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SOFTWARE MANUAL. MAN-066, REVISION C

OPENVISION HD.

OVHD-NDT-70 SOFTWARE MANUAL

Revision Record

	Date	Description
	1/13/2024	Updated software manual to Version 1.7

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A	03/2023	Production Release
B	03/2023	Content Revision
C	01/2025	Content Revision

Power Cycling

Each OpenVision™ HD unit utilizes an embedded microprocessor to handle and coordinate all aspects of safety and normal operating functions. With such a system, it requires several seconds to initialize before starting normal operations. Following the Startup and Shutdown sequences below is critical for normal operation; (Figure 1) for key and indicator locations.

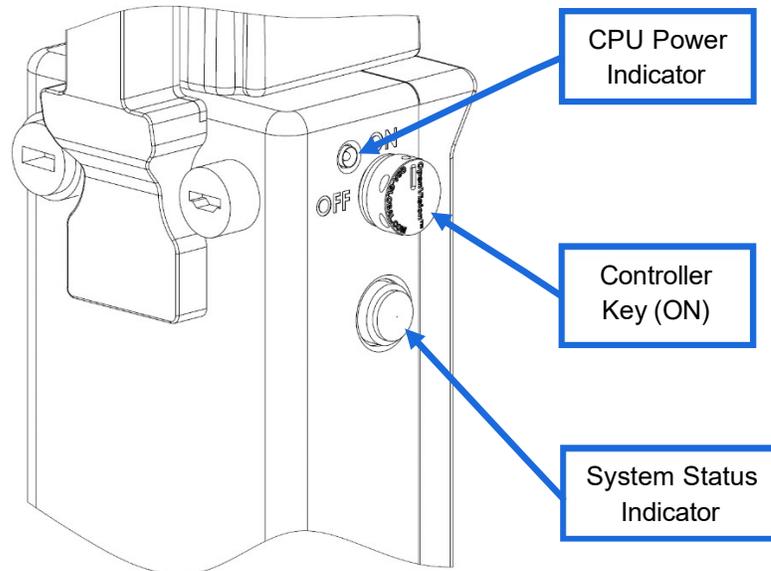


Figure 1 Indicators and Power Switch Details

Startup

When the Controller Key is turned to its ON position, the CPU indicator will immediately turn on (blue). A boot up screen will be displayed during initialization, and the System Status Indicators will also illuminate. When these indicators turn green and the *Home Screen* (Figure) is displayed, system startup is complete and ready for normal operation.

Xray 60-day Warning

The *60-day warning* screen (Figure 2) alerts customers of an idle system requiring a warmup cycle prior to field usage. If idle for 60 or more days. This warning will prevent potential Xray tube field failure.

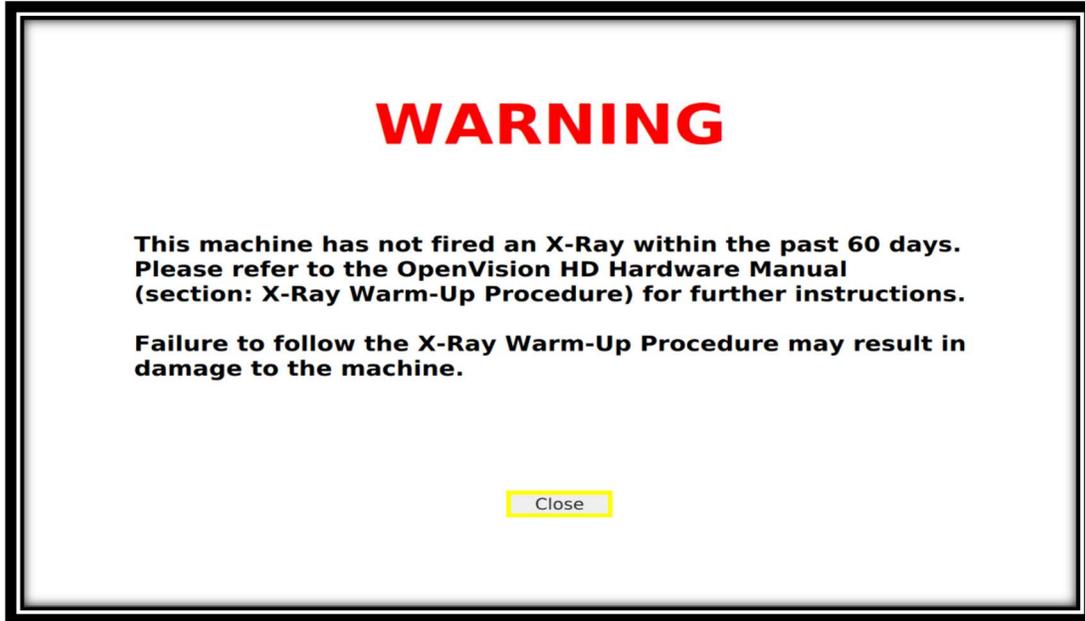


Figure 2 Warning screen

If your Openvision HD System has not been run for an extended period of time (60 days or more), you need to perform a Manual Warm Up of the X-Ray Tube as follows in steps 1-6 to avoid machine damage:

To perform a manual warm-up of the X-ray tube:

1. Install the controller key and turn to ON: allow time for system to initialize. While warming up, the status indicator light (located on either side of main housing) will turn **AMBER**. System status indicator lights will turn **GREEN** when the system is ready.
2. Set the kV and mA to the LOW settings.
3. Turn on x-rays for 30 seconds. Ensure the status indicator light turns from **GREEN** to **RED** and that the audible beeps are produced during the exposure.
4. Reset the kV and mA to the MEDIUM settings.
5. Turn on x-rays for another 30 seconds. Ensure the status indicator light turns from **GREEN** to **RED** and that the audible beeps are produced during the exposure.
6. The unit is now ready to run on any setting – LOW, MEDIUM or HIGH for normal inspection.

If any of the indicators noted in this section do not occur as noted or the machine is operating abnormally, shut down the device and review the information in the Troubleshooting section of this manual. If the issue cannot be resolved after reviewing the Troubleshooting section, then contact QSA Global, Inc. as the unit may require repair prior to further use.

Shutdown

Turning the Controller Key to its OFF position will begin the shutdown sequence. The Status Indicator Lights will turn off after one to three seconds, but the system will not be fully powered down until the CPU Power Indicator LED is turned off. Once off, remove the key, and place the unit in storage. No additional cool down is required.

CAUTION: FAILURE TO ALLOW THE SYSTEM TO PROPERLY SHUTDOWN MAY CORRUPT INTERNAL MEMORY, AND UNIT MAY NOT BE ABLE TO RESTART.

Home Screen

The *Home Screen* (Figure 3) displays the output of the targeting camera (outlined in red) and the Settings menu across the bottom (outlined in yellow).

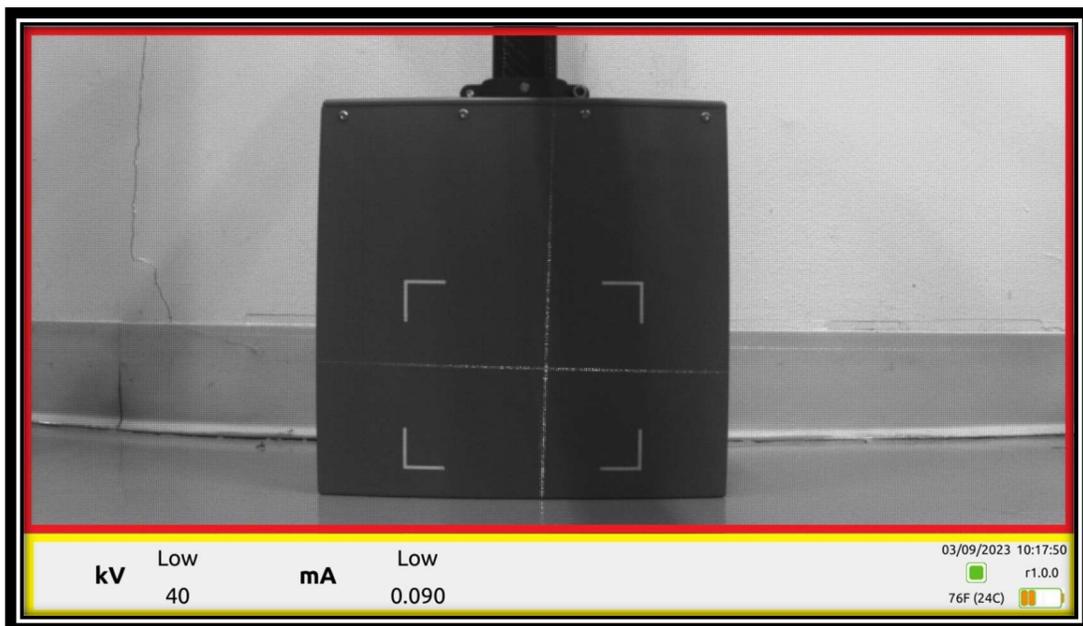


Figure 3 Home Screen

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Settings Menu

The *Settings* menu will always be displayed when the *Home Screen* is active. On the *Home Screen*, the *Settings* menu is inactive (i.e. unable to change values) by default. The *Settings* menu can be activated from either the *Home Screen* or the *X-Ray Imaging Screen* by holding the hat switch down for three seconds (Figure 4).

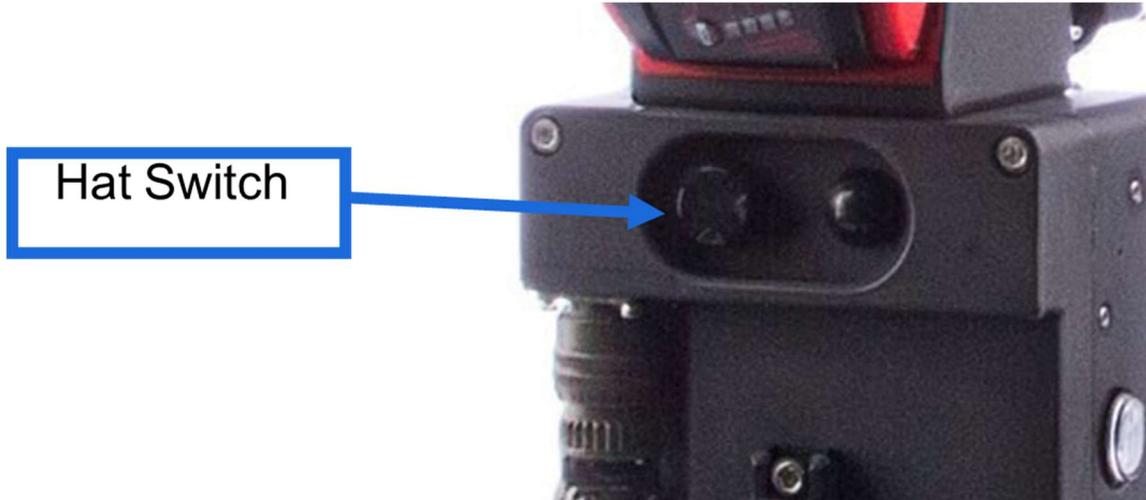


Figure 4 Hat Switch

When the X-Ray voltage becomes highlighted in yellow (Figure 5), the *Settings* menu is active, and can be navigated using the hat switch's left/right positions. Up/down positions change the value of the highlighted setting.

The *Settings* menu becomes disabled when the hat switch is in its neutral (center) position for 15 seconds.

Note: While the *Settings* menu is active, the hat switch cannot be used to navigate to another screen.

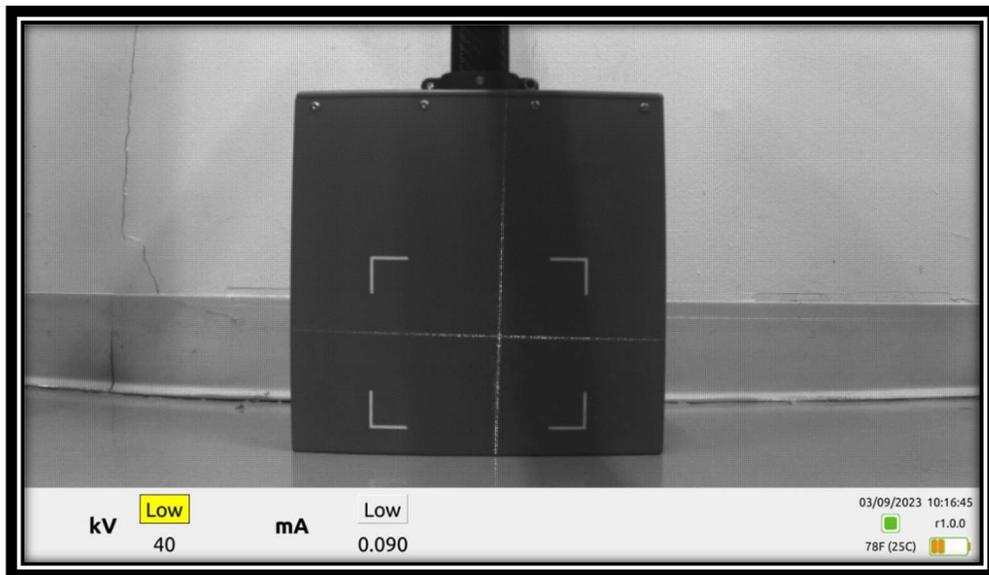


Figure 5 Active Settings Menu

Table 1 shows the settings and user adjustable values available in the *Settings* menu:

Table 1 Settings Menu Parameters

Setting (Units)	Possible Values
X-Ray Voltage (kV)	Low, Medium, High (default Low)
X-Ray Current (mA)	Low, Medium, High (default Low)

The *Settings* menu also displays the following system information on the right-hand side:

- System date and time
- Software version
- Current battery level (OpenVision HD)
- X-Ray tube temperature
- OpenVision™ HD online status indicator

Firing X-Rays

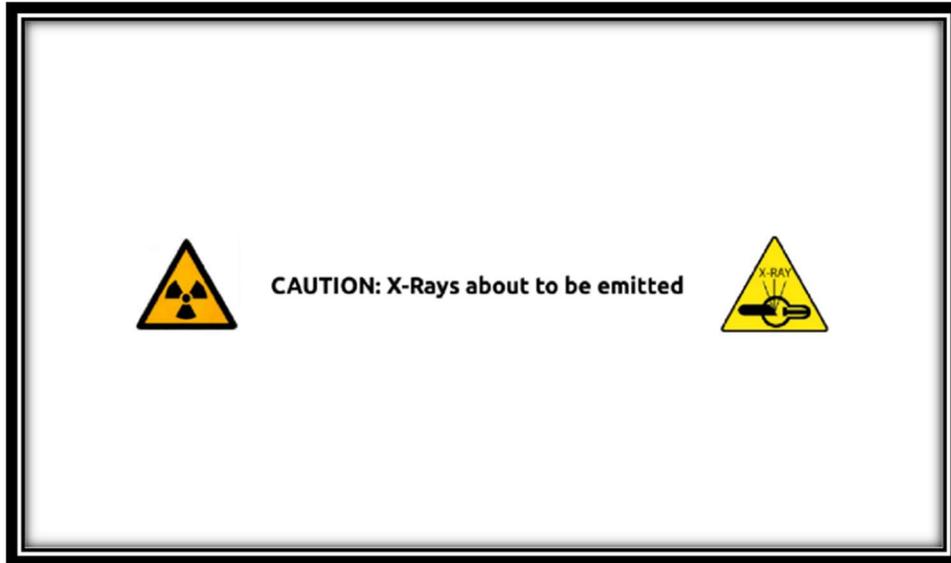


Figure 6 X-Ray Warning Screen

The Trigger Handle shown in (Figure 7) is a positionally adjustable fixture that allows the user to grip the machine, fire X-rays, and take snapshots and video recordings.

- **Trigger Handle:** Hold the red trigger to begin firing X-rays. Release the trigger to stop firing X-rays. The Snapshot Button can then be pressed as need while X-rays continue to fire. You can take an image by pressing and releasing the button or take a video by pressing for two seconds and then releasing. The video will continue to record until the button is pressed again. If the operator's hand is removed from the Trigger Handle, X-rays will stop firing.

System will transition to the *X-Ray Warning Screen* (Figure 6) for five seconds, during which the buzzer will pulse at one-second intervals. The System Status Indicators (on either side of main housing) will also turn amber.

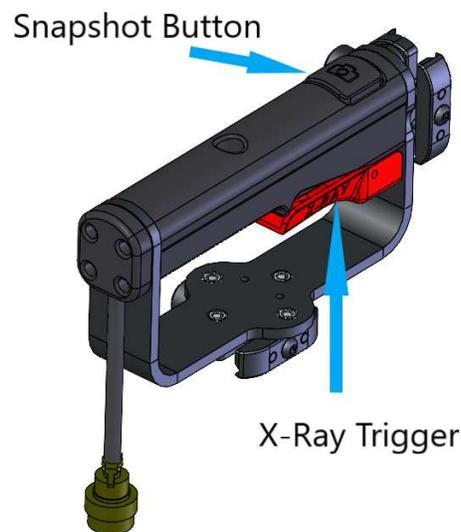


Figure 7 Trigger Switch Options

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X-Ray Live Image Screen

After five seconds of holding the X-ray trigger, the system will begin emitting X-Rays, and transition to the *X-Ray Live Image Screen* (Figure 8); (*Settings* menu is hidden by default). System Status Indicators remain amber-colored, and the buzzer pulse rate changes to two-second intervals.

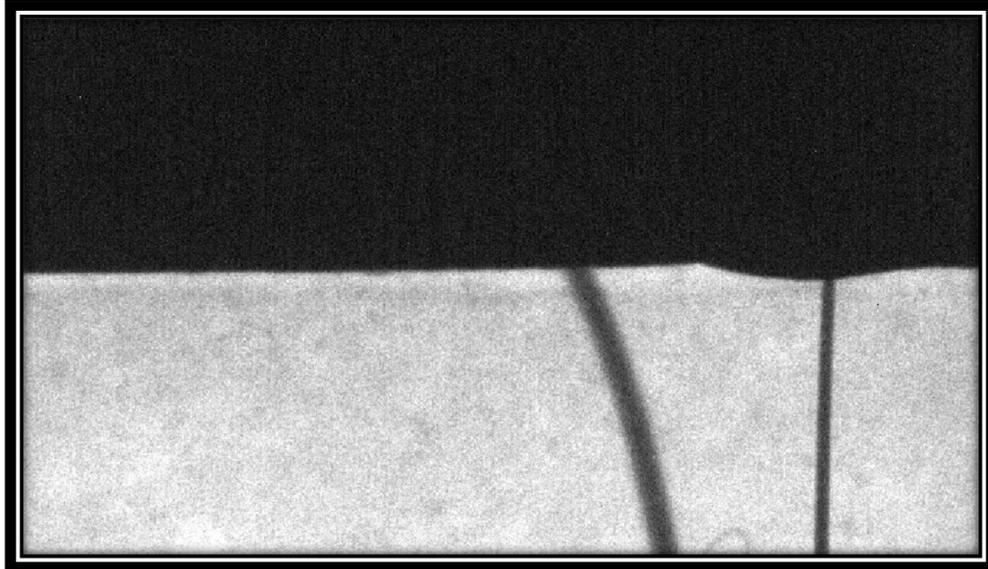


Figure 8 X-Ray Live Image Screen

To change settings while emitting X-Rays, hold down the hat switch for three seconds (Figure 4) to show and activate the *Settings* menu (Figure 9).

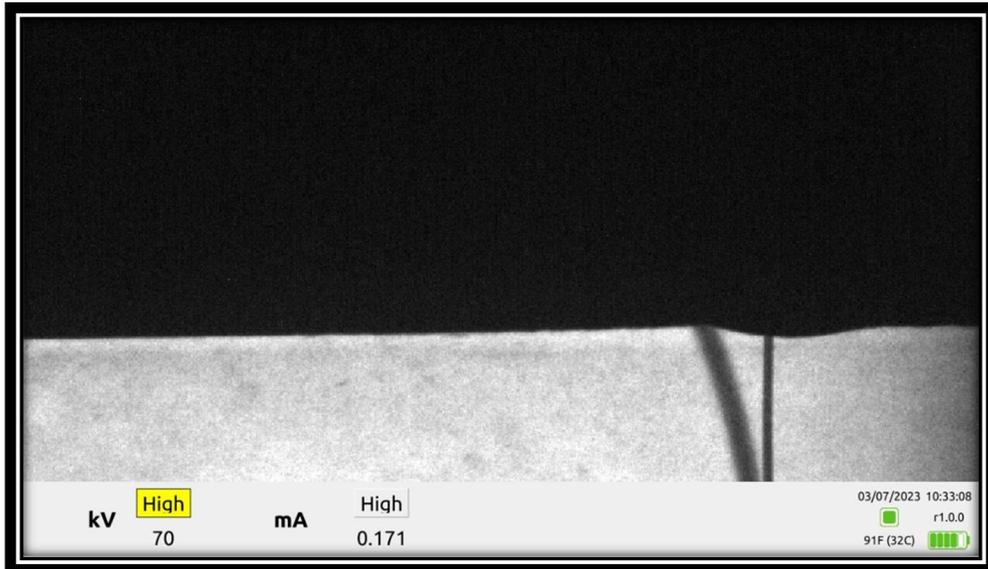


Figure 9 Settings Menu Re-activated

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The *X-Ray Live Image Screen* remains active until the red trigger button is released or 90 seconds has elapsed. When either occurs, the following will happen:

- System stops emitting X-rays
- Buzzer turns off
- System Status Indicators turn green
- *Home Screen* is displayed

Image Capture

An image (or snapshot) can be captured from either the *Home Screen* (targeting camera image) or the *X-Ray Live Image Screen* (X-Ray image). Snapshots are taken by pressing and releasing the Snapshot Button on either the system or Trigger Handle (Figure 10).

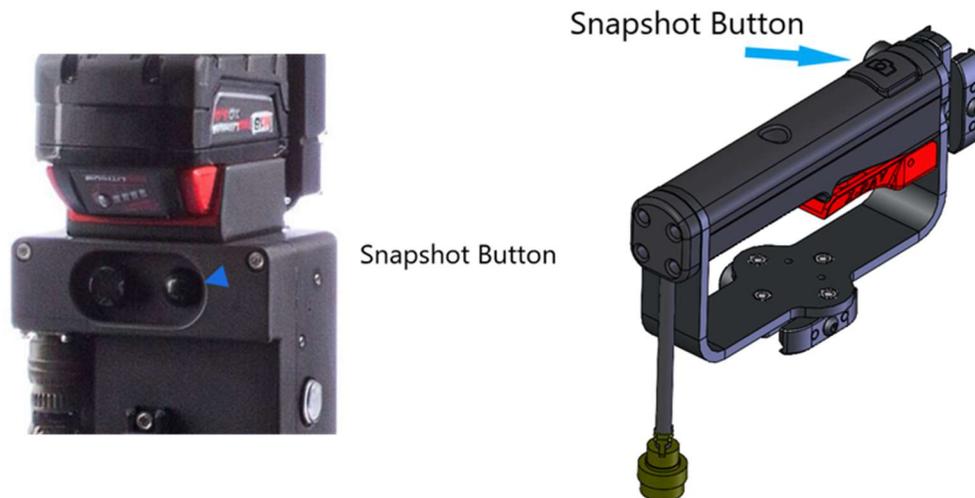


Figure 10 Snapshot Button Options

The system will display the snapshot in the upper left-hand corner (Picture-in-Picture) of the current screen for five seconds (Figure 11) and is automatically saved to internal storage in PNG image format.



Figure 11 Image Capture Retained (upper left corner)

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Video Capture

Like snapshots, videos can be recorded from either the *Home Screen* (targeting camera image) or the *X-Ray Live Image Screen* (X-Ray image). Videos are taken by pressing and holding the Snapshot Button for at least two seconds. Within one second, the system will commence recording video, indicated by a notification 'Recording in progress...' appearing in the upper right-hand corner of the display (Figure 12). After two seconds, the operator can release the capture button. When the button is pressed again, the recording stops and is automatically saved to internal storage in MPEG4 video format.

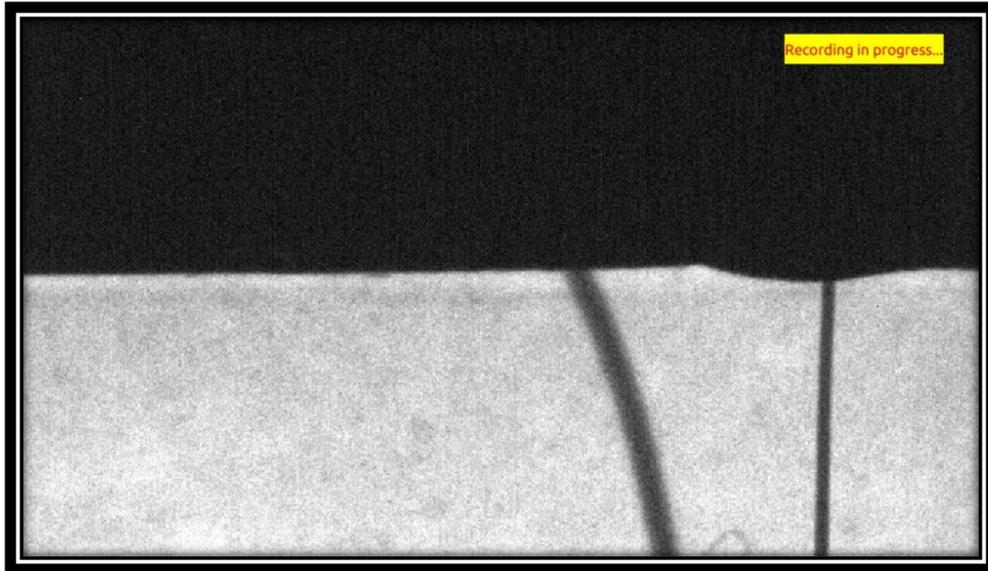


Figure 12 X-Ray Video Recording in Progress

Custom Naming Media Files

Media Files (video and snapshots) can be given a name of choice to act as an identifier that will display within the image. A filename can be set before recording images, and videos. The name will increment numerically as more images are captured. (Ex: "Image1", "Image2", etc.). This allows for the creation a collection of image captures in an alpha-numerical sequence to identify a select body of work.

To set a Custom Naming sequence, press right on the toggle switch for five seconds. A keyboard menu will appear on the monitor (Figure 13). Use the toggle switch to navigate to the desired letter/number. Press the Snapshot button to select each character. When finished, select "Apply". The monitor will then return to the main screen. The system is now ready to record Images/Videos with the custom name. When the system is shutdown the filename sequence will return to its default value.

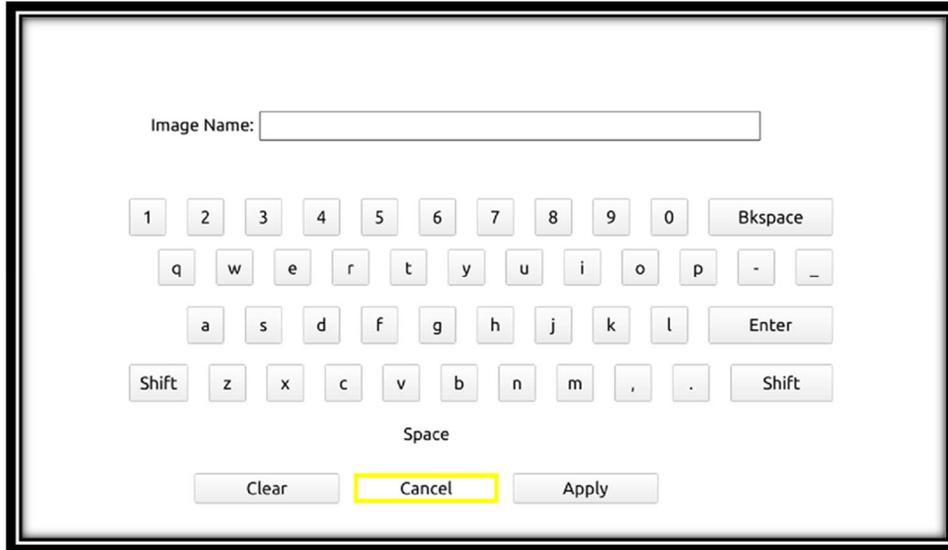


Figure 13 File Naming Sequence Selection Screen

System Information

The *System Information Screen* (Figure 14) is accessible from the *Home Screen* (and with the *Settings* menu inactive) by holding the hat switch in the left position for three seconds. The *System Info Screen* includes:

- X-ray tube temperature
- X-ray tube cycle count
- Approximate number of images system's internal storage can hold (*Storage Available*)
- Current system date and time (can be modified)
- Access to *Admin Screen*
- Image, Video Playback
- Manage Media

This menu is navigated by the hat switch's left/right positions. Up/down positions change the value of the highlighted setting. On-screen buttons (e.g., **Apply**) are actuated with the Snapshot Button (Figure 9). **Exit** transitions back to the *Home Screen*.

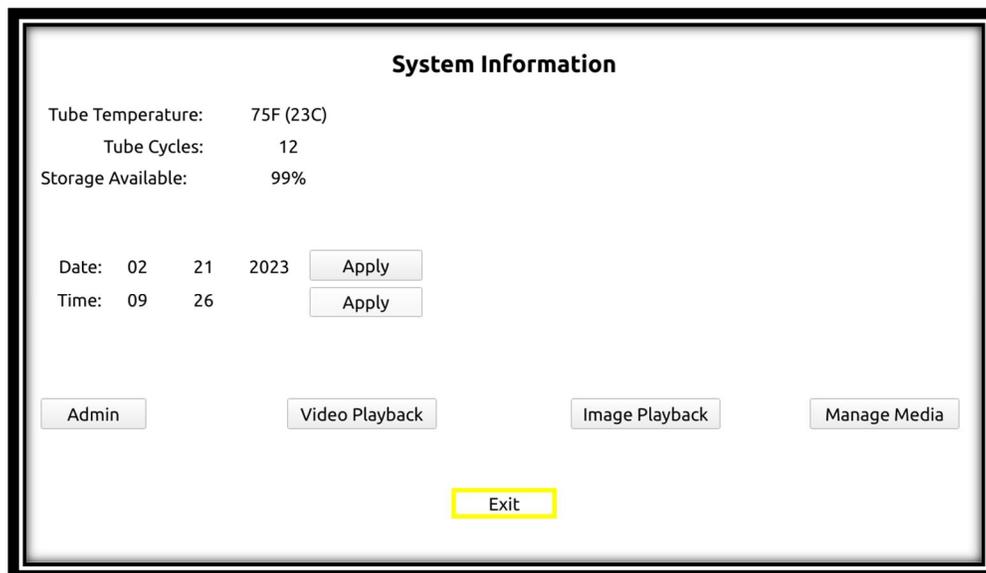


Figure 14 System Info Screen

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Video Playback

Image Playback (System Info Screen, Figure 14) brings up the **Playback Selection Screen** (Figure 15). Image directories (if any) are shown on this screen, labeled by date. Newest directories are displayed first. Selecting the **Oldest** on-screen button shows additional folders (if any). Select desired folder to view playback videos or images. As always, the Snapshot Button (Figure 10) actuates on-screen buttons/folders.

Left/right hat switch positions navigate between images/videos within an image folder. The hat switch's down position exits image playback mode.

The organization of images on the OpenVision HD is by directories that are named with a date stamp of the format 'YYYYMMDD'. If the directory does not exist at the point the first snapshot for the day is taken, the directory will be automatically created. Images within the directory are named in the format 'YYYYMMDD-HHMMSS.png' to ensure that unique names are created for each image taken.

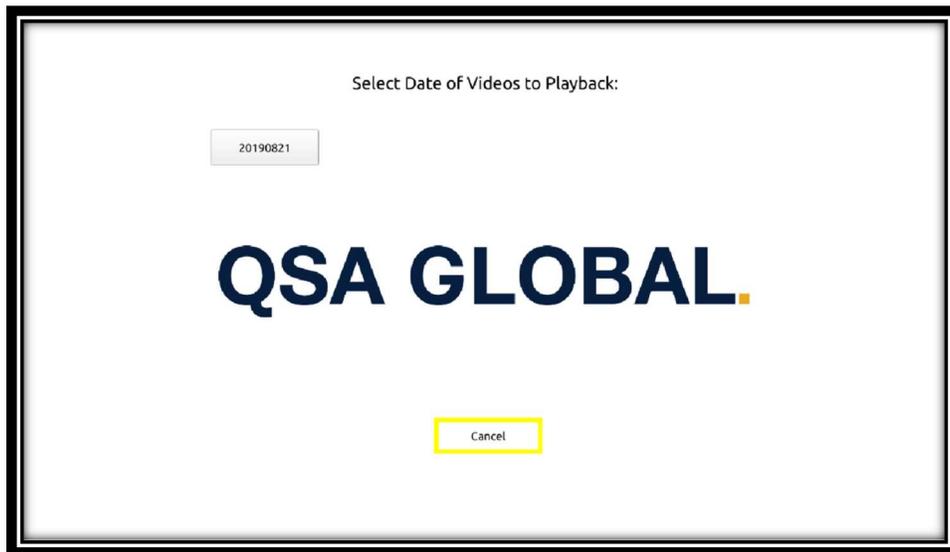


Figure 15 Playback Selection Screen

USB Drive Configuration for Media Transfer

USB drives must be configured before images/videos can be transferred from the OpenVision HD system. A properly configured USB drive includes an 'ov2' directory at the drive's top-level, and an 'images' directory within the 'ov2' directory (see Figure 16). Unless these directories are on the USB drive as indicated, the software will not transfer images/videos.

CAUTION: TO ENSURE THAT THE USB DRIVE DOES NOT BECOME CORRUPTED, ALWAYS WAIT UNTIL THE SYSTEM TRANSITIONS BACK TO THE HOME SCREEN (Figure 3) BEFORE REMOVING THE USB DRIVE FROM OPENVISION HD.

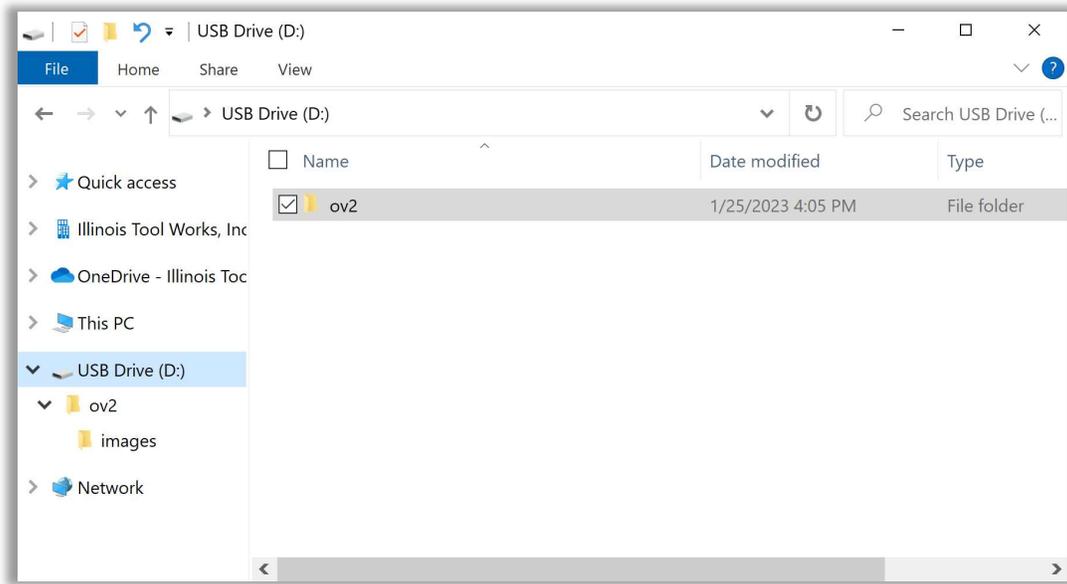


Figure 16 USB Drive Folder Format

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Image Transfer

Inserting a properly configured (Figure 16) USB drive in the external USB port (Figure 17) of the OpenVision HD transitions to the *Media Transfer Screen* (Figure 18). Navigate to desired folder to copy, then press and release the Snapshot Button (Figure 10) to initiate file transfer.



Figure 17 USB Port

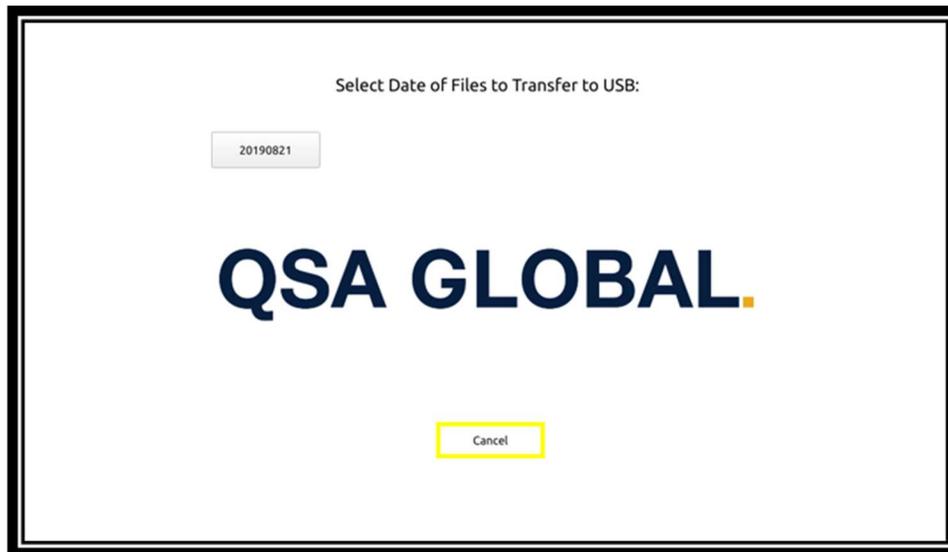


Figure 18 Media Transfer Screen

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When no image directories are found on the OpenVision HD, the message “No Images to transfer” message (Figure 19) will be displayed. Selecting [Cancel] will transition to the *Home Screen* and the USB drive can then be safely removed.

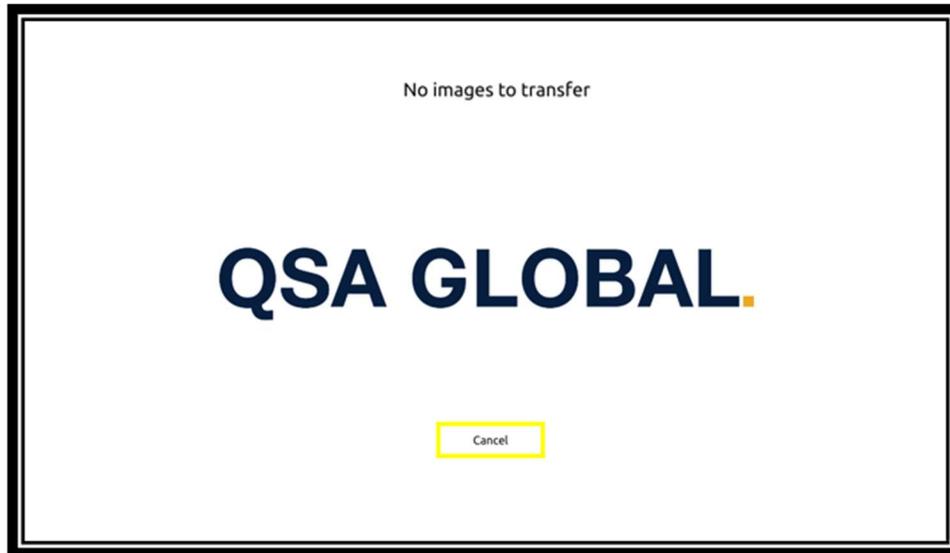


Figure 19 No Images Present

When one or more image directories are found, the *Media Transfer Screen* (Figure 17) will appear displaying up to four buttons at one time with names of the directories that exist on the OpenVision HD. To select a directory for transfer, navigate to the desired date stamp button and select the button. This will transition the user to the *Image Transfer Confirmation Screen* (Figure 20).

NOTICE: Only one directory of images will be transferred to the USB drive per insertion. Following the last step of a transfer the screen will transition to the home screen. To initiate another transfer, remove the USB drive from the OpenVision HD and reinsert.



Figure 20 Image Transfer Confirmation

Figure 20 presents the user with **Yes** and **No** to confirm the image transfer. Selecting **No** will transition to the *Home Screen* and the USB drive may be safely removed. Selecting **Yes** will transition to the *Transfer in Progress Screen* (Figure 21). No user action is required. The amount of time this screen is displayed is determined by the number of images in the image directory. At the completion of the transfer, the system will transition to the *Image Deletion Confirmation Screen* (Figure).



Figure 21 Transfer in Progress

Figure 22 presents the user with **Yes** and **No** to confirm the image deletion for the selected date. Selecting **No** will transition to the *Home Screen* and the USB drive may be safely removed (no images will be deleted from the OpenVision HD). Selecting **Yes** will cause the images in that specified folder to be deleted from the OpenVision HD and then the system will transition to the *Home Screen*.

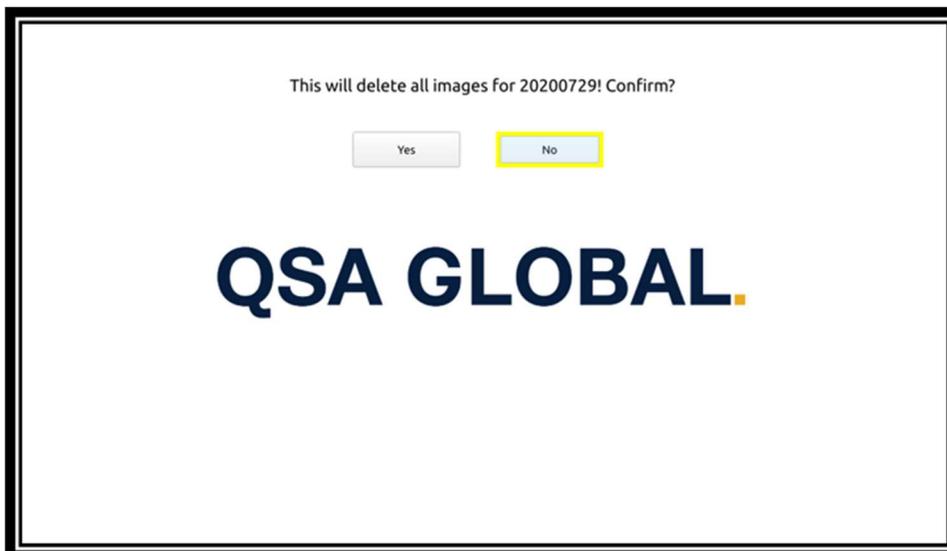


Figure 22 Image Deletion Confirmation

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When the user has confirmed the image transfer, the software performs a check to determine if there is enough space on the USB drive to hold all the images contained in the selected folder. If there is insufficient space, this screen will be displayed (Figure 23). Selecting the **Close** button will cause the system to transition to the *Home Screen* and the USB drive can be safely removed.

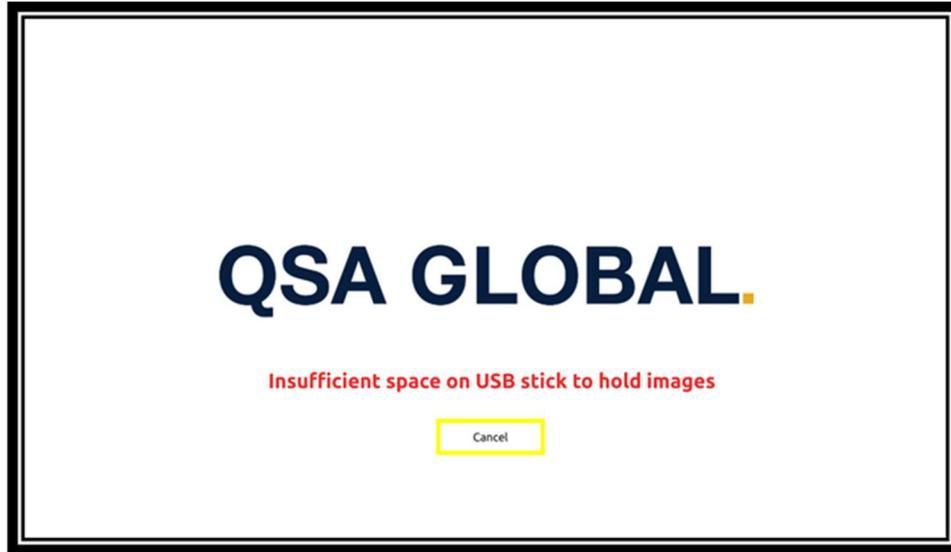


Figure 23 Insufficient Space Warning

Admin Password Screen

Selecting the **Admin** in the *System Info Screen* (Figure 13) transitions to the *Admin Password Screen* (Figure 24). The hat switch's left/ right positions navigate between **Enter**, **Exit**, and the password digits. Pressing **Exit** will transition back to the *Home Screen*. If the correct password has been entered, selecting **Enter** transitions to the *Admin Screen*.

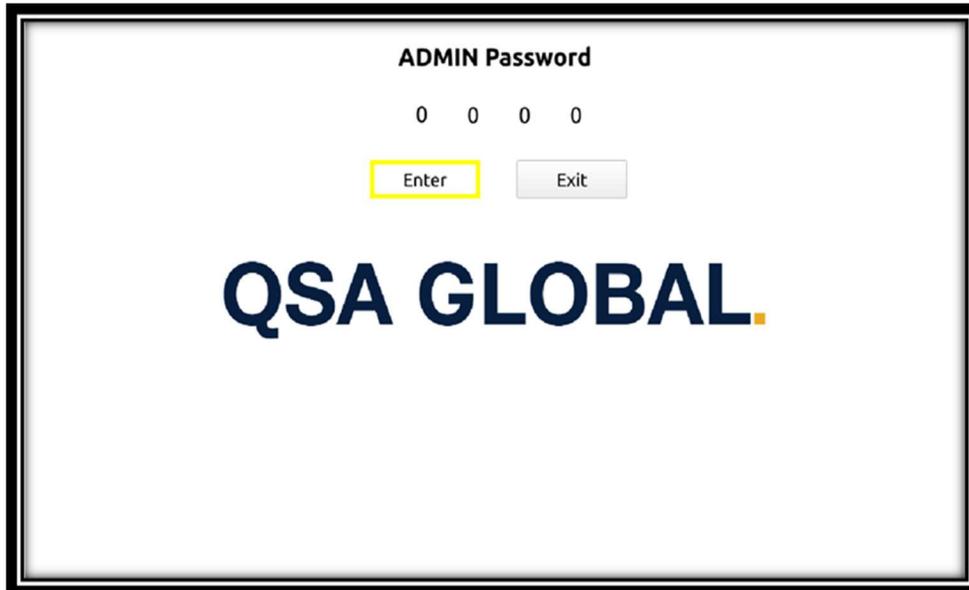


Figure24 Admin Password Screen

System Administration

In the *Admin Screen* (Figure 25), use the hat switch's left/right positions to navigate between settings, and the up/down positions to change the highlighted setting. Settings that can be changed and their value ranges are shown in Table 2. Select *Apply Settings* to save any changes. Otherwise, select *Cancel*. Either action will transition back to the *Home Screen*.



Figure 25 Admin Screen

Table 2 Admin Screen Settings

Admin Screen Setting	Possible values*
Voltage, Low (kV)	40 - 70 kV
Voltage, Medium (kV)	40 kV to 70 kV
Voltage, High (kV)	40 kV to 70 kV
Voltage, Super (kV)	40 kV to 70 kV
Current, Low	0.090 mA to 0.300 mA
Current, Medium	0.090 mA to 0.300 mA
Current, High	0.090 mA to 0.300 mA
Current, Super	0.090 mA to 0.300 mA
Super Mode	Enable/Disable
Require Scatter Shield	Enable/Disable
Admin Password	0000-9999
Factory Reset	Resets OpenVision HD to factory settings
Ethernet Server	Enable/Disable
Remote Power Control	Enable/Disable
Video Stitching	Enable/Disable

*Power is limited to 12 W (kV x mA) max. (e.g., 70 kV @ .171 mA = 12 W, 40 kV @ .300 mA = 12 W)

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Super Mode

Super Mode provides the ability for fine control of voltage and current settings while on the *Home Screen* and during operation of the OpenVision HD. With Super Mode enabled, the operator can adjust (through the settings menu) voltage in 1 kV increments and current in .001 mA increments.

The *Admin Screen's* Super Mode (Figure 25) must be checked. Once the user selects the *Apply Settings* on-screen button the user interface will return to the *Home Screen* and both kV and mA in the settings menu will indicate Super (Figure 26Figure). Activate the *Settings* menu (Settings Menu section beginning on page 5) and navigate to either the kV or mA setting. Pressing the up/down hat switch will change the value highlighted.

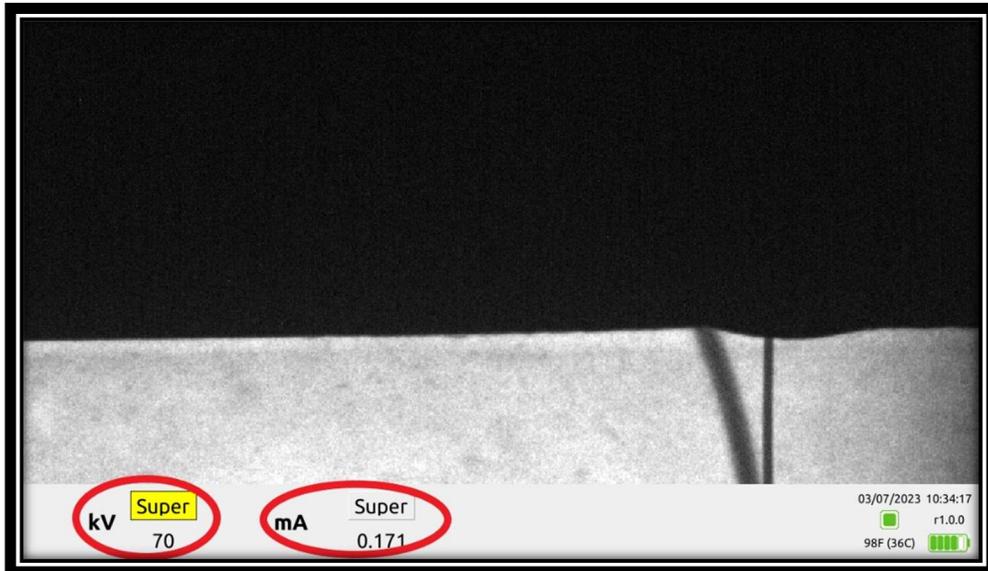


Figure 26 Home Screen with Super Mode Enabled

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OpenVision Wi-Fi Tablet.



Figure 27 OpenVision HD Wi-Fi Table

Startup and Power Down of Tablet

The OpenVision™ HD tablet is a touch screen tablet. To power up, press the power button on the tablet's upper-left corner. The OpenVision HD APP will automatically launch on power up. To power down the tablet, press the *Home Screen's* power button (Figure 28). Press the **Okay** button to verify shutdown.

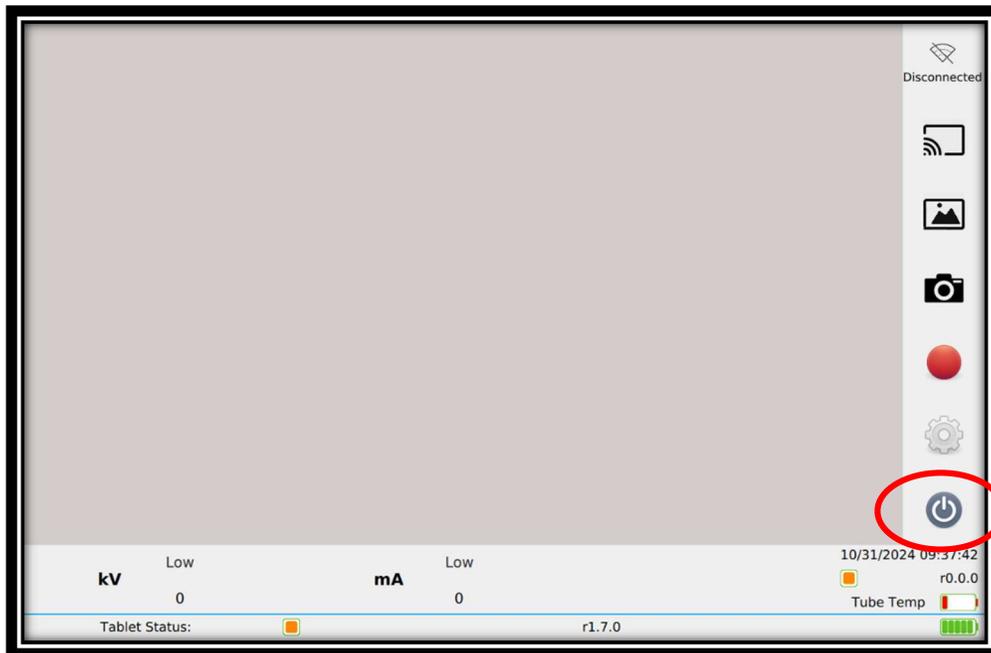


Figure 28 Software Power Button

Home Screen

The home screen (Figure 29) is divided into three main sections: Viewing window (center), Settings menu (bottom, outlined in yellow), and Control Panel which can be user-selected to appear on the left or right side (shown on right, outlined in red).

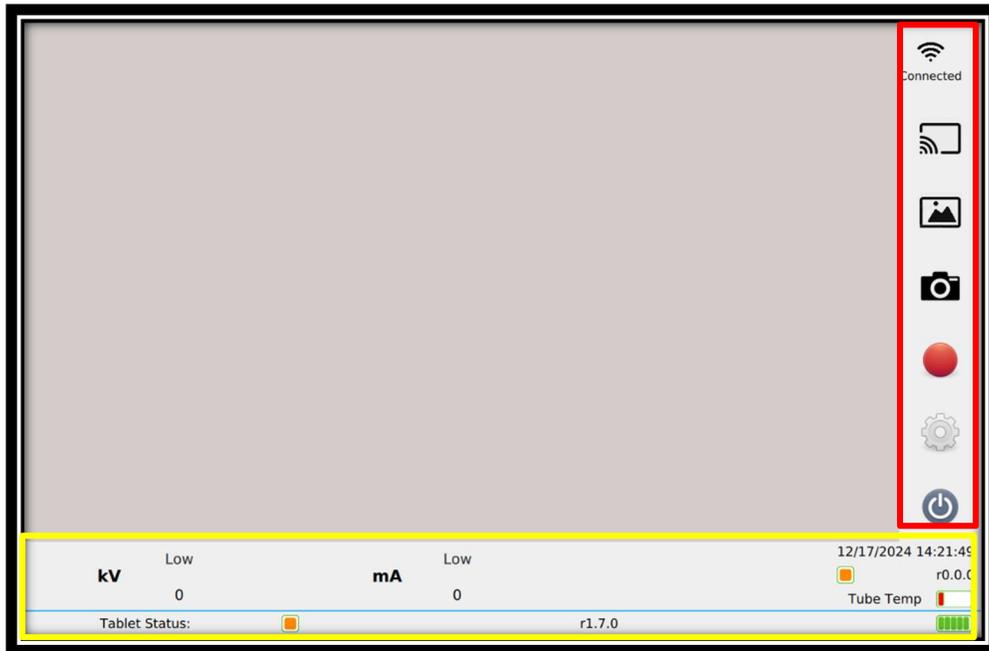


Figure 29

Establishing Wi-Fi Connection, Link, and Streaming

Tablet will automatically connect to Wi-Fi direct when the APP launches, which may take a few seconds. The Wi-Fi symbol will show “Connected” when a Wi-Fi connection has been established. Once connected to Wi-Fi, the tablet can then be linked to the Openvision HD by pressing the stream icon (As seen in figure 30). Once the link is established, the settings from the Openvision HD will update (along bottom of screen as shown in Figure 30). With the tablet synced to the OpenVision HD, Along with syncing to the openvision HD by pressing the sync button, you can also begin streaming data. (, (Figure 30. To stop streaming, press the stop button (, Figure 30).

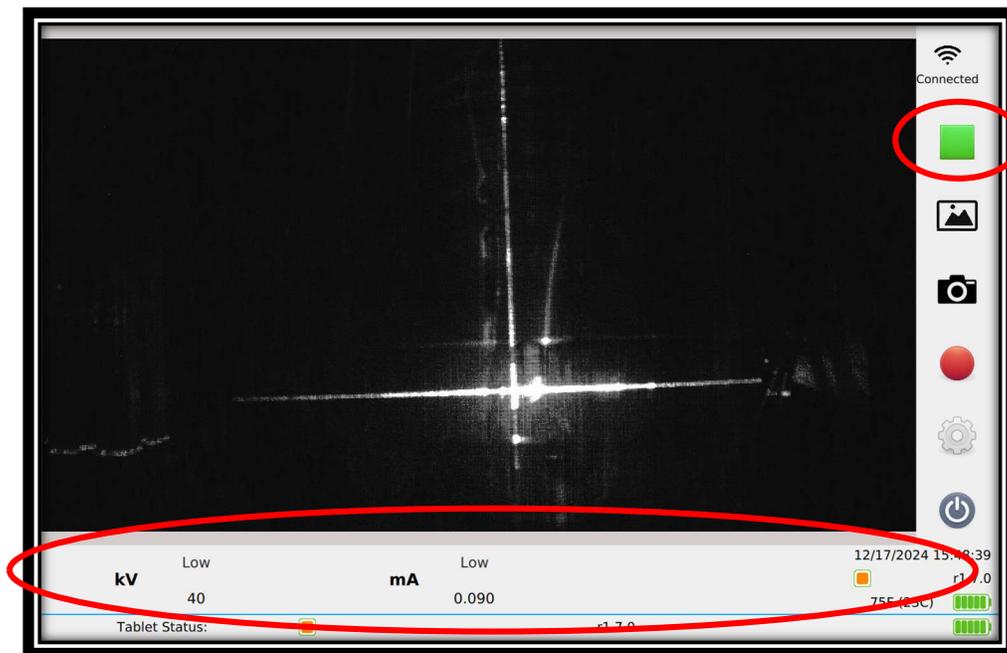


Figure 30 stream button

Image and Video Capture

Pressing the camera icon (📷, Figure 31) takes a snapshot. Once pressed, a picture-in-picture will appear in the upper-left corner (Figure 31). Snapshots work for both targeting and X-ray images.



Figure 31 Image Snapshot Picture-in-Picture

Pressing the video record icon (●, Figure 32) starts a recording. The icon will change (■, Figure 32) to indicate video recording in progress. Press this button again to stop recording. The tablet can perform seamless targeting to X-ray videos.

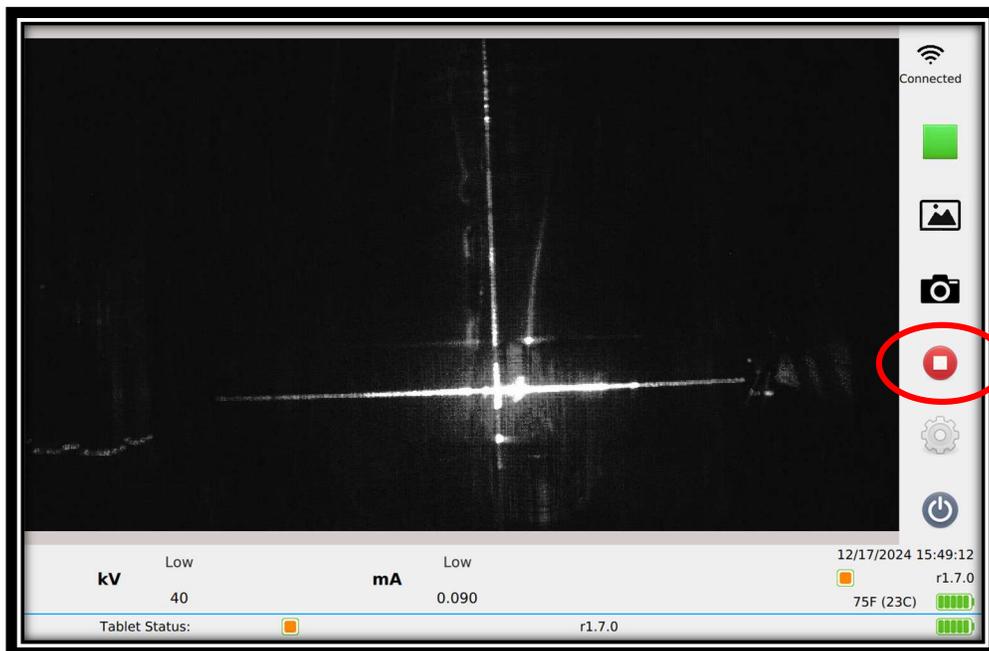


Figure 32 Video Capture

MyMedia screen

By pressing the MyMedia icon (🖼️, Figure 33) You will access your snapshots and videos directly from the home screen. The MyMedia screen allows you to scroll through organized thumbnails to preview individual and groups of media files.

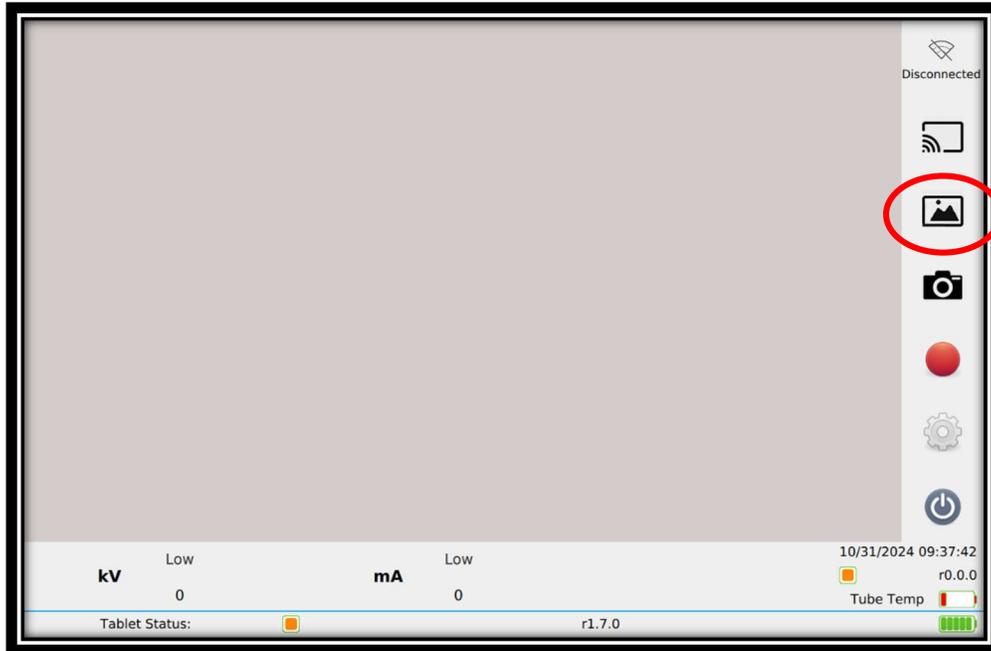


Figure 33 MyMedia screen

The MyMedia screen allows you to scroll through organized thumbnails to preview individual and groups of media files (as seen in figure 34)

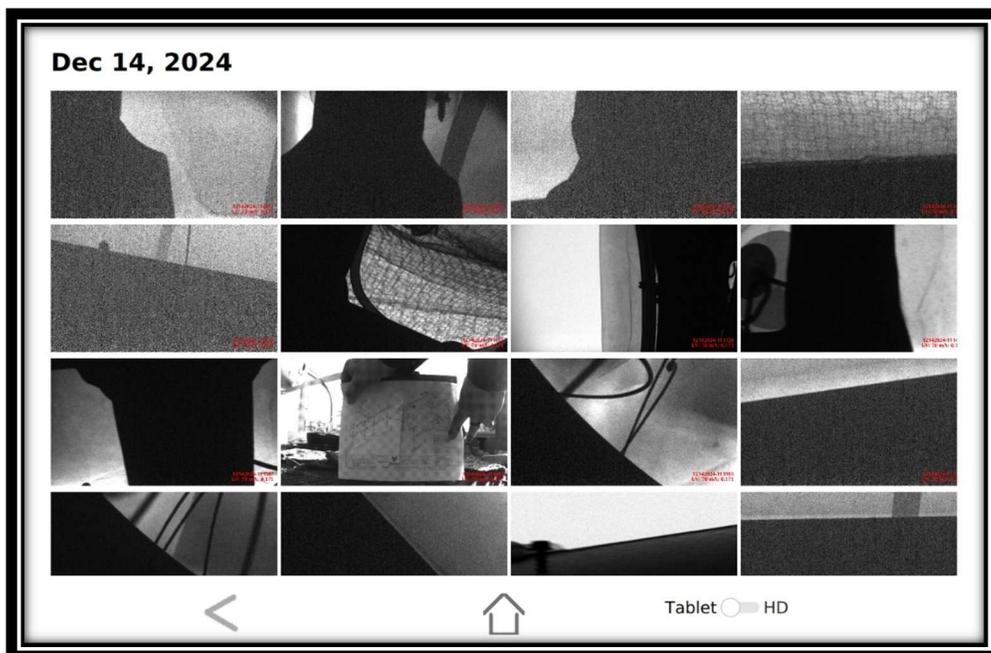


Figure 34 MyMedia files

By pressing the three white dots in the bottom on the screen (As seen in figure 35) You will have the opportunity to send file, send folder, delete file, and delete folder.

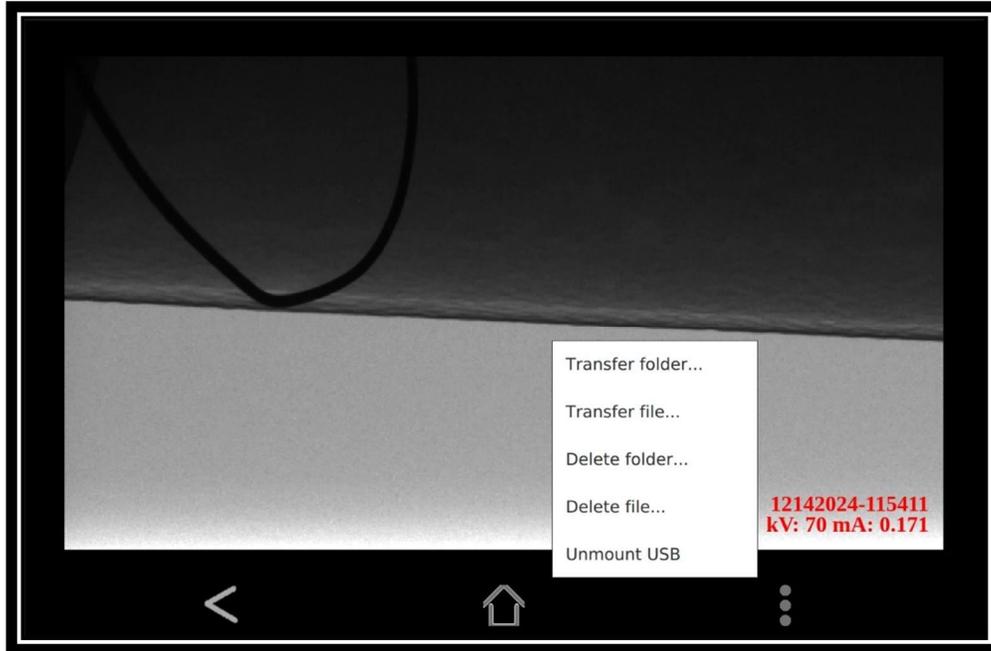


Figure 35

Interactive Video Playback

The new MyMedia screen (Figure 33) allows you to play/pause videos while taking a snapshot during video playback to capture a specific frame of the video by tapping the screen (As seen in figure 36). You can zoom in/out on the videos and snapshots by using your fingers to pinch in to zoom in and pinch out to zoom out to get the detail you desire. You can also change the speed to slow or speed up video playback.



Figure 36 Interactive Video Playback

OpenVision HD Screen Displays

In addition to the live image streaming, the tablet will display most OpenVision HD data and information screens. The status bar (Figure 37) includes: kV and mA adjustments, (which can be changed by tapping on KV or MA), the on-line connection status of the OpenVision HD and tablet (), the current date and time, the software revision installed on the system and tablet, the X-Ray tube temperature and the battery level of the tablet and the OpenVision HD.

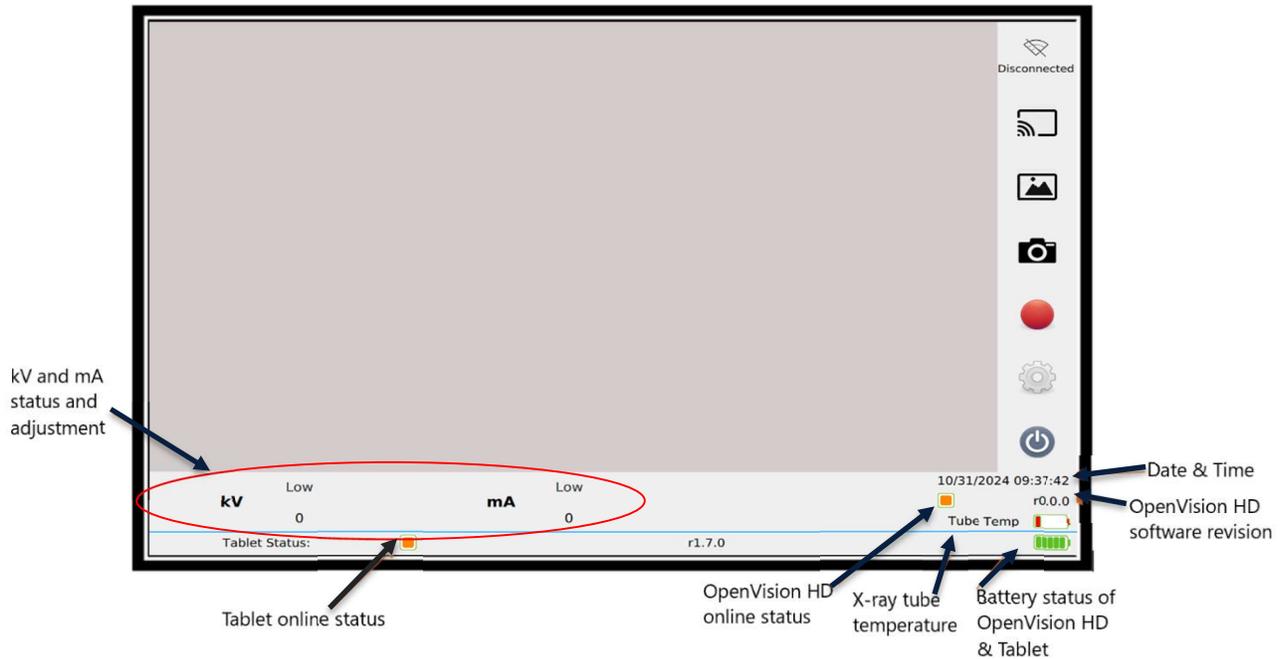


Figure 37 Screen Display

Other screens include the *X-Ray Caution Screen* (Figure 38), error screens (example shown in Figure 39), *ADMIN Screen*, etc.

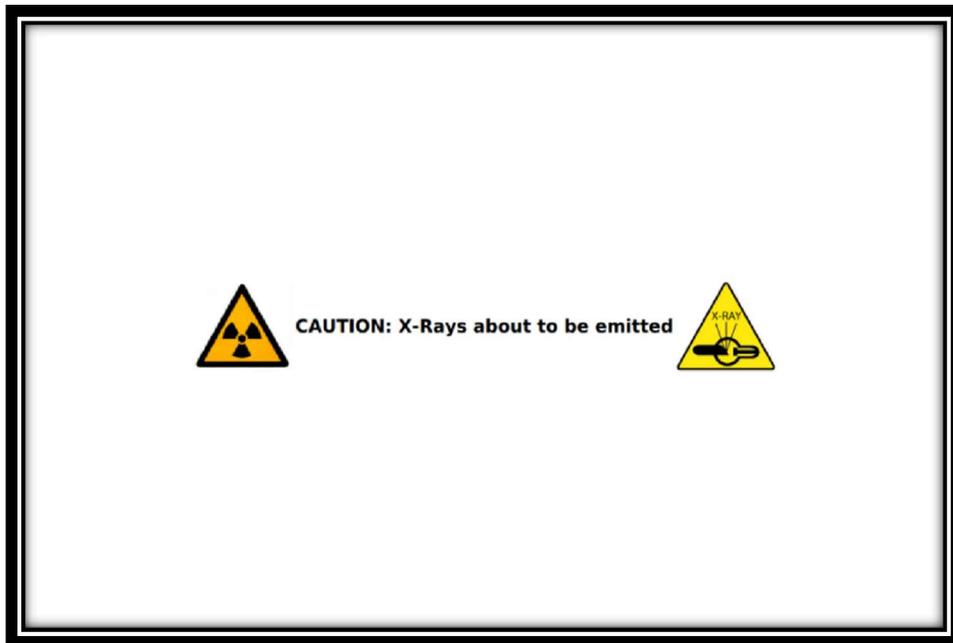


Figure 38 Caution Screen

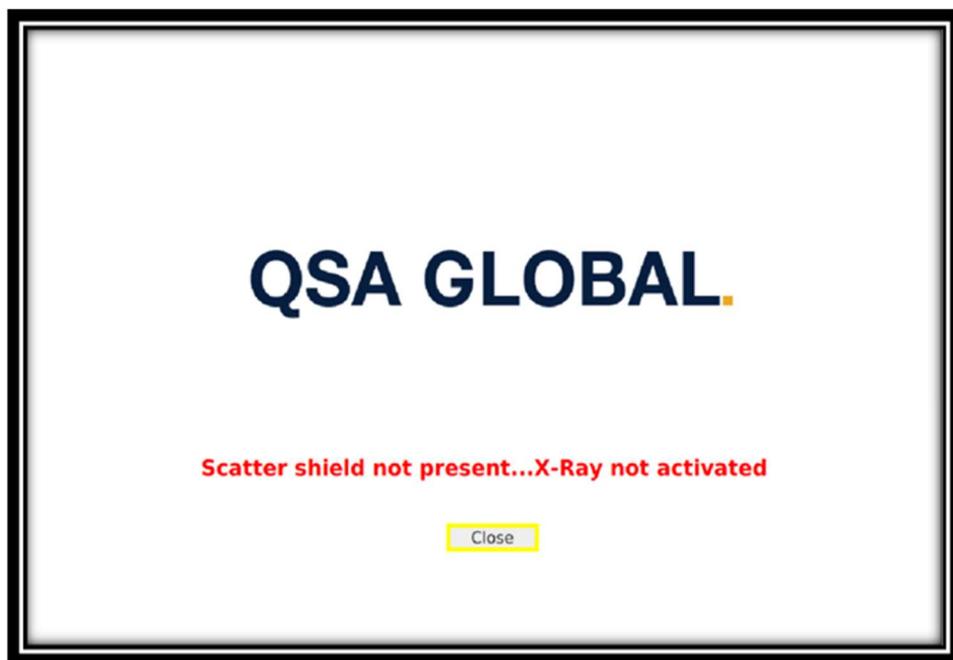


Figure 39 Error Screen Example

Brightness Adjustment

The tablet's screen brightness can be adjusted by sliding the *Brightness* bar left or right (Figure 40).

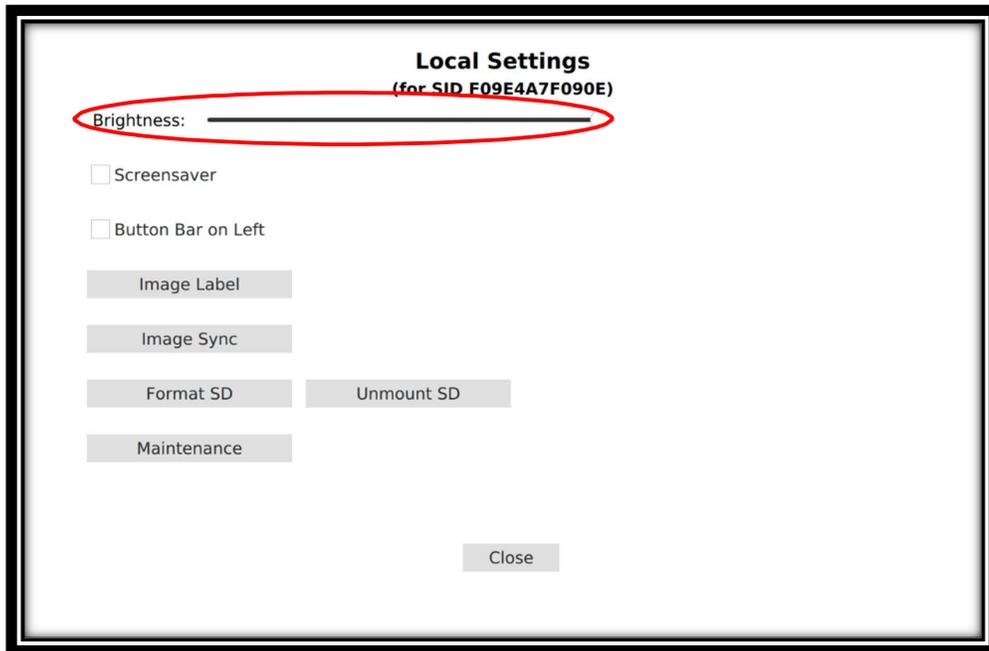


Figure 40 Brightness Control

Control Panel Configuration (Button Bar)

The Control Panel on the *Home Screen* (Figure 29) can be positioned on the left or right side of the tablet's screen. Default is on the right; the check box (Figure 41) allows you to position it on the left.

NOTE: The *Maintenance* button is for QSA Global, Inc. use only.

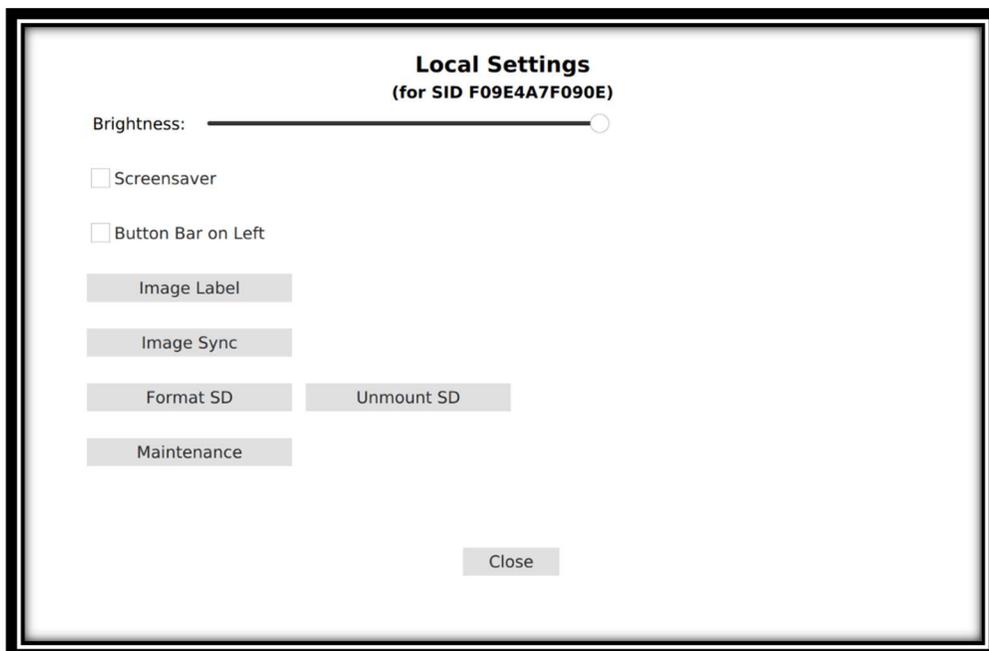


Figure 41 Control Panel Configuration

Remote Power Control

The remote power control option allows the user to adjust kV and mA via the tablet. To enable this feature, the *Remote Power Control* option must be selected (Figure 42) in the OpenVision HD *Software Administration Screen*.

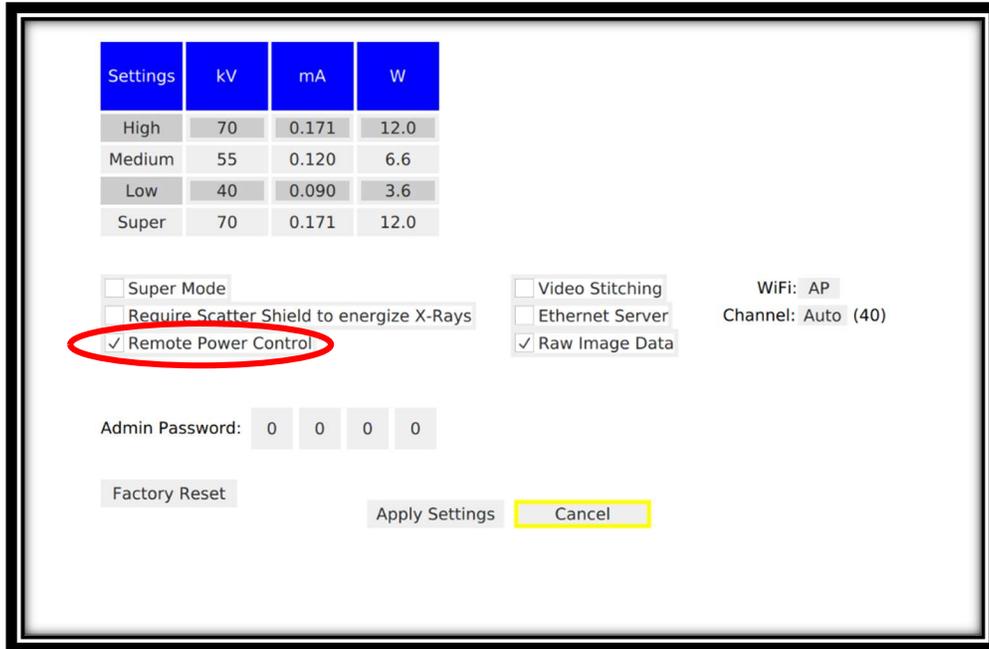


Figure 42 Remote Power Control Selection

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Once the Remote Power Control option is enabled, the kV and mA can be selected and adjusted via the tablet by pressing on the kV or mA. A corresponding window will pop-up and you can adjust kV or mA (Figure 43) by pressing either “-“ or “+” buttons and then pressing the **Apply** button.



Figure 43 kV and mA Selection and Adjustment

Tablet Tethering

The Tablet can connect directly to the OpenVision System via an ethernet cable through the USB Ports. This feature gives the system the ability to continue use in high wireless traffic areas that would normally inhibit the effective use of a WiFi connection. Tethering the Tablet can also aid in the transfer of media files from the system to the Tablet for processing.

To enable Tablet Tethering, a secondary ethernet dongle is required.

With the ethernet cable attached, insert the ethernet dongle into the USB Port of the system. Enter the Admin screen on the system by holding the toggle switch to the left for three seconds. Scroll to “Ethernet Server”, and select it. Scroll back to “Apply Settings” and select it (Figure 44).

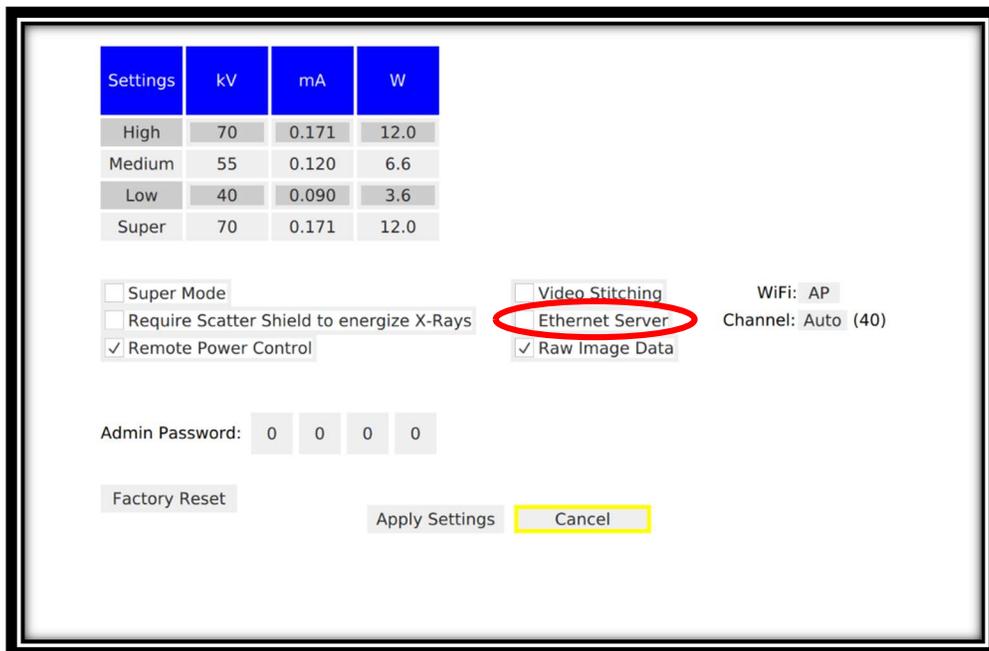


Figure 44 Ethernet Connection

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Plug the secondary ethernet dongle into the opposite end of the ethernet cable. Plug the ethernet dongle into the Tablet USB Port. In a moment, the Signal Strength meter on the tablet should go to full strength (Figure 45). The Tablet is now ready to sync and stream with all Tablet functions available.

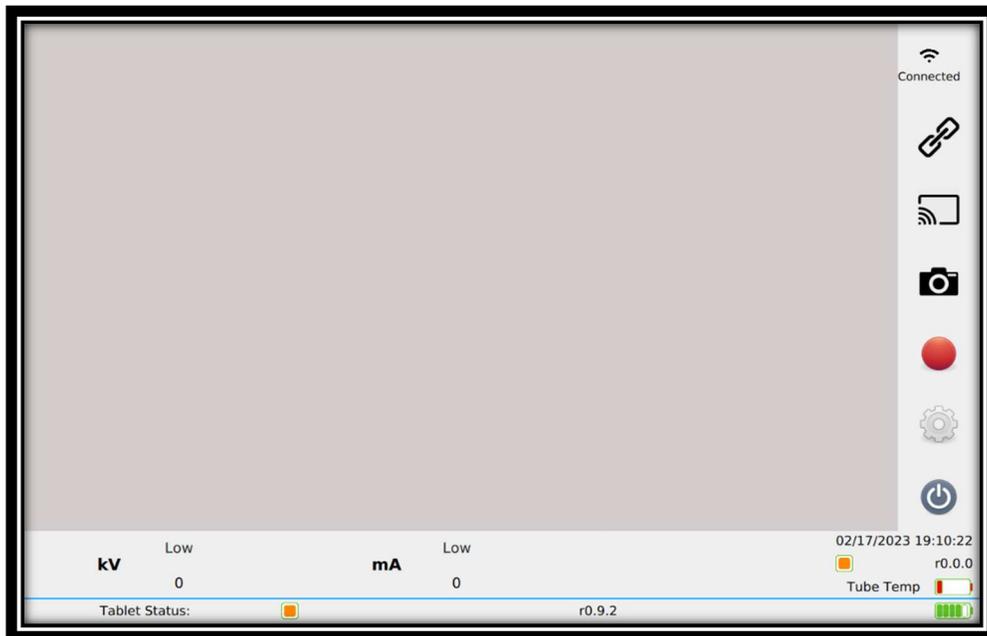


Figure 45 Tablet Tethering

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Software Updates.

For information on the latest software revision please visit:

<https://www.qsa-global.com/openvision-software-updates> or contact your local QSA Global, Inc. representative.

To see your OpenVision™ HD system's current software revision, refer to the bottom right of the OpenVision HD's user interface as shown below.

To see your wireless tablet's current software revision, refer to the bottom of the tablet's user interface, (as shown in Figure 46).

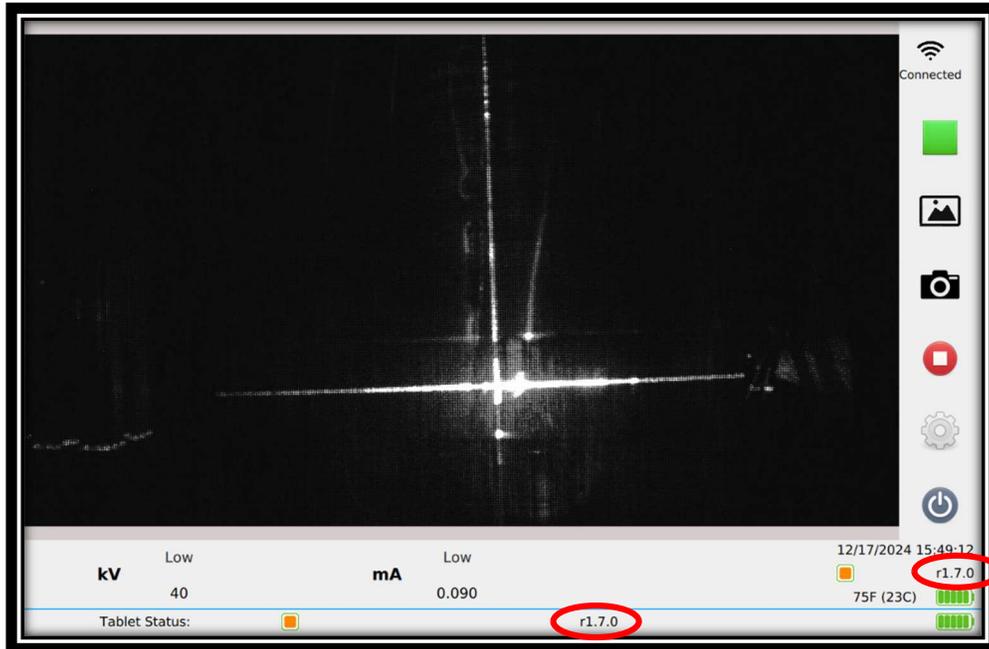


Figure 46 System Software Revision

NOTE: It is mandatory that the OpenVision HD system and the wireless tablet are on the same software revision in order to be compatible.

To upgrade the software on your OpenVision HD and or wireless tablet, please contact your local QSA Global, Inc. representative.

Required items for software updating:

- Ethernet adaptor (ELE115) (Figure 47)
- USB 3.0 adaptor (ELE116) (Figure 47)
- CAT 5 ethernet cable
- Secure ethernet connection
- OpenVision HD system with fully charged battery



Figure 47 USB Dongle

Things to be aware of during system update process

- The System screen, as well as all LED indicators; with the exception of the main power LED will go blank during the update.
- The update may take several minutes to complete. **Do NOT turn the machine off or remove the battery** until the update has completed. See **Error! Reference source not found.** for reference
- The update will be complete when the system user interface returns to the screen. Note: the user interface may not fully return to the user screen and hold up on the main intro screen or display an 006 Error.

Troubleshooting.

CAUTION: Opening the OpenVision™ HD potentially will damage the system and will void any warranty. If faced with any issues with the OpenVision HD, contact your QSA Global, Inc. representative immediately for guidance.

The OpenVision HD has been designed as a rugged, safe, reliable system. A series of interlocks and self-checks are built into the system to ensure safe operation. These checks may trigger an error code which will prevent normal operation of the OpenVision HD. Use Table 3 Error Code Guide as a reference guide for system error codes.

NOTICE: Prior to any troubleshooting, please ensure that a fully charged M18™ battery is installed. A low battery may cause system to report false error codes.

Table 3 Error Code Guide

Error Code	Description	Corrective Action
001	Memory Failure	Hard drive and/or system memory error or failure. If restart does not clear error, contact your QSA Global, Inc. representative for repair options.
002	LED Failure	Status Indicator LED(s) are not functioning properly. If restart does not clear error, contact your QSA Global, Inc. representative for repair options.
003	X-ray Tube Failure	X-ray tube is not communicating or has malfunctioned. If restart does not clear error, contact your QSA Global, Inc. representative for repair options.
004	X-Ray Over Temperature	X-ray tube has exceeded its operating temperature, forcing system to stop emitting X-rays. Perform following actions to recover from this error: <ul style="list-style-type: none"> • Turn off unit • Place in cooler environment for 30 minutes • Turn unit on
005	Board Over Temperature	Main control board has overheated. Perform following actions to recover from this error: <ul style="list-style-type: none"> • Turn Off unit • Place in cooler environment for 30 minutes • Turn unit on
006	Imaging Camera Failure	Communication error and/or failure with targeting camera. Perform a system restart, if a restart does not clear the error, contact your QSA Global, Inc. representative for repair options.
007	Targeting Camera Failure	Communication error and/or failure with targeting camera. Contact your QSA Global, Inc. representative for repair options.
008	Low Voltage	M18™ battery has insufficient charge; change battery.
009	Camera Communication Error	Communication error with internal camera. Cycle system power to clear error.
010	Camera Communication Error	Communication error with internal camera. Cycle system power to clear error.

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