QZ2, etc.) over standard CUES cables for distances up to 4000 ft. Kits are also available to retrofit HD onto existing CUES TV trucks. By design, both new and retrofitted HD trucks can run most CUES legacy equipment.

Referring to the block diagram, in HD applications, an OZ4-HD front-facing camera transmits an encoded HD video stream up the main cable to the topside system (truck, base-station, etc.). The DEC receives that stream, and provides decoding, titling, and converts the output format to HDMI. The SRM provides intelligent, automatic switching of the video coming from the main cable, either to the DEC, if HD, or to the K2, if SD (CUES's legacy OZII/III, LAMP II, etc.). The 1:8 SPLITTER and FRAME GRABBER are support functions for driving TV monitors and the GraniteNet PC. The ROUTER provides IP connectivity between the CUES Sensors and Truck network, the GraniteNet PC network, any customer-connected equipment, and an optional Wifi Access Point.

Configuring Equipment in an HD System

From an operator's perspective, a CUES HD TV system works just like a standard SD TV system. The K2 boots up displaying the CONFIG SCREEN. The principal difference in the HD CONFIG Screen is that there is now a selection for an OZ4-HD Front Camera. The HD system can also run any legacy SD camera (OZII and OZIII, LAMP, DUC, MP+, QZ3, etc.). Just choose the appropriate camera type from the CONFIG screen, install the camera onto the transporter, and you're ready to go. No other configuration changes are required in the HD truck.

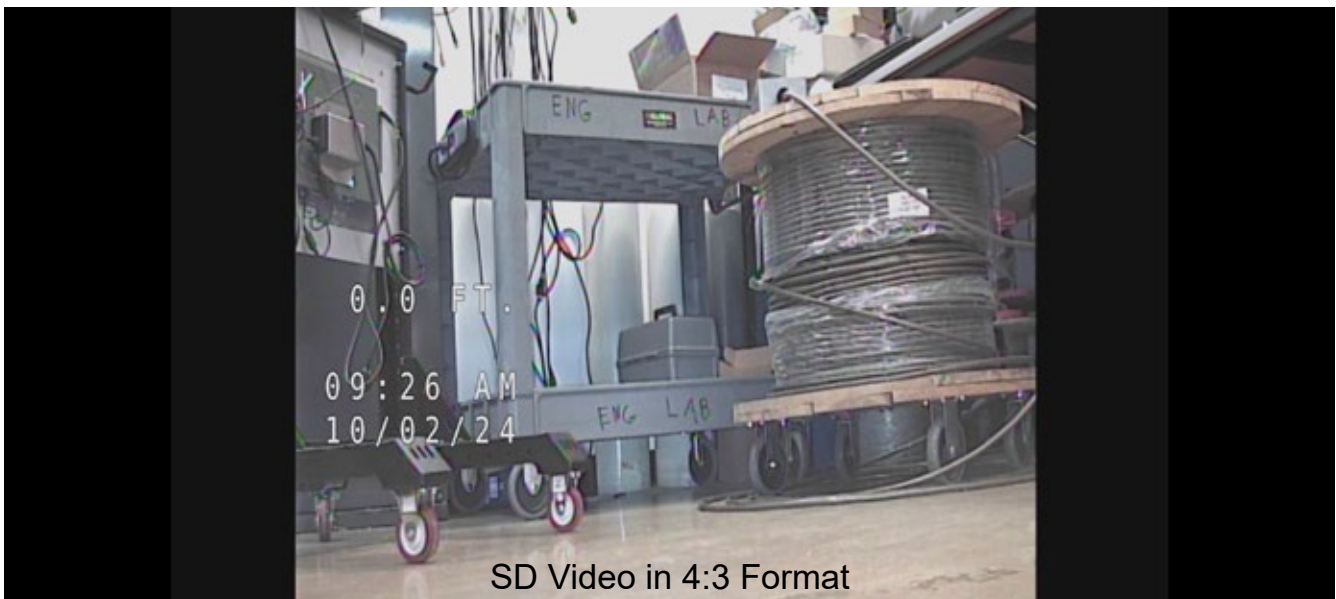
NOTE: Because the K2 for HD now runs Linux, upon bootup, a Linux splash screen may appear momentarily (depending on boot order) just before the CONFIG screen. Please note that this is normal.



By selecting the camera type in the K2 CONFIG Screen, the SRM is informed on how to process the camera signal. If an OZ4-HD option is selected, the SRM automatically switches the incoming camera signal to the DEC via the ROUTER, where it is converted to an HDMI signal with titling. The HDMI is then sent to the 1:8 HDMI SPLITTER, providing multiple HDMI outputs to the truck monitors, and an (Elgato Brand) HDMI Frame Grabber. The Elgato output (USB3.0) connects to the GraniteNet PC and is the source of video data for the GraniteNet application. OZ4-HD video is displayed in 16:9 aspect ratio by default.



If any other camera type (except DUC) is selected in the CONFIG Screen, the SRM switches video to the K2, which processes it as an SD signal. The K2 SD output is then sent to the DEC, which converts it to HDMI, overlays titling, and transmits it out to the 1:8 SPLITTER. The SPLITTER then drives the truck monitors and HDMI Frame Grabber, whose output goes on to the GraniteNet PC. Video from cameras other than OZ4-HD are displayed in 4:3 aspect ratio by default.



Finally, if a CUES DUC camera is selected, then the operator should proceed as follows. The SRM is not compatible with DUC currently. When selecting DUC in the CONFIG Screen, the operator must also connect the DUC to the VDSL Bridge, as currently done, either manually at the System Select Panel or by manually switching at the MD1601 Switch Box.

Controlling Equipment in an HD System

Controls for front/rear/lateral cameras, transporter, lift, etc., (e.g., Lights, pan, rotate, IRIS, Shutter, Zoom, forward/reverse/right/left, lift, etc.) all work the same way on an HD truck as on CUES's legacy Standard Definition (SD) trucks. Operators control all functions via a (wired or wireless) gamepad controller. Switching between front view and rear-view cameras (RVC) is the same for HD trucks as for SD, although the RVC is only SD quality currently. Diagnostic Information is also initiated and displayed in the same way on both HD and legacy SD cameras.

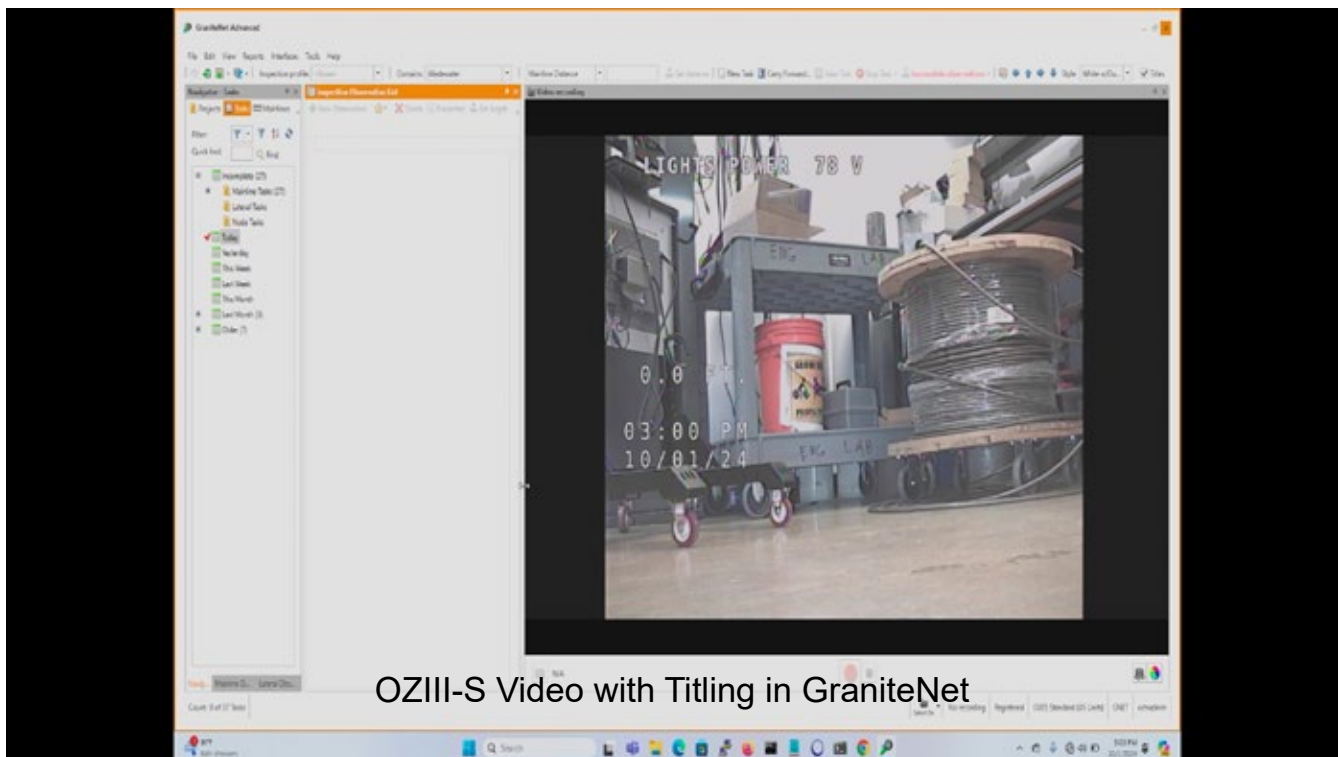
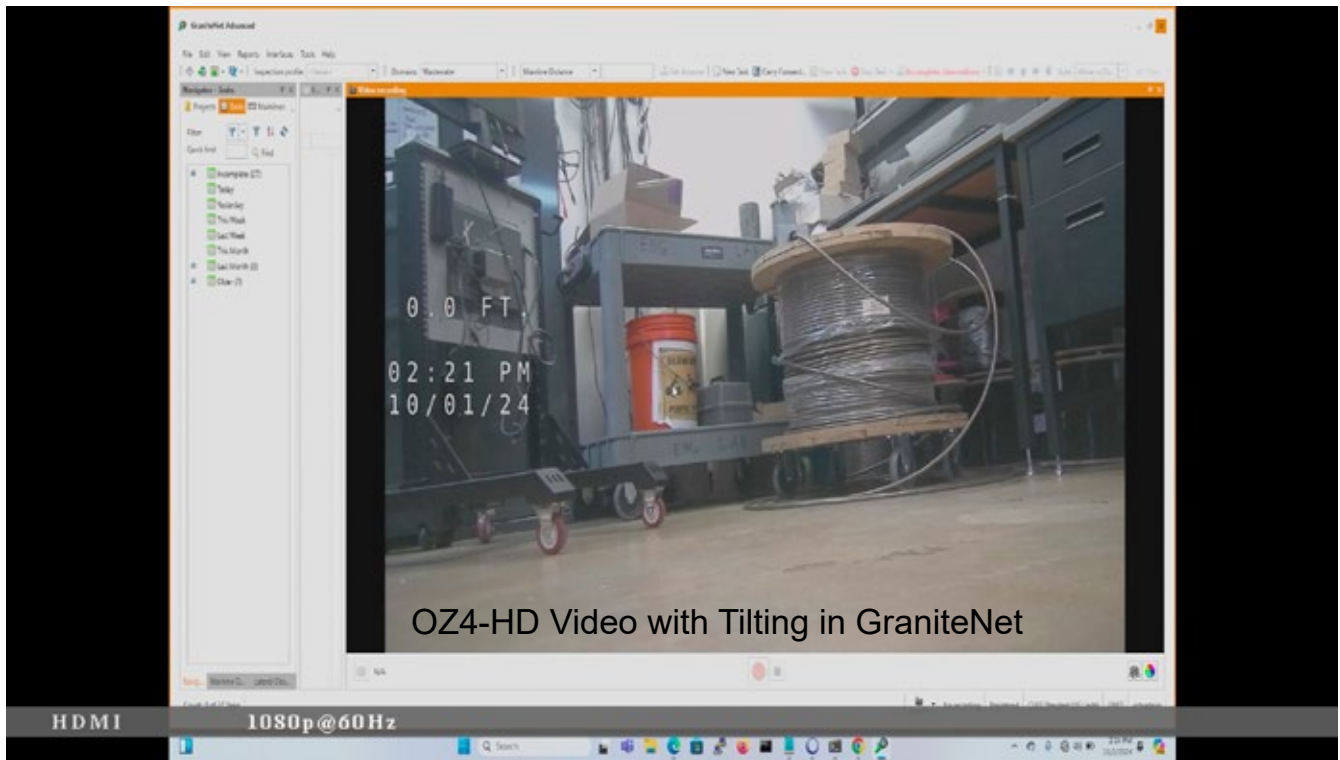
LAMP II on HD Trucks: LAMP II works in the same way that SD works on an HD truck. The LAMP II Main, Rear View, and Lateral camera signals are sent first to the K2 by the SRM. The K2 outputs the LAMP II video to the DEC where they are digitized and forwarded to the 1:8 SPLITTER. The SPLITTER outputs drive the truck monitors, Elgato Frame Grabber, and so forth. However, just as with the RVC, LAMP II Main and Lateral videos are still SD quality currently.

Monitor Settings: All HD truck monitors should normally be set for HDMI input, even when running CUES's legacy SD cameras (e.g., OZII/OZIII or LAMP). Operators do not need to change monitor settings when changing between camera types.

The GraniteNet PC and GraniteNet Assessment Software: The software works the same way on both HD and SD trucks, for display, titling, and recording. Once the GraniteNet Video Recording settings on an HD truck are properly configured, those settings can be used for any camera selectable in the CONFIG screen. There is no need to change the GraniteNet video recording settings when changing cameras, just swap them out and continue. For GraniteNet to work properly, HD trucks require a relatively recent version of GraniteNet software along with a GraniteNet HD recording module. All of these details can be found in Section II.4 of this manual. The OZ4-HD default video display is 16:9 format; all other CUES cameras default to CUES's legacy 4:3 format. The user can change the display format if desired.



CUES's SoLID FX - Currently, the OZ4-HD camera does not work directly with a CUES SoLID FX downhole Electronics Box, because the OZ4-HD uses a different communication scheme (10BaseT1L, rather than VDSL used in SoLID FX). However, HD can be installed on a SoLID FX truck that can also perform standard TV inspections.



Controlling Equipment in an HD System

HD-DVR Option: An optional HD-DVR is available. The HD-DVR functions like the Analog DVRs, CUES's P/N MS600, that are used in non-HD trucks. The HD-DVR contains an internal HD display, so operators can 'see' what they are recording. The device has many additional features, however basic recording or taking a snapshot is easy to do using clearly marked buttons on the HD-DVR front panel. A 128GB flash drive is provided for storage. Since all camera types are converted by the DEC to HDMI, the HD-DVR can capture video from any camera type selectable in the CONFIG screen.

HD Caliper Option: An optional HD Caliper is available. The HD Caliper functions similarly to the MicrolImage brand Analog Caliper (CUES's P/N MS705) that are used in non-HD trucks. The implementation includes a 2:1 HDMI switch located near the HD Caliper on the office desktop. This switch allows operators to switch between displayed video with or without caliper overlay. Since all camera types in an HD truck are converted to HDMI, the HD Caliper can be used on any camera type selectable in the CONFIG screen. No need to change any caliper settings or aspect ratios, just swap out the cameras and continue.

HD-Specific Equipment Descriptions

This chapter describe the functions, switches, I/O, controls, indicators, etc., of the HD-specific components. For additional information and support, contact CUES's Service & Support: <https://cuesinc.com/pages/contact-us>.

2.1 Smart Relay Module (SRM), CUES's P/N CRA00001

Description:

- ◆ Allows legacy analog and HD cameras to be interchanged
- ◆ Automatically switches analog or digital signals and accommodates video and data
- ◆ Plug-n-Play, no manual switching required
- ◆ The SRM is designed by CUES and does not have a manual.

User I/O (all on the front panel):

- ◆ REEL IN: Video input from the REEL (coaxial)
- ◆ K2: Video output to the K2 CCU (coaxial)
- ◆ DUC: Unused. Do not connect.
- ◆ USB Power: 5V power to the SRM (USB Type B)
- ◆ E-NET: Ethernet connection to ROUTER Port 2 (RJ-45)

User Controls: None

LED's:

- ◆ Power
- ◆ A1: Illuminated for analog video (solid)
- ◆ D1: Illuminated for digital video (flashes when receiving HD video)
- ◆ A2 and D2: Unused

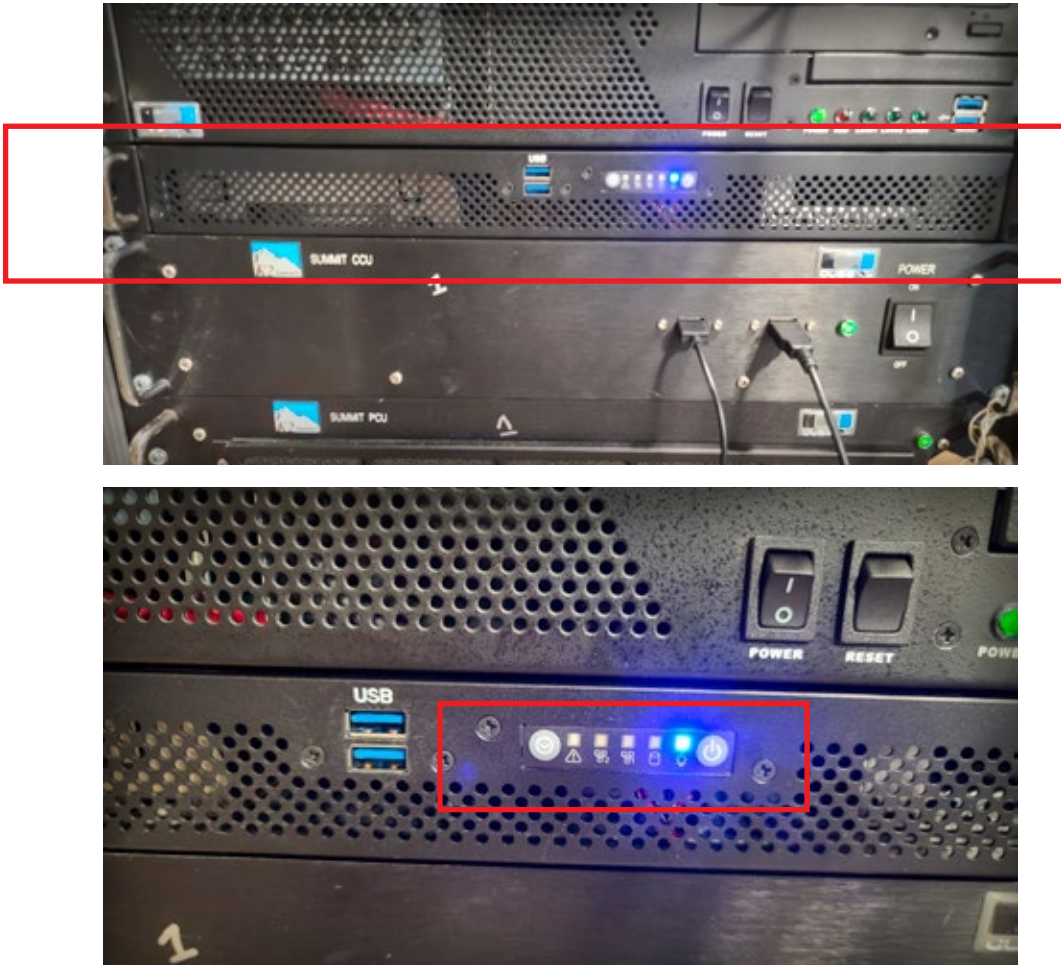
Notes:

- ◆ (1) The SRM defaults to passing SD video if power is removed.
- ◆ (2) Only A1 or D1 should ever be on, and never together. Any other combination would indicate a problem with the SRM.



2 HD-Specific Equipment Descriptions

2.2 Digital Extender Chassis (DEC) w/ Internal SD Video Digitizer, CUES's P/N ELA00015



Description:

General Purpose Industrial Computer, Linux OS

Motherboard: IMB-Q670JT2-MATX

1U high, standard 19-inch rack mount chassis

Vendor: BSI Computer

Website: <https://bsicomputer.com/products/rms143-1u-rackmount-pc-27344>

User I/O:

- ◆ Front Panel: 1 x Power On/Off Button, 1 x Reset Button, 2 x USB
- ◆ Rear Panel: 3 x Ethernet, 1 x RS232/422/485, 6 x USB, 2 x HDMI, 1 x Displayport
- ◆ 8-way BNC Pigtail (connect the K2 only to BNC #1)

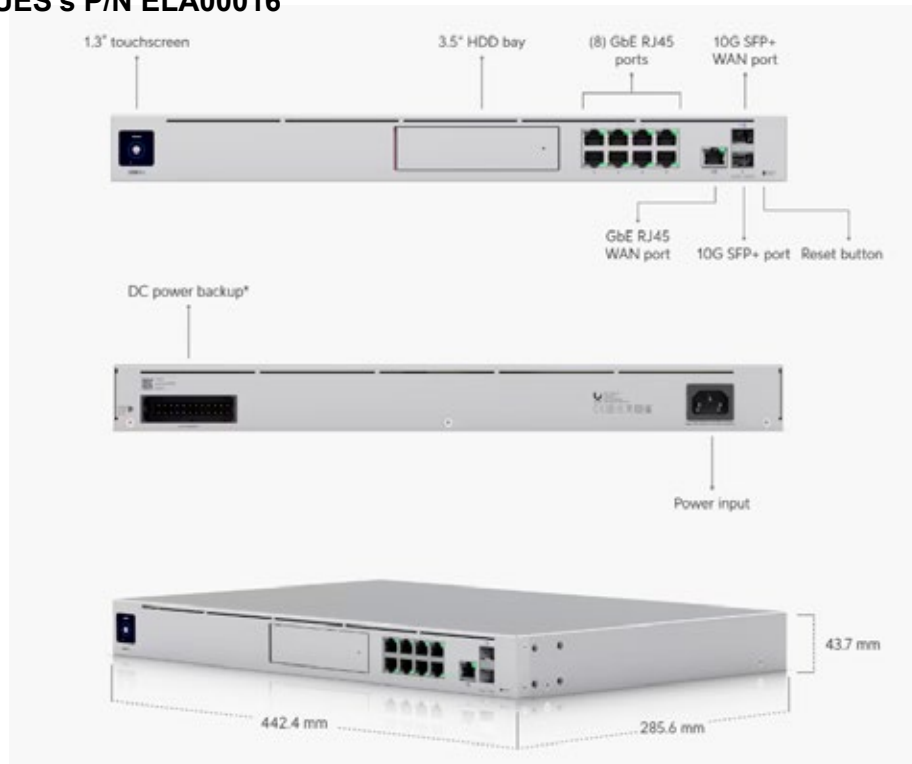
LED's:

- ◆ Power, HDD, LAN 1, LAN 2, Alert (front panel, left to right)

User Controls:

- ◆ Power Button, Reset Button (both on front panel)

2.3 ROUTER, CUES's P/N ELA00016



Description:

- ◆ Enterprise Router with Integrated Network Switch
- ◆ 1U high, standard 19-inch rack mount chassis
- ◆ Vendor: Ubiquiti; Model: Dream Machine Pro
- ◆ Website: <https://store.ui.com/us/en/products/udm-pro>

User I/O:

- ◆ Front Panel: 8 x GbE RJ45 LAN ports, 1 x GbE RJ45 WAN Port

LED's and Display:

- ◆ Ethernet RJ45 (Green = 1G, Amber = 10/100M), 1.3" Touchscreen

User Controls: None

Port Allocations:

- ◆ **Ports 1-4:** Truck Network (172.25.0.xx). Provides communication for the SRM, K2, and DEC. Connect here via DHCP to communicate directly with any truck sensors (e.g., OZ4-HD camera, Lidar, Sonar, etc.)
- ◆ **Port 5:** Truck WiFi Access Point (172.25.30.x). Three SSIDs are available: (1) truckwifi, (2) gnetwifi, and (3) guestwifi. Passwords are located in Cues manual "How to Configure a Dream Machine Pro". Connect to truckwifi to communicate with Router Ports 1-4 or Router Port 9 (Internet). Connect to gnetwifi to communicate with Ports 6-7, the DEC, or Router Port 9. Connect to guestwifi to connect to Router Port 9 only.
- ◆ **Ports 6-7:** GraniteNet Network (172.25.1.x). Connect the GraniteNet PC to one of these ports. These ports communicate to the DEC and to Router Port 9, but not to any equipment on Ports 1-4 or 8.
- ◆ **Port 8:** Customer Network (172.25.2.x). Connect Customer network equipment here. This port can only get to Router Port 9.
- ◆ **Port 9:** WAN. Connect Internet here.

2 HD-Specific Equipment Descriptions

2.4 1:8 HDMI SPLITTER, CUES's P/N ELC00010



Description:

- ◆ Splits one HDMI input into eight HDMI outputs

User I/O:

- ◆ 1 x HDMI Input, 8 x HDMI Output

LED's: Power only

User Controls: None

Vendor: OREI, P/N HD-108

Website: https://www.orei.com/products/hd108-1-in-8-hdmi-splitter?srsItd=AfmBOopOlpgMx_0ID_HsmL1CD2YdkuseSjPf5QQeFezTLp8vEgDBb21_

2.5 HDMI FRAME GRABBER, CUES's P/N ELC00009



Description:

- ◆ Converts HDMI to serial USB stream

User I/O:

- ◆ 1 x HDMI Input, 1 x USB3.x Output, 1 x Audio Input

LED's: Power only

User Controls: None

Vendor: ELGATO, P/N HD60X

Website: <https://help.elgato.com/hc/en-us/articles/5293216945805-Elgato-Game-Capture-HD60-X-Technical-Specifications>

2.6 HD-DVR (optional), CUES's P/N ELE00010



Description:

- ◆ Records HDMI Video, and also takes Snapshots. This HD-DVR can record video from any type of camera selectable in the CONFIG Screen.

User Manual:

- ◆ www.clearclicksoftware.com/Manuals/HDUltimate2.pdf

User I/O:

- ◆ 1 x HDMI Input, 1 x HDMI Output (passthrough), 1 x USB (for Storage)
- ◆ 1 x SD Card (for Storage), 1 x Audio Input

LED's and Display:

- ◆ Power, Internal HD Display

User Controls:

- ◆ Record Button, Snapshot Button (front panel)
- ◆ Vendor: ClearClick, P/N HD Video Capture Box Ultimate 2.0

**The unit comes with a Universal Remote and additional front panel buttons for other features. Normally however, the Record and Snapshot Buttons are all an operator will need.

2 HD-Specific Equipment Descriptions

2.7 HD Video Caliper (optional), CUES's P/N ELE00017



Description:

- ◆ Allows X and Y measurements on HD Video. This unit can be used to make measurements on any camera type selectable in the CONFIG Screen.

Website: <https://www.colorado-video.com/hi-def-video-micrometer/index.html>

(Note: The terms Micrometer and Caliper are used interchangeably.)

User I/O:

- ◆ DVI Input and Output. Attach DVI to HDMI adapters if using HDMI cables.

LED's and Display:

- ◆ Dual Purpose LED; flashing Green when Power but no video, Solid Green when good (HD) video

User Controls

- ◆ Knobs for Horizontal and Vertical Measurement Cursor Overlay
- ◆ Pushbutton for Function Selection
- ◆ Vendor: Colorado Video, P/N DD309CS

Operating The HD TV System

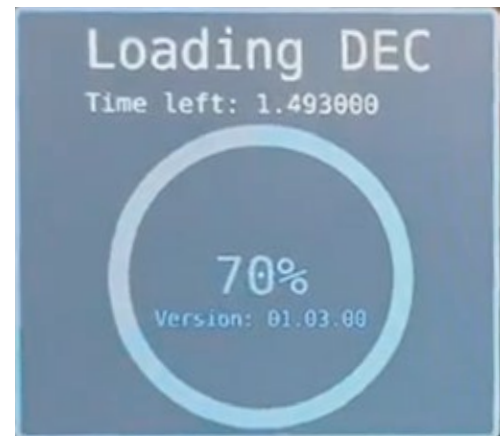
The following sequence applies for any camera type selectable in the K2 CONFIG screen. All HD Truck monitors should normally be set for HDMI.

Note: OZ4-HD live video is displayed in 16:9 format by default.
For all other cameras, live video is displayed in legacy 4:3 format by default.

3.1 Powering Up the System

Powering the Equipment:

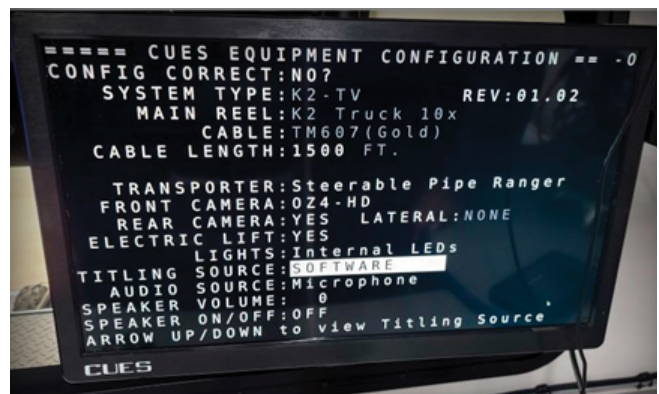
The equipment in an HD truck can be powered up in any order. However, do not start the GraniteNet application on the GraniteNet PC until both the K2 and the DEC have booted. Locate the Power switches for the K2, DEC, and GraniteNet PC. Turn on the K2, DEC, and GraniteNet PC. The ROUTER has no power switch and powers up automatically once the truck AC mains become active. If this is the first time powering up the system, check that other ancillary equipment, such as the HDMI 1:8 SPLITTER and Elgato HDMI Framer Grabber are powered up, by verifying that their Power LEDs are illuminated.



K2, DEC, and GraniteNet Bootup:

The K2 should boot up into the CONFIG screen. (Note: You may also see a Linux splash-screen momentarily, depending on what order the equipment is powered up. This is normal.) Boot up to the CONFIG screen takes approximately the same amount of time as on a non-HD truck. While the CONFIG screen is displayed, the main (Gold) cable and all downhole electronics are de-energized. For applications that include GraniteNet, the GraniteNet PC can be started at any time, however, the GraniteNet application should always be started after both the K2 and the DEC have completely booted. The GraniteNet PC should boot into a standard Microsoft Windows OS display.

K2 and DEC boot up into the K2 CONFIG Screen. On HD trucks, there is a new option for FRONT CAMERA: OZ4-HD. Choose this for HD inspections. Otherwise, this screen is the same as in any other K2-based CUES TV Inspection system.



3 Operating the HD TV System

3.2 Configuring the Downhole Equipment

Setting the CONFIG Screen:

Set the CONFIG screen in the same manner as with non-HD trucks, using the (K2 keyboard) TAB and ARROW keys to select and modify the various fields for Camera, Lights, Lift, Transporter, Cable Type and Length, etc. Select the desired camera type. Choose the OZ4-HD camera type for HD inspections. While the CONFIG screen is displayed, the main cable and downhole electronics are de-energized.

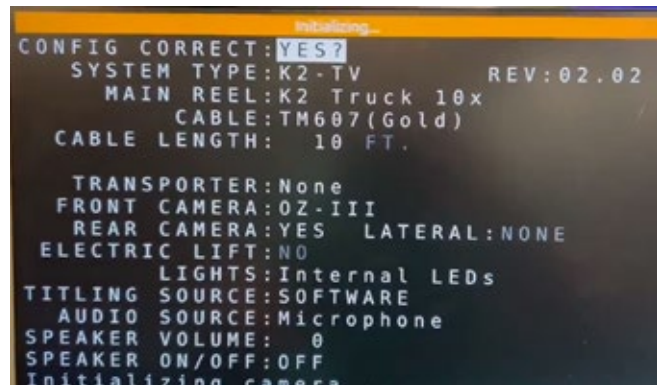
**If GraniteNet titling is to be used for inspection, set the CONFIG screen Titling Source to SOFTWARE, if necessary.

Connecting the Downhole Equipment:

Connect all the downhole equipment and cabling in the usual manner (transporter, lift, camera, RVC, etc.) before exiting the CONFIG screen. Be sure to use the proper camera adapter kit (CUES base P/N MZ904) for OZ4-HD on any transporter other than CPR or Ultrashorty 3. Contact CUES Sales or Customer Service for additional information about connecting transporters, cables, lifts, RVC, etc.

Powering the Downhole Equipment:

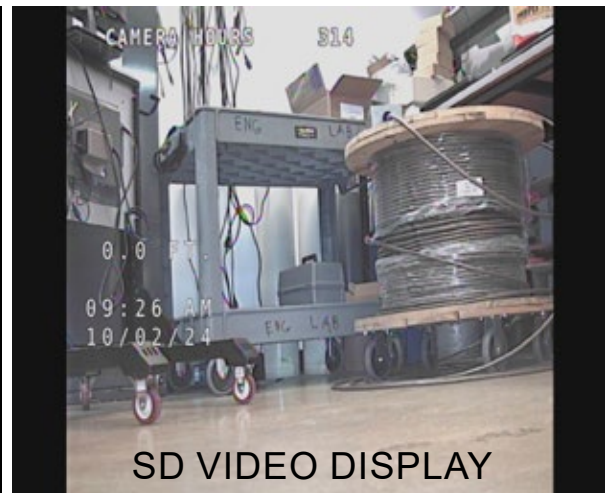
Power the downhole equipment by exiting out of the CONFIG screen (K2 keyboard TAB to CONFIG CORRECT?, select YES, and hit ENTER).



Live Video with titling will appear on the truck monitors momentarily. The default display format for HD video is 16:9 format. All other cameras display in legacy 4:3 format by default. Titling is customized in the same way as is done on non-HD trucks, by modifications in the K2 Titling Menus, and K2 on HD trucks provides the same hot-keys.



HD VIDEO DISPLAY



SD VIDEO DISPLAY

3.3 Equipment Operation - Functional Checkout

The operator can now test the downhole equipment above ground to ensure everything is functioning properly. CUES's downhole equipment is controlled and operated the same way on HD trucks as on non-HD trucks.

Check Equipment Operation:

Check all configured equipment: Cameras (front, rear, and lateral, if LAMP), Transporter, Lift, etc. (e.g., Lights, Pan/Rotate, Zoom, transporter forward/reverse, etc.) should all operate correctly using the gamepad controller. Refer to user manual P/N CMA00001-MAN for additional information about the OZ4-HD camera and gamepad controller operation, if necessary.

Note: The OZ4-HD pan motor drive system has been redesigned. If the joystick is engaged while the pan motor is at its left or right stop, the camera will emit a 'ticking' sound. You will also hear this ticking sound while the camera is HOMING. In any case, this is normal and not cause for alarm. The camera will not be damaged.

Verify that the front camera stores any previous HOME settings. To test this, while the front camera is HOME, use the gamepad controller to decrease the IRIS, making the video image dark, and press the HOME button to save the setting. Pan away and then HOME the camera. When the camera returns HOME, the image should remain dark if the camera is working correctly. Finally, increase the IRIS to brighten the image back to the operator's preference when the camera is HOME, and press the HOME button again to save the new setting.

Query the Camera Diagnostics:

Turn on the lights and verify the lights voltage is displayed on the truck monitor for a few seconds. Leave the lights ON. Check the camera diagnostics and confirm that all diagnostic data is displayed on the monitor(s) in a continuous cycle. Verify that the humidity and temperature are < 75% and <130F, respectively, for a used camera in good working condition. (Note: The humidity in a camera with low operational hours or recent servicing should be relatively low, typically < 30%).

Rear View and LAMP II Lateral Cameras:

If a Rear View Camera (RVC) is installed, verify that it is working. Use the VIEW button to toggle between front and rear camera video on the truck monitors. If this is a CUES LAMP II system, use the VIEW button to verify front, rear, and lateral video is displayed properly.

Sonde, Inclinometer, and Caliper:

OZ4-HD cameras come with a SONDE as standard equipment. The Sonde becomes active when the camera lights are turned ON. For customers who expect to use the Sonde, verify that the SONDE is working, by turning on the camera lights, and verifying that a SONDE Receiver detects the 512Hz tone.



Sonde, Inclinometer, and Caliper - continued:

If an inclinometer is installed on the HD camera, it should be calibrated the same way an OZII/III camera inclinometer is calibrated in a truck setup. Put the transporter on the ground, hit <CTRL> + < i >. Turn the transporter 180 degrees and hit <CTRL> + < i > again, to complete the in-truck calibration. Select "INCLINOMETER" in the K2 or GraniteNet titling settings, and then tip the transporter up and down to verify that the inclinometer and titling are working properly.

Laser Lighthead:

If the OZ4-HD is fitted with a Laser Lighthead for caliper measurements, verify that the laser diodes turn ON and OFF with the main camera lights. Verify that the HD Video Caliper is working properly. For directions on testing and using the HD Caliper, refer to the Colorado Video DD309CS User's Manual.

Note: The HD Video Caliper works correctly with all front camera types (HD or legacy) on an HD truck. There is no need to switch between analog and video calipers or change the HD Caliper settings when switching between camera types.

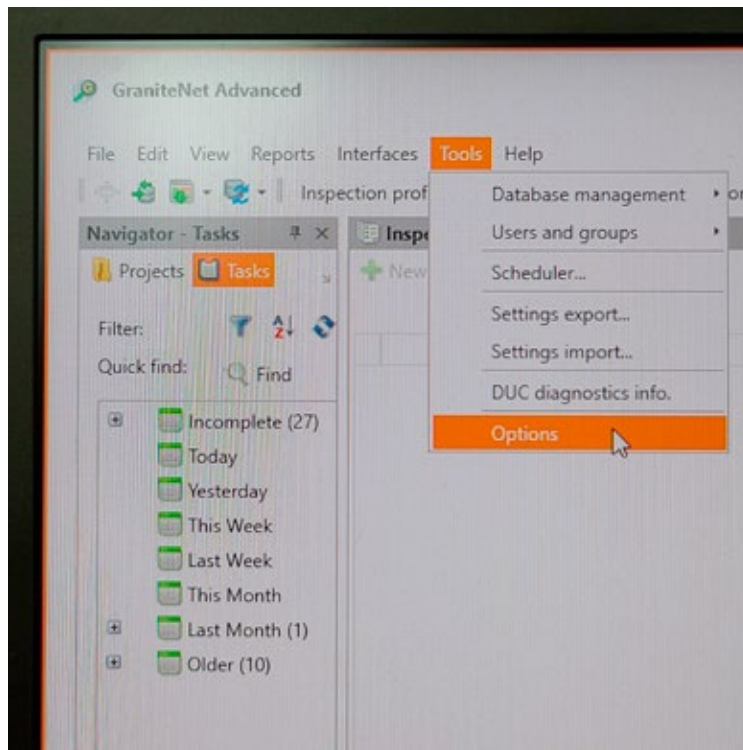
3.4 Setting Up the GraniteNet Software for HD Recordings

For applications that include GraniteNet, open the GraniteNet application. Go to the Tools -> Options menu, select "Video Inspection", and set the video capture device to Elgato. Set the Video Recording for Compression Format of <MPEG H.264>, and Compression Quality of <HD 1080p>. Set the Audio Capture device to the audio port on the GraniteNet PC, or the Elgato, depending on where the RCA audio cable from the K2 is connected.

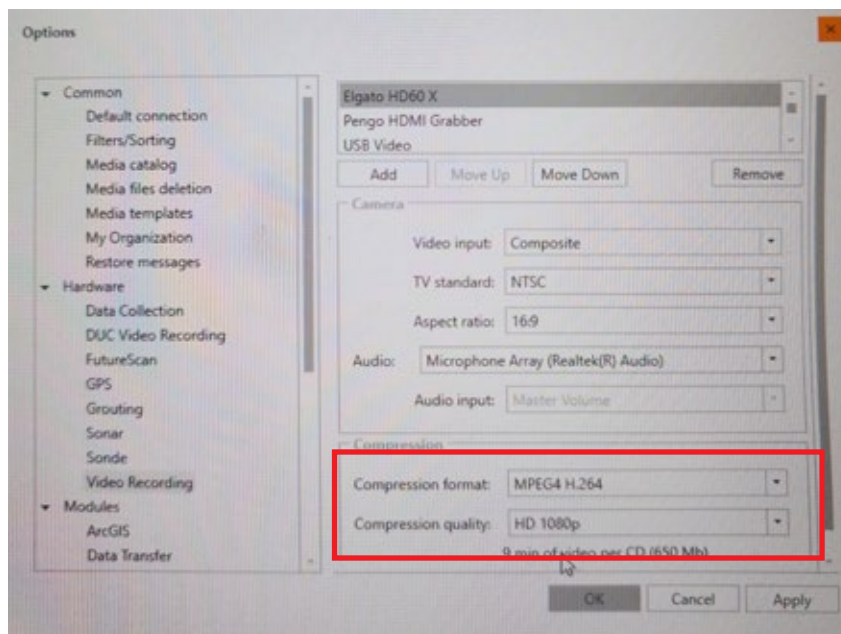
Minimum Requirements for GraniteNet PC in HD Systems:

1. GraniteNet Inspection software Version 5.8.0 or later
2. GraniteNet P/N GN560, MPEG4 H.264 Module
3. A USB3.x connector on the GraniteNet PC to connect to the ElGato capture device.

(Consult CUES CSD, Sales or Customer Service for compatibility requirements of non-Cues inspection assessment software, or to address hardware deficiencies.)



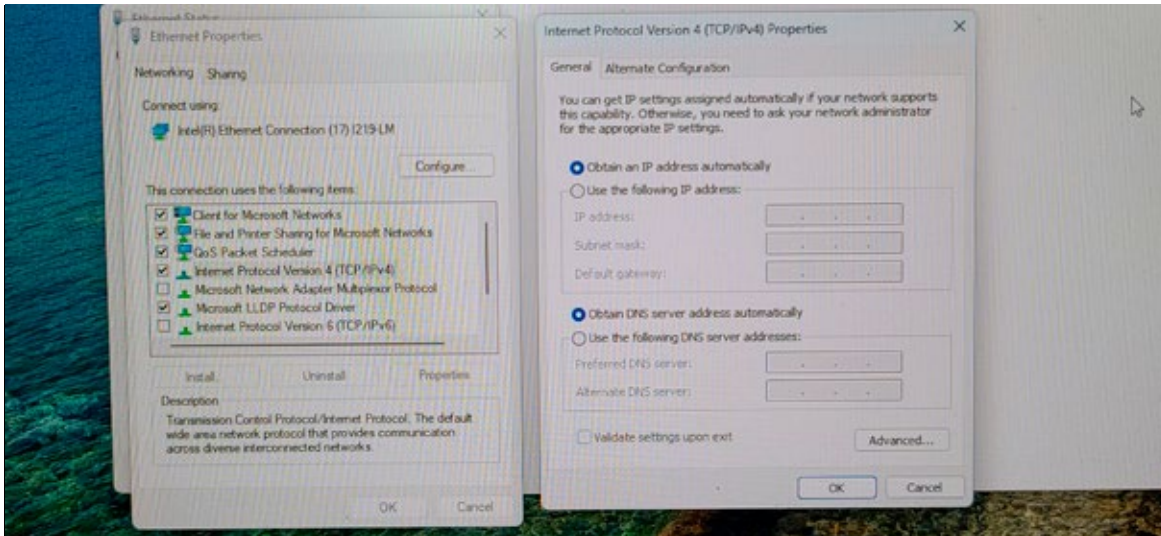
GRANITENET TOOL OPTIONS



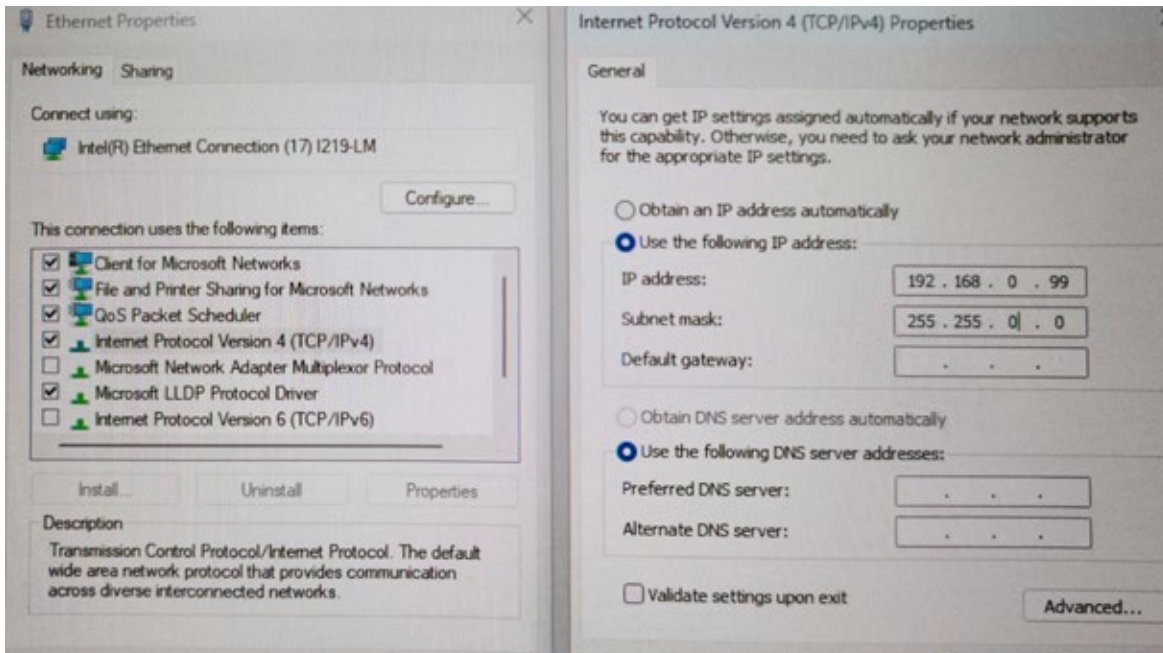
GRANITENET VIDEO RECORDING SETTINGS

3.4 Setting Up the GraniteNet Software for HD Recordings - continued

The GraniteNet PC NIC (Network Interface Card) connects by the Ethernet cable to ROUTER Port 6, is set for DHCP, and gets its IP address from the ROUTER. The GraniteNet PC's IP range in this case is 172.25.1.x and is designed to communicate only with the DEC and Router Port 9 over IP.

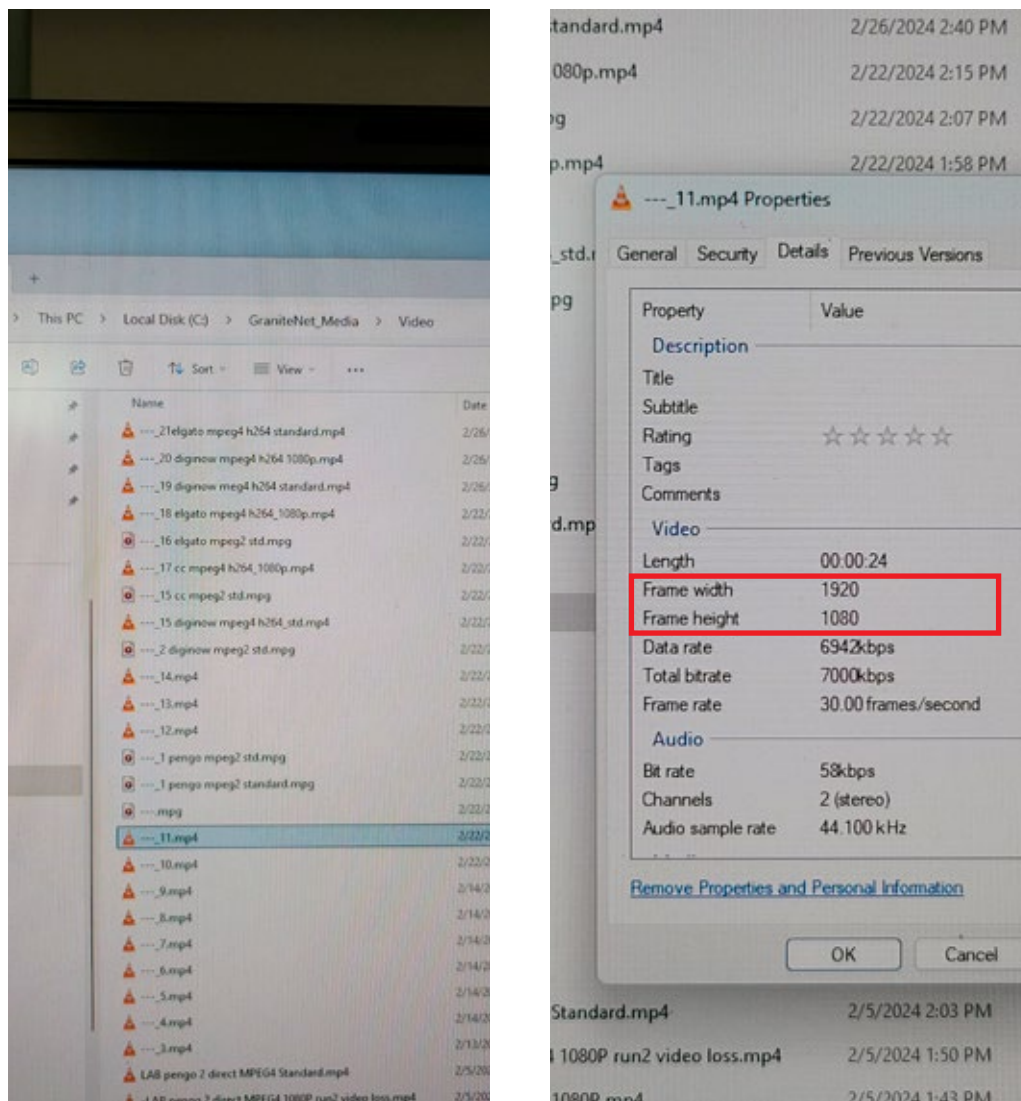


CUES's DUC and/or SFX applications require a second NIC be installed in the GraniteNet PC. The second NIC connects to the truck-side VDSL Bridge, either directly, or the bridge located in the MD1601 Switch Box. The 2nd NIC should be set for a static address of 192.168.0.99, Netmask = 255.255.0.0. See the picture below.



Configure the GraniteNet titling as required for the intended inspection (e.g., set for 'Hardware Titling' if GraniteNet will control titling). Set up a mock inspection and verify that the video, audio, and titling are correct and properly recording, and can be played back, using the GraniteNet application.

OZ4-HD video recordings will be in Full HD (1080p) resolution (see the next pic). For any other camera type, the recording will also be 1080p, because the DEC upscales the analog video to HDMI. However, even though analog video recordings are 1080p, the video resolution is still only SD quality.



VIDEO RECORDING FILE PROPERTIES

Note: If during the setup process an error message appears that GraniteNet cannot initialize K2 Com1 port, then close GraniteNet and reopen it. This should clear the issue.

3 Operating the HD TV System

3.5 Setting up an HD-DVR (optional)

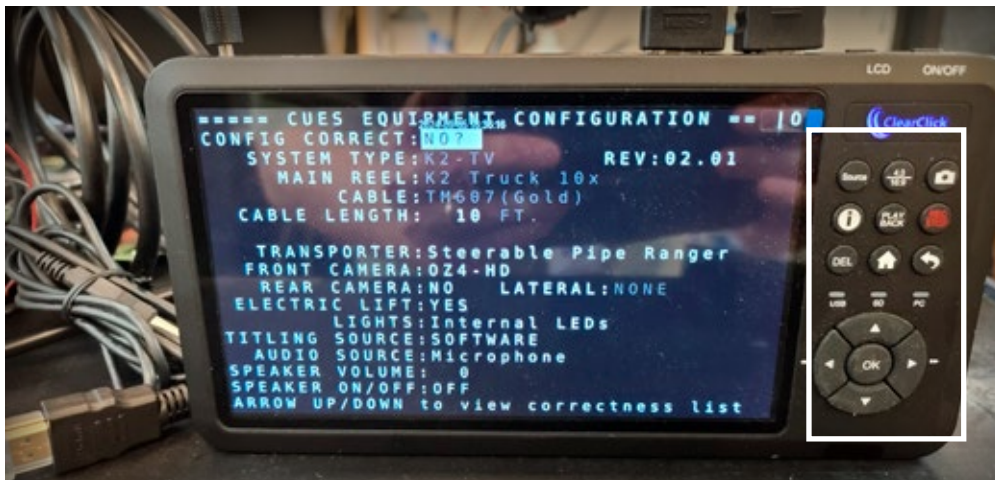
This section is optional for customers who purchase the HD-DVR.

First, install a 3V coin cell battery, CR2032 or similar, if necessary. Power the unit up, and using the front panel controls on the device, set the current time and date. (These steps are necessary for correct time/date stamping of recorded files and snapshots.)

Install a flash drive into the USB port of the HD-DVR, if necessary, maximum size 512G. At this point the device is ready to record. With the HDMI cable connected to its HDMI input from the 1:8 SPLITTER, the HD-DVR internal monitor will 'mirror' whenever is on the Main monitors.

Recording is easy, just hit the record button to start (a flashing REC will appear in the upper left-hand corner of the display). To stop the recording just push the REC button again. The device takes a few seconds to save a file to the flash drive after recording stops, so wait before removing the flash drive after stopping a recording.

To take snapshots, simple press the CAMERA button (the one with the Camera Icon on it) once. In the upper left corner of the display, a red camera icon will illuminate momentarily, indicating the snapshot was taken and stored.



The HD-DVR can also record to an SD card. (SD card not included.) The HD-DVR can record on Flash drives and SD cards up to 512G. The nominal recording rate is ~ 120 MBytes/minute for all camera types (OZ4-HD, OZII, OZIII, LAMP). The HD-DVR ships with a 128GB flash drive, sufficient for more than 17 hours of continuous recording.

Miscellaneous

4.1.1 Updating K2 and DEC Firmware in the Field:

The latest version of K2 F/W and DEC F/W are available through CUES's Service & Support: <https://cuesinc.com/pages/contact-us>

Steps to Update K2:

1. Take latest K2_prime_FW_xx.yy.tar.gz and move it to the root of the flash drive.
* NOTE: this file must be at the top level of the flash drive, it cannot be in a folder on your flash drive.
2. Insert flash drive into K2 unit with the application running.
3. Take a picture of the Equipment Configuration screen. The upgrade should restore all of these values, but in the event that it does not, the picture will enable resetting these values to their proper settings.
4. Activate "Administrator mode" on the K2 by using the tab key to highlight "Speaker on/off". Once the cursor is on "Speaker on/off" press "ctrl" + "alt" + "a".
5. A message should appear at the bottom of the screen stating that administrator mode has been activated.
6. Tab back up to confirm that the configuration is correct and launch the system.
7. Once the video appears on the screen press the "ESC" key to enter the menu.
8. Navigate down to "Copyright Screen" and press "Enter".
9. Once on this screen press "ctrl" + "alt" + "u" to begin the update.
10. Once the equipment configuration screen appears again the update is complete.

Steps to Update a DEC:

1. Take cues_dec_update_vxxx.cpkg and move to root of flash drive.
2. Insert flash drive into DEC with application running.
3. Wait 30 seconds.
4. Remove flash drive from DEC.
5. Reboot DEC.

Note: Both files (DEC and K2) can be on the same flash drive to save time.
If updating both K2 and DEC, then update the K2 first.

4.1.2 Updating the SRM and OZ4-HD Camera Firmware in the Field:

It is not possible at this time to view the current version of SRM or OZ4-HD Camera firmware. However, both the SRM and OZ4-HD Camera firmware can be upgraded in the field, by following the steps in Section 7.

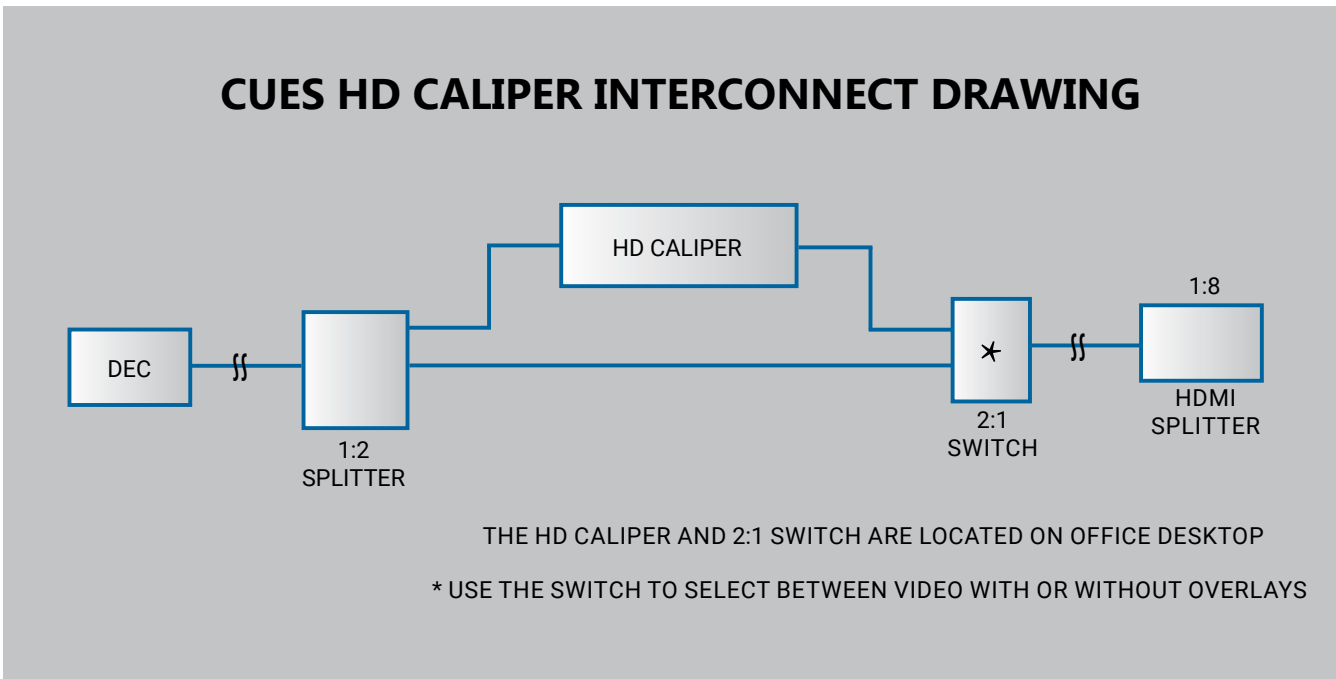
4.2 Configuring and Updating the ROUTER and WiFi Access Point in the Field:

ROUTERS and WiFi APs from CUES come pre-configured, so there is generally no need to configure them in the field. However they may need to be updated in the field as new configuration or firmware revisions are released.

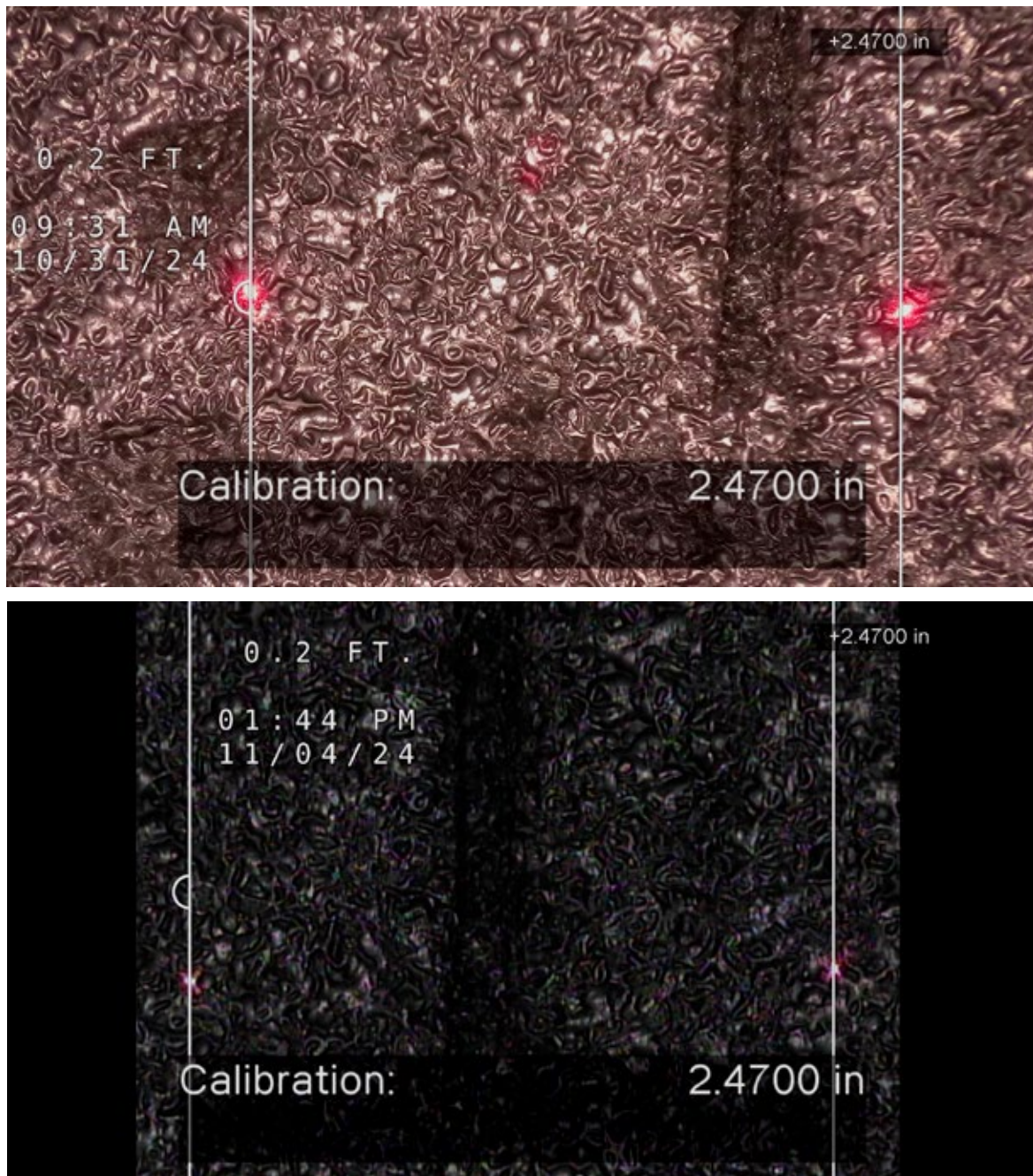
If a ROUTER or WiFi AP does need to be configured or updated in the field, as directed by CUES Customer Service, those instructions are available in the document “Dream Machine PRO, Ubiquiti, Configured Programming Procedure”. This document has CUES part number ELA00016-PGM, and is available through CUES’s Service & Support: <https://cuesinc.com/pages/contact-us>

4.3 Optional Equipment (Caliper, WiFi AP, Customer Network, WAN Connection)

4.3.1 HD Caliper: To add HD Caliper requires CUES P/N KIT00007, which includes a HD Caliper, a 1:2 HDMI Splitter, and a 2:1 HDMI Switch, all connected between the DEC HDMI Output and the 1:8 SPLITTER HDMI Input, as shown in the following diagram.



The Caliper and the 2:1 Switch are located on the office desktop, accessible to the operator. Detailed information about the HD Caliper can be found in the vendor’s user manual. The 2:1 switch allows the operator to either select HDMI video with Caliper overlay to be displayed on all monitors, or simply HDMI video without the Caliper overlay. The Switch includes two LEDs, indicating its current state (Video with or without Caliper overlay out).



The upper picture shows OZ4-HD video out of the HD Caliper, in its default 16:9 format. The lower picture shows OZ3-S (analog) video out of the HD Caliper, in its default 4:3 format.

The HD Caliper can be used with any camera type selectable on the K2 CONFIG screen. Because the DEC changes the aspect ratios between HD and Analog video, when operators change between HD and SD cameras, they will need to recalibrate the HD Caliper.

4.3.2 WiFi Access Point:

The WiFi Access Point option requires CUES P/N KIT00008. The WiFi Access Point equipment connects to ROUTER Port 5. Information on how to set up and connect to the WiFi AP is located in the last section of the CUES document “How to Configure a Dream Machine Pro”.

The WiFi AP provides three WiFi networks with the following SSID's : truckwifi, gnetwifi, and guestwifi. The passwords for these three SSID's may be found in the document “How to Configure a Dream Machine Pro”.

The truckwifi SSID allows connections to the truck network (e.g., HD camera, SRM, DEC) and the Internet (Router Port 9). The gnetwifi SSID allows connection to the GraniteNet PC, the DEC, and the Internet. The guestwifi SSID allows connection only to the Internet.

4.3.3 Customer Networks:

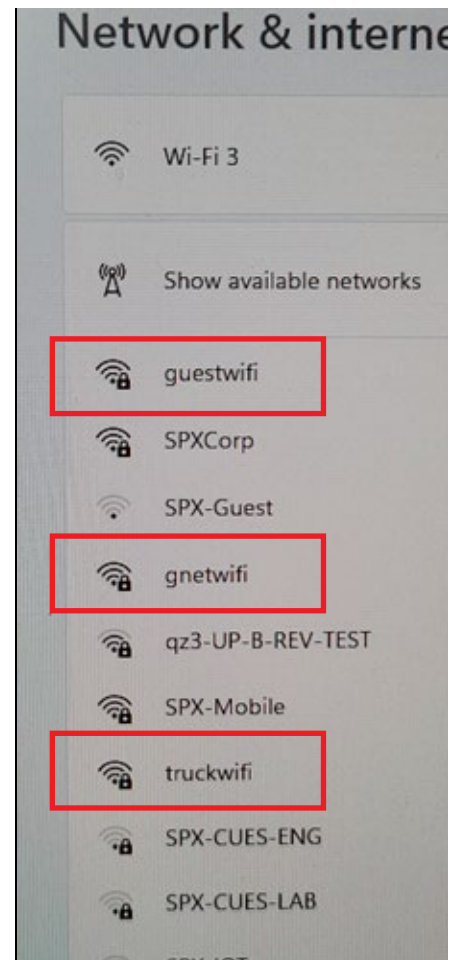
The ROUTER Port 8 provides a separate VLAN for customers to connect their own networking equipment. Customers should set their equipment for DHCP and will be assigned an IP address in the range 172.25.2.100 to 172.25.2.199 by the ROUTER. This VLAN only allows connectivity to the ROUTER WAN (Port 9), generally for internet connectivity.

4.3.4 WAN Connection:

The ROUTER Port 9 can be connected to the Internet if available.

4.4 RediKit on HD Trucks:

RediKit (CUES P/N TB334) can be used on HD trucks, provided a non-HD camera type is selected in the K2 CONFIG screen. By selecting any non-HD camera (OZII/III or LAMP), the SRM processes the RediKit (analog) camera signal just like an OZII/III or LAMP signal. The K2 receives and processes the RediKit signal from the SRM, and then passes it to the DEC. The DEC digitizes the signal and converts it to HDMI with titling overlay. If the RediKit video displays properly, it indicates that only the ‘analog’ signal path and the main cable are working correctly. There is no RediKit HD camera available currently, so follow section 6 of this document to test the HD path and HD camera.



Troubleshooting an HD Truck System

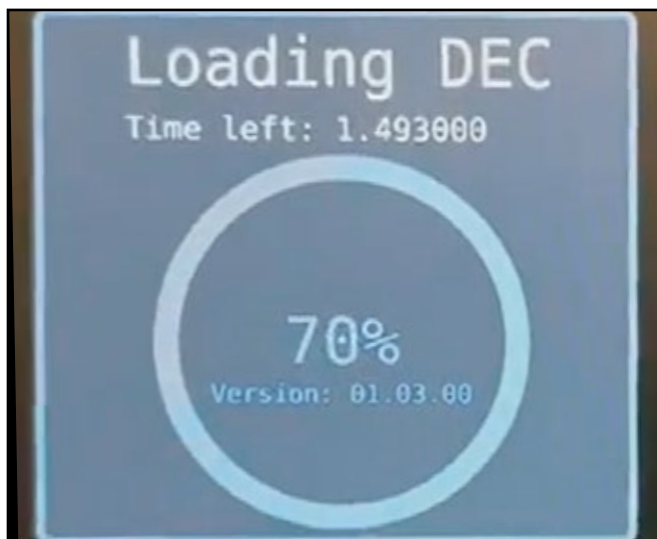
Before applying any of the following procedures, recheck that all equipment is powered on, the K2 CONFIG screen is set correctly, cables appear to be in order, switches in correct position(s), and Monitor Source Inputs set to HDMI. Verify that the SRM, DEC, and K2 are plugged into only ports 1-4 of the ROUTER, and that the GraniteNet PC is plugged into Port 6 of the ROUTER.

NOTE: HD trucks may require two separate test cables. P/N MD327-1 for testing with an OZ4-HD camera, and P/N TB319 if the HD truck also operates other camera types.

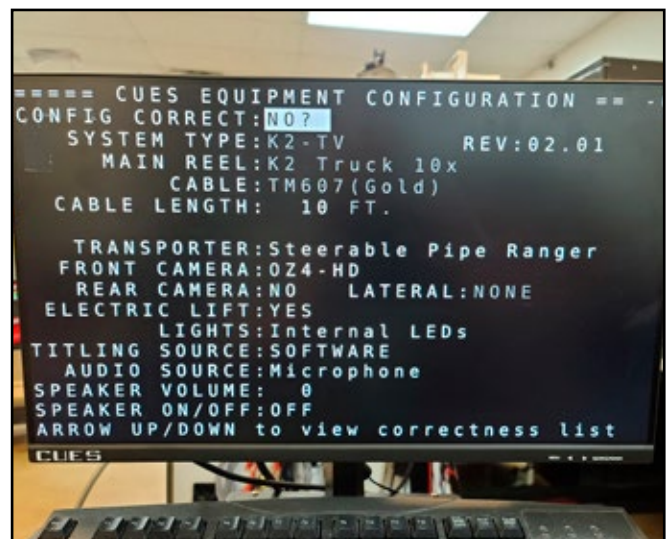
5.1 How to verify the current K2, DEC, and SRM F/W version:

The SRM F/W version cannot be determined in the field at this time.

For K2 and DEC: Power up the DEC first, without the K2. The DEC should boot to a display showing the current DEC firmware (01.03.00 in this example). Now power up the K2. The monitor should eventually show the K2 CONFIG Screen, with the current K2 firmware (02.01 in this example).



DEC FIRMWARE REVISION DISPLAY



CONFIG SCREEN SHOWING K2 FW REV

5.2 No CONFIG Screen after Boot-up?

If the CONFIG screen doesn't appear after startup, the system may not have booted correctly. Verify that the truck monitors are set for HDMI. Check that all equipment is powered, including the 1:8 HDMI Splitter and Elgato HDMI Frame Grabber.

Power down both the K2 and the DEC. Power the DEC only and verify that it lands on a display of its firmware version; check that it is the latest version. Then power up the K2 and verify that that it lands the CONFIG screen with titling and showing the firmware version. Verify it is the latest version.

If there is still no CONFIG Screen titling at this point, switch the Office Monitor from HDMI to BNC to display the SD video from the K2. Does the CONFIG Screen with titling appear now? If so, then there may be a DEC, ROUTER, or interconnect cabling issue. If not, then there may be a problem with the K2 or the SRM.

5.3 Titling but no video after leaving the CONFIG screen?

Recheck that the CONFIG screen is set correctly, then exit the CONFIG screen again.

Check the SRM Front Panel LEDs:

- >For OZ4-HD, verify SRM D1 LED is flashing, indicating data from the camera
- >For any other camera, verify SRM A1 LED is solidly on

Open the Power Supply Status Screen. Are the camera Load Voltage and Current reasonable? (Camera Load Voltage is typically 40 to 60V and Camera current is typically 0.2 to 0.4A.) Verify that the K2 and DEC are running the latest F/W.

Follow sections 6.1 and 6.2 to use the DEC to ping the camera and verify that the camera is running and the main cable is ok.

Advanced Test for OZ4-HD camera:

Refer to section 6.3 for information on the ONVIF application. Connect a separate PC running the ONVIF application to the ROUTER, following the instructions in section 6.3 (use any open Port 1-4, or the WiFi AP if available). Verify that you can ping IP addresses 172.25.0.100 and 172.25.0.110, indicating that the camera is running, and the main cable is working properly. If pinging is unsuccessful, this implies either a bad camera/DEC/SRM/ROUTER or a bad main cable.

If you can ping the camera, then open ONVIF to view HD video from the OZ4-HD camera (IP Address 172.25.0.100). See Section 6.3 for details on how to use ONVIF. If you have good video in ONVIF, then the problem is on the truck-side in the DEC or an interconnection cable. If there is no video, then the problem is most likely the camera module inside the OZ4-HD.

If you cannot ping the OZ4-HD camera, repeat these tests with a test cable MZ327-1. Using the test cable, if you can ping both IP addresses and if the HD video is good in ONVIF, then the main cable is likely bad.

Advanced Test for CUES Analog (SD) Cameras:

Set the Office Monitor from HDMI to BNC to display the incoming SD video directly from the K2. If there is video on the monitor, then there may be a problem in the DEC or the coax from the K2 to the DEC BNC#1 pigtail. If no video on the monitor, remove power to the SRM to force the SRM to pass SD video... if video appears after removing the SRM power (USB-A connector on the SRM), this may indicate a problem with the SRM, ROUTER, or K2.

If there's still no video, connect the test cable CUES P/N TB319. If video appears, the issue is likely with the main cable, otherwise it is likely to be the camera. In the latter case, if a RediKit is available, use its analog test camera to verify video.

5.4 HD Camera Lagging video, Video Dropouts, or Slow AutoExposure Recovery

These types of problems often result when the camera runs at excessively high or low data rates. The cause may be an incorrect parameter setting in the HD Camera Module, or a problem with the camera itself.

Follow the steps in Sections 6.1 and 6.4 to open the Bandwidth Meter on the DEC. The display should indicate that the Data Rate is running quiescently between 5 and 7 Mb/s. If not, the camera needs to

5.5 Troubleshooting no GraniteNet Video, or GraniteNet doesn't Record

- ◆ Is the Elgato HDMI Frame Grabber powered on? (Check for green light on unit)
- ◆ Are the input (HDMI) and output (USB) cables secure, and connected to the proper destinations?
- ◆ Is the USB from Elgato going into a USB3.x port on the GraniteNet PC?
- ◆ Is the GraniteNet software version 5.8.0 or later?
- ◆ Does GraniteNet contain module P/N GN560 (MPEG4 H.265)?
- ◆ Are the GraniteNet Video Recording settings correct?
- ◆ Is the GraniteNet Audio set correctly? Set to GraniteNet PC Audio if K2 audio is connected to the GraniteNet PC. Set to Elgato if K2 audio is connected to the Elgato.

5.6 Troubleshooting GraniteNet with DUC or SFX

- ◆ Does the GraniteNet PC have a 2nd NIC card for DUC/SoLID FX? Are the card static IP settings correct?
- ◆ Is a VDSL Bridge Ethernet Output connected to the 2nd NIC? Are the ETH lights flashing on the ETH connectors at both ends of the cable, indicating data activity over the cable?
- ◆ From the GraniteNet PC, can you ping the DUC or SoLID FX? If so, then the DUC camera or SoLID FX Electronics box may be at fault. If not, then there may be a bad cable. Retest with test cable P/N TB319.
- ◆ (DUC: Ping 192.168.0.125 or 192.168.0.126)
- ◆ Are the GraniteNet Video Recording settings correct?
- ◆ Open GraniteNet>View>Panels and select the correct Panel(s) to view live DUC video.

5.7 Troubleshooting the HD-DVR

- ◆ Has a battery been installed? Are the time and date set and displayed properly?
- ◆ Is the unit powered up? (Press the On/Off button and the LCD On Button. Check for Green light on the unit.)
- ◆ Is an HDMI cable inserted properly, and from a valid source (e.g., the 1:8 HDMI Splitter)
- ◆ (If there is video on the Main truck monitor, is that same video displayed on the small HD-DVR built-in LCD monitor?)
- ◆ Verify either a Flash Drive or SD card is inserted, 512G or less.
- ◆ When the Record Button is pressed, does the Red Dot appear indicating that recording is underway? When you press the Record Button a second time, does the Red Dot disappear?
- ◆ Is the recorded file on the storage device (Flash drive or SD card), and are its properties HD (1920 x 1080p)?
- ◆ Saving large files may take some time. Please ensure you wait long enough before removing the storage device after stopping the recording.

5.8 Troubleshooting the HD Caliper

- Verify the Caliper is powered on.
- Be sure the input and output cables are secure and connected to the proper destinations. (Caliper Output to 2:1 HDMI Switch Input; Caliper Input to one output of the 1:2 SPLITTER.)
- Don't see the Caliper cursors? Always see the Caliper cursors?
- Check that the 2:1 Switch is set to the proper state by checking the RED 'state' LEDs on the device. Verify that the 2:1 switch is actually switching.



6 Checking IP Connectivity

Checking IP Connectivity, Video Quality with ONVIF, and OZ4-HD Data Rate (Advanced Topics)

The OZ4-HD functions operate like any CUES legacy analog camera. Verifying the functions of the OZ4-HD (pan, rotate, zoom, etc.) is done in the same way as with CUES legacy cameras, using a gamepad controller.

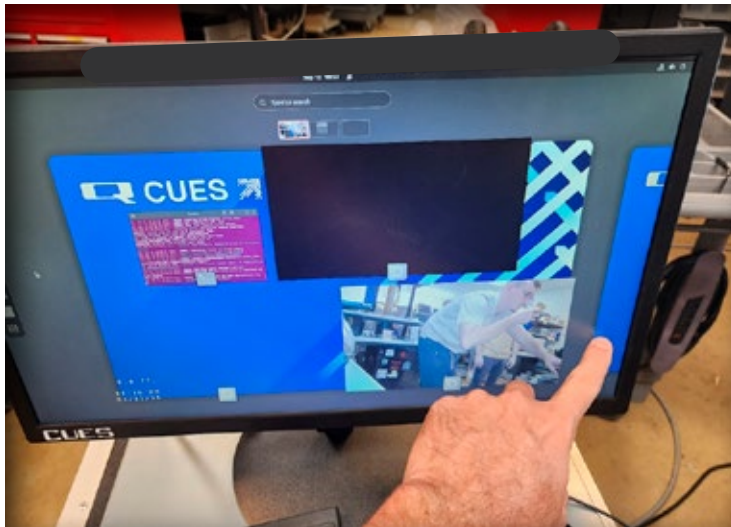
However, the OZ4-HD camera video signal uses IP technology, so testing the camera communications and video quality require different techniques than for legacy cameras. This section covers those techniques and applies to the OZ4-HD only.

6.1 Gaining Control of the DEC

This section describes how to access the DEC for testing and troubleshooting purposes. This will be necessary in order to perform the tests in sections 6.2 and 6.4. Connect an OZ4-HD to the truck system and set the system up to display HD video.

When plugging a keyboard and mouse into the DEC computer it can be difficult to make any changes as there is an overlay preventing any actions from happening while the DEC application is running. This guide will show you how to get the DEC to a state where you can make changes or perform troubleshooting techniques.

1. Press the windows key on a keyboard plugged into the DEC computer. This should give you an overview of the desktop and show all processes running side by side. This should also show you an adjacent desktop to the right of the screen. See the image below for details.



2. Clicking on this additional desktop will open a new, clean workspace with no running processes, providing the ability to fully utilize the space for any necessary troubleshooting.
3. Press the windows key again to lock into this clean desktop.
4. From here, a terminal can be opened or the other troubleshooting tools of the DEC computer can be accessed from any other guide.

6.2 Checking IP Connectivity between the DEC and the OZ4-HD Camera

This section describes how to check IP continuity between the DEC and the Camera Co-Processor (IP 172.25.0.110), Camera Module (172.25.0.100), and the SRM (172.25.0.130). Connect an OZ4-HD to the truck system and set the system up to display HD video.

To check on the connectivity of items downhole we can use a ping test. Ping is a tool built into computers that allows us to check if it has a path to another network device. To get the DEC into a state where a ping test can be performed, please see section 6.1 “Gaining Control of the DEC” section.

Co-Processor:

1. Open a terminal by pressing “CTRL” + “ALT” + “T”, a new window should pop up that has the text Cues@cues-dec:~\$, you should see a cursor blinking behind the \$.
2. In the terminal, type the following:

```
1 ping 172.25.0.110
```

3. Press “Ctrl” + <C> to stop pinging. If the connection is successful, the following should be displayed per below:

```
cues@cues-dec ~
cues@cues-dec:~$ ping 172.25.0.110
PING 172.25.0.110 (172.25.0.110) 56(84) bytes of data.
64 bytes from 172.25.0.110: icmp_seq=1 ttl=128 time=24.9 ms
64 bytes from 172.25.0.110: icmp_seq=2 ttl=128 time=27.5 ms
64 bytes from 172.25.0.110: icmp_seq=3 ttl=128 time=18.0 ms
64 bytes from 172.25.0.110: icmp_seq=4 ttl=128 time=19.0 ms
64 bytes from 172.25.0.110: icmp_seq=5 ttl=128 time=22.9 ms
^C
--- 172.25.0.110 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 400ms
rtt min/avg/max/mdev = 17.992/22.460/27.473/3.558 ms
cues@cues-dec:~$
```

An unsuccessful ping will look similar to the following displaying “Destination Host Unreachable”:

```
cues@cues-dec ~
cues@cues-dec:~$ ping 172.25.0.100
PING 172.25.0.100 (172.25.0.100) 56(84) bytes of data.
From 172.25.0.223 icmp_seq=9 Destination Host Unreachable
From 172.25.0.223 icmp_seq=10 Destination Host Unreachable
From 172.25.0.223 icmp_seq=11 Destination Host Unreachable
From 172.25.0.223 icmp_seq=12 Destination Host Unreachable
From 172.25.0.223 icmp_seq=13 Destination Host Unreachable
From 172.25.0.223 icmp_seq=14 Destination Host Unreachable
^C
--- 172.25.0.100 ping statistics ---
14 packets transmitted, 0 received, +6 errors, 100% packet loss, time 1327ms
pipe 3
cues@cues-dec:~$
```

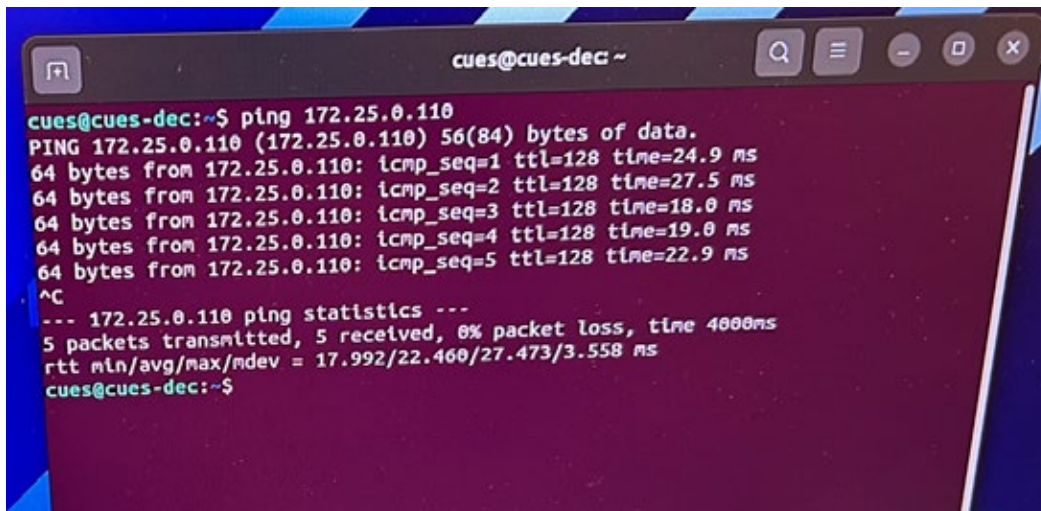
6 Checking IP Connectivity

Camera Module:

1. Open a terminal by pressing “CTRL” + “ALT” + “T”, a new window should pop up that has the text Cues@cues-dec:~\$, you should see a cursor blinking behind the \$.
2. in the terminal, type:

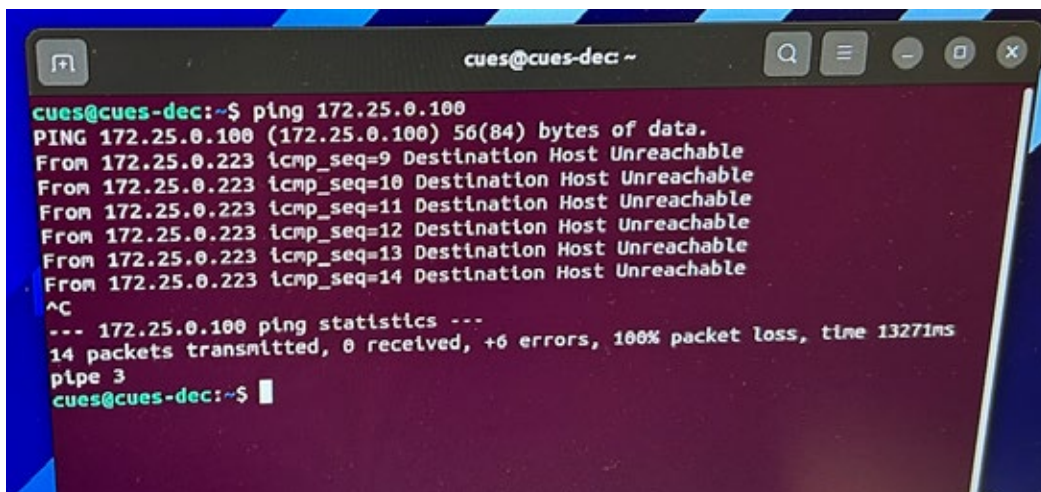
```
1 ping 172.25.0.100
```

3. Press “Ctrl” + <C> to stop pinging. If the connection is successful, the following should be displayed per below:



```
cues@cues-dec ~
cues@cues-dec:~$ ping 172.25.0.110
PING 172.25.0.110 (172.25.0.110) 56(84) bytes of data.
64 bytes from 172.25.0.110: icmp_seq=1 ttl=128 time=24.9 ms
64 bytes from 172.25.0.110: icmp_seq=2 ttl=128 time=27.5 ms
64 bytes from 172.25.0.110: icmp_seq=3 ttl=128 time=18.0 ms
64 bytes from 172.25.0.110: icmp_seq=4 ttl=128 time=19.0 ms
64 bytes from 172.25.0.110: icmp_seq=5 ttl=128 time=22.9 ms
^C
--- 172.25.0.110 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4000ms
rtt min/avg/max/mdev = 17.992/22.460/27.473/3.558 ms
cues@cues-dec:~$
```

An unsuccessful ping will look similar to the following displaying “Destination Host Unreachable”:



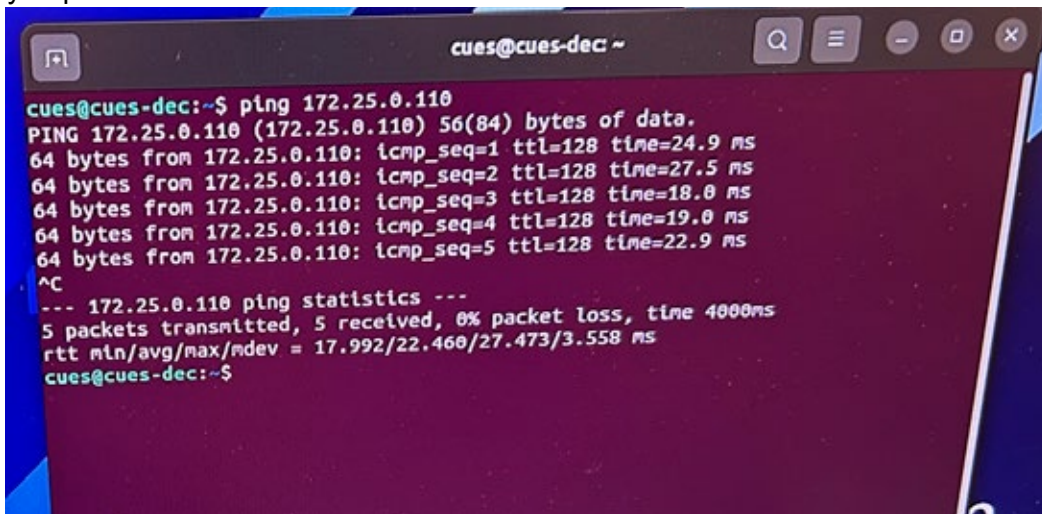
```
cues@cues-dec ~
cues@cues-dec:~$ ping 172.25.0.100
PING 172.25.0.100 (172.25.0.100) 56(84) bytes of data.
From 172.25.0.223 icmp_seq=9 Destination Host Unreachable
From 172.25.0.223 icmp_seq=10 Destination Host Unreachable
From 172.25.0.223 icmp_seq=11 Destination Host Unreachable
From 172.25.0.223 icmp_seq=12 Destination Host Unreachable
From 172.25.0.223 icmp_seq=13 Destination Host Unreachable
From 172.25.0.223 icmp_seq=14 Destination Host Unreachable
^C
--- 172.25.0.100 ping statistics ---
14 packets transmitted, 0 received, +6 errors, 100% packet loss, time 13271ms
pipe 3
cues@cues-dec:~$
```

SRM:

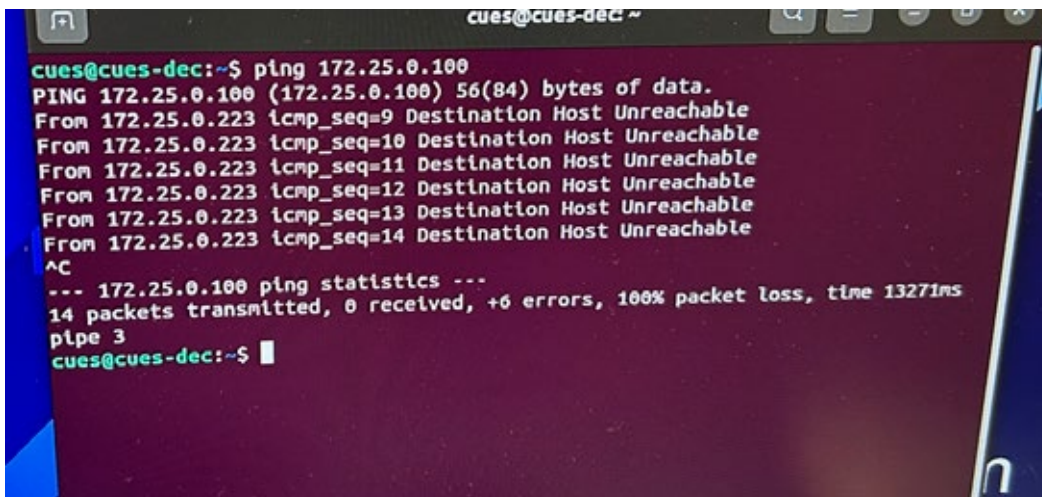
1. Open a terminal by pressing “CTRL” + “ALT” + “T”, a new window should pop up that has the text Cues@cues-dec:~\$, you should see a cursor blinking behind the \$.
2. in the terminal, type:

```
1 ping 172.25.0.130
```

3. Press “Ctrl” + <C> to stop pinging. If the connection is successful, the following should be displayed per below:



An unsuccessful ping will look similar to the following displaying “Destination Host Unreachable”:





Checking IP Connectivity

6.3 Running the ONVIF Application to Check OZ4-HD Video Quality

This section focuses on how to check the Camera HD Video quality independently of the DEC. Connect an OZ4-HD to the truck system and set the system up to display HD video.

Troubleshooting OZ4-HD Video

This section 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 the computer Ethernet interface for a static IP address. Set the static address to 172.0.25.99 and the Netmask to 255.255.0.0)
- 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

```

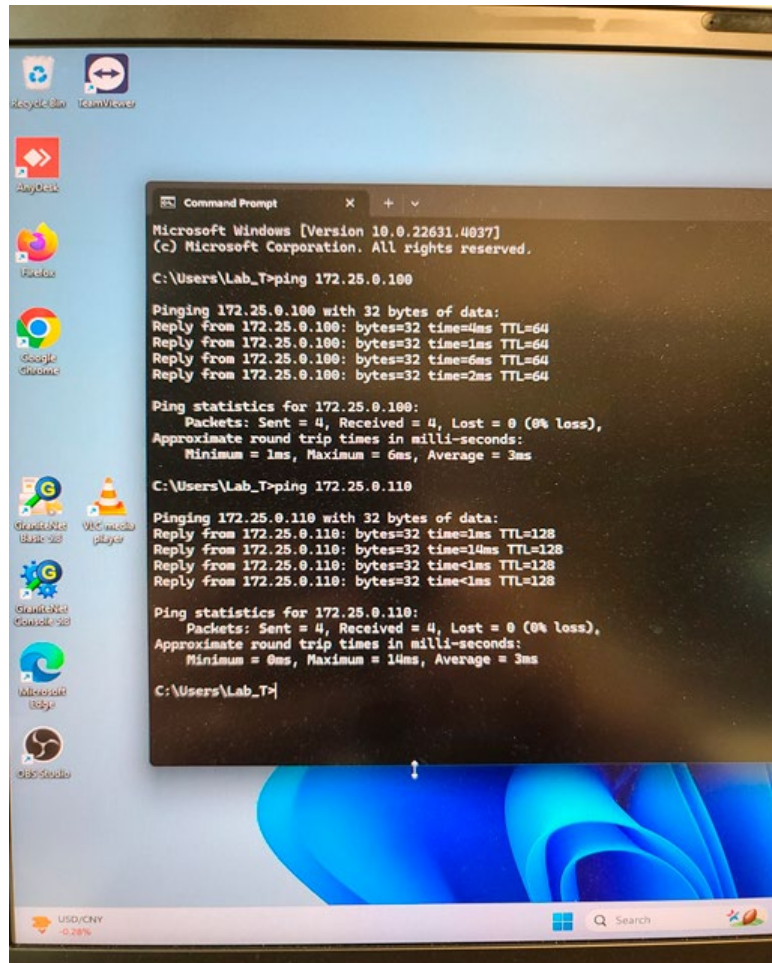

Troubleshooting OZ4-HD Video - continued

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.

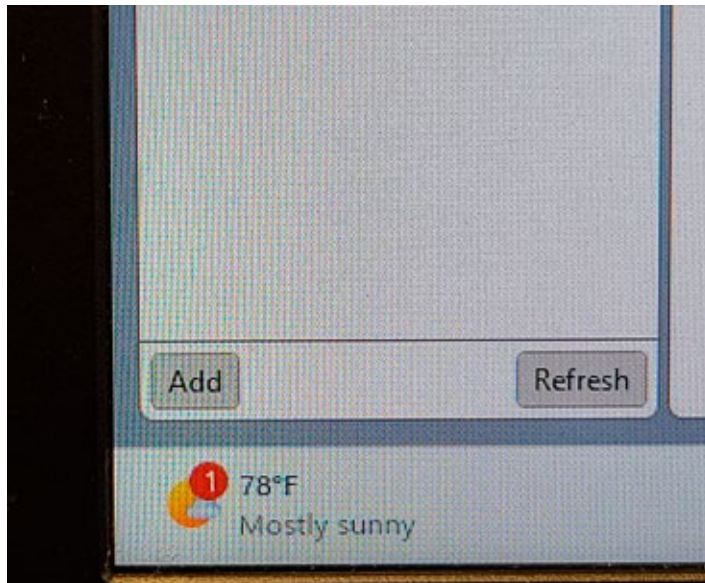


6 Checking IP Connectivity

Troubleshooting OZ4-HD Video - continued

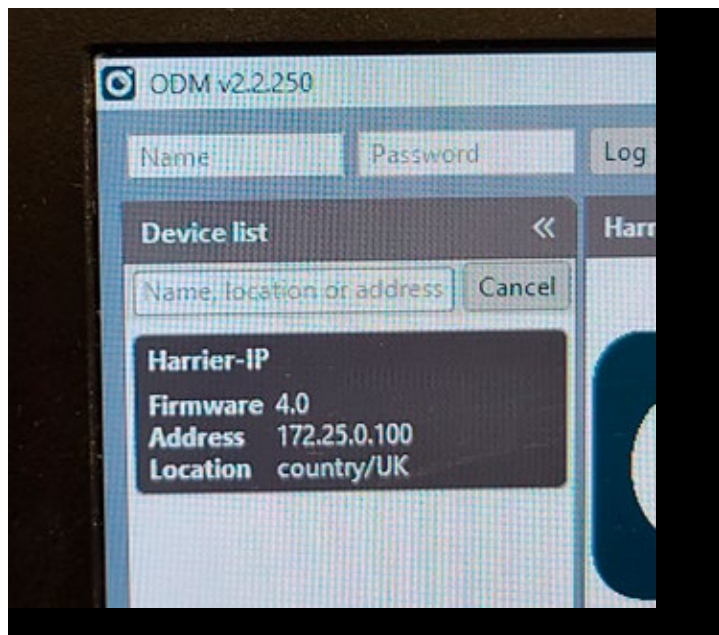
Step 4:

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.

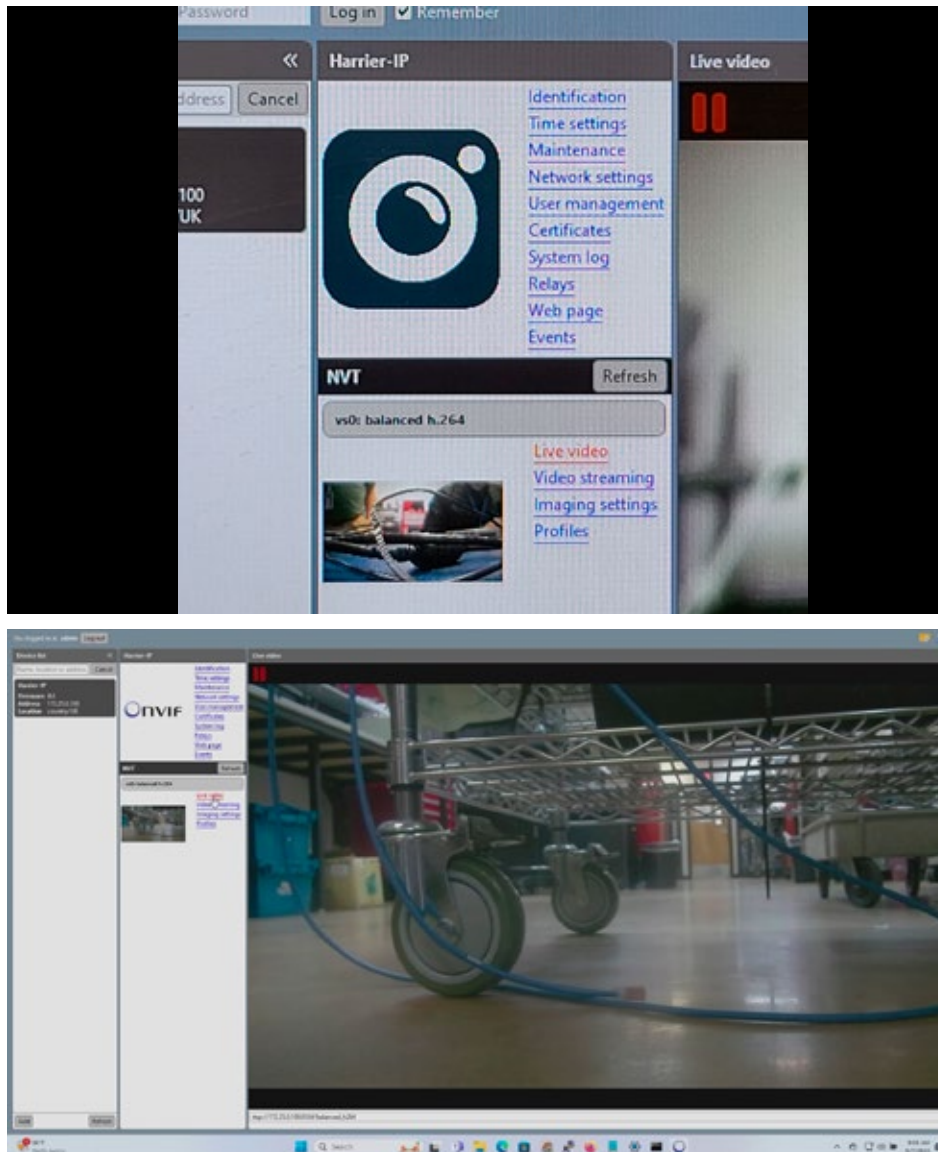


Step 5:

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 in this section. 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.

6 Checking IP Connectivity

6.4 How to use the Bandwidth Meter to check the OZ4-HD's Data Rate

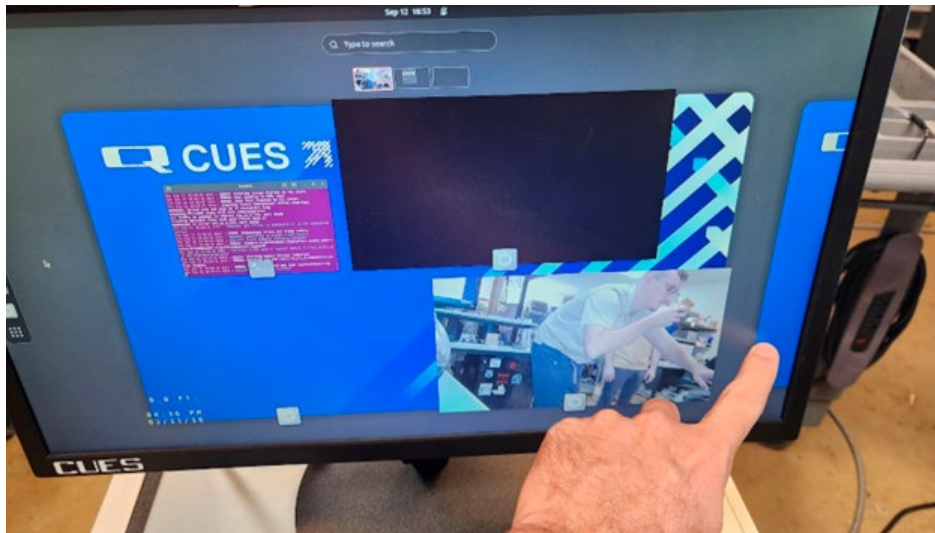
This section illustrates how to check if the OZ4-HD data rate is within acceptable limits. Connect an OZ4-HD to the truck system and set up to display HD video.

Test for Camera Average Data Rate:

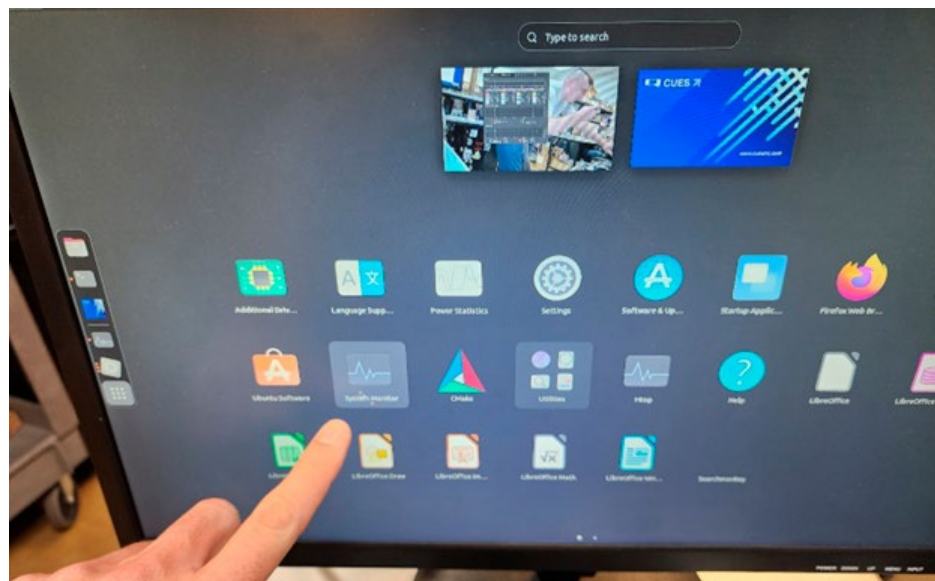
Description: This can be used to monitor DEC bandwidth to assist with diagnosing glitching or lagging OZ4-HD video.

Process:

1. Press the [windows key] to open up a view that shows all available [virtual desktops]. Then click the desktop on the right.

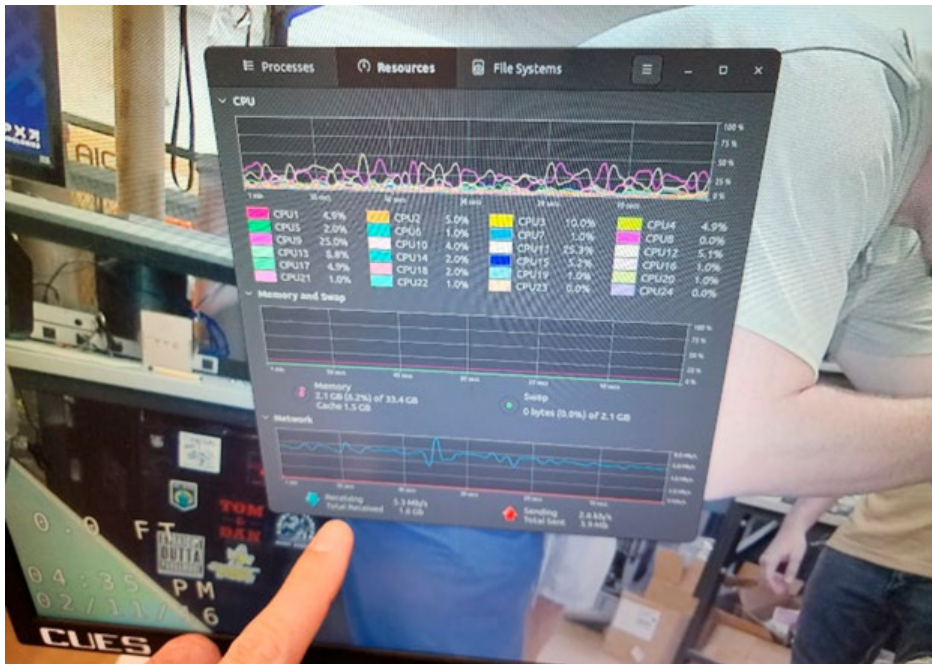


2. On the left ribbon, click the [dot grid] short cut to open system preferences menu, and then click [system monitor].

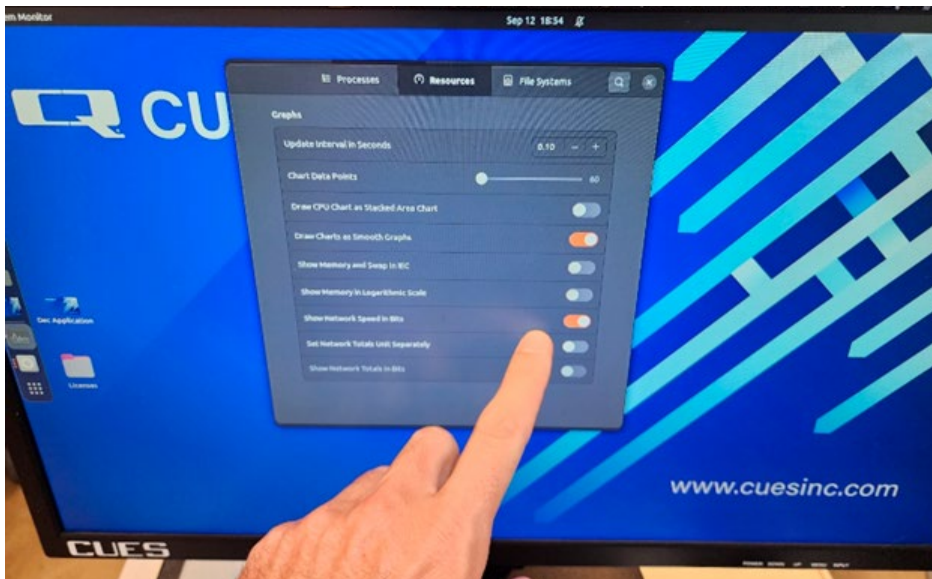


Test for Camera Average Data Rate - continued:

3. Select the “Resources” tab. Network consumption is displayed in the bottom plot. It should average 4~6 MBps under a fixed view, and will spike as the camera scene changes, but should not exceed system limit of 10 Mbps. If it is consistently running above 6 Mbps, there might be a bad cable or connection in the system. It could also indicate that the camera is malfunctioning.

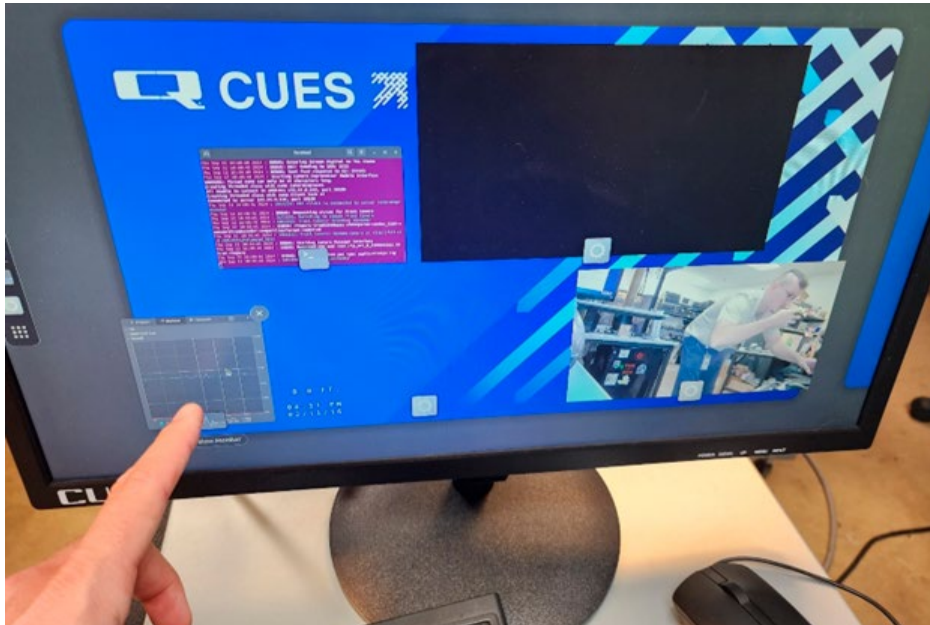


4. The Network Consumption might not be setup for Bits per second. Click the 3 horizontal bars on the top right to open preferences, and toggle [Show Network Speed in Bits].

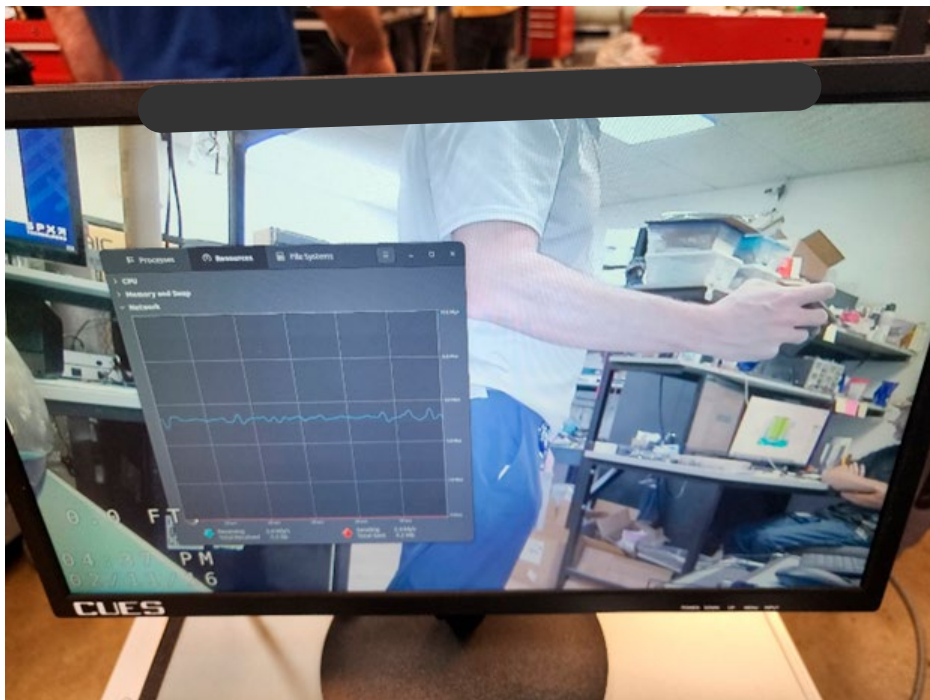


6 Checking IP Connectivity

5. To move the meter to overlay on top of the camera video, click the [windows key] button and drag it back to the left [virtual desktop]. Then click on it and it will stack on top.



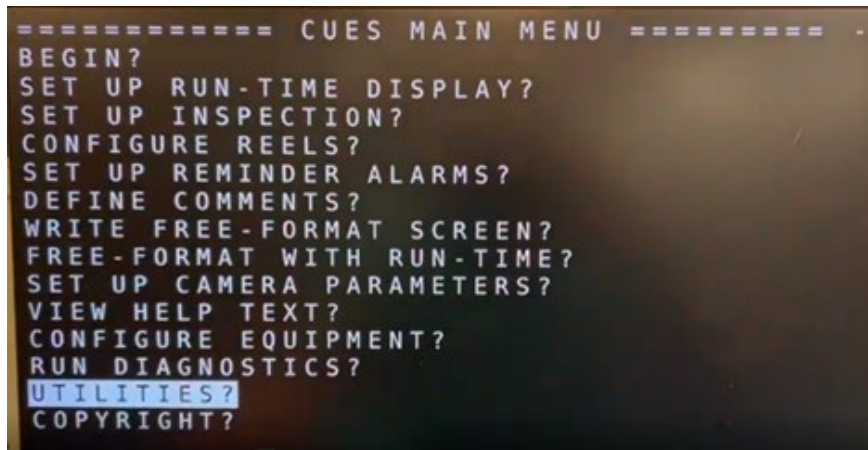
6. The drop downs can be collapsed so just the system bandwidth is displayed over the video.



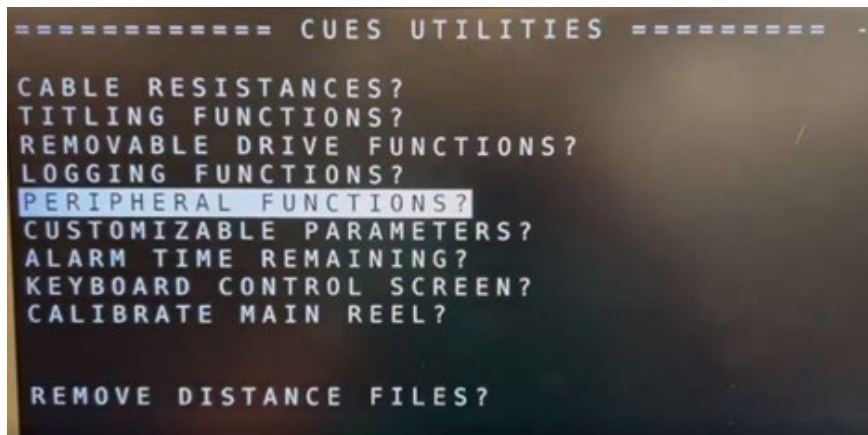
Updating SRM and OZ4-HD Firmware in the Field

These features are located within the same nested menu on the K2. To see the correct menu ensure you have gained administrative access within the K2 using the usual method and accept the equipment configuration to show video from the system. The SRM can always be updated regardless of camera selected but to update the camera main body processor (ELA0003) and camera coprocessor (ELA0006) you will need to have the camera selected as an OZ4-HD.

Once video is showing, press the ESC key to get the system menu. Navigate to the “UTILITIES” menu as show below.

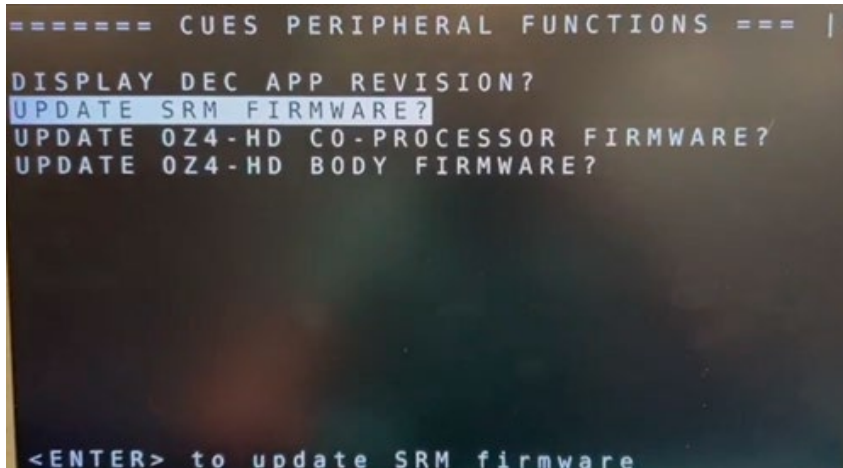


From the utilities menu select “PERIPHERAL FUNCTIONS”.

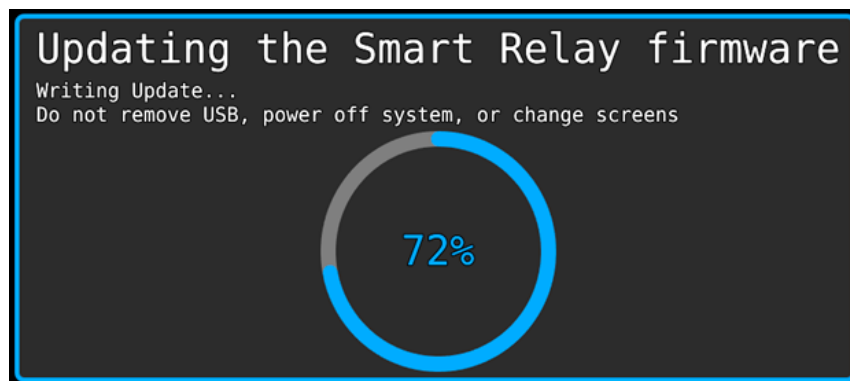


7 Updating SRM and OZ4-HD Firmware in the Field

This will show the new options including show DEC version, update SRM, update camera Coprocessor and update camera main body firmware.



Selecting any of these options will have a title box come up over this window to display the relevant information. To perform the three update options shown here a flash drive with the necessary update files will need to be inserted into the DEC. Some examples of the title windows are shown below:



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
HD System Operational Manual	12.15.24	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.

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60
Years

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