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SOFTWARE MANUAL. MAN-063, REVISION B

OPENVISION™ DX.

OVDX-NDT-70 and OVDX-SEC-70 SOFTWARE MANUAL

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INTRODUCTION.

OpenVision™ DX is an easy to use, digital x-ray system with live video output for real-time inspection and reporting. The OpenVision DX utilizes a patent-pending combination of a c-arm mounted 70 kV X-ray source and a digital imager.

For NDT applications this allows the operator to observe external defects as small as 0.010-inch (250 µm) on insulated piping for NDT applications. OpenVision DX can be used on various insulation and cladding combinations, including mineral wool and calcium silicate with galvanized steel, stainless steel, and aluminum cladding up to 36 inches (91 cm) in total diameter. OpenVision DX enables the inspection of hundreds of feet (many tens of meters) of insulated piping to quickly identify indications of corrosion or corrosion precursors such as scaling, external wall loss, and wet insulation. Pictures and real-time videos are recorded and downloaded with the touch of a button for rapid review and reporting.

For security-related inspections the OpenVision DX can be quickly deployed for inspecting suspicious items within minutes. The patent pending ergonomic features, improved weight distribution, and customizable handling features allow the operator to maximize their attention on the item being inspected. Pictures and real-time videos are recorded and downloaded with the touch of a button for rapid review and inclusion in inspection reports.


EQUIPMENT SPECIFICATIONS.

Table 1 OpenVision™ DX Specifications

Imaging Area (Field of View)	4 in. x 6 in. (10 cm x 15 cm)		
<u>Dimensions</u>			
X-Ray Tube to Imager	9.5 in. (24 cm) to 20.9 in. (53 cm)		
Throat Depth	21 in. (58 cm)		
Imager Thickness	2.5 in. (6.4 cm)		
X-Ray Tube Thickness	3.4 in. (8.7 cm)		
Startup Time (est.)	30 seconds		
Shutdown Time (est.)	5 seconds		
<u>X-Ray Energies</u>	Voltage (kV)	Current (mA)	Dose @ 12 in (30.5 cm) from beam port
Low	40	0.300	50 R/hr (0.5 Sv/hr)
Medium	55	0.218	80 R/hr (0.8 Sv/hr)
High	70	0.171	95 R/hr (0.95 Sv/hr)
Beam Collimation (Approximate)	18° Horizontal 10° Vertical		
Image Resolution	250 microns (0.01in)		
<u>Battery Life</u>			
Continuous duty with 5 Ah battery	3 hours		
Standby	8 hours		
<u>System Weight</u>			
C-arm	15 lbs. (6.8 kg)		
Monitor w/ handle (optional)	2 lbs. (.9 kg)		
Packaged system (shipping weight)	50 lbs. (23 kg)		
Operating Temperature	-20° F to 120° F (-29° C to 49° C)		
Storage Temperature	-20° F to 140° F (-29° C to 60° C)		
Display Options	HDMI Monitor: 7 in. LCD, 1920 x 1200 pixels WiFi Tablet: 10 in Touchscreen, 1400 x 900 PirateEye: 854 x 480 pixels Also compatible with any device that accepts an HDMI signals		
<u>Recording (OpenVision DX)</u>			
Internal storage	128 GB		
Resolution	1280 X 720		
Image / video transfer	USB		
<u>Recording (WiFi Tablet)</u>			
Internal storage	4 GB with expandable 128 GB memory		
Resolution	1280 X 720		
Image / video transfer	USB		
Shipping Dimensions	32 in. x 20.5 in. x 12.5 in (82 cm x 52 cm x 32 cm)		
FDA Accession #	1680071-000		

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The OVDX-NDT-70 and OVDX-SEC-70 are built in compliance with ISO 9001:2015 and meets the following standards when used as directed:

- ANSI/HPS N43.5 (2005)
- Ionizing Radiation Regulations (2017)
- ISTA 3A Over the Road vibration standard
- MIL-STD-810, Method 514, Annex C, Cat 4
- REACH/ROHS
- 

Heads Up Display (HUD)

- ANSI Z87.1+, US Federal OSHA
- US Mil Spec MIL-PRF-31013
- CE EN 166 FTKN

Battery/Charger



California Energy Commission



Underwriters Laboratory for Canada and U.S.

Revision Record

Revision	Date	Description
A	06/2019	Production Release
B	03/2020	r3.0.0 Software updates, Tablet operation, Remote trigger configuration, Remote software update instructions

SAFETY PRECAUTIONS.



WARNING

Do not perform any unauthorized modifications to the OpenVision™ DX system or components of the system.

It is important that trained and qualified personnel perform or supervise a daily safety inspection of the OpenVision DX system for obvious defects before using the system. Do not compromise on safety. Always perform the daily inspection of the system prior to use.

Any foreign material (dirt, mud, ice, etc.) must be removed before using the system. Inspect, clean, and test the equipment as described in this manual to ensure long-term safety and reliability.

Do not use any component that is not approved for use with the OpenVision DX system or any after-market component as they may compromise the safety features designed into the system.

Defective equipment that is discovered during the daily inspection must be removed from service until repaired or replaced.

The user of this equipment must follow the operating instructions, in the order shown, to ensure safe operations and compliance with government regulations.

Personnel operating this equipment must be completely familiar with this manual and they must read and understand these important safety alerts before proceeding.

IMPORTANT SAFETY ALERTS

NOTICE: Can cause minor problems and reminders.

CAUTION: Can cause equipment damage or potential problems.

WARNING: Can cause serious or fatal injury.



WARNING: JOB SITE SAFETY PRECAUTIONS

Surveillance

Only trained and qualified individuals, or assistants working under their direct supervision, may operate the OpenVision DX system. The qualified individuals must be physically present at the site and able to control and limit access to the vicinity of the work.

Locking

Keep the OpenVision DX controller locked while assembling the system and when not being used to perform scanning. Locked is defined as the controller key switch in the Off position with the key removed. Store the key in a secure location.

Operating Conditions

OpenVision™ DX is designed for applications where the equipment will not be exposed to harsh handling or environmental extremes. See Equipment Specifications for more information

X-Ray Training

It is required that OpenVision DX operators are properly trained and qualified to perform radiographic inspections. This manual does not address radiographic inspection techniques or procedures.

Precautions

The OpenVision DX system is designed for portability and is ruggedized for industrial environments. However, it does contain fragile components. Use care to avoid strong vibrations and shock conditions (e.g. equipment drops or transportation outside the approved case) to the main housing, imager housing, and display(s).

CAUTION

Do not attempt to open or modify the imager housing, main housing, or X-ray tube. Opening any of these components will void the system warranty and may expose the operator to a high voltage shock hazard.

CAUTION

Do not allow liquids to come into contact with any part of the OpenVision™ DX system. The main and imager housings have been made water resistant, but they are not “Waterproof”. Appropriate care should be taken to protect all cabling and connectors to ensure reliable and safe operation of the OpenVision DX system.



WARNING: Class 2 Target Laser

Because the blink reflex (glare aversion response to bright lights) will limit the exposure to no more than 0.25 seconds, Class 2 laser pointers are considered to be safe. Furthermore, Class 2 lasers do not harm eyes unless a person deliberately stares into the beam, making laser protective eyewear not necessary. A Class 2 laser is not a skin or materials burn hazard. NEVER aim any laser towards an aircraft or vehicle in motion.



OPENVISION™ DX SOFTWARE.

Power Cycling

Each OpenVision™ DX 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.

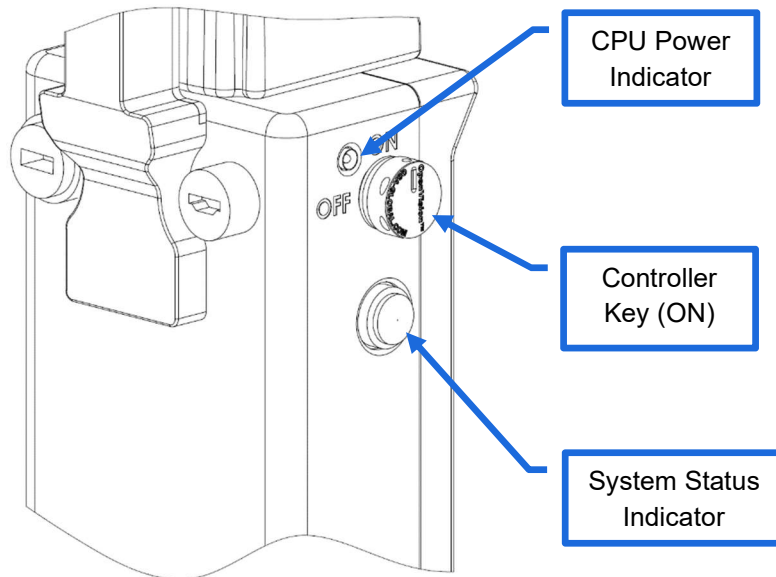


Figure 1 Indicators and Power Switch Details

Startup

When the Controller Key is turned to its ON position, the CPU indicator will immediately turn on (green). 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 2) is displayed, system startup is complete and ready for normal operation.

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 2) displays the output of the targeting camera (outlined in red) and the *Settings* menu across the bottom (outlined in yellow).

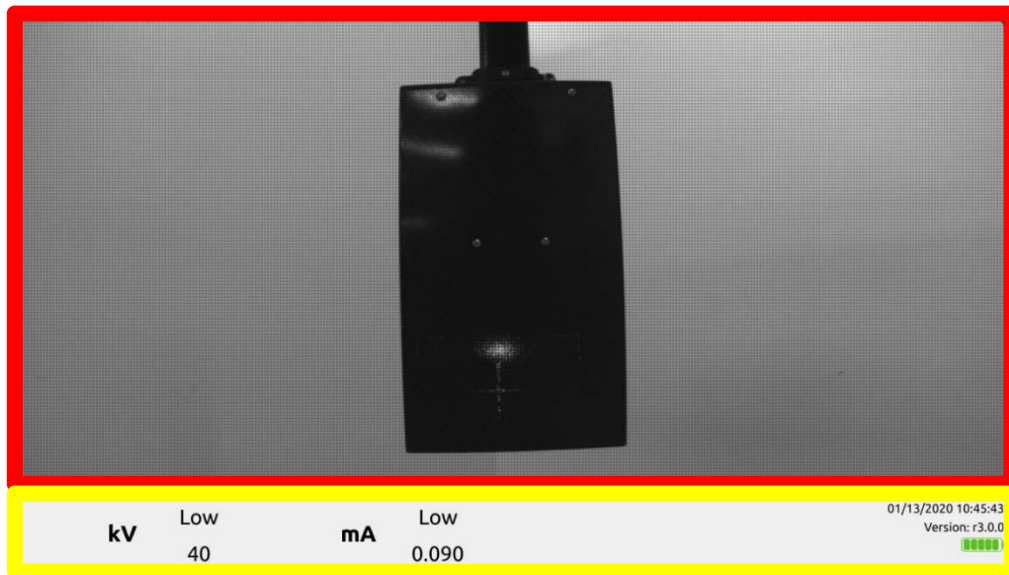


Figure 2 Home Screen

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 (located on the SEC grip or the NDT Housing) down for three seconds (Figure 3).

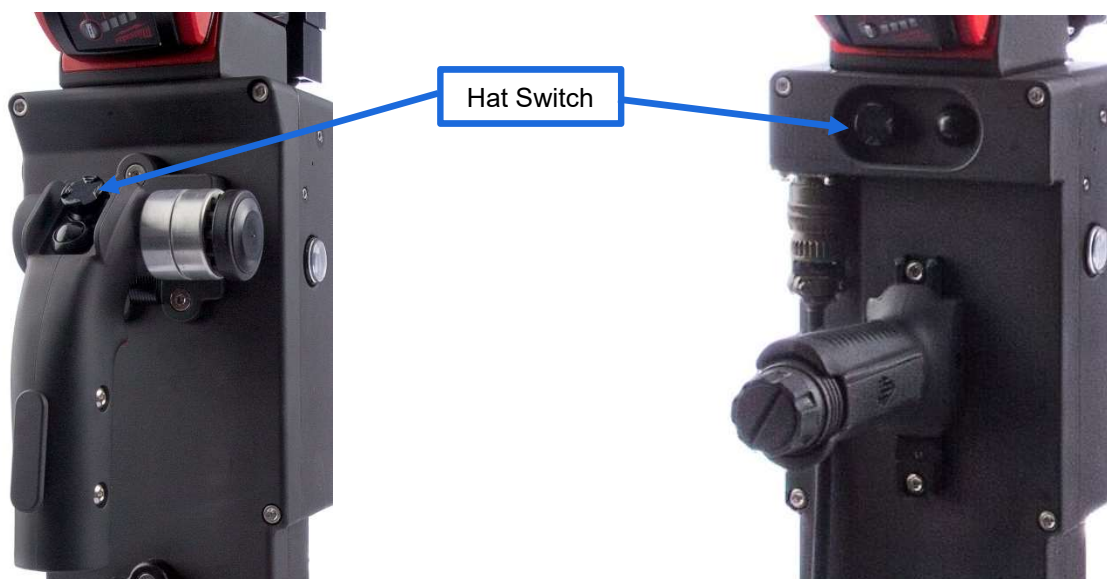


Figure 3 Hat Switch Options

When the X-ray Voltage becomes highlighted in yellow (Figure 4), 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.

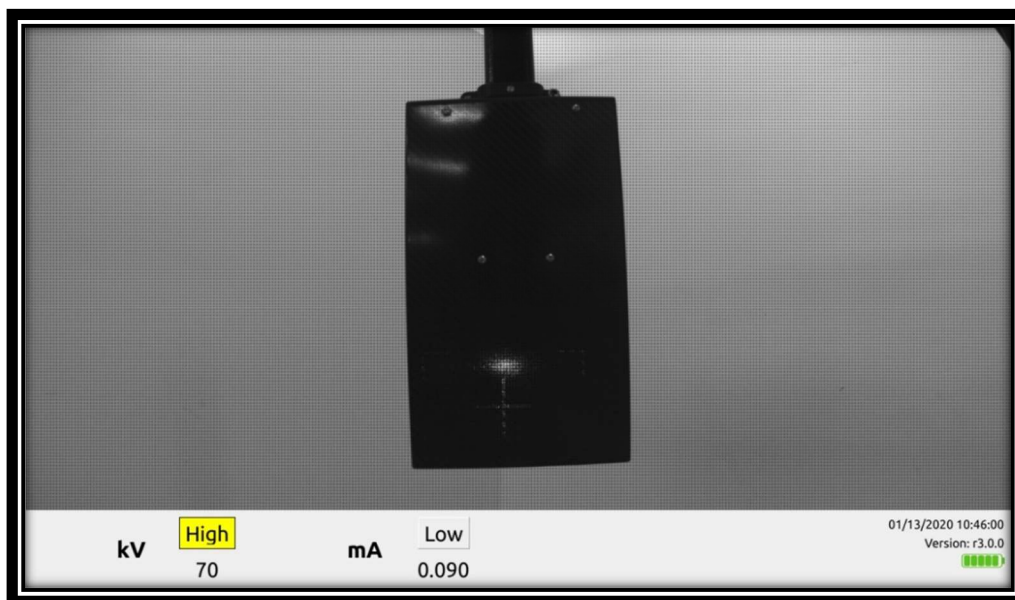


Figure 4 Active Settings Menu

Table 2 shows the settings and user adjustable values available in the *Settings* menu:

Table 2 - *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 DX)

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Firing X-Rays

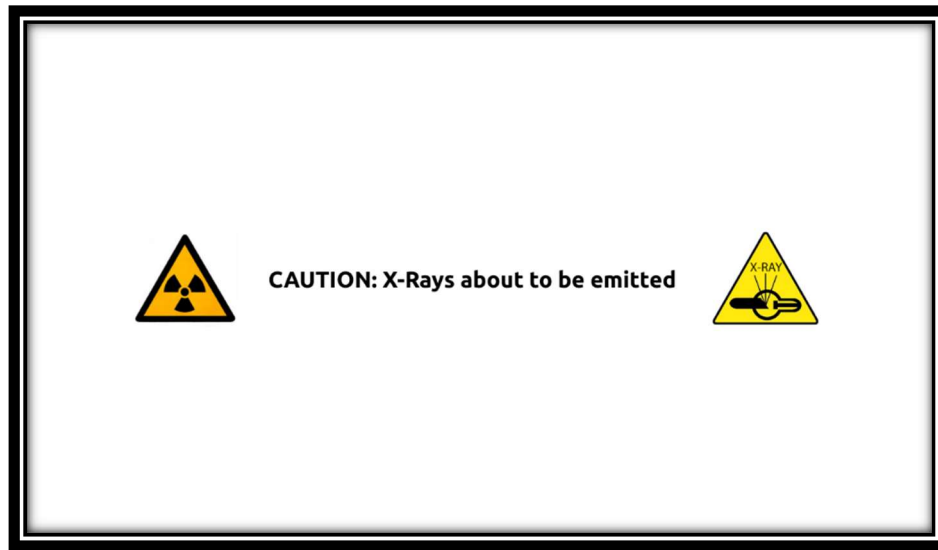


Figure 5 X-Ray Warning Screen

Firing X-rays varies slightly from NDT and SEC versions of OpenVision™ DX systems:

NDT – Two X-ray trigger harnesses are available; both are shown in Figure 6:

- **Trigger Button Harness:** Press and hold the X-ray button to start firing X-rays. Firing will stop when button is released.
- **Remote Trigger Harness:** A latching button allows the operator to press and release the X-ray button. Press and release the X-ray button again to stop firing. The Image Capture button can then be pressed as needed 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. The cover is interlocked; if the operator's hand is removed from the harness, X-rays will stop firing.

SEC - Press and hold the palm switch and then the red trigger switch to start firing X-rays. Firing will stop when red trigger switch is released.

System will transition to the *X-Ray Warning Screen* (Figure 5) 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.

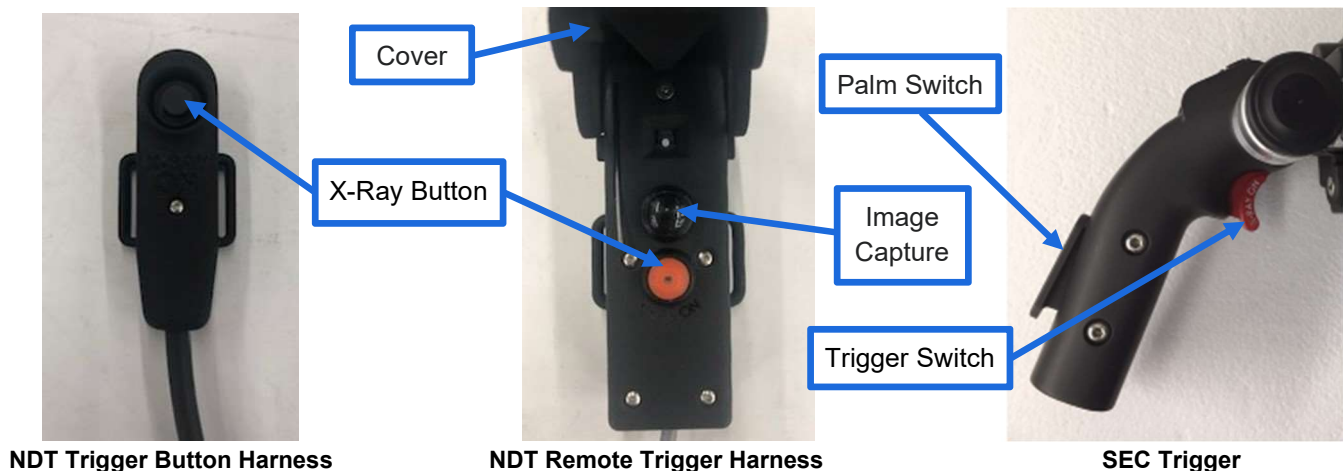


Figure 6 Trigger Switch Options

X-Ray Live Image Screen

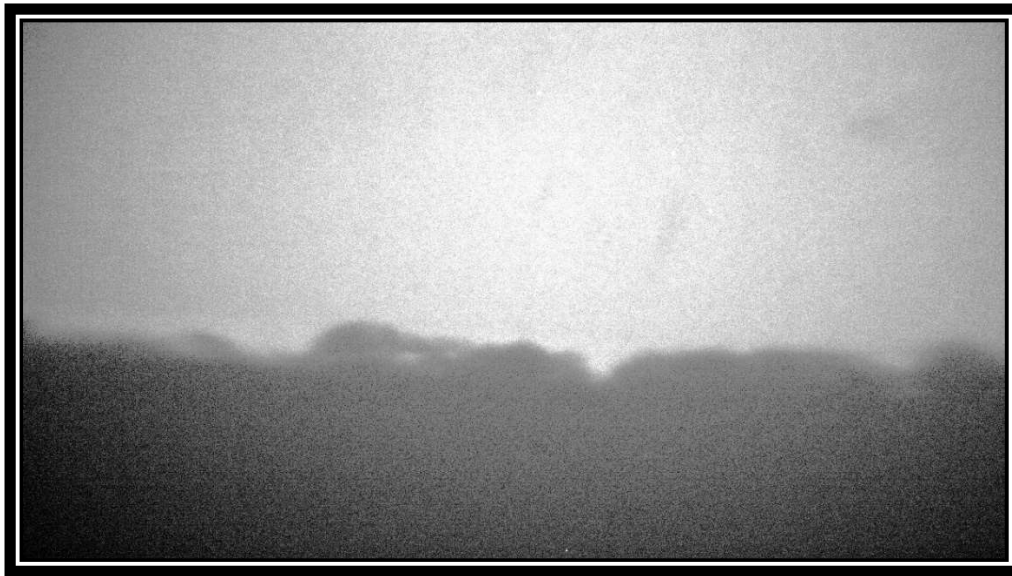


Figure 7 X-Ray Live Image Screen

After five seconds, the system will emit X-rays, and transition to the *X-ray Live Image Screen* (Figure 7; *Settings* menu is hidden by default). System Status Indicators remain amber-colored, and the buzzer pulse rate changes to two-second intervals.

To change settings while emitting X-rays (i.e., on-the-fly), hold down the hat switch for three seconds (Figure 3) to show and activate the *Settings* menu (Figure 8).

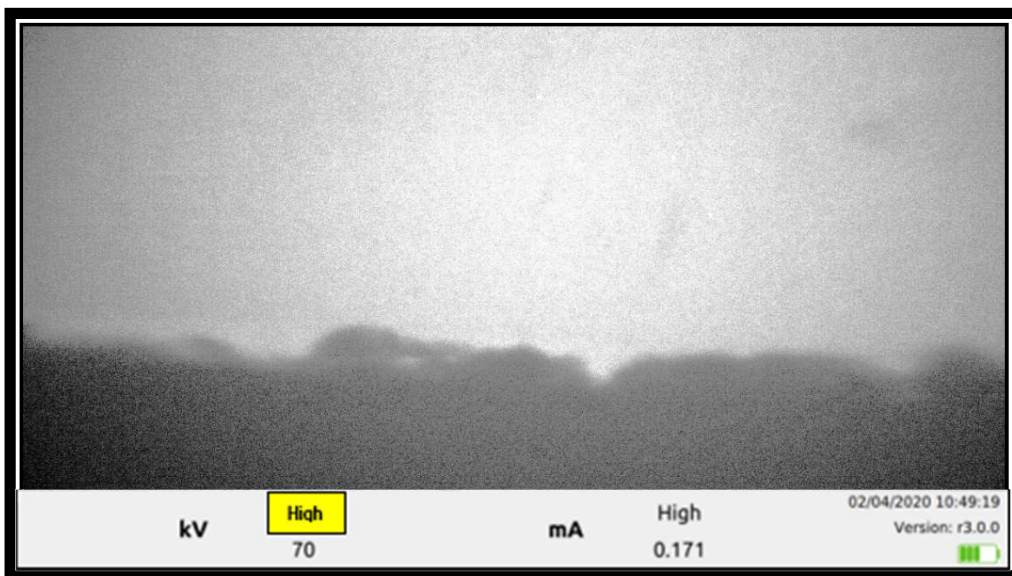


Figure 8 Settings menu re-activated

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

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- 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 round Image Capture button (Figure 9).

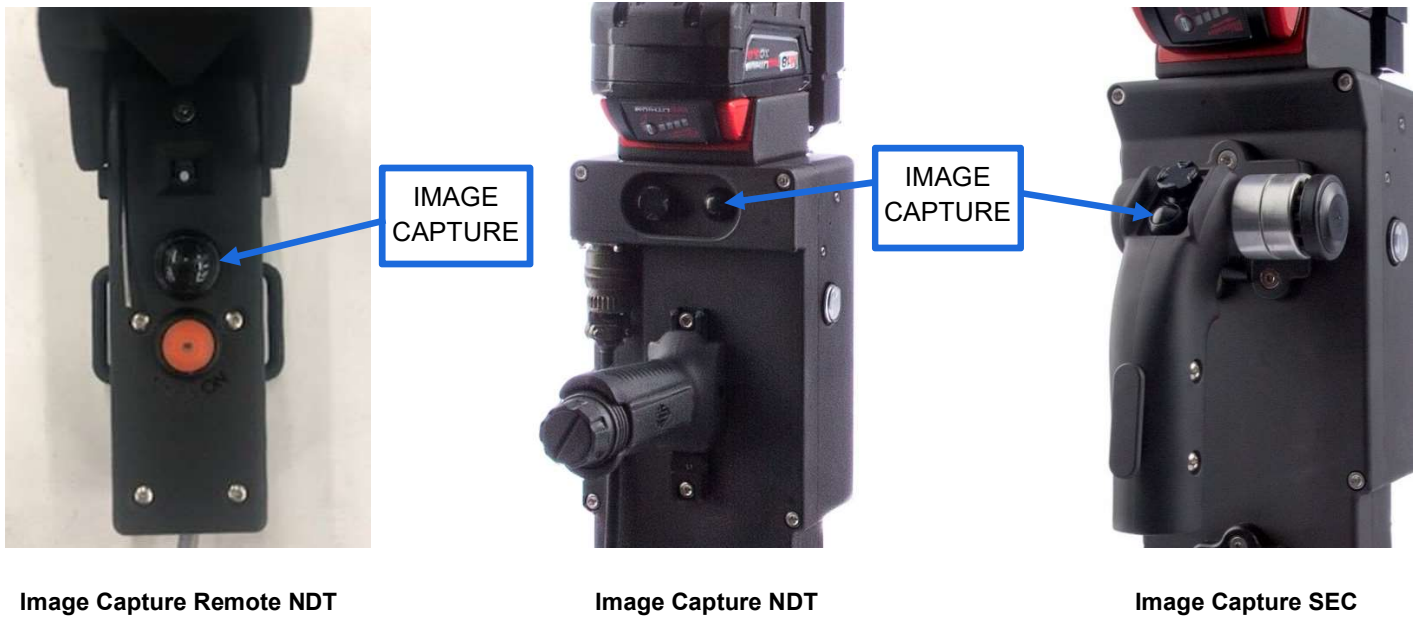


Figure 9 Capture Button Options

The system will display the snapshot in the upper left-hand corner (Picture-in-Picture) of the current screen for five seconds (Figure 10) and is automatically saved to internal storage in PNG image format.



Figure 10 Image Capture retained (upper left corner)

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 capture 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 11). 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.

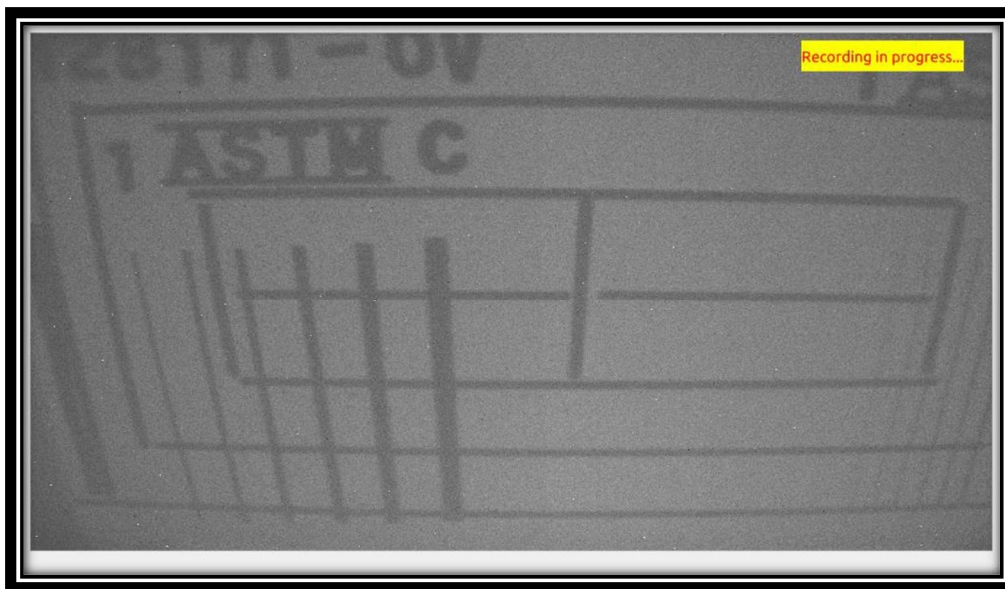


Figure 11 X-Ray Video Recording in Progress

System Information

System Information

Tube Temperature: 68F (5C)
Tube Cycles: 2
Storage Available: 2005 images

Date: 05 06 2019
Time: 10 39

Figure 12 System Info Screen

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The *System Info Screen* 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

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 Image Capture button (Figure 9). *Exit* transitions back to the *Home Screen*.

Image Playback

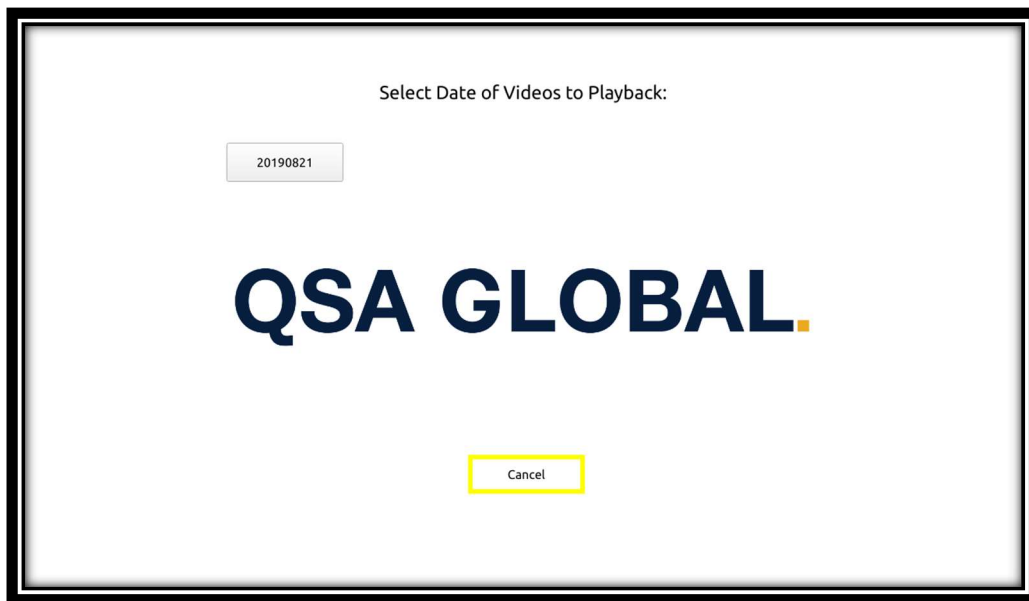


Figure 13 Playback Selection Screen

Image Playback (*System Info Screen*, Figure 12) brings up the *Playback Selection Screen* (Figure 13). 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 and still images. As always, the Image Capture button (Figure 9) 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™ DX 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.

USB Drive Configuration for Media Transfer

USB drives must be configured before images/videos can be transferred from the OpenVision™ DX system. A properly configured USB drive includes an 'ovdx' directory at the drive's top-level, and an 'images' directory within the 'ovdx' directory (see Figure 14). **Unless these directories are on the USB drive as indicated, the software will not transfer images/videos.**

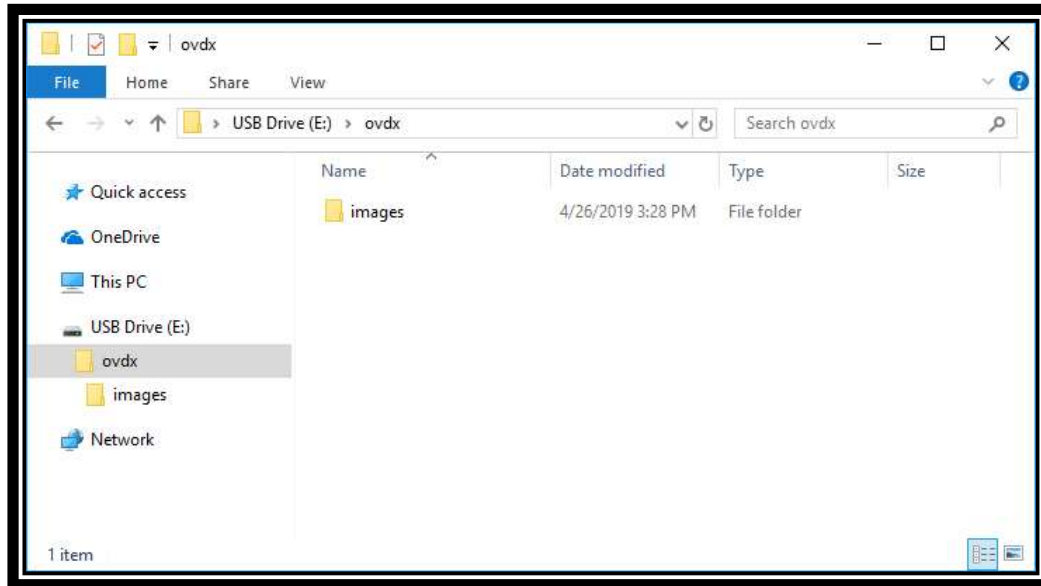


Figure 14 USB Drive Folder Format

CAUTION

To ensure that the USB drive does not become corrupted, always wait until the system transitions back to the *Home Screen* (Figure 2) before removing the USB drive from OpenVision DX.

Image Transfer

Inserting a properly configured (Figure 14) USB drive in the external USB port (Figure 15) of the OpenVision™ DX transitions to the *Media Transfer Screen* (Figure 16). Navigate to desired folder to copy, then press and release the Image Capture button (Figure 9) to initiate file transfer.



Figure 15 - USB Port

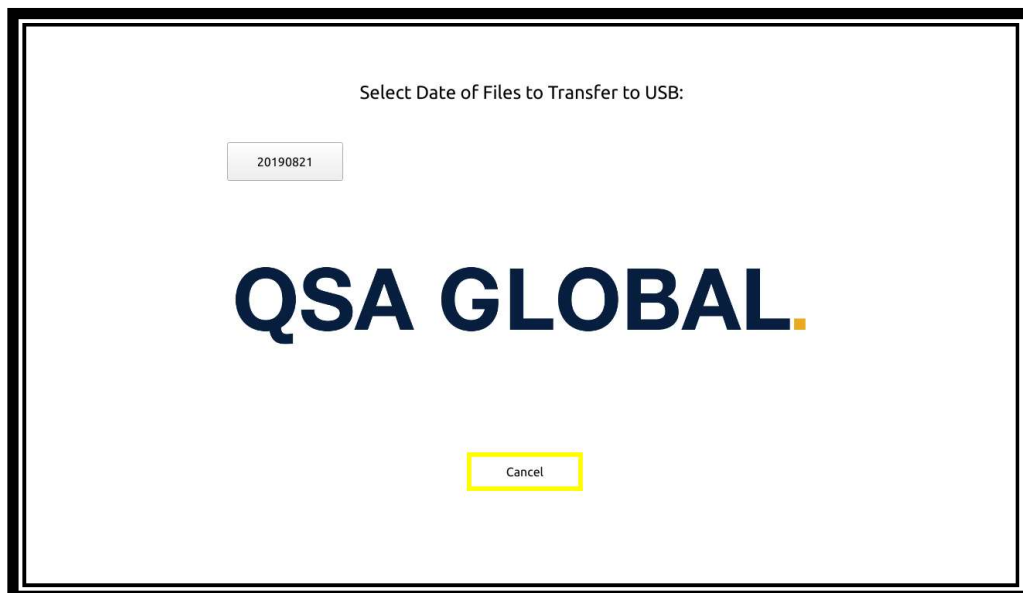


Figure 16 Media Transfer Screen

When no image directories are found on the OpenVision DX, the message "No Images to transfer" message (Figure 17) will be displayed. Selecting [Cancel] will transition to the *Home Screen* and the USB drive can then be safely removed.

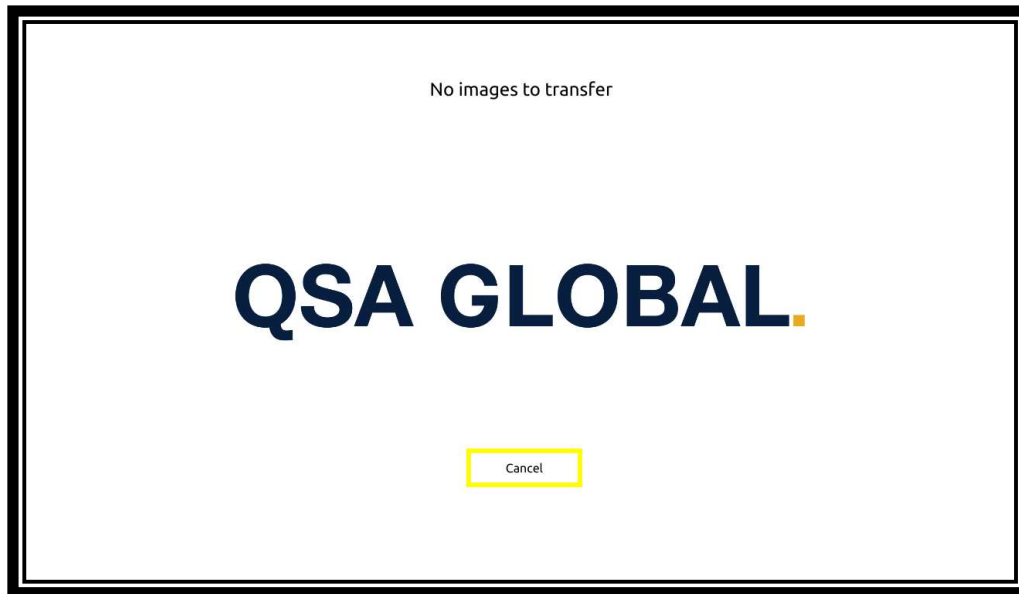


Figure 17 No Images Present

When one or more image directories are found, the *Media Transfer Screen* (Figure 16) will appear displaying up to four buttons at one time with names of the directories that exist on the OpenVision DX. 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 18).

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 DX and reinsert.



Figure 18 Image Transfer Confirmation

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This screen 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 19). 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 20).



Figure 19 Transfer in Progress

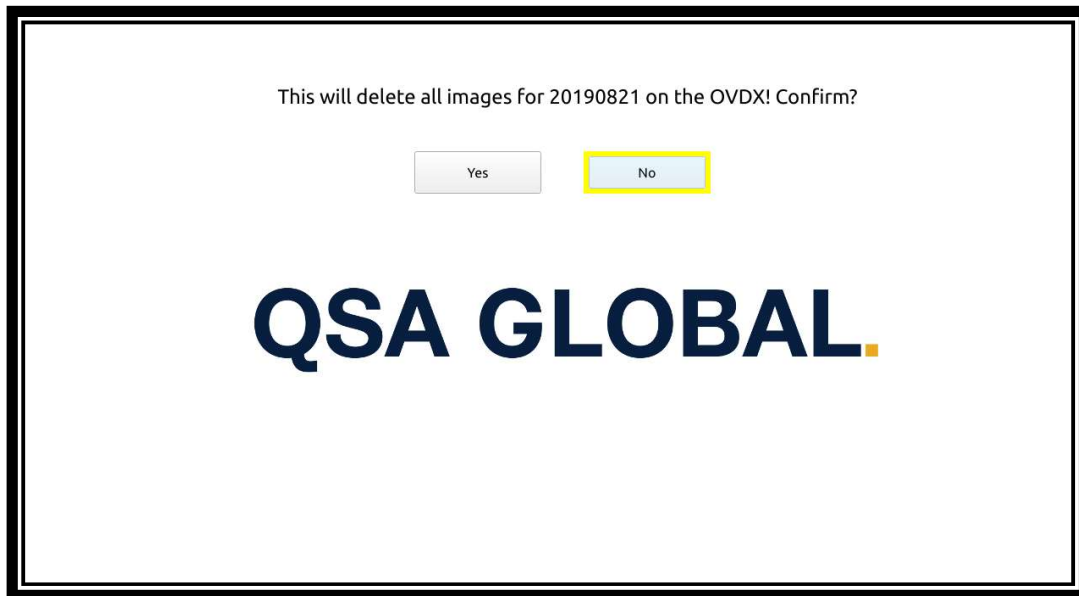


Figure 20 Image Deletion Confirmation

This screen 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 DX). Selecting **Yes** will cause the images in that specified folder to be deleted from the OpenVision DX and then the system will transition to the *Home Screen*.

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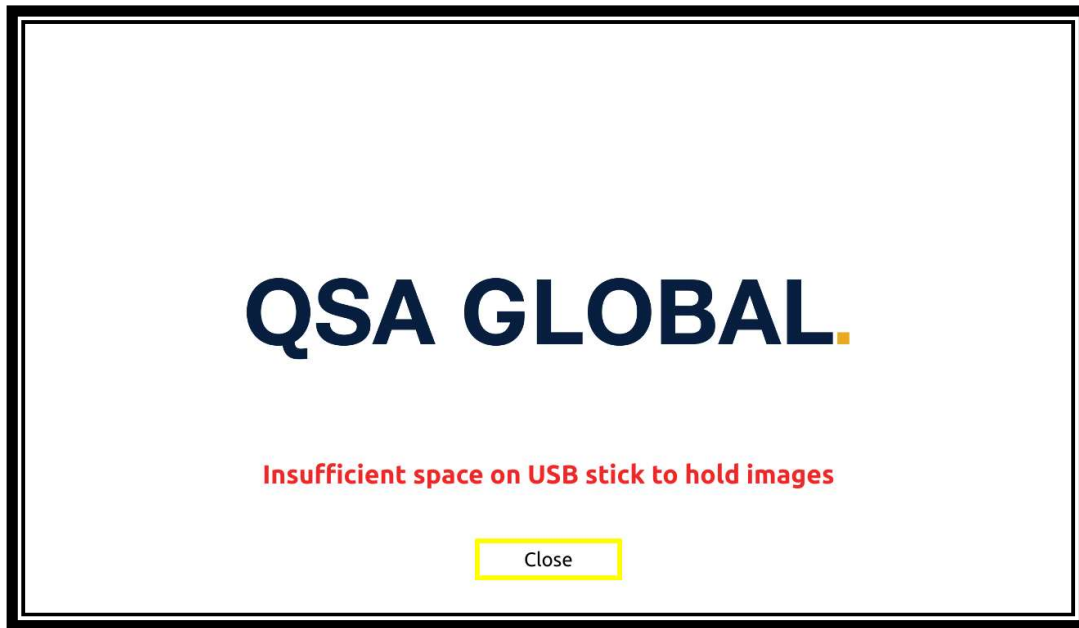


Figure 21 Insufficient Space Warning

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 21). Selecting the *Close* button will cause the system to transition to the *Home Screen* and the USB drive can be safely removed.

Software Update



Figure 22 Software Update Screen

Transition to the *Software Update Screen* is achieved by inserting a properly configured USB drive in the external USB port of the OpenVision™ DX.

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A properly configured USB for software update includes an 'ovdx' directory at the top-level directory of the USB drive and the content of the 'ovdx' directory must contain files associated with a software update including one versions.xml file and one or more files containing a '.pkg' extension that have been generated by a release engineer. The procedures associated with release generation are beyond the scope of this document.

As with other screens, navigation between buttons is performed using the left/right hat switch positions of the hand-held controller. Use the capture switch (Figure 9) to select an on-screen button.

This screen is displayed when a properly formatted software update USB drive has been inserted into the external USB port of the OpenVision DX. The user is presented with a **Yes** and a **No**. Selecting **No** causes the system to transition to the *Home Screen* at which point no software update has been performed, allowing the USB drive to be safely removed. Selecting **Yes** will initiate a software update to the OpenVision DX that will then cause the system to restart. The USB drive can be safely removed only after the display has been disabled (i.e. display goes blank).

Admin Password Screen

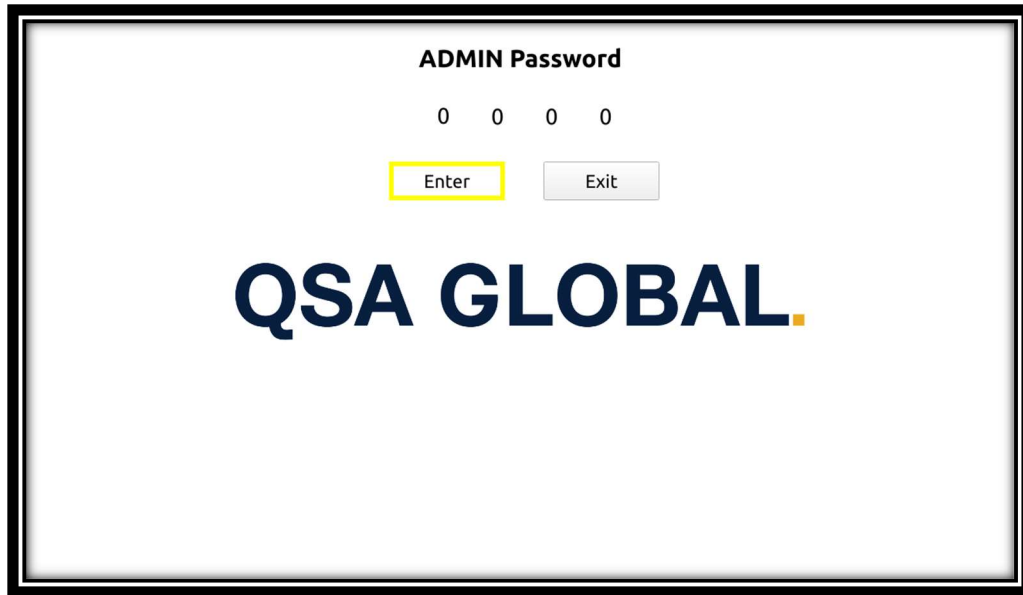


Figure 23 Admin Password Screen

Selecting the *Admin* in the *System Info Screen* (Figure 12) transitions to the *Admin Password Screen* (Figure 23). 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*.

System Administration

Setting	kV	mA	W
High	70	0.171	12.0
Medium	55	0.120	6.6
Low	40	0.090	3.6
Super	70	0.171	12.0

☐ Super Mode
☒ Require Scatter Shield to energize X-Rays
☒ GO Support
☐ Remote Power Control

Admin Password: 0 0 0 0

Figure 24 Admin Screen

In the *Admin Screen*, the hat switch's left/right positions navigate between settings, and the up/down positions changes the highlighted setting. Settings that can be changed and their value ranges are shown in Table 3.

Table 3 - 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 DX to factory settings

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

Select *Apply Settings* to save any changes. Otherwise, select *Cancel*. Either action will transition back to the *Home Screen*.

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™ DX. With Super Mode enabled the operator can adjust (through the settings menu) voltage in 1 kV increments and current in .001 mA increments.



Figure 25 Home Screen with Super Mode enabled.

The *Admin Screen's* Super Mode (Figure 24) 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 25). Activate the *Settings* menu (see **Settings Menu** section on page 10) and navigate to either the kV or mA setting. Pressing the up/down hat switch will change the value highlighted.

OPENVISION™ DX WI-FI TABLET.



Figure 26 OpenVision DX Wi-Fi Tablet

GO Support

Go Support must be selected in the OpenVision DX **System Administration** screen for the Wi-Fi functionality to operate. This is set at the factory (Figure 27).

A screenshot of the OpenVision DX System Administration screen. It features a table with settings for kV, mA, and W, followed by several checkboxes. The "GO Support" checkbox is checked and circled in red. At the bottom, there are buttons for "Factory Reset", "Apply Settings", and "Cancel".

Setting	kV	mA	W
High	70	0.171	12.0
Medium	55	0.120	6.6
Low	40	0.090	3.6
Super	70	0.171	12.0

☐ Super Mode
☒ Require Scatter Shield to energize X-Rays
☒ GO Support
☐ Remote Power Control

Admin Password: 0 0 0 0

Factory Reset

Apply Settings Cancel

Figure 27 GO Support selected

Startup and Power Down of Tablet

The OpenVision™ DX tablet is a touch screen tablet. To power up, press the power button on the tablet's upper-left corner. The OpenVision DX 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 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 OpenVision DX APP Home Screen

Establishing Wi-Fi Connection, Link, and Streaming

Tablet will automatically connect to Wi-Fi 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 (Figure 30).



Figure 30 Wi-Fi Connected to OpenVision DX

Once connected to Wi-Fi, the tablet can then be linked to the OpenVision™ DX by pressing the link icon (). Once the link is established (), the settings from the OpenVision DX will update (along bottom of screen, as shown in Figure 31).

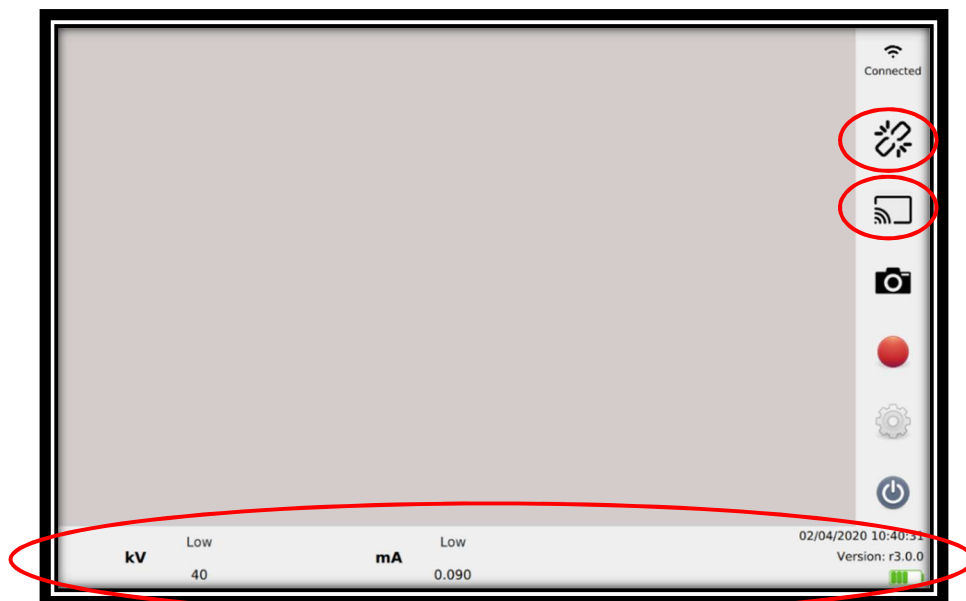


Figure 31 Wi-Fi LINK to OpenVision DX

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With the tablet linked to the OpenVision DX, can stream image data by pressing the streaming icon (📶, Figure 31). To stop streaming, press the stop button (■, Figure 32).



Figure 32 Streaming Image Data to Tablet

Image and Video Capture

Pressing the camera icon (📷, Figure 32) takes a snapshot. Once pressed, a picture-in-picture will appear in the upper-left corner (Figure 33). Snapshots work for both targeting and X-ray images.

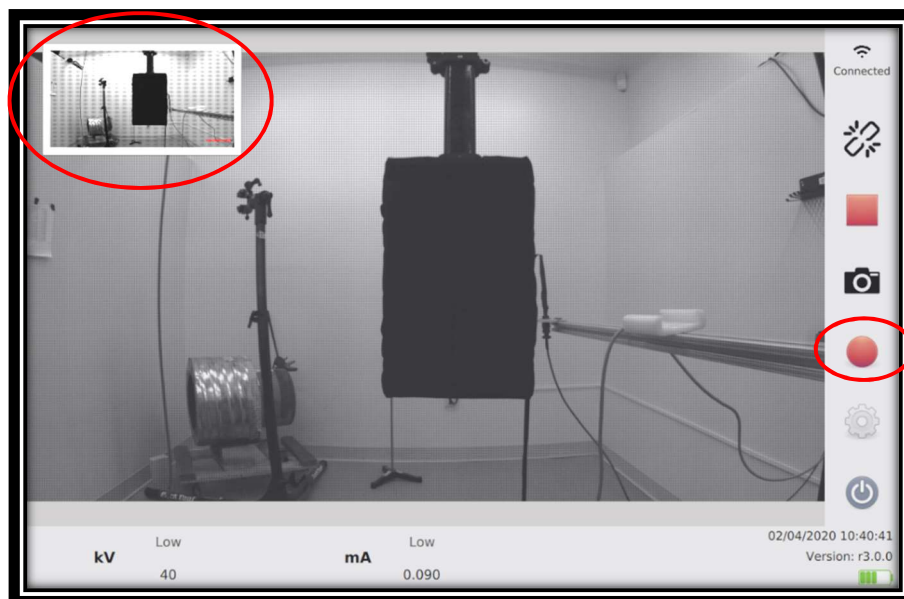


Figure 33 Image Snapshot Picture-in-Picture

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Pressing the video record icon (●, Figure 33) starts a recording. The icon will change (■, Figure 34) to indicate video recording in progress. Press this button again to stop recording. Tablet can perform seamless targeting to X-ray videos.



Figure 34 Video Capture

OpenVision™ DX Screen Displays

In addition to the live image streaming, the tablet will display most OpenVision DX data and information screens, including kV and mA adjustments (Figure 35), X-ray Caution screen (Figure 36), error screens (Figure 37), ADMIN screen, etc.



Figure 35 Screen showing kV and mA Adjustment via OpenVision DX

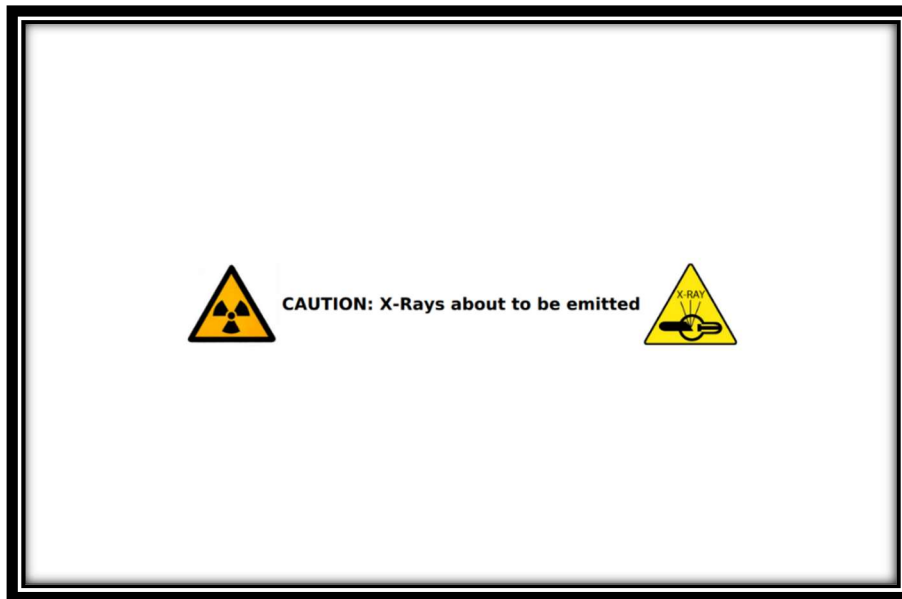


Figure 36 Caution Screen

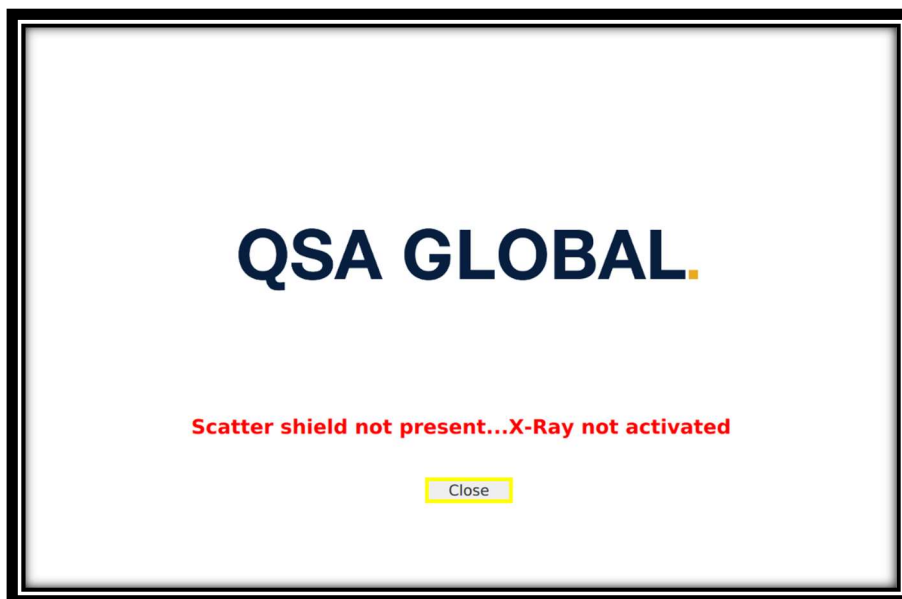


Figure 37 Error Screen Example

Local Settings Screen

Media Transfer

Images and videos can be downloaded to a USB drive. Plug an appropriate size USB drive into the USB port located on the right side of the tablet using the provided adapter (Figure 38).

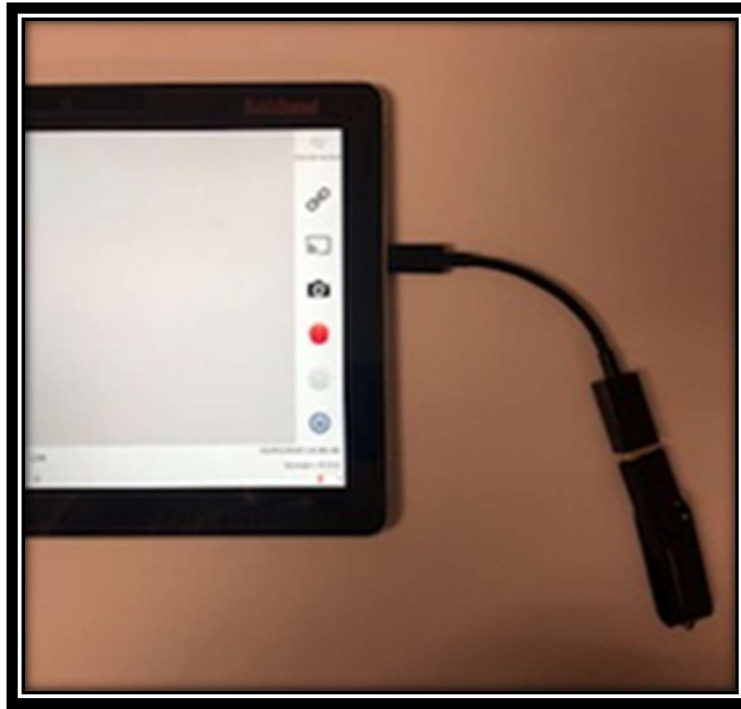


Figure 38 USB Adapter and Drive Connected to Tablet

Press the Local Settings button (⚙️,) to go to the *Local Settings* screen (Figure 39).



Figure 39 Local Settings Button

Pressing the *Media Transfer* button (Figure 40) will transition tablet to the *Media Transfer* screen.

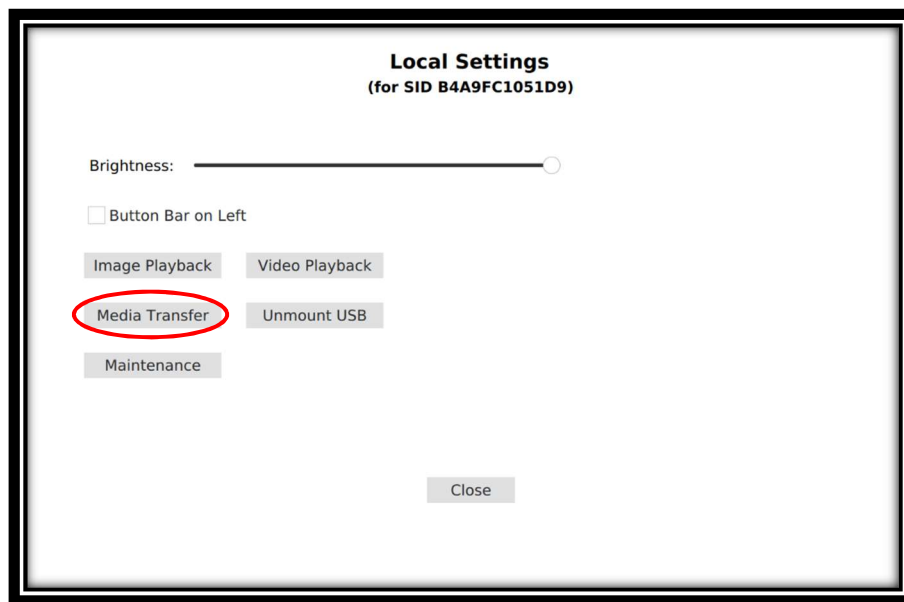


Figure 40 Local Settings Screen

Select desired folder to transfer and press the *Open* button (Figure 41). All media in that folder (snapshots and videos) will automatically transfer to the attached USB drive. Transfer in Progress window (Figure 42) will be displayed during transfer.



Figure 41 Media Transfer Screen

CAUTION

DO NOT remove USB drive until “Unmount USB” operation has been completed. Otherwise, USB files may become corrupt and unusable.

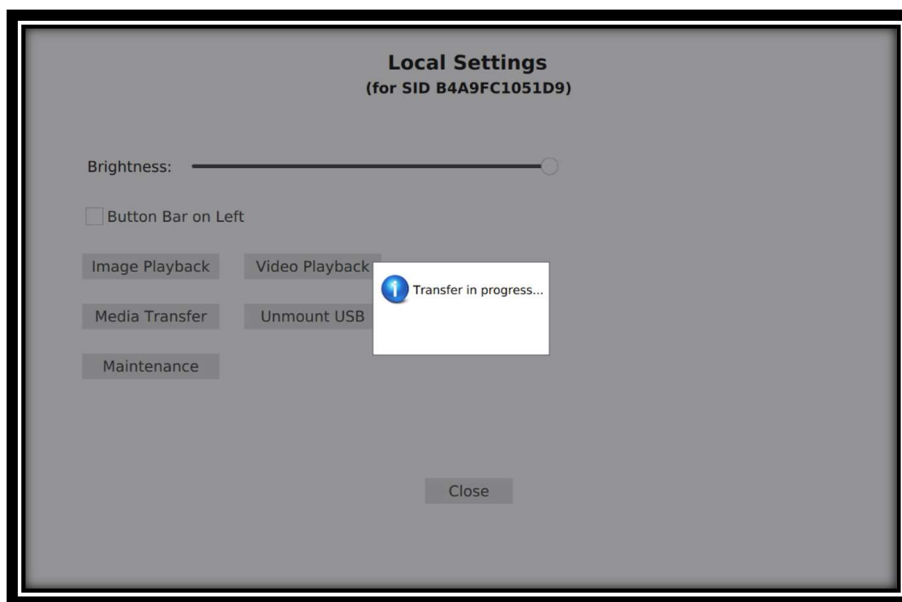


Figure 42 Transfer in Progress

Once the media transfer is complete, tablet will transition back to the *Local Settings* screen. Press the *Unmount USB* button (Figure 43) prior to removing the USB drive. This will assure the USB drive is properly unmounted. If this step is not completed, some files may be corrupted.

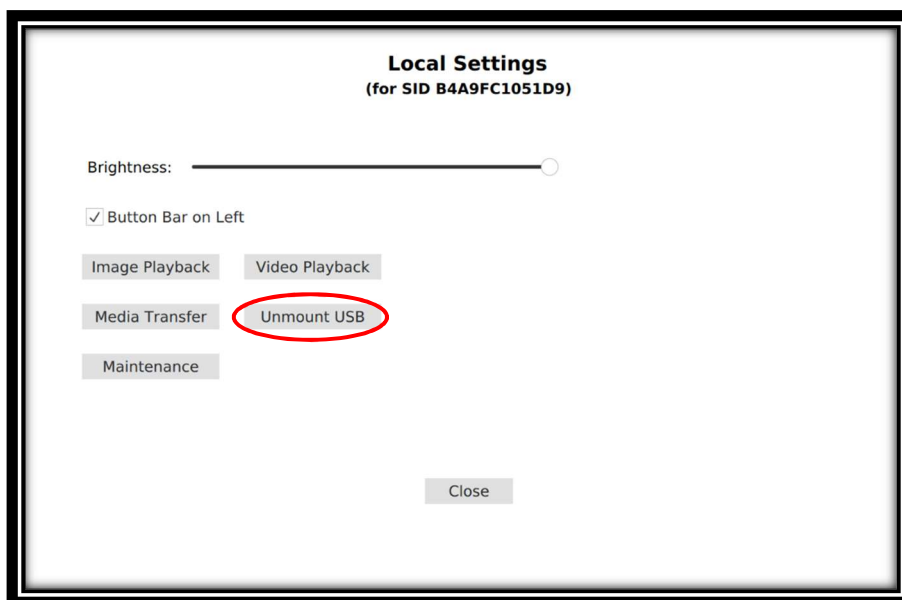


Figure 43 Unmount USB

Image Playback

In the Local Settings screen select the *Image Playback* button (Figure 44).

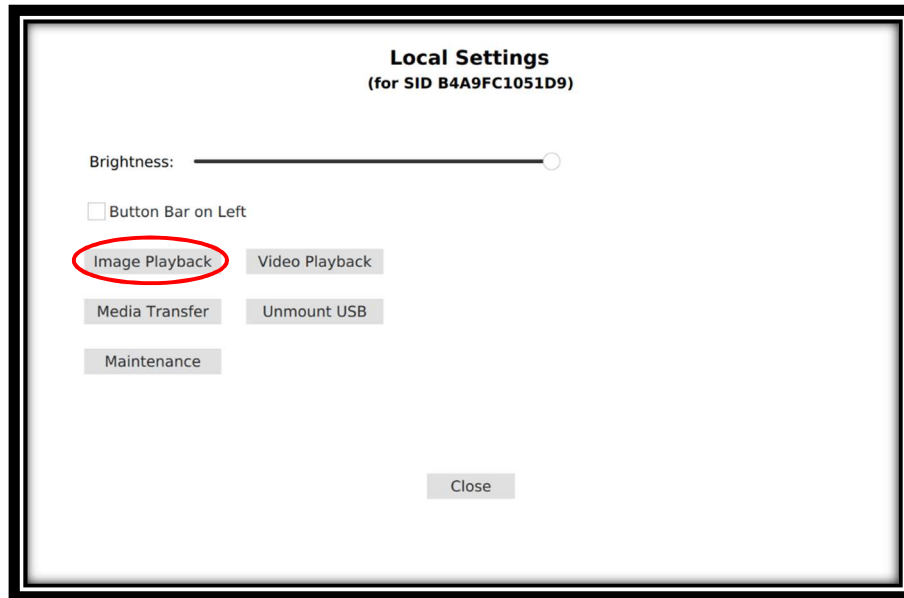


Figure 44 Image Playback Button

Press *Select Folder* button (Figure 45) to select a folder from the list (Figure 46). If only one folder is available, you can directly scroll through ALL images. Folders can also be deleted from the *Folder List* screen.



Figure 45 Image Playback/Select Folder



Figure 46 Folder List

Video Playback

For Video Playback, transition to *Local Settings* screen and press **Video Playback** button (Figure 47). Folder navigation and delete functions are identical to image playback.

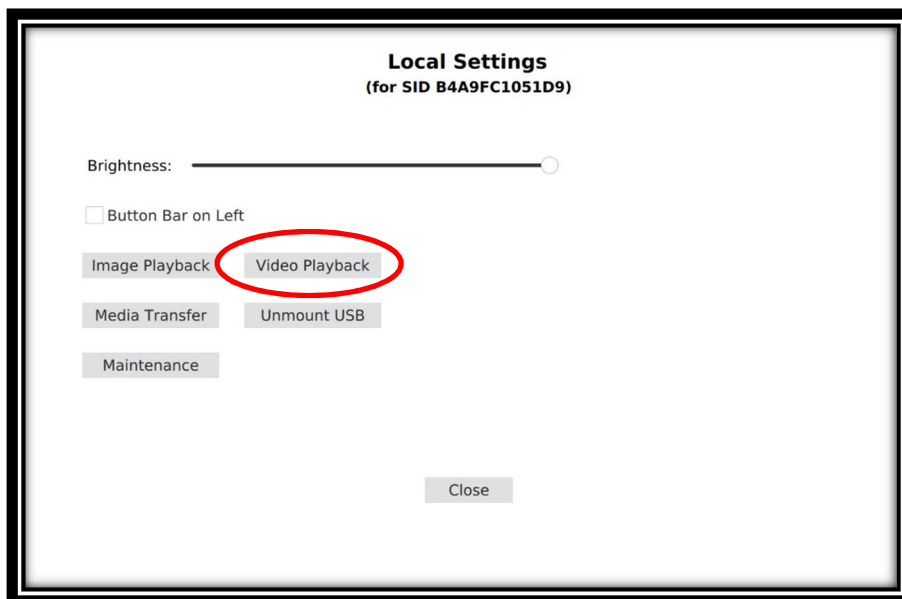


Figure 47 Video Playback Button

Standard video playback controls are available to the selected video (Figure 48).



Figure 48 Video Playback

Brightness Adjustment

The tablet's screen brightness can be adjusted by sliding the bar left or right (Figure 49).

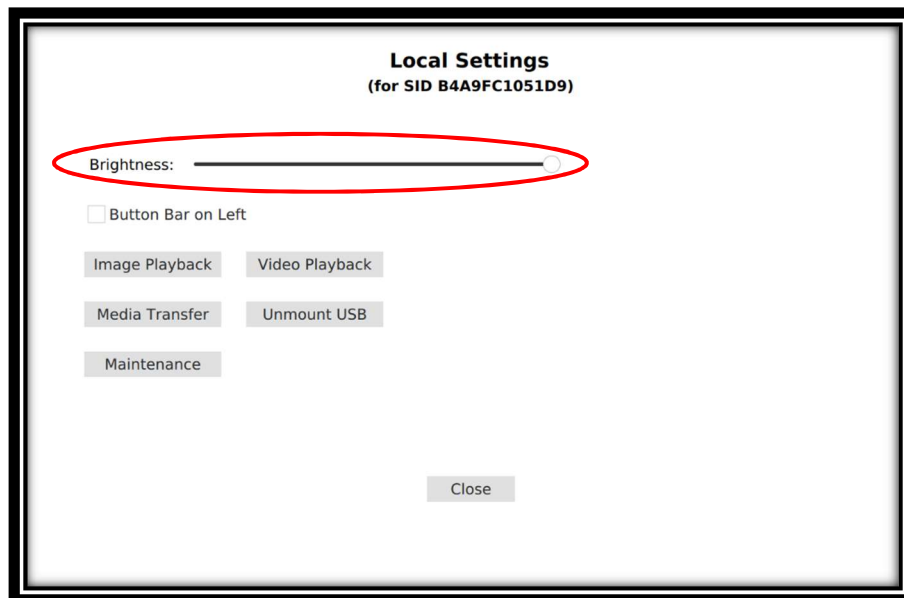


Figure 49 Brightness Control

Control Panel Configuration (Button Bar)

The Control Panel on the *Home* screen (Figure 29) can be shifted to the left or right side of the tablet. Default is on the right; the check box (Figure 50) allows you to position it on the left.

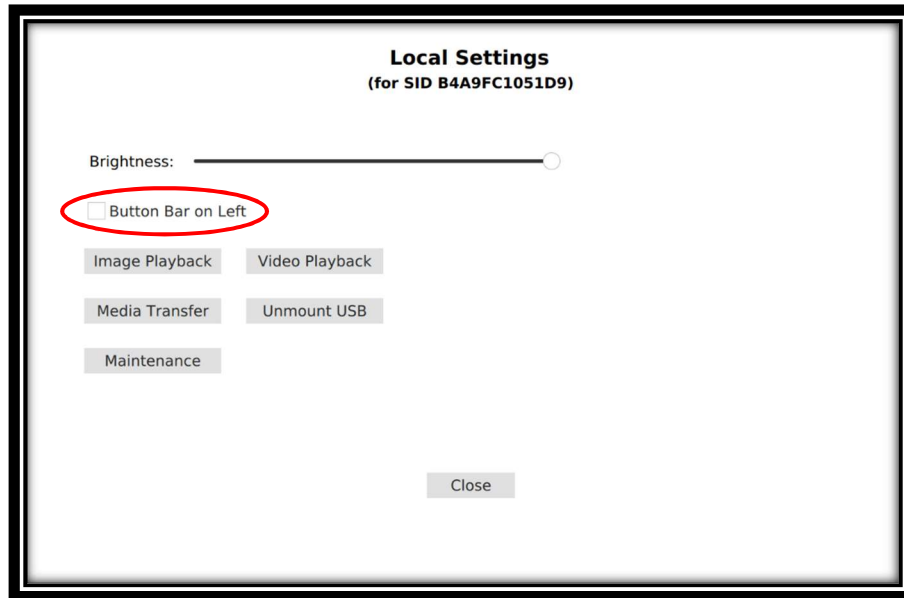


Figure 50 Control Panel Configuration

NOTE: The [Maintenance] button/screen is for QSA Global, Inc. use only.

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 51) in the OpenVision™ DX Software Administration screen.

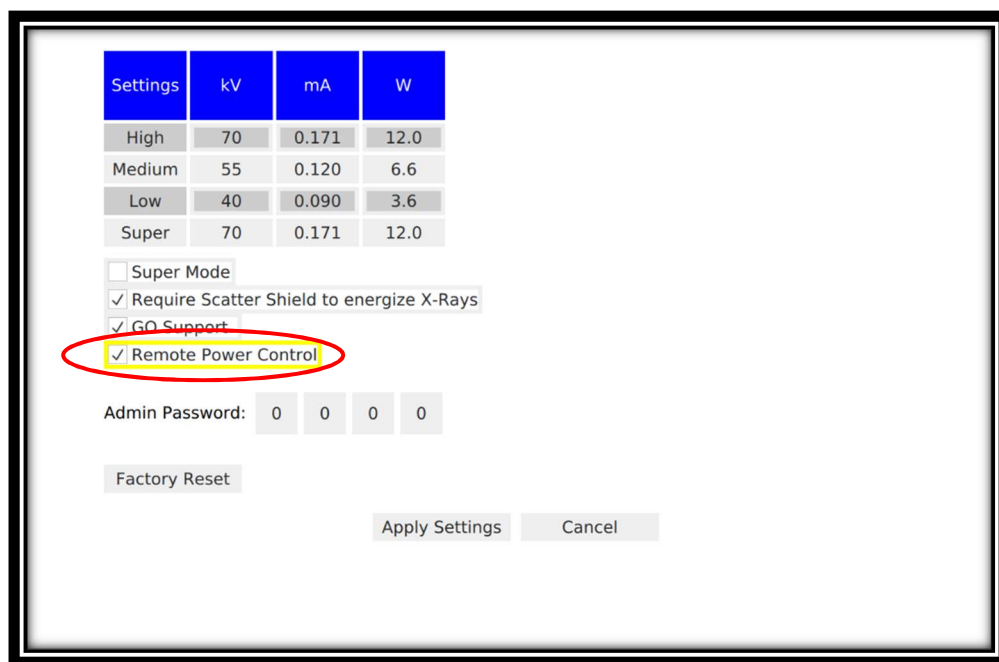


Figure 51 Remote Power Control Selection

The kV and mA can now 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 (Figure 52) or mA (Figure 53) by pressing either **-** or **+** buttons and then pressing the **Apply** button.

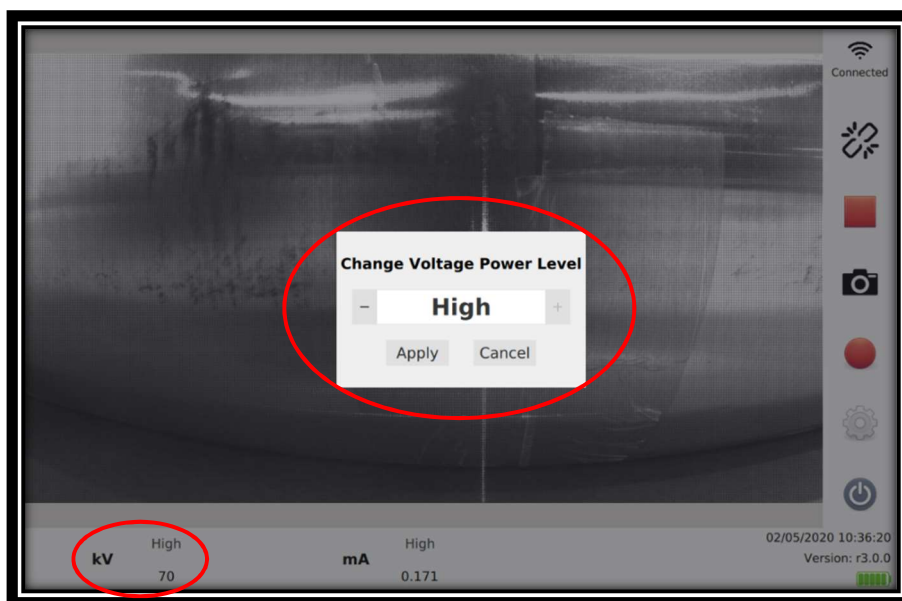


Figure 52 kV Selection and Adjustment

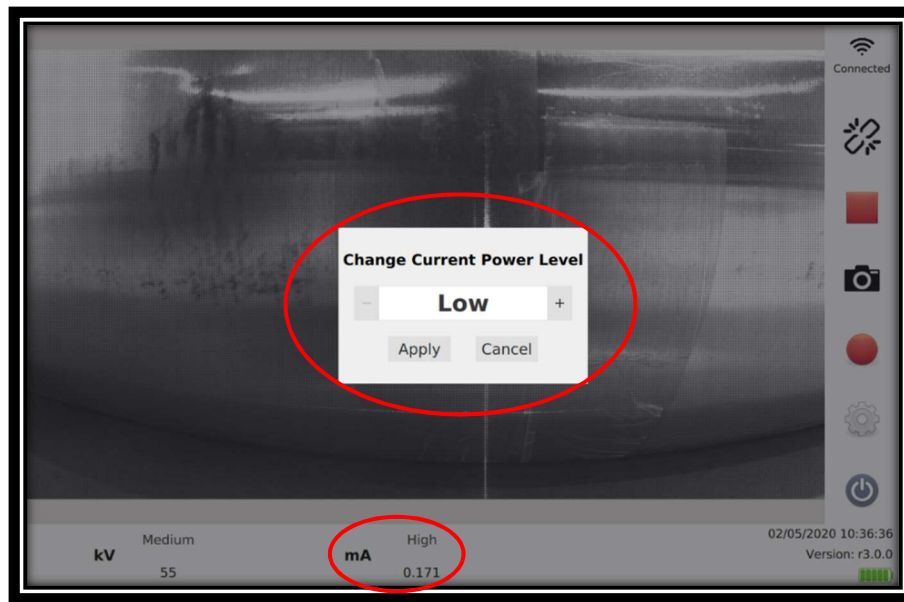


Figure 53 mA Selection and Adjustment

REMOTE SOFTWARE UPDATES.

The OpenVision™ DX is capable of remote software updates. These updates can be performed with or without the tablet. These updates are performed at the customers discretion. An ethernet connection is required in order to perform software updates.

For information on the latest software revision please visit:

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

Performing a Software Update *WITH* a WiFi Tablet

Turn on the tablet and allow the OpenVision DX APP to launch. Turn on the OpenVision DX and wait for the green LED's.

Plug the ethernet dongle (provided with all OpenVision DX units) into the USB C slot of the tablet (Figure 54).



Figure 54 USB Dongle to Tablet

Connect the dongle to an ethernet connection (Figure 55).



Figure 55 Ethernet Connection

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The system will automatically update after several minutes.

Performing a Software Update *WITHOUT* a WiFi Tablet

Turn on the OpenVision™ DX and wait for the green LED's.

Put the USB A-C adapter (provided with all OpenVision DX units) on the ethernet dongle (provided with all OpenVision DX units) (Figure 56).



Figure 56 USB A-C Adapter

Plug the dongle into the USB port on the OpenVision DX (Figure 57).



Figure 57 Ethernet Connection to OpenVision DX

Connect the dongle to the ethernet connection (Figure 55).

The system will automatically update after several minutes.

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MAINTENANCE.

The OpenVision™ DX has been designed to require minimal maintenance by the operator. QSA Global, Inc. recommends daily visual inspection of the system. Specific attention should be paid to the following:

- M18™ battery and its mount (on top of Main Housing) – Ensure both are clean, and in sound shape.
- HDMI cable – Inspect for any cracks or wear.
- Allen/thumb screws – Check for tightness.
- Imager bag – Check for excessive wear.

Use a soft, damp cloth to clean to remove dirt and grime from the OpenVision DX.

CAUTION

Do not use solvents or apply cleaning agents directly on the OpenVision DX as this can damage the components and/or corrode the electronics.

CAUTION

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

The OpenVision™ DX 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 DX. Use Table 4 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 4 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.

Error Code	Cause	Description
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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