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ASTROPHYSICS INC.

X-Ray Imaging System

XIS USER's MANUAL

DOCUMENT OVERVIEW

This user's manual is an operator's guide to the Astrophysics Inc.*X-ray Imaging System* (XIS) with XIS Application Software 2.1.2.x*. It provides instructions on using the following XIS Product Family models:

- XIS-5335
- XIS-5335S
- XIS-5878
- XIS-6040
- XIS-6545
- XIS-6545 SC
- XIS-7858
- XIS-100X
- XIS-100XD
- XIS-100XDX
- XIS-1080
- XIS-1080D
- XIS-6545 DV (Dual View System)
- XIS-100x DV (Dual View System)
- XIS-1210D
- XIS-1517
- XIS-1818
- XIS-1517 DV (Dual View System
- XIS-1818 DV (Dual View System
- XIS-1517 DV-320KV (Dual View System)
- XIS-1818 DV-320KV (Dual View System)

These models vary in inspection tunnel size, image resolution, number of x-ray views, geometry of x-ray view and transport system. But they all operate similarly because they all share:

- A common hardware design with common components
- A common operating system with the same features
- A common set of user screens and features.

This manual applies to all XIS models except where noted. It is intended for all XIS users.

Note: XIS Application Software Version 2.1.2.x* includes, but not limited to, Versions 2.1.2.4 and 2.1.2.5

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NOTICE

The information contained in this document is believed to be correct as of the date of publication. The contents are presented “as is”. Except as required by applicable law, no warranties of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, are made in relation to the accuracy, reliability, or contents of this document. Astrophysics Inc. reserves the right to make changes to this document and the product specifications contained herein without notice.

CONFIDENTIAL AND PROPRIETARY NOTICE

CONVENTIONS IN THIS MANUAL

Throughout this manual, the Astrophysics *X-ray Imaging System* (XIS) is referred to as the *XIS*.

Operator console button presses are specified in "square" ("[", "]") brackets. For example, pressing the STOP button on the Xkeypad operator console is represented as [**STOP**]

"Control" key characters are denoted with square bracket notation, [Ctrl-character].
For example, [Ctrl-x] refers to simultaneously pressing the [Ctrl] key and the [x] key on the PC keyboard.

"Alt" key characters are denoted with square bracket notation, [Alt-character].
For example, [Alt-x] refers to simultaneously pressing the [Alt] key and the [x] key on the PC keyboard.

[Alt-Ctrl-del] refers to simultaneously pressing the [Alt] key, the [Ctrl] key, and the [del] key.

IMPORTANT
Very important notices are highlighted by the "IMPORTANT" text box. These messages involve critical safety issues and deserve special attention.

B/W refers to the Black & White (left side) video display monitor
[**B/W**] refers to the button *B/W* on the Xkeypad operator console.

Very important operational information is highlighted in this format (black text in yellow when this manual is printed in color).

Key step-by-step procedures are highlighted in this format (black text on a tan background when this manual is printed in color.)

CHAPTER 1 SAFETY INFORMATION

IMPORTANT

The Astrophysics X-ray Imaging System produces and uses ionizing x-ray radiation. X-rays can be harmful to human health. They cannot be directly detected by any of the human senses. Please exercise the utmost safety.

Chapter Overview

This chapter provides important safety information on operating the Astrophysics X-ray Imaging System (XIS). It is intended for all users of the XIS.

Safety Features

- The Astrophysics X-ray Imaging System (*hereinafter referred to as the XIS*) has many safety features to protect the operator and others including:
- Lead shielded construction to minimize radiation leakage.
- Lead fabric **curtains** at the inspection tunnel openings to help block scattered x-rays from escaping the tunnel.
- *Interlock switches* that stops (power off) the x-ray generator and conveyor belt when an access panel is opened or removed.
- *Steel frame* and *heavy gauge steel panels* that reduce any residual external x-ray radiation emissions.
- *Infrared Photocells* inside the inspection tunnels that senses when objects entering and exiting the inspection tunnel. The x-ray generator is activated only for the minimum amount of time necessary to image items traversing the inspection tunnel. X-rays are NOT produced when the x-ray machine is idle, or when the conveyor is stopped, or when the inspection tunnel is empty.
- *Emergency Stop* switches that can be pressed to immediately stop (power off) the x-ray generator and the conveyor belt.
- Green *Power-ON* LED lamps at each end of the x-ray tunnel and on the control panel to indicate when the system is powered on and ready for use. A Power-ON LED light is also located on the main operator control panel.
- Red warning *X-ray ON* LED lamps at each end of the x-ray tunnel and on the control panel to indicate when x-rays are being generated. An X-ray ON LED light is also located on the main operator control panel.

Safety Precautions

- The XIS is designed to be safe and easy to use. However, like all major electro-mechanical devices, it should be treated with care and respect.

- When operating the XIS, follow the safety precautions below:
- Do NOT operate the unit outdoors. The XIS must be protected from moisture, precipitation, and extremes of temperature.
- Do not operate the XIS below 0^{o}C (32^{o}F) or above 40^{o}C (104^{o}F).
- Connect the unit to a well-grounded power outlet. The XIS requires a reliable protective earth ground to operate.
- Do NOT operate the unit when the x-ray curtains are torn or missing.
- Clear the x-ray tunnel of all items before starting the unit.
- Do NOT insert any part of the body into the inspection tunnel while x-rays are energized. Avoid all unnecessary radiation exposures.
- If something becomes jammed in the inspection tunnel, stop the x-ray generator and conveyors before attempting to clear the jam.
- Either :
    - press the Emergency Stop button , OR

    - turn the main AC switch to the OFF position, OR
    - turn the key-switch to the OFF position, OR
    - unplug the machine.
- Do not reach in the inspection tunnel while the conveyor / rollers are running. The x-rays generator may turn on exposing you to x-ray radiation
- Check the ***Power ON*** and the ***X-ray ON*** lights for proper operation. The Power ON light becomes lit when the key-switch is turned to the ON position. The x-ray generator only turns on when objects are being carried through the inspection tunnel. The X-ray ON light becomes lit when the x-ray generator is producing x-rays.
- The X-ray ON lights are located:
    - above the entrances of the inspection tunnel,
    - on the operator console
    - (X-RAY ON, radiation trefoil, icon) on bottom of the status bar on the x-ray imaging screen.

- If required, post appropriate warning signs around the XIS to alert people that they are in the vicinity of a device that produces ionizing x-ray radiation.
- All cover panels must be closed and securely fastened.
- Do not open any cover panel when the XIS is operating. The cover panels have protective interlock safety switches. They prevent operation of the x-ray generator and conveyor/rollers if anypanel is opened or removed.
- Ensure that sharp objects do not cut the x-ray curtains and conveyor belt
- Perform a comprehensive radiation survey and safety inspection after the XIS is serviced.
- The foot-mat switch is a safety device that requires the operator to stand on it when operating the machine. Do not place heavy objects on the **foot-mat** switch to over-ride it.
- Keep hands, fingers, clothing and hair away from moving conveyor / rollers.
- Do not sit on, stand on, or ride on the conveyor / rollers.
- Do not stand closer than necessary to the x-ray machine. Do not allow anyone to unnecessarily loiter within 2 meters (7.7 ft) of the x-ray machine.
- Do not leave the XIS turned ON and unattended.
- Do not obscure or cover the X-RAY ON warning lights or the warning signs. They must be clearly visible at all times.
- Turn "OFF" the equipment as soon as an unsafe operating condition develops or might develop. Inform your supervisor who will contact the maintenance technician.
- Do not place any objects such as plants, coffee cups, soda cans, bottles etc. on top of the machine. The liquid from these containers could spill and create a potential shock hazard.

U.S. Federal Health and Safety Regulatory Compliance

The XIS is classified as a *Cabinet X-ray Device.*

- In the U.S., the cabinet x-ray devices are regulated by *U.S. Food and Drug Administration.* The XIS complies with applicable U.S. statutes including, but not limited to, *U.S. Code of Federal Regulation (CFR), Title 29, Section 1020.40,* Performance Standards for Cabinet X-ray Devices.
- In Canada, cabinet x-ray devices are regulated by *Health Canada*. The XIS complies with applicable Canadian statutes including but not limited to the *Radiation Emitting Device* (RED) Act, CCR 1370 and *Canada Safety Code 29*.
- United States and Canada law requires that the XIS `shall ONLY be installed, moved, and serviced by factory trained and certified technicians. There are no user serviceable parts inside the machine.
- United States and Canada law requires that you use only factory certified replacement parts to repair the XIS.

Local Regulatory Compliance

Local radiation safety requirements differ significantly from one jurisdiction to another.

- Some jurisdictions require the registration of x-ray producing equipment ***PRIOR*** to their usage.
- Many jurisdictions require a commissioning and annual radiation safety surveys.
- Some jurisdictions require certification of all x-ray machine operators.
- In Canada, personal radiation dosimeters are not required for baggage x-ray machine operators.

XIS users are responsible for their compliance with all applicable federal, state, and local laws. Failure to comply may result in substantial penalties.

Facility Safety

During security screening with your XIS, you may identify hazardous contraband, weapons, explosives, and other threats in the bags, packages, and articles that you examine. Plan ahead. Have your facility security manager prepare clear and concise instructions for these situations. Be prepared to follow them.

CHAPTER 2 PRODUCT SUPPORT

Chapter Overview

This chapter provides product support, warranty, training, and business contact information for the XIS. This information is intended for the all users of the XIS.

Product Warranty

Per the terms of your sales contract, the XIS is warranted to be free of defects for the warranty period. Under the parts warranty, Astrophysics will replace defective parts that are returned freight prepaid to Astrophysics within the warranty period. Astrophysics shall not be liable for other consequential, economic, or contingent damages. The parts warranty does not apply to any parts or material that has been damaged as a result of accident, misuse, neglect, improper installation or operation in a manner not set forth by this manual.

Product Information

All Astrophysics Inc. (Astrophysics) X-ray Imaging System "XIS" products have precision electronics that require stable input power for proper operation. The input voltage and frequency requirements are listed next to the power plug on the mainframe. The input power should not vary more than +/- 10% from the listed requirement.

Input power that is outside these requirements may damage the XIS. Momentary high voltage spikes, for example, can severely damage the electronics and X-ray generator inside the XIS. Astrophysics Inc. does not warrant the XIS against damage caused by improper input power. Astrophysics recommends that the XIS should be protected by a constant voltage transformer or line conditioner that clamps high voltage spikes and stabilizes input voltage. For the most reliable operation, we recommend that the XIS also be protected by a suitably rated battery backed uninterruptable power supply (UPS).

All constant voltage transformers, line conditioners, and UPS's should be placed between the wall outlet and the XIS. The requirements for a voltage transformer, line conditioner, and UPS vary by the XIS model and its application. For more information contact Astrophysics Customer Service Department.

Technical Support, Field Service, and Training

Astrophysics offers the following support services for your XIS:

- Onsite and Factory Operator Training Course
- Onsite and Factory Maintenance and Troubleshooting Courses
- Telephone, Virtual Internet, and E-Mail Technical Support
- Warranty Service
- Time and Material (Cost) Service
- Radiation Survey Service
- Software Maintenance Update Agreements
- Preventive Maintenance Agreements

For further information on the above services please call the Astrophysics Customer Service Department. See the *Business Contact Information* section below for the telephone number.

Requesting Product Assistance

If you have a problem with your XIS, please call the Customer Service Department. *Contact Information* section is provided in Business Contact Information section below.

Please have the following information available when you call:

1. The *Model and Serial Number* of your XIS system,

   Note: The *Serial Number* of the XIS is usually located under the conveyor bed next to AC power cord connection.

2. A description of the problem and any error messages that were displayed. Please note the circumstances that preceded your problem.

3. Your contact information including:

   - Your Name (or the name of someone who we can call back)
   - Your Company's Name
     - Your Telephone number
     - Your E-Mail address
     - Your (shipping) Address

Astrophysics Business Contact Information

For technical support or to order accessories and replacement parts, contact Astrophysics at:

Astrophysics., Inc.

21481 Ferrero Parkway
City of Industry, CA 91789
Office Telephone: (909) 598-5546
Customer Service (909) 527-6750
Fax: (909) 598-5546
Web Page: www.AstrophysicsInc.com
E-Mail: support@www.AstrophysicsInc.com

CHAPTER 3 USING THE X-ray IMAGING SYSTEM (XIS)

Chapter Overview

This chapter explains how to use the XIS. This chapter is intended for all XIS users. It assumes the XIS system is next to you and is ready to use.

Introduction

The XIS is a sophisticated computer based *dual energy* imaging system for screening baggage, cargo, and other items. X-ray imaging allows the internal inspection of items without the need for opening the enclosing container. The XIS thus provides for fast unobtrusive inspection of most all articles. It is specially designed to meet the screening needs of airport security checkpoints, court houses, prisons, corporate mailrooms and other areas requiring controlled access.

** Dual Energy – The XIS measures, and compares the transmission of *High Energy* (high frequency) and *Low Energy* (low frequency) x-rays through items that are being imaged. From this comparison, the XIS is able to determine approximate material composition.

The XIS has four phases of operation:

(1) ***System Startup***

(2) ***Login***

(3) ***X-ray Screening***

(4) ***System Shutdown***

Procedures for each phase of operation are described below.

PHASE 1 SYSTEM STARTUP

System Startup involves the following three steps:

STEP 1: Insert the key into the key-switch.

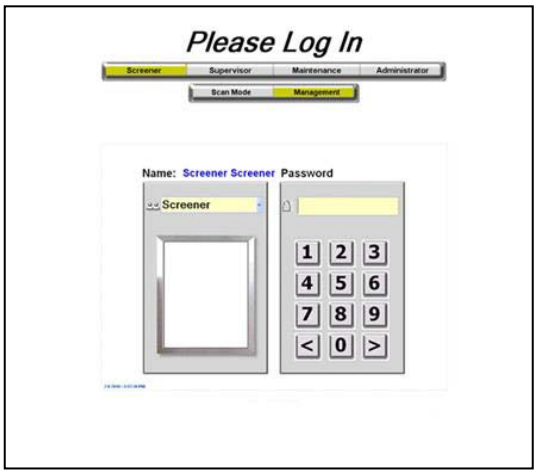
- The XIS AC power cord should already be “plugged-in”. If it is not plugged in, plug it in now.
    - NOTE: The AC power cord is located under the exit end conveyor bed.
    - NOTE: Leave the AC power cord plugged in.
- The main AC switch should be turned to the ON (up position). If the switch is not turned to the ON position, turn it to the ON position now.
    - NOTE: The main AC switch is located under the exit end conveyor bed.
    - NOTE: Leave the main AC switch in the ON position. This allows the batteries in the internal UPS (Uninterruptible Power Supply) to remain fully charged. The UPS battery slowly discharges on its own if the XIS is not plugged in. If the UPS battery becomes fully discharged, it may require up to eight hours to fully re-charge.

STEP 2: Turn the key-switch 90 degrees clockwise to the horizontal “ON” position. .

- The key-switch has two positions: the vertical OFF position and the horizontal ON position.
- Leave the key-switch in the “ON” position until you have finished using the XIS.
    - NOTE: When the key-switch is turned to the ON position, the following sequence occurs:
        - The computer screen briefly displays the PC BIOS startup messages.
        - The Windows Operating System briefly displays its startup messages.
        - The Windows Operating System briefly displays the Windows *Desktop* screen.

STEP 3: Wait for the ***Please Log In*** Screen to appear

Figure 1 - ***Please Log In*** Screen



PHASE 2 LOGIN

System login involves the following five steps:

STEP 1: Move the cursor to the [**Operator**] button and double tap the touchpad.

- Double tapping (i.e. tapping the touchpad twice) is equivalent to clicking the left mouse button.

STEP 2: Position the cursor over down arrow,[⮟] (located right of the *User Name* entry box). Then double tap the touchpad.

STEP 3: Position the cursor over your User Name in the drop down list and double tap the touchpad.

- Contact your supervisor if you do not have a user name to select. Ask your supervisor to add your user name and password for you.

STEP 4: Enter your password.

- Contact your supervisor if you do not have a user name to select. Ask your supervisor to add your user name and password for you.
- To ensure security, asterisk characters (*) are printed on the screen when you type in your password.
- All passwords are four characters long. Shorter or longer entries are NOT allowed.
- Passwords can consist of either alphabetic or numeric characters.

- To enter alphabetic characters, press the [**ALPHA**] shift button to enter the "*Alpha Entry Mode*". In Alpha Entry Mode, the control panel (AOCP) accepts the special alphabetic character designated (labeled above) for each button. The ALPHA status light will be lit when you are in alpha entry mode.

- Pressing [**ALPHA**] shift button again will toggle you back into numeric entry mode. The ALPHA status light turns off (unlit) when you are in regular "numeric" entry mode.

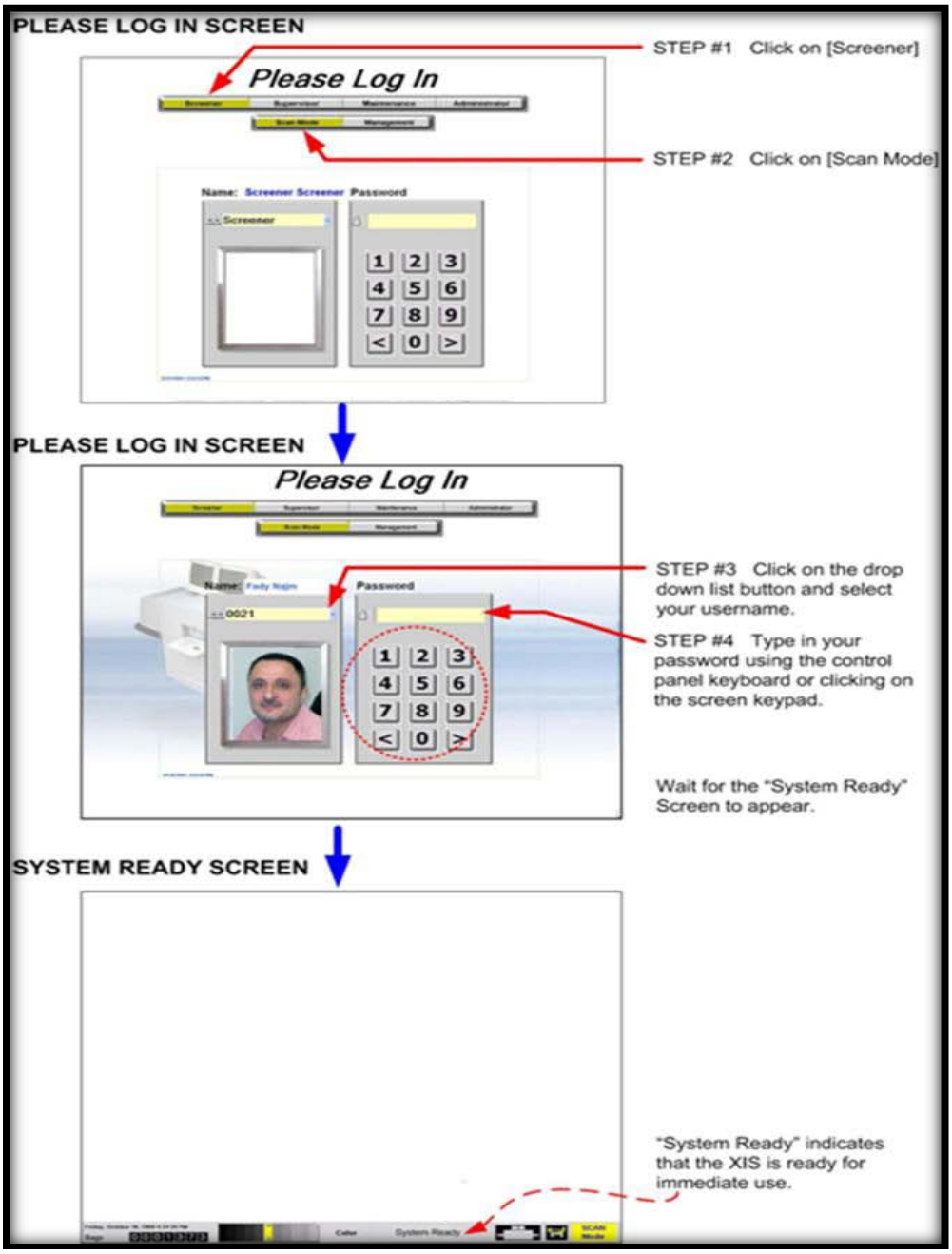
    - You can also enter your password numbers by positioning the cursor over the digits on the bottom of the screen and then double tapping the touchpad.

    - If a PC keyboard is available, you can also enter your password by directly typing the characters in and pressing the [**Enter**] key. All alphabetic character entries are automatically shifted into upper case characters for entry.

STEP 5: Wait for the *System Ready* screen to appear. The system is now ready for immediate use

The diagram below visually summarizes the Login procedure.

Version XIS 2.1.X.X - Login Steps



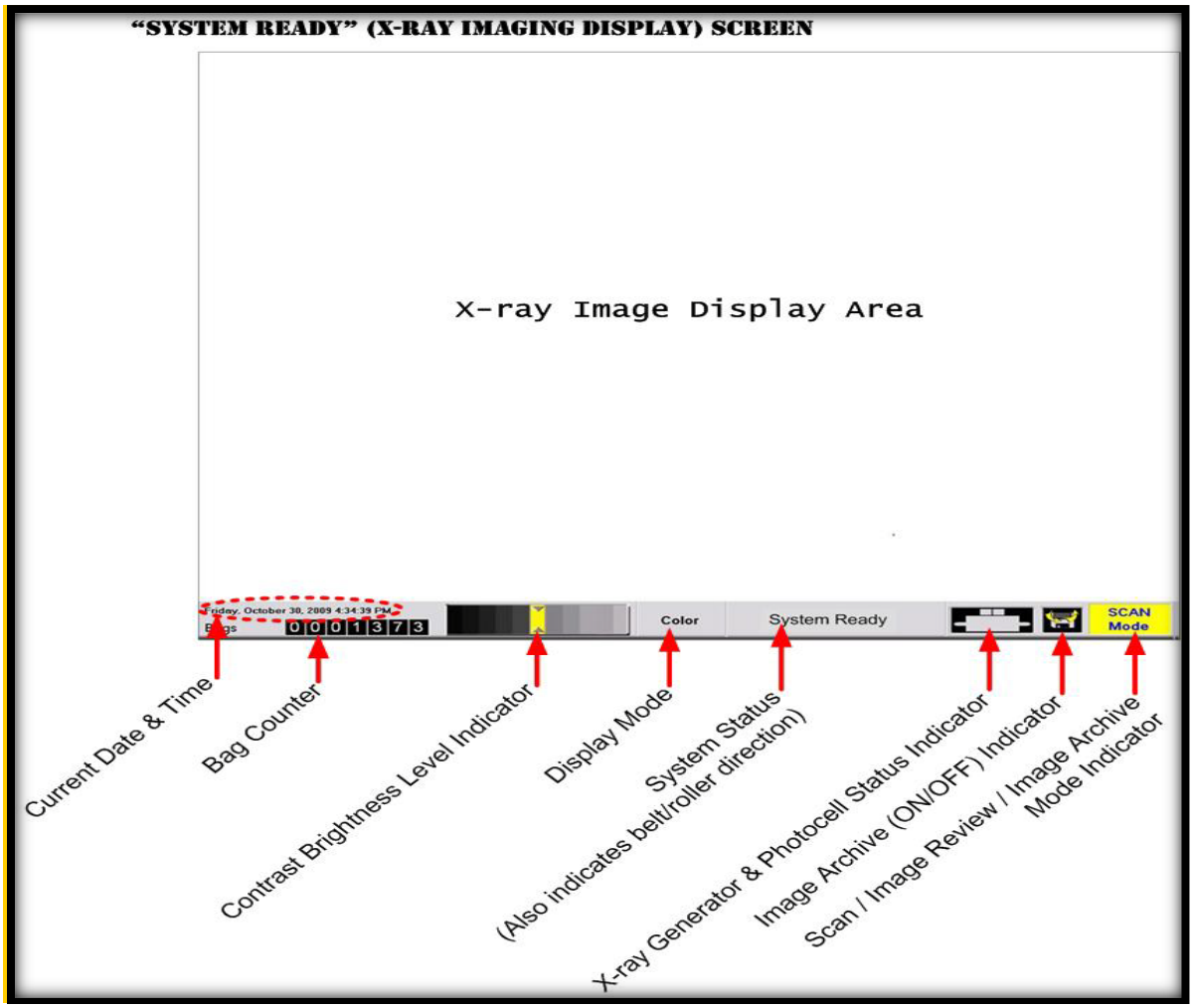
PHASE 3 X-RAY IMAGE SCREENING

Successful x-ray imaging security screening requires knowledge of:

- How to operate the XIS
- How to interpret the X-ray images

This manual provides you with information on how to operate the XIS. Since everyone's security need is different, it is beyond the scope of this guide to provide you with specific instructions on how to analyze and interpret x-ray images. For information and training on security x-ray image analysis contact the Customer Service Department for referrals. Customer Service Contact information is available on page10.

In *X-Ray Screening Mode* bags, packages, and other articles are placed on the conveyor belt and are carried through the inspection tunnel by the conveyor belt. Inside the x-ray tunnels, items are exposed to penetrating x-rays. The XIS then generates and displays a scanned "x-ray" image revealing the internal contents of each item. Scanned x-ray images are presented "X-ray Imaging Display" screen, which is shown below.



In summary, x-ray image screening involves four steps:

STEP 1: Press the [LEFT] button to start the conveyor in the left (forward) direction.

- If your system has a foot-mat switch, stand on it.

NOTE: If a foot-mat switch is present, the XIS requires the presence of an operator standing on the foot-mat to run the machine. If no one is standing on foot-mat, the XIS will stop and display an “INTERLOCK” warning message on the bottom right corner of the screen. Stepping on the foot mat will clear INTERLOCK message from the screen and allow further operation of the machine. If the INTERLOCK warning is not cleared in two minutes, the XIS application will logout the user and returns to the “Please Login Screen”.

NOTE: Ensure that the foot-mat is properly plugged into the XIS and placed near the operator control console.

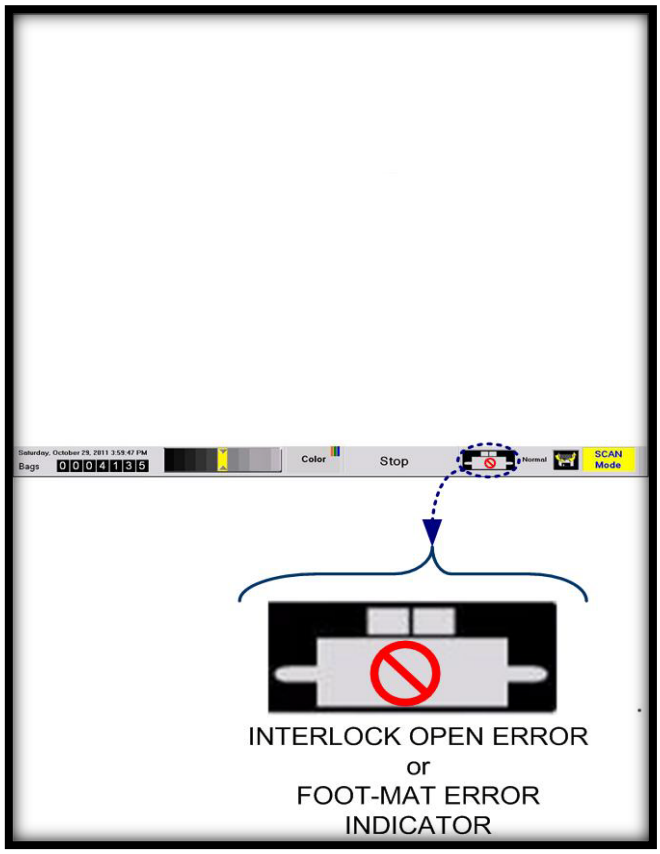
IMPORTANT

- Do NOT place a heavy object on the foot-mat to over-ride the foot-mat switch.
- Do NOT place a pointed chair leg on the foot-mat. The chair leg will rapidly damage the foot-mat switch.

Figure 2 - Foot Mat Switch

IMPORTANT

Stepping off the foot-mat switch (if present) or opening a panel on the x-ray machine will stop the conveyor and halt the x-ray generator. An INTERLOCK / FOOT-MAT open error warning is displayed on the bottom status bar of the screen. If the INTERLOCK / FOOT-MAT error is not cleared by either closing the open panel or stepping back onto the foot-mat switch within 30 seconds, the x-ray machine will log-out the user and return to the “Please Login Screen”.



- Pressing the [**LEFT**] key, commands the conveyor to move in the left (forward) direction (moving from entry end to exit end)

IMPORTANT
- Do **NOT** continuously run the conveyor in the RIGHT (reverse) direction for more than 30 seconds at a time.
- Running the belt in the forward direction keeps the conveyor belt in optimum alignment.

NOTE: Press the [**STOP**] button to stop the conveyor.

STEP 2: Place the articles that you want inspected on the conveyor so that they are carried into the x-ray inspection tunnel.

- ***Items carried into the inspection tunnel are automatically x-ray scanned and imaged. The resulting x-ray image is displayed on the computer monitors***

- *Scanned bag images remain on the screen (i.e. do not scroll off) until another item is scrolled on to the screen.*

STEP 3: Carefully examine each scanned image.

- *The control panel has several image adjustment buttons to help you analyze the displayed x-ray image.*
- *Instructions for using the various image functions are described in the next chapter. .*

STEP 4: Repeat Steps #2 and #3 for each item that you want to inspect.

PHASE 4 SHUTDOWN

Logout when you are finished with x-ray screening.

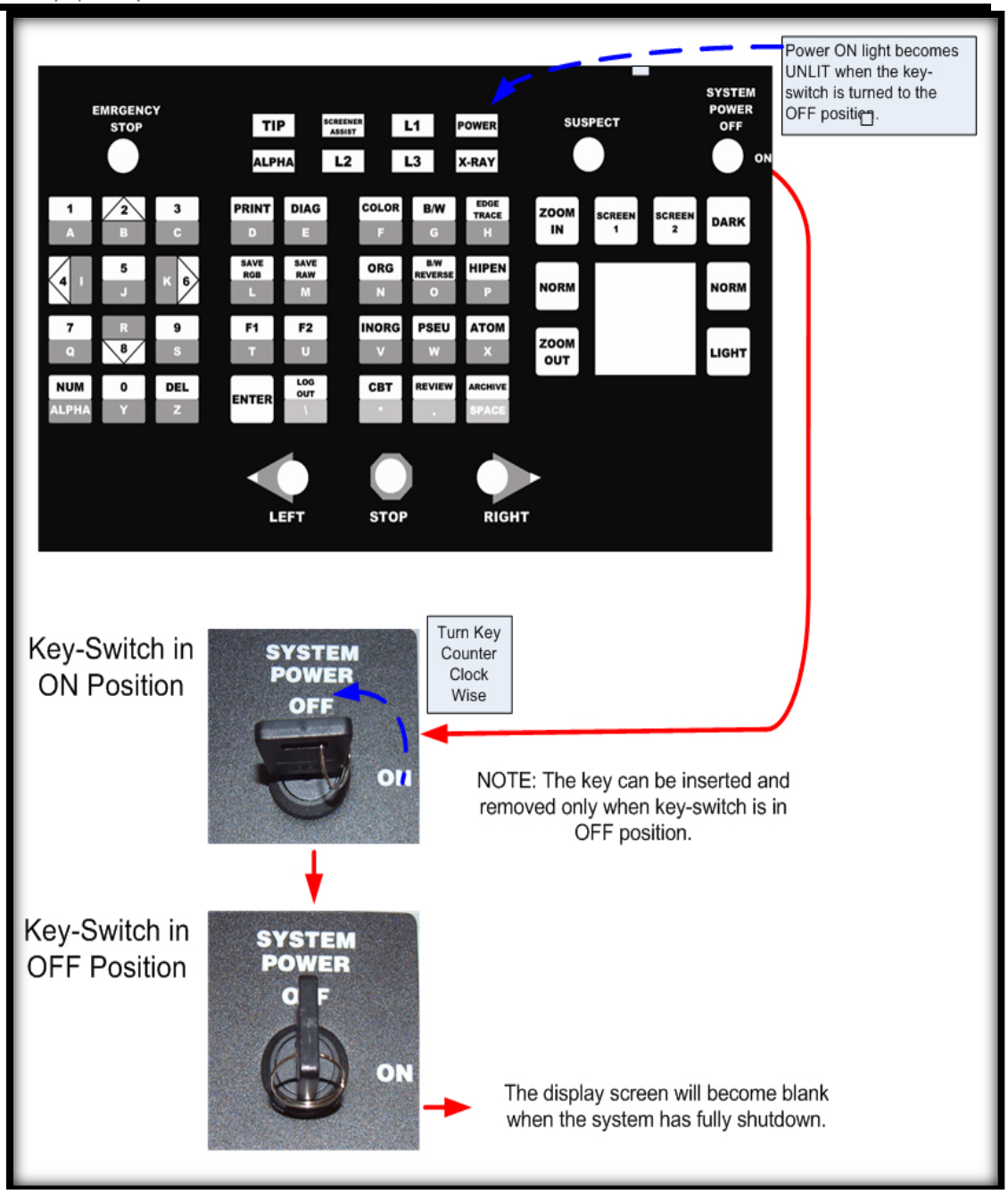
STEP 1: To LOGOUT press the [**EXIT**] button on the Operator Console.

- Logout allows another user to login and continue using the system.

- Logout also prevents unauthorized persons from using the system when it is unattended.

If you have finished using the XIS for the rest of day, shut down the XIS by turning the key-switch to the OFF position.

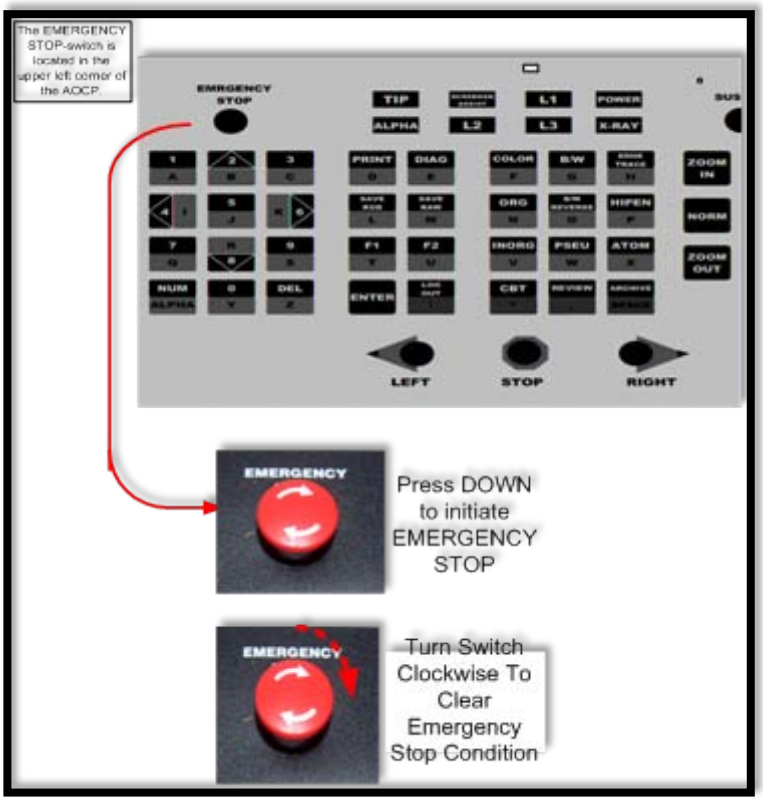
- **Remember to securely store the key.**


Power ON light becomes UNLIT when the key-switch is turned to the OFF position.
EMRGENCY STOP
TIP
SCREENER ASSIST
L1
POWER
SUSPECT
SYSTEM POWER OFF
ON
ALPHA
L2
L3
X-RAY
PRINT
DIAG
COLOR
B/W
EDGE TRACE
ZOOM IN
SCREEN 1
SCREEN 2
DARK
SAVE RGB
SAVE RAW
ORG
B/W REVERSE
HIPEN
NORM
NORM
F1
F2
INORG
PSEU
ATOM
ZOOM OUT
LIGHT
NUM
DEL
ENTER
LOG OUT
CBT
REVIEW
ARCHIVE
SPACE
LEFT
STOP
RIGHT
Key-Switch in ON Position
SYSTEM POWER
OFF
ON
Turn Key Counter Clock Wise
NOTE: The key can be inserted and removed only when key-switch is in OFF position.
Key-Switch in OFF Position
SYSTEM POWER
ON
The display screen will become blank when the system has fully shutdown.

IN AN EMERGENCY PRESS THE EMERGENCY STOP BUTTON

In an emergency, press the Emergency Stop Button (E-STOP) immediately. E-STOP halts everything, including the conveyor / rollers and the x-ray generator(s). The XIS remains in a safe non-operational state until the E-STOP button is turned clockwise and "released".

- **Use the Emergency Stop Button for "real" emergencies only.**
- **Do NOT use the Emergency Stop Button as a substitute for the [STOP] button or for turning the key-switch to OFF.**



The Emergency Stop Buttons are located next to the inspection tunnel entrances and on the upper left corner of the operator control panel.

The conveyor belt and x-ray generator can <u>also be stopped by:</u>

- Turning the KEY-SWITCH to the OFF position,
- Turning the main breaker switch to the OFF position, or
- Unplugging the XIS from the wall outlet.

CHAPTER 4 EXAMANING X-ray IMAGES

Chapter Overview

The control panel has image adjustment buttons that allow you to examine the currently displayed x-ray image in greater detail. Each image adjustment control is described below.

The Image Zoom Control Buttons

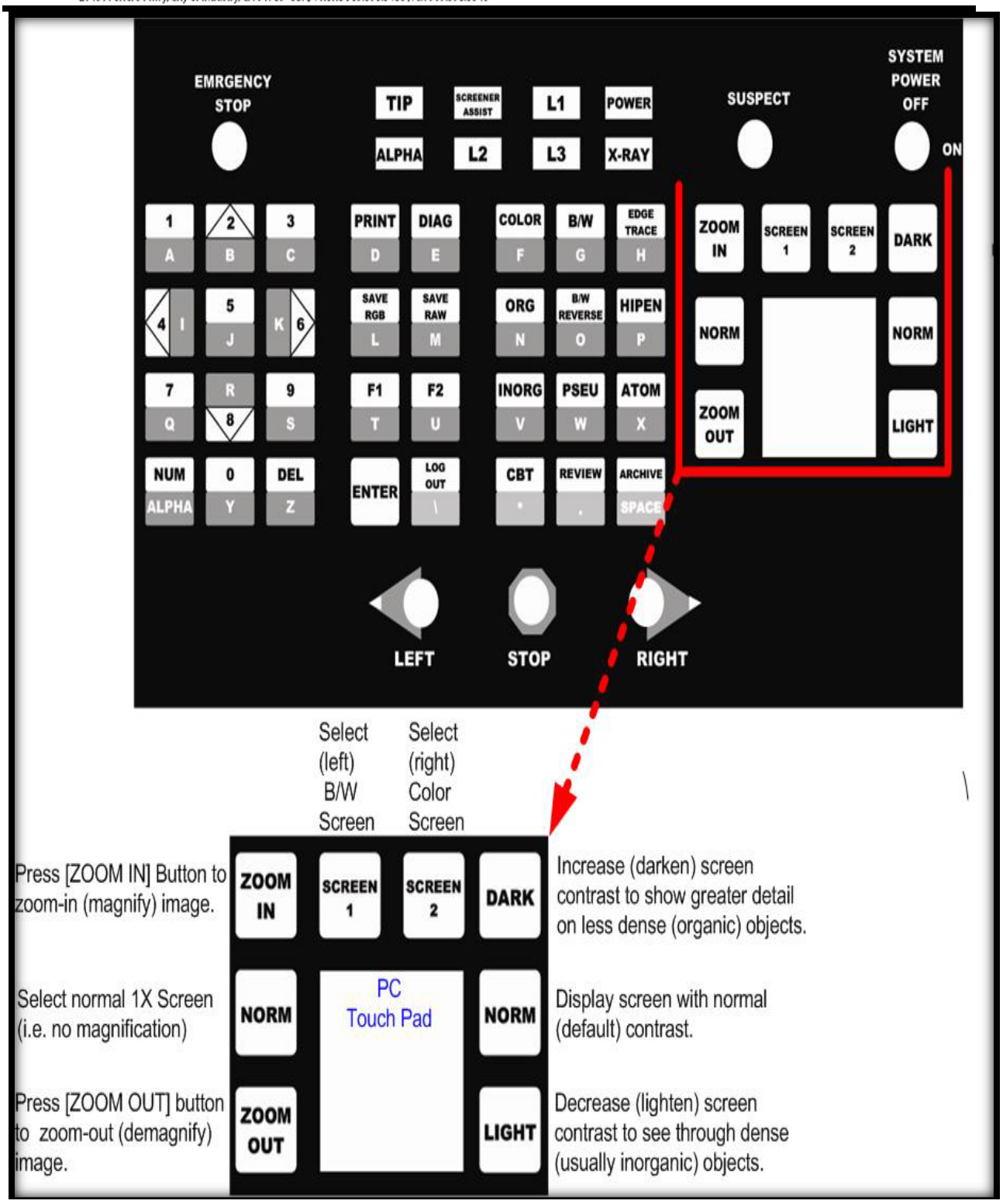
The Zoom control buttons magnifies the currently displayed x-ray image. They are two sets of “Zoom” button controls: The “[ZOOM IN] / [NORM] / [ZOOM OUT]” buttons and “Zonal Zoom:[0],[1],[2],[3],[4],[5],[6],[7],[8],[9]” buttons.

***ZOOM IN** (i.e. Zoom-In) Function* FOR COLOR & B/W SCREEN

- Use the [ZOOM IN] (i.e. zoom-in) function to magnify and more closely examine areas of interest. To use the [ZOOM IN] function:
  - Press the [**ZOOM-IN**] button.
    - The pointer cursor will appear on the screen.
  - Then (using the touchpad) move the cursor over the area of interest on the screen.
    - Each press of the [**ZOOM-IN**] button increases the screen magnification by a factor of two times (2x). For example, pressing the STOP button twice magnifies the image by factor of four times (4x).
    - The “zoomed” screen re-centers itself around where the cursor was originally positioned.
    - Each screen can be separately “zoomed”. For example, you can “zoom-in” an image on the left (B/W) screen while leaving the right (color) screen image alone.
    - The [**ZOOM-IN**] button can be successively pressed five times for a maximum zoom-in magnification of 32x.
  - The screen also immediately returns to normal magnification (1x) when the [LEFT] or [RIGHT] button is pressed.

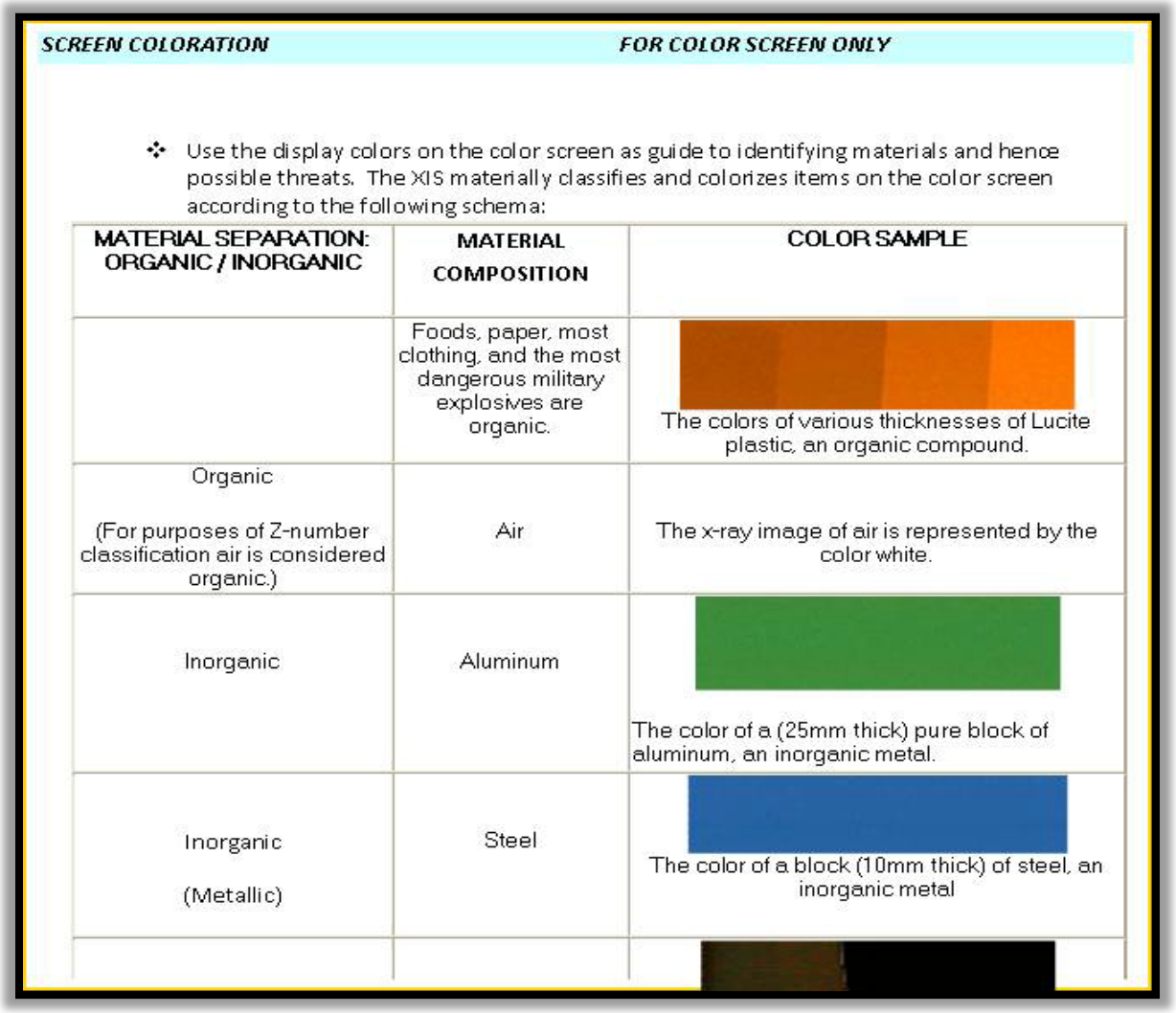
***ZOOM OUT** (i.e. Zoom-Out) Function* FOR COLOR & B/W SCREEN

- The screen magnification can be reduced by pressing the Zoom Down [**ZOOM OUT**] button.
  - Pressing the [**ZOOM-OUT**] now reduces the magnification by factor of one-half (1/2). For example, if the screen is at 8x zoom, pressing the [**ZOOM-OUT**] button once reduces the screen magnification to 4x.
  - You can ZOOM down to a minimum of 1x magnification.
  - The screen also immediately returns to normal magnification (1x) when the Forward or Reverse button is pressed.


EMRGENCY STOP
TIP
SCREENER ASSIST
L1
POWER
ALPHA
L2
L3
X-RAY
SUSPECT
SYSTEM POWER OFF
ON
1 A
2 B
3 C
PRINT D
DIAG E
COLOR F
B/W G
EDGE TRACE H
4 I
5 J
K 6
SAVE RGB L
SAVE RAW M
ORG N
B/W REVERSE O
HIPEN P
7 Q
R 8
9 S
F1 T
F2 U
INORG V
PSEU W
ATOM X
NUM ALPHA
0 Y
DEL Z
ENTER
LOG OUT \
CBT *
REVIEW .
ARCHIVE SPACE
ZOOM IN
SCREEN 1
SCREEN 2
DARK
NORM
NORM
ZOOM OUT
LIGHT
LEFT
STOP
RIGHT
Select (left) B/W Screen
Select (right) Color Screen
Press [ZOOM IN] Button to zoom-in (magnify) image.
ZOOM IN
SCREEN 1
SCREEN 2
DARK
Increase (darken) screen contrast to show greater detail on less dense (organic) objects.
Select normal 1X Screen (i.e. no magnification)
NORM
PC Touch Pad
NORM
Display screen with normal (default) contrast.
Press [ZOOM OUT] button to zoom-out (demagnify) image.
ZOOM OUT
LIGHT
Decrease (lighten) screen contrast to see through dense (usually inorganic) objects.

COLOR Button Function — FOR THE COLOR SCREEN ONLY

- **Use the COLOR image function button to colorize and highlight organic material in the image.**



***ORG** Button Function* — FOR THE COLOR SCREEN ONLY

- Use the ORGANIC image function button to highlight organic material in the image. Pressing the organic image function button “de-emphasizes” the presence of inorganic items on the screen. This reduces distracting visual clutter.

  NOTE: “Organic” items are of special interest because the most powerful and dangerous (military) explosives are “organic” compounds.

  NOTE: Organic items are also very common. All foods are organic. Most clothing is organic. Papers and currencies are organic.

Organic items refer to things that are made from "non-metallic" materials. Organic items encompass a large variety of things including all foodstuff, most clothing fabrics, leather products, wood products, and all plastics. In contrast, items made of metals, such as aluminum, steel, tin, copper, etc. are classified as "inorganic". Inorganic items can also be imaged with PP, but they are not rendered in enhanced detail as organic items are.

The XIS distinguishes between organic and inorganic items by color. The XIS displays organic items in the hues of orange to reddish brown, while inorganic items displayed in hues of green to blue. The specific color shade is determined by an item's density. Denser items are colored with darker shades. Very dense items (and x-ray opaque items) are colored black.

***INORG** Button Function* FOR THE COLOR SCREEN ONLY

- Use the *INORGANIC* image function button to highlight inorganic material in the image. Pressing the [**INORG**] image function button "de-emphasizes" the cluttering presence of organic items in the screen.

  NOTE: "Inorganic" materials are of special interest because most weapons including guns, knives, shanks, and "brass" knuckles are usually constructed of inorganic metals such as steel, brass, and aluminum.

- However, it is important to note that deadly weapons can also be constructed from dense "organic" plastics.

***B/W** Button Function* FOR B/W SCREEN ONLY

- Use the "B/W" Function button to select the default B/W display mode on the left Black & White display screen. The B/W function only affects the image on the Black & White (i.e. left side) monitor.

  - The B/W (Black and White) screen displays the scanned image in gray-tones based on the density of the scanned item.
    - Highly x-ray absorptive dense objects are displayed in dark black tones.
    - Lower densities are displayed in lighter tones.
    - The lowest density, air, is displayed as white.
    - Many users prefer using the B/W screen instead of the other pseudo colorized screen.

***REV** Button Function* FOR B/W SCREEN ONLY

- Use the [**B/W REVERSE**] button to invert the *Black on White* image to *White on Black*. The [**B/W REVERSE**] function only affects the image on the Black & White (i.e. right side monitor) display. Notice how the [**B/W REVERSE**] functions instantly inverts the normal contrast perspective. The image may now show critically important details that may have been previously overlooked.

 Color image after the [**COLOR**] button was pressed. (This selected normal contrast color image display.)	 Color image after the [**ORG**] button was pressed. (Image now emphasizes ORGANIC MATERIAL detail.)	 Color image after the [**INORG**] button was pressed. (Image now emphasizes INORGANIC MATERIAL Detail)	 Color image after the [**LIGHT**] button was pressed twice. (Image now shows greater detail for dense materials.)
 B/W Image after [**PSEU**] button was pressed. (Contrast was adjusted two step darker)			

Figure 3 - Color Image Adjustment Comparison

***ATOM** (Atomic Number) Button Function* FOR COLOR SCREEN ONLY

- Use the ATOM function to check the *Z-Number* of suspicious objects on the screen.
    - *Z-Number*, or Atomic Number, is equal to the number of protons (in the elemental atoms that make up the object). *Z-number* can be used to estimate material composition of the item. The XIS calculates Z number by measuring and comparing the absorption of low and high frequency x-rays by an object.
    - To display *Z-NUMBER* function:
    - Press the [**ATOM**] button.
    - Imagine a “box” that encloses the area of interest on the screen. Using the touchpad, position the cursor to one corner of that box.

- Double tap the cursor. An expanding box will appear on the screen.
- Slide your finger (i.e. slide your finger while keeping it in constant contact with the touchpad) across the touchpad and move the cursor to expand the box to cover the area of interest.
- The average Z-Number of the area will be displayed on the bottom corner of the screen.

- The XIS only calculates and displays the Z-numbers between 6 and 26.

List of Common *Z-Numbers*

Material	Z-Number
Graphite (C) i.e. carbon	7
Water (H_20)	8 (approximate, exact value is determined by the container)
Aluminum (Al)	13
Steel (iron)	26

Table 3 – LIST OF COMMON Z-NUMBERS

The ***IMAGE ARCHIVE*** Button Function

Use the Image Archive feature to review and compare previously scanned images if necessary. The Image Archive feature provides on-demand retrieval and review of the last 50,000 previously scanned items on the color screen.

- Previously scanned images can be recalled as follow:

1. Press the [**IA**] button. The Image Archive Selection Dial menu screen will now be displayed.

2. Position the cursor on the “selector” dial. Then double tap the touchpad.

   NOTE: The Image Selector first points to the very right hand side of the Dial Screen. This represents the most recently scanned image. Other older scanned images are represented to the left of this point on the dial. The earliest image is represented on the very left most side of the dial

3. Using the touchpad, move the cursor to the left and select a starting point where you will begin reviewing images.

   NOTE: The date and time of each image referenced by the pointer is displayed on the left bottom side of the screen.

4. Position the cursor to the [**FORWARD**] button on the screen and double tap the touchpad to display bag images from oldest to most recent

   NOTE: To review bag images that were scanned earlier than the one currently referenced, move the cursor to the [**REVERSE**] button on the screen and double tap the touchpad to display bags from the most recent to older

5. To return to regular x-ray image scanning, press the Console's [**LEFT**] (or [**RIGHT**]) button.

Printing the Current Color Screen Image

- To print the current screen:
  - If the conveyor belt is moving, press the [**STOP**] button to stop the belt.
  - Press the [**PRINT**] button on the AOCP.
  - A printer must be connected to the XIS and the printer driver software for that printer must be installed before the *Print* function will work. To ensure software compatibility, please consult with the Customer Service Department before installing your printer.

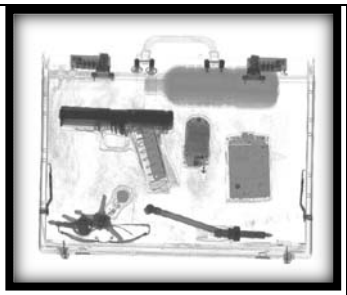
Image Density — FOR COLOR & B/W SCREEN

- Use the lightness and darkness of the image as a guide for identifying overall object density.
  - Dense objects are displayed on the screen in dark tones.
  - Less dense objects are displayed in lighter gray tones.
  - Air, the least dense material, is displayed as white.
    - Exceptionally dense objects are displayed in black.
  - Very dense objects are usually the most problematic in terms of security. For example, guns and knives, are usually made of dense hardened steel.

[**LIGHT**] and [**DARK**] **ADJUSTMENT** *Control* — FOR COLOR & B/W SCREEN

- The [**LIGHT**] and [**DARK**] buttons allows the screen to lightened five steps or darkened five steps from the "normal" screen image brightness.
- Very dense objects are normally displayed in black or in very dark gray tones.
- Lightening a dark object may reveal hidden items (behind a dense object) and critically important details.
- The [**LIGHT**] and [**DARK**] controls adjust the image "brightness" of the across the entire screen. For example, moving the slide left 3 steps darken all objects in 3 "steps" darker.

The images below compare the effect of using the images adjustment "buttons" on the same bag image. The images were obtained from the (left side) B/W (Black and White) Video Monitor.

			
B/W Image after [**B/W**] button was pressed. (Displays Normal B/W Contrast)	B/W Image after [**LIGHT**] button was pressed twice. (Contrast adjusted 2 steps lighter)	B/W Image after the [**DARK**] contrast adjustment button was pressed twice. (Contrast level was adjusted two step darker)	B/W Image after [**REVERSE B/W**] button was pressed. Note the enhanced image clarity. (Black on White imaging was changed to White on Black)

[PICTURE PERFECT] Imaging Mode FOR COLOR & B/W SCREEN

Picture Perfect ("PP") Imaging" Mode is an enhanced imaging mode that displays organic items in much greater detail.

Normal Color Image of Bag	"Picture Perfect" Image of Bag
	

Picture Perfect mode is started by pressing the [**PICTURE PERFECT**] button.

The conveyor belt must first be stopped before PP can be used. PP is inactive while the belt is moving.

- PP displays the image of the **LAST** bag that was scanned.
- Pressing the [**PICTURE PERFECT**] button "toggles" the XIS between "Normal" and PPIM mode.
- You CANNOT x-ray image other bags while in PP mode. To resume screening bags, you must first exit PP by pressing the [**PICTURE PERFECT**] button.

- You can control PPIM by pressing the following buttons:

BUTTON	DESCRIPTION OF BUTTON FUNCTION	COMMENTS
[**LOGOUT**]	Logout current user	Logs out users and returns to "Please Log In" screen.
[**LEFT**]	Start conveyor in left direction	XIS will start conveyor and resume normal x-ray image imaging.
[**RIGHT**]	Start conveyor in right direction	XIS will start conveyor and resume normal x-ray image imaging.
[**EDGETRACE*I***]	Display image with Edge Trace image enhancement.	XIS will resume "normal" imaging when [**LEFT**] or [**RIGHT**] button is pressed.
[**PSEU**]	Display BW (black & white screen) image in Pseudo-color mode	XIS will resume "normal" x-ray imaging when [**LEFT**] or [**RIGHT**] button is pressed.
[**INORG**]	Display image with Inorganic image enhancement	

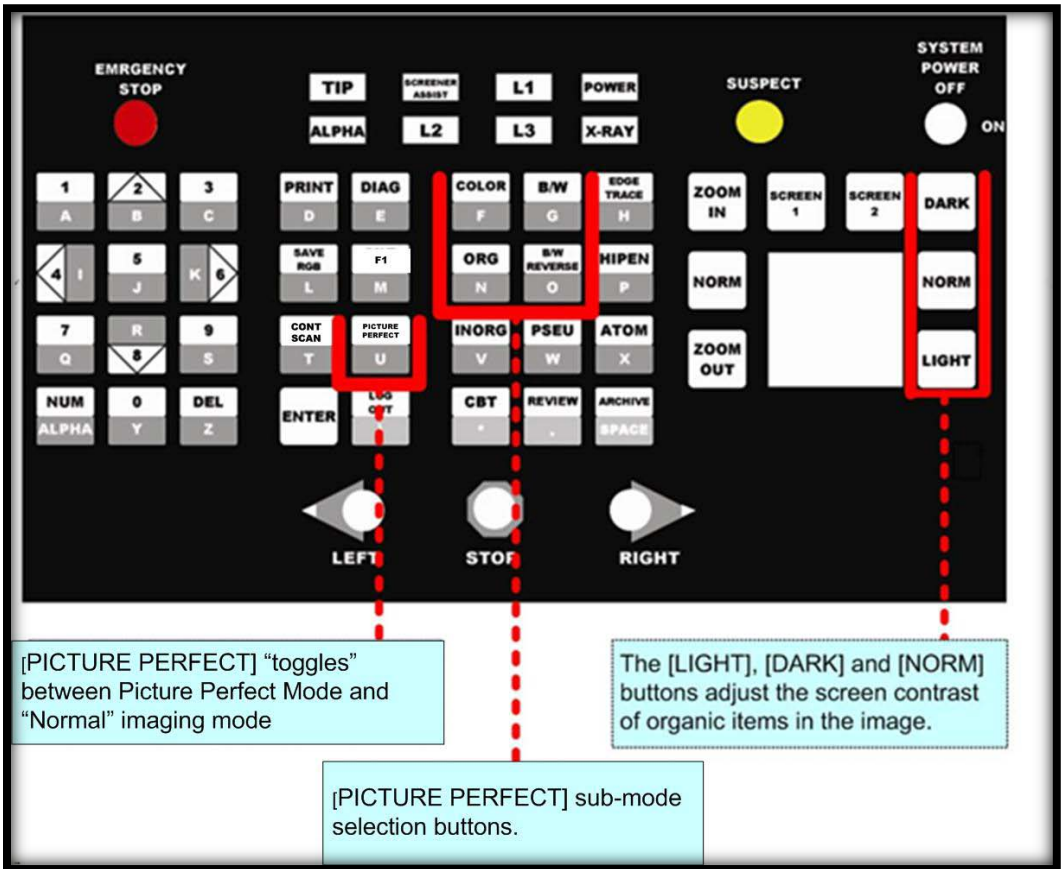
PPIM does three things:

1. It erases the screen,
2. It analyzes and re-displays the last bag image, and
3. It displays organic items with enhanced "texture" and detail.
    - Note, if there is no organic items in the x-ray image, the Picture Perfect image of the last bag will appear the same as before without any change.
    - If the last bag is exceptionally long, PPIM displays only the last part of the bag. During imaging long bags are divided into 0.5 meter sections.

Picture Perfect Mode is first started by pressing [**PICTURE PERFECT**].

- Pressing [**PICTURE PERFECT**] returns (i.e. toggles) you to normal imaging mode.
- Picture Perfect Mode enhances BOTH the Color, Black/White, and the Reverse Black/White Screen image mode.

The various PP modes can be selected by pressing the [ORG], [**COLOR**], [**B/W**], or [**REVERSE B/W**] button.

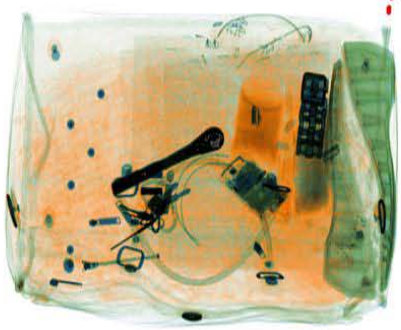


The PP MODE is exited by either:

- Pressing [*PICTURE PERFECT*] button to resume to normal screening, or
- Pressing [*LOGOUT*] to logout and return to the "Please Log In" Screen.

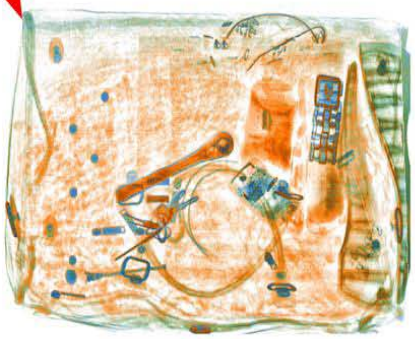
The Picture Perfect image can be further enhanced by pressing the [***LIGHT***] or [***DARK***] button to lighten or darken the image. This can reveal additional details in the image.

Normal Color Image



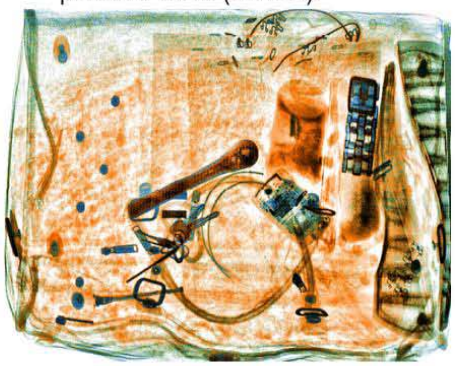
[***F2***]
+
[***ORG***]

Picture Perfect – SE (Single Energy) Organic imaging mode.



This image was generated by scanning a bag and then pressing [***F2***] (to select Picture Perfect Mode) and then pressing [ORG] twice (to select Single Energy Organic Mode).

Picture Perfect – SE Organic [DARK] button has been pressed twice (i.e.. 2x).



This image was generated by pressing [***DARK***] twice with the image above.

Notice how only the organic items become darker.

Picture Perfect – SE Organic [DARK] button has been pressed a total of four times (i.e.. 4x)

This image was generated by pressing [***DARK***] two more times with the image above.

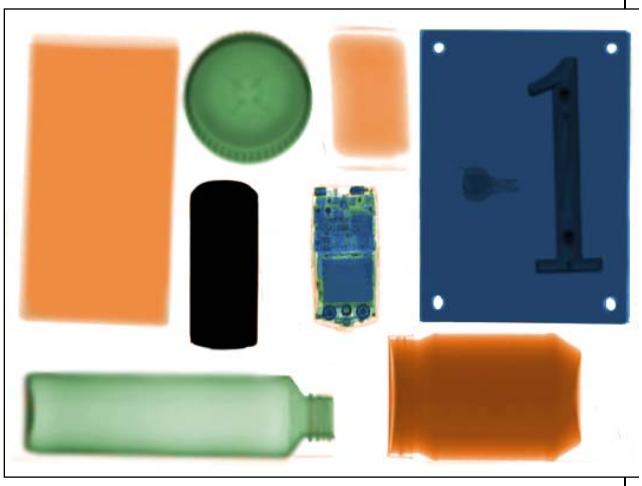
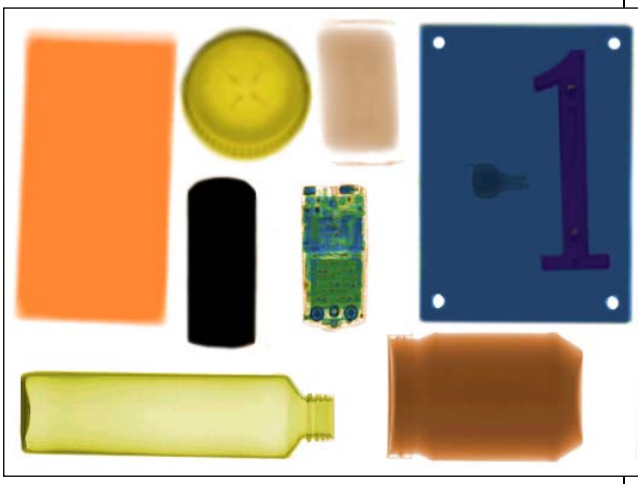
The following AOCP function buttons do **NOT** work with PP.

The following AOCP Buttons that are NOT supported with PP	Description of UNSUPPORTED AOCP button function
[***ATOM***]	Display atomic z-number.
[***PRINT***]	Print screen image
[***CBT***]	Start computer based training
[***REVIEW***]	Start image review
[***ARCHIVE***]	Display image archive menu screen.

6 Color Imaging Mode **FOR COLOR & B/W SCREEN**

- 6 Color Atomic Display: The default display option utilizes atomic number analysis and assigns colors based on their respective densities.

Z-Number	Material Type	3-Color	6-Color	Examples	Possible Threats
0-8	Organic	Orange	Brown	Wood, Oil	C-4, TNT, Semtex
8-10	Low Inorganic	Orange	Orange	Paper, Alcohol	Cocaine, Heroin
10-12	High Inorganic	Green	Yellow	Glass	Ceramic Knife
12-17	Light Metals	Green	Green	Aluminum, Silicon	Gunpowder, Trigger Devices
17-28	Heavy Metals	Blue	Blue	Iron, Steel	Guns, Bullets, Knives
28+	Dense Metals	Blue	Violet	Silver	High-Value Contraband
-	Very Dense Metal	Black	Black	Lead	Shielding for Above Threats

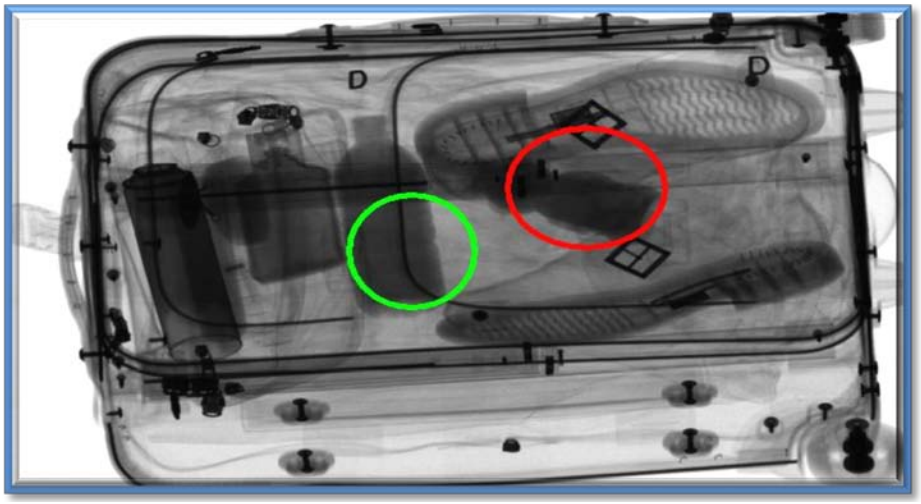
3-Color Imaging	6-Color Imaging
	

CHAPTER 5 MAINTENANCE CHECK LIST

Screener Assist

Screener Assist is an optional software feature that allows the XIS to detect and highlight presence of potential threats in the x-ray image on the age screen to the user when it is screening items such as luggage bags and parcels. When the XIS detects a significant mass of organic material that has the same Z-number* of military explosives, it draws a highlighting ellipse around the area to alert the XIS operator. It is important to note that many common organic items including certain foods, certain jells (i.e. shampoos, toothpaste, etc.), large pieces of plastic, certain batteries (from notebook computers, cameras, etc.) may also have the same Z-number as military explosives. Screener Assist may highlight these items as well. It is up to the operator to differentiate between these items and real potential threats by closely examining the screen and taking action when necessary. Action may include alerting your supervisor, questioning the owner of the bag, re-screening the bag in another orientation, opening the bag for direct visual examination, etc. Follow the security pro cedures in your facility for handling these situations.

Screener Assist is an adjunct for detecting potential threats in the items that you are screening. Screening Assist does not replace constant vigilance or common sense. Carefully inspect the ALL x-ray images.



A Black & White X-ray image of a bag with highlighting Screener Assist ellipses.

CHAPTER 6 DIAGNOSTICS SCREENS

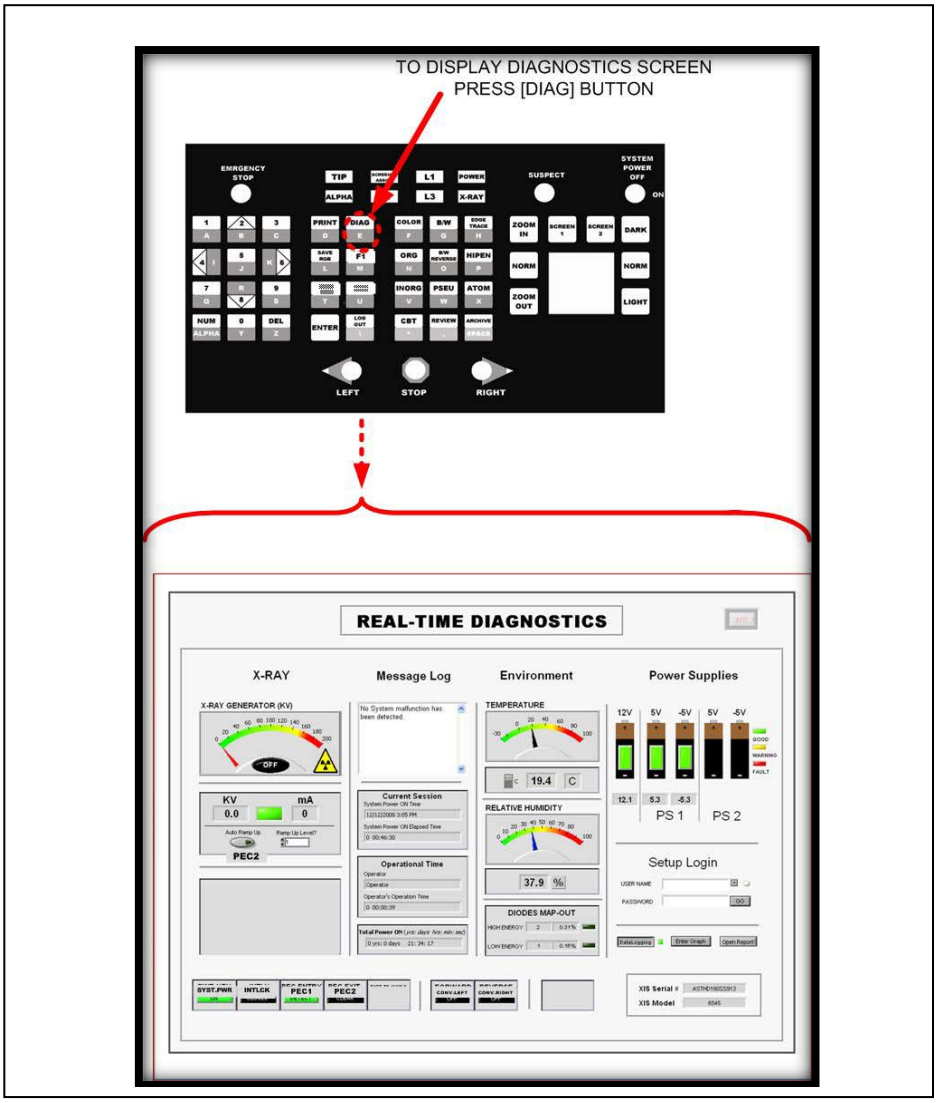
Introduction

The Diagnostic System is a system screen provides “real-time” status information on the most critical components of the x-ray machine.

It tracks:

- **Internal power supply outputs**
- **Ambient temperature**
- **Ambient relative humidity**
- **X-ray Generator temperature**
- **The key-switch (selection) status**
- **The x-ray generator status**
- **The status of the Emergency Stop Switches**
- **The total elapsed system power on-time**
- **The total elapsed x-ray generator on-time**
- **Diode Map Out status**

Press the [**DIAG**] button to activate and display the Real-Time Diagnostic Screen,



Press the [**DIAG**] button again to return to the regular x-ray imaging screen.

The diagram below shows the various status and information fields of the Diagnostics Screen.

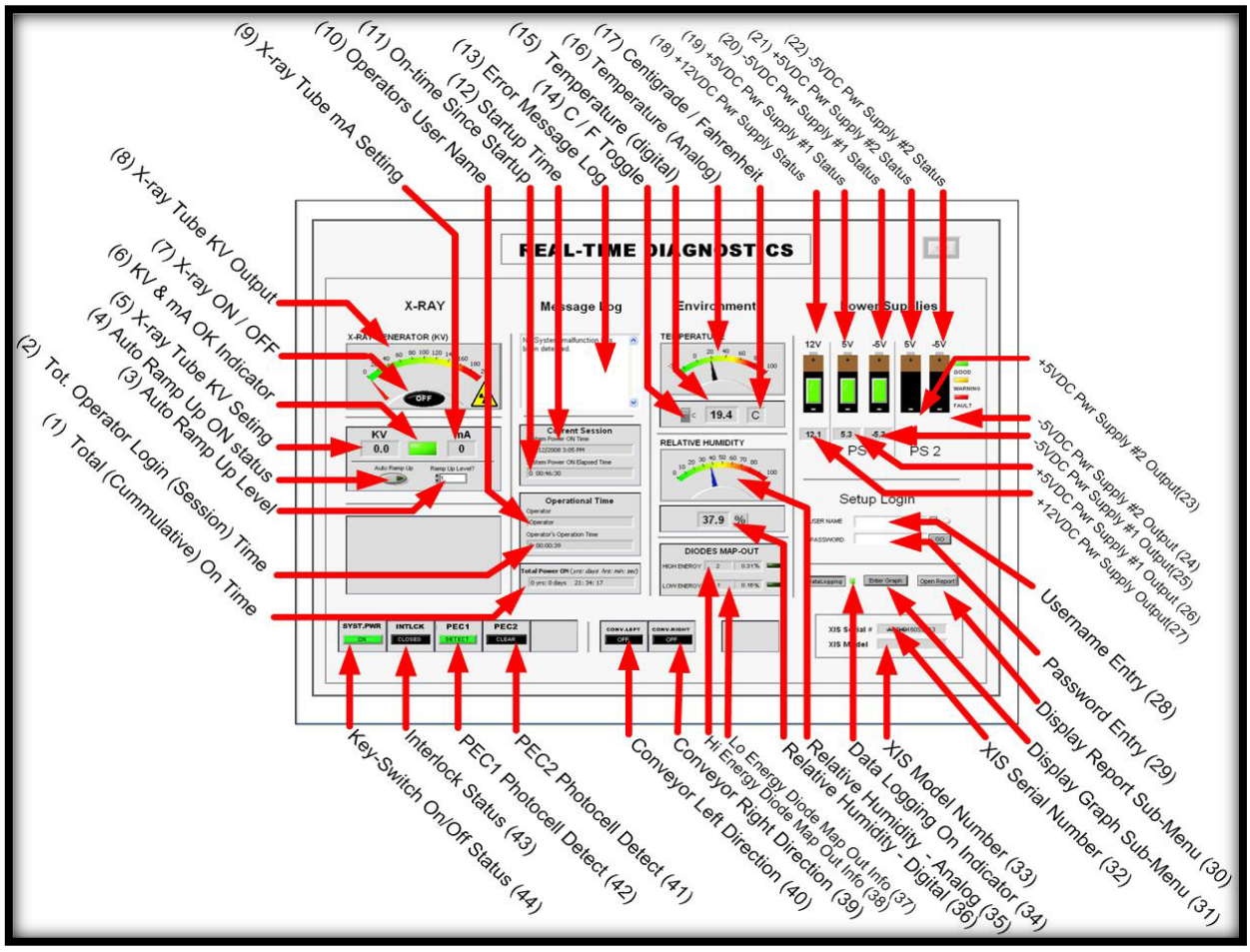


Table of Diagnostic Screen Display Fields

	Real-Time Diagnostic Field	Comments
1.	Total (cumulative) ON Time	Displays cumulative power-ON time in the format: YY:DD:HH:MM:SS • YY indicates number of years • DD indicates number of days • HH indicates number of hours • MM indicates number of minutes • SS indicates number of seconds
2.	Operator's Operation Time	Displays Cumulative (operator's) session time in the format: HH:MM:SS • HH indicates number of hours • MM indicates number of minutes • SS indicates number of seconds
3.	Auto Ramp Up Level	Displays x-ray tube auto ramp-up setting. • 1 = "Short" term (i.e. fast) ramp-up • 2 = "Long" term (i.e. slow) ramp-up Use long term setting when x-ray machine has been idle for more than 30 days.
4.	X-ray Tube kV Setting	Displays X-ray tube kV setting (anode potential)
5.	kV & mA OK Indicator	Displays kV & mA feedback OK indicator
6.	X-ray Tube kV Output (digital display)	Displays x-ray tube kV (feedback output)
7.	X-ray ON/OFF Indicator	Displays x-ray ON status. • Green indicates that x-ray generator is powered and producing x-rays.
8.	X-ray Tube kV Output (analog meter display)	Displays x-ray tube cathode mA (feedback) output
9.	X-ray Tube mA Setting	Displays X-ray tube cathode mA setting in milliamperes
10.	Operators Name	Displays Operator's name
11.	ON-time Since Startup	Displays Cumulative time since system startup
12.	Startup Time	Displays System Start Time
13.	Error Message Log	Displays Error Message Log
14.	C & F Toggle	Centigrade / Fahrenheit indicator • C = Centigrade temperature display • F = Fahrenheit temperature display
15.	Temperature (digital display)	Displays internal frame temperature with digital display
16.	Temperature (analog meter display)	Displays internal frame temperature with analog (meter) display
17.	C / F (Centigrade / Fahrenheit indicator)	Displays Centigrade / Fahrenheit indicator. • "C" indicates centigrade. • "F" indicates Fahrenheit.
18.	+12VDC Power Supply Status	Displays +12VDC power supply #1 output status • Green = Good • Yellow = Warning • Red = Fault
19.	+5VDC Power Supply #1 Status	Displays +5VDC power supply #1 output status • Green = Good • Yellow = Warning • Red = Fault

Table of Diagnostic Screen Display Fields (continued)

	Real-Time Diagnostic Field	Comments
20.	+5VDC Power Supply #1 Output Voltage	Displays +5VDC power supply #1 output voltage. • Output should be within +/- 10% of +5V.
21.	+12VDC Power Supply #1 Output Voltage	Displays +12VDC power supply #1 output voltage. • Output should be within +/- 10% of +12V.
22.	Username Entry	Username login entry field for access to diagnostic report and sub-graph menu
23.	Password Entry	Password entry field for access to diagnostic report and graph sub-menu
24.	Display Report Sub-Menu (button)	Display Report Sub-menu (after successful display)
25.	Display Graph Sub-Menu (button)	Display Graph Sub-menu (after successful display)
26.	XIS Serial Number	Displays XIS Serial number
27.	XIS Model Number	Display XIS Model number
28.	Data Logging ON Indicator	• Data logging ON indicator. • Green = Data logging is enabled
29.	Relative Humidity (Analog meter)	Displays relative humidity of internal mainframe – Analog (meter) display
30.	Relative Humidity	Displays relative humidity of internal mainframe – Digital display
31.	Low Energy Diode Map-out Info	Number and % of low energy detector diodes that are “mapped-out”
32.	High Energy Diode Map-out Info	Number and % of high energy x-ray detectors that are “mapped out”
33.	Conveyor Right Direction	Green = Conveyor motor is on and moving right (i.e. from left to right)
34.	Conveyor Left Direction	Green = Conveyor motor is energized and moving left (i.e. from right to left)
35.	PEC2 Photocell Detect	• Displays inspection tunnel exit photocell (photo-sensor) status. • Green = Exit photo-cell is “triggered”, indicating bag is exiting inspection tunnel.
36.	PEC1 Photocell Detect	• Displays inspection tunnel entry photocell (photo-sensor) status. • Green = Exit photo-cell is “trigger”, indicating bag is entering the inspection tunnel.
37.	Interlock Status	• Displays internal safety interlock switch status. • Green = Internal interlock is OK (i.e. access panels)
38.	Key-switch ON/OFF Status	• Displays AOCP (Operator Console) key-switch status Green = key-switch is ON position.

Table of Diagnostic Screen Display Fields (continued)

	Real-Time Diagnostic Field	Comments
39.	Temperature (analog meter display)	Displays internal frame temperature with analog (meter) display
40.	C / F (Centigrade / Fahrenheit indicator)	Displays Centigrade / Fahrenheit indicator. • "C" indicates centigrade. • "F" indicates Fahrenheit.
41.	+12VDC Power Supply Status	Displays +12VDC power supply #1 output status • Green = Good • Yellow = Warning • Red = Fault
42.	+5VDC Power Supply #1 Status	Displays +5VDC power supply #1 output status • Green = Good • Yellow = Warning • Red = Fault
43.	-5VDC Power Supply #1 Status	Displays -5VDC power supply #1 output status • Green = Good • Yellow = Warning • Red = Fault
44.	+5VDC Power Supply #2 Status	Displays +5VDC power supply #1 output status. • Green = Good • Yellow = Warning • Red = Fault
45.	-5VDC Power Supply #2 Status	Displays -5VDC power supply #1 output status • Green = Good • Yellow = Warning • Red = Fault
46.	+5VDC Power Supply #2 Output Voltage	Displays +5VDC power supply #1 output voltage. • Output should be within +/- 10% of +5V.
47.	-5VDC Power Supply #1 Output Voltage	Displays -5VDC power supply #1 output voltage. • Output should be within +/- 10% of -5V.
48.	-5VDC Power Supply #1 Output Voltage	Displays -5VDC power supply #1 output voltage. • Output should be within +/- 10% of +5V.
49.	+5VDC Power Supply #1 Output Voltage	Displays +5VDC power supply #1 output voltage. • Output should be within +/- 10% of +5V.
50.	+12VDC Power Supply #1 Output Voltage	Displays +12VDC power supply #1 output voltage. • Output should be within +/- 10% of +12V.
51.	Username Entry	Username login entry field for access to diagnostic report and sub-graph menu
52.	Password Entry	Password entry field for access to diagnostic report and graph sub-menu
53.	Display Report Sub-Menu (button)	Display Report Sub-menu (after successful display
54.	Display Graph Sub-Menu (button)	Display Graph Sub-menu (after successful display
55.	XIS Serial Number	Displays XIS Serial number
56.	+5VDC Power Supply #1 Output Voltage	Displays +5VDC power supply #1 output voltage. • Output should be within +/- 10% of +5V.
57.	+12VDC Power Supply #1 Output Voltage	Displays +12VDC power supply #1 output voltage. • Output should be within +/- 10% of +12V.
58.	Username Entry	Username login entry field for access to diagnostic report and sub-graph menu
59.	+5VDC Power Supply #1 Output Voltage	Displays +5VDC power supply #1 output voltage. • Output should be within +/- 10% of +5V.

ERROR LOG – ERROR MESSAGE LIST

The list below itemizes the various types of error messages that may be displayed in the Diagnostic Screen's ERROR LOG.

	ERROR LOG MESSAGE	COMMENTS & DISCUSSION
1	**XRAY Generator's/Controller's malfunction. (KV/mA is under min or over max)**	**DESCRIPTION** • X-ray generator has malfunctioned and NO x-rays are being produced. • XIS may show a "scrolling" black screen. **RECOMMENDATION** • Contact Customer Support for assistance. • Report error message. • Request assistance.
2	**System 12VDC Power Supply's malfunction.**	**DESCRIPTION** • The 12VDC power supply has failed. • The key-switch, warning lights, and DAS board will fail to operate. • The XIS will not display proper x-ray images. **RECOMMENDATION** • Contact Customer Support for assistance. • Report error message. • Request assistance.
3	**+5VDC PS1's malfunction.**	**DESCRIPTION** • The +5VDC power supply (first set) has failed. • The x-ray detector assembly will fail to operate. • The XIS will not display proper x-ray images **RECOMMENDATION** • Contact Customer Support for assistance. • Report error message. • Request assistance.
4	**-5VDC PS1's malfunction.**	**DESCRIPTION** • The -5VDC power supply (first set) has failed. • The x-ray detector assembly will fail to operate. • The XIS will not display x-proper ray images **RECOMMENDATION** • Contact Customer Support for assistance. • Report error message. • Request assistance.

ERROR LOG – ERROR LIST (continued)

	ERROR LOG MESSAGE	COMMENTS & DISCUSSION
5	**+5VDC PS2's malfunction.**	**DESCRIPTION** • The -5VDC power supply (second set) has failed. • The x-ray detector assembly will fail to operate. • The XIS will not display x-proper ray images **RECOMMENDATION** • Contact Customer Support for assistance. • Report error message. • Request assistance.
6	**-5VDC PS2's malfunction.**	**DESCRIPTION** • The -5VDC power supply is not operational. • The x-ray detector assembly will fail to operate. • The XIS will not display x-ray images **RECOMMENDATION** • Contact Customer Support for assistance. • Report error message. • Request assistance.
7	**No System malfunction has been detected.**	**DESCRIPTION** The XIS is operating normally. **RECOMMENDATION** Continue using XIS.

CHAPTER 7 THE ADVANCE OPERATOR CONTROL PANEL – REV. 2

Introduction

The Advance Operator Control Panel (AOCP) Revision 2 is the latest operator control interface for the XIS. The AOCP replaces the PC keyboard and mouse for communicating with the embedded PC inside the XIS. The AOCP has six main components:

- An Emergency Stop Button,
- A TIP Threat Alert Button,
- A set of status control lights,
- A Key-switch,
- A set of operator control buttons, and
- A touchpad interface.

The AOCP Rev 2.0

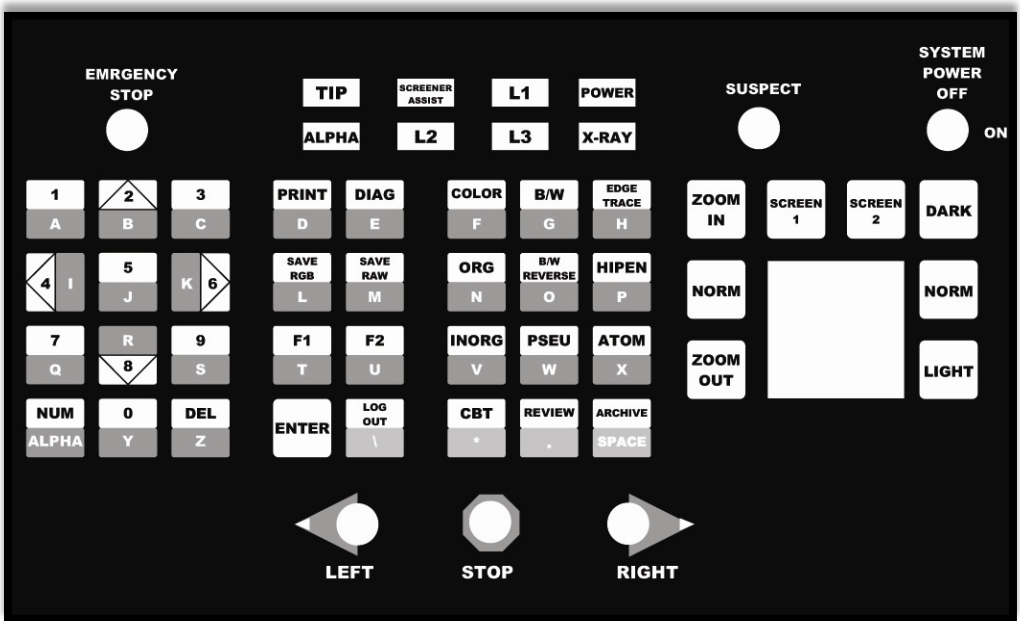
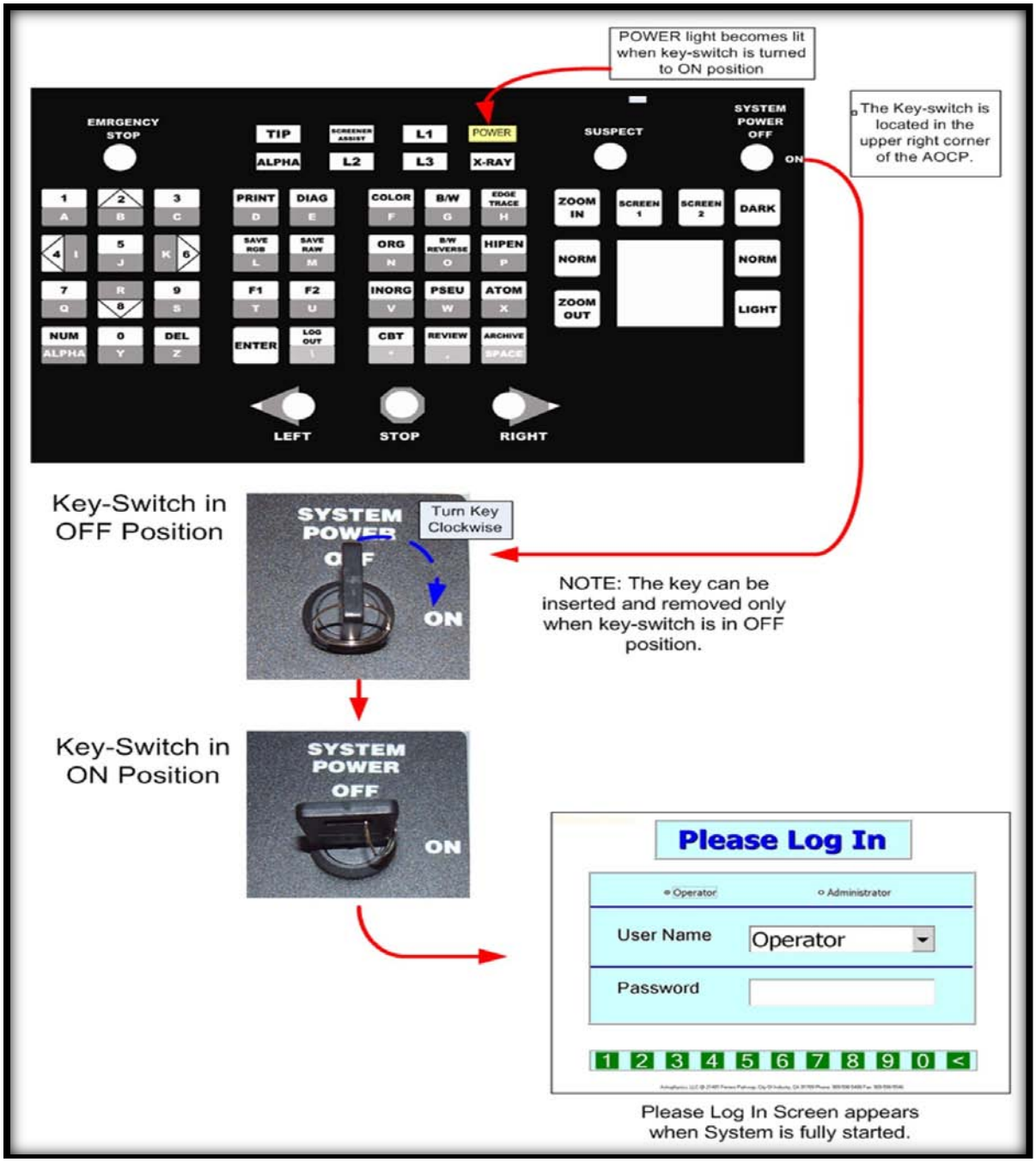


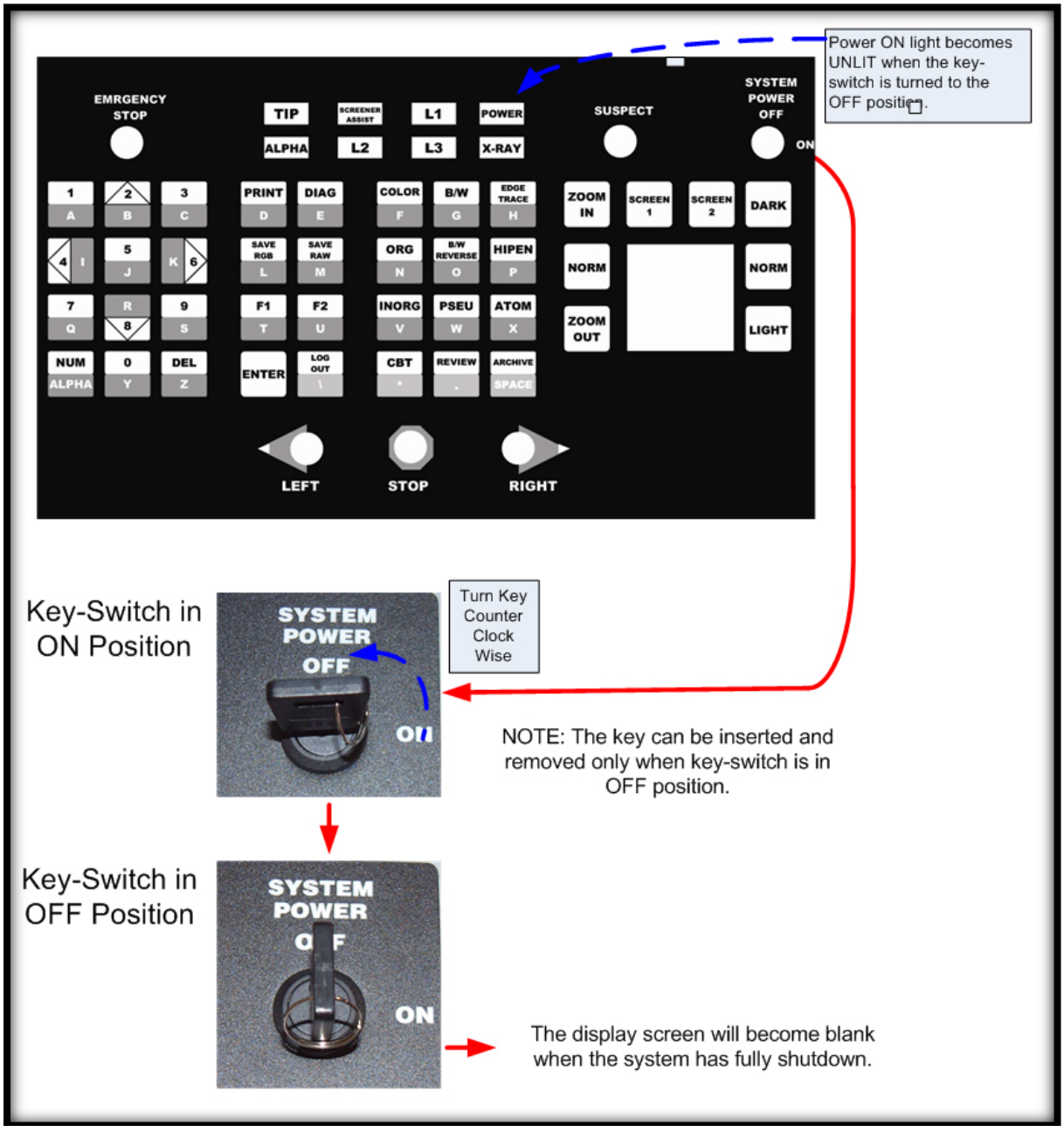
Figure 4 – AOCP Rev 2 - Advance Operator Control Panel – Keyboard Layout

AOCP REV 2 KEY-SWITCH→ TURNING THE XIS ON

The AOCP Key-Switch is located in the upper right corner of the AOCP. The key-switch is used to turns the XIS ON and OFF.

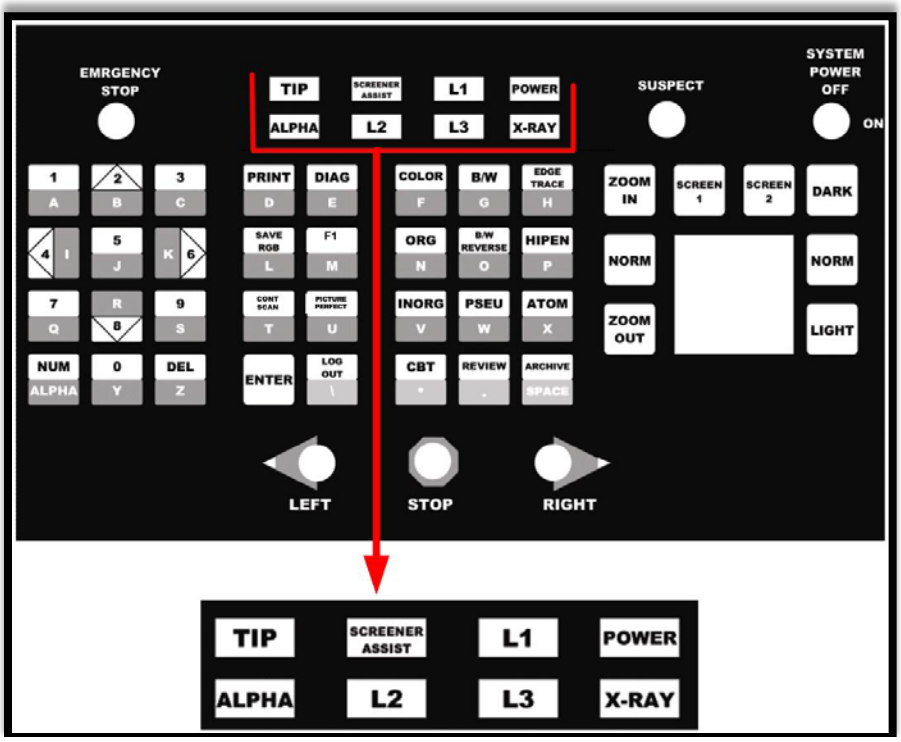


AOCP REV 2 KEY-SWITCH → TURNING THE XIS OFF



AOCP REV 2 STATUS CONTROL LIGHTS

The AOCP has a set of eight system status lights. They are located at the top of the panel. The status lights provide “real-time” operational information on the XIS. The function of each status light is described in the table below.



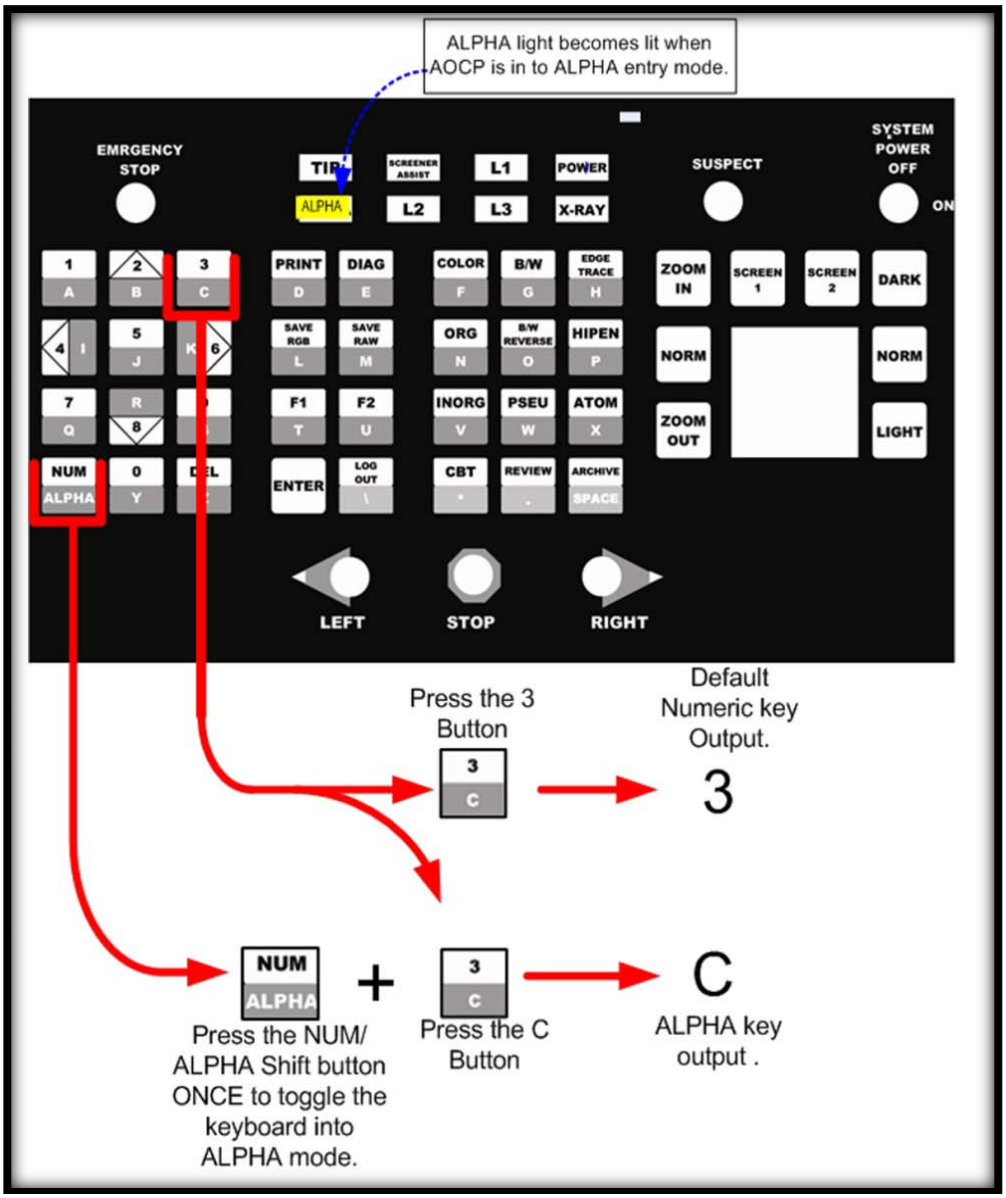
Status Light	Status when status light is lit (On).	Status when status light is un-lit (Off).
ALPHA	The ALPHABETIC characters are entered when the buttons are pressed. • Pressing the ALPHA button (lower left most button) sets the AOCP into alphabetic character output mode. The ALPHA output mode is indicated by the upper ALPHA status light. • Pressing the ALPHA button again returns the AOCP to “default” numeric/function mode.	The (Upper Case) function button entries are entered when the AOCP buttons are pressed. • The Upper Case functions are indicated by the black text that highlighted with white background.
L1	The Image Archive system is ON (I.e. IA is recording scanned bag images for future retrieval.)	The Image Archive system is OFF (I.e. IA is NOT recording scanned bag images.)
L2	No function. (For future system implementation.)	No function. (For future system implementation.)
L3	No function. (For future system implementation.)	No function. (For future system implementation.)
SCREENER ASSIST	No function. (For future system implementation.)	No function. (For future system implementation.)
TIP	The TIP system is software is enabled (i.e. turned ON) • When the TIP system is ON, the TIP system software will periodically blend in threat images to test the operator.	The TIP system is OFF (I.e. No TIP images will be projected.)
X-RAY	The X-ray generator is ON and producing x-rays. • Do NOT insert any part of the body into the inspection tunnel when the X-RAY light is lit.	The X-ray generator is OFF and NOT producing x-rays.
POWER	The AOCP key-switch is turned ON.	The XIS is turned OFF.

AOCP REV 2 DUAL FUNCTION BUTTONS

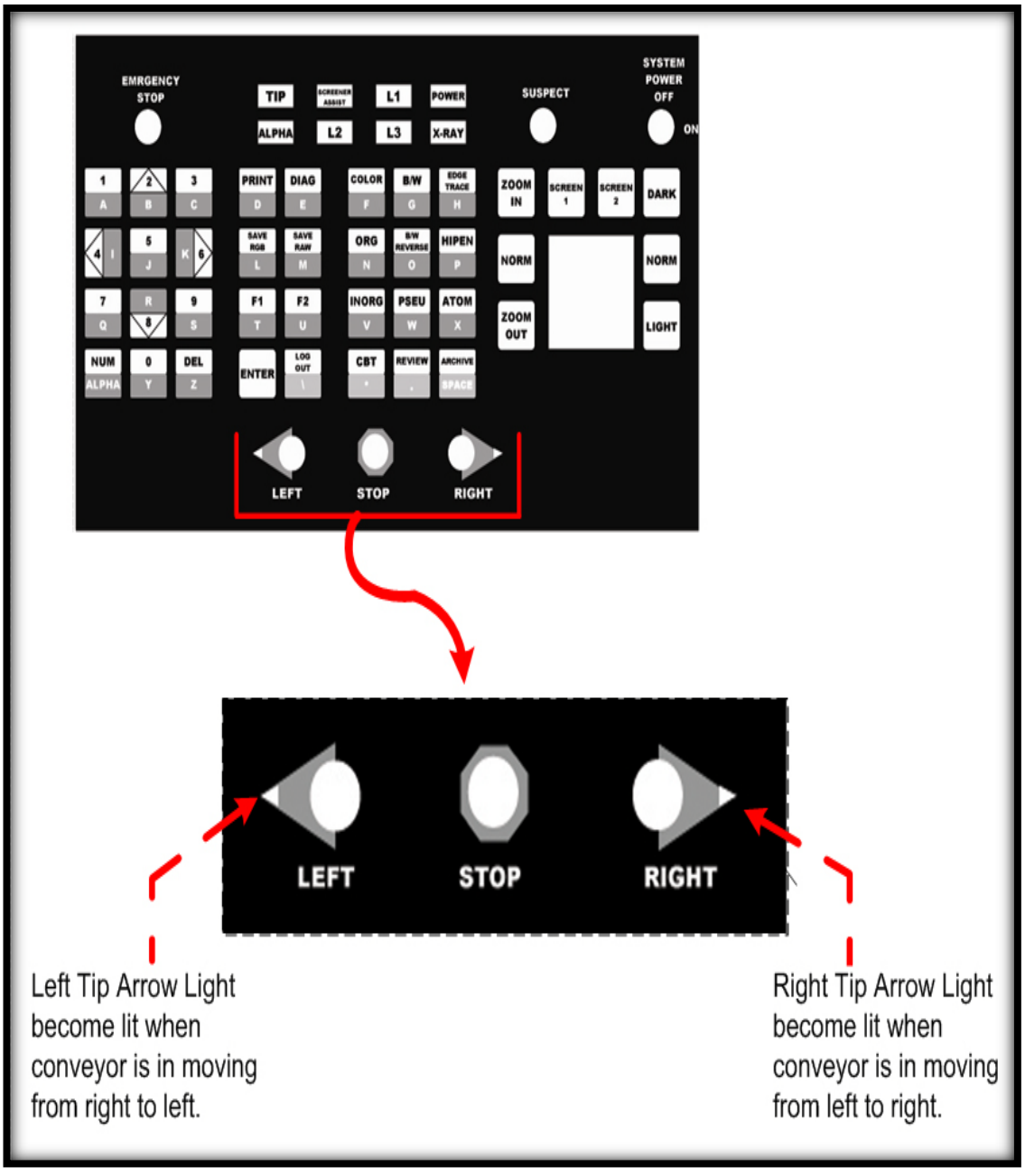
Most of the AOCP buttons have dual function outputs. The dual function outputs are labeled on each key. For example, the [3C] button outputs [3] in normal (numeric) entry mode and [C] in "*ALPHA*" entry mode. The ALPHA entry mode is selected by pressing the [ALPHA] button. The AOCP [ALPHA] status light becomes lit when the AOCP is in ALPHA entry mode.

The AOCP remains in ALPHA entry mode until the [ALPHA] button is pressed again, toggling the OCP back into normal entry mode.

On startup, the AOCP defaults to the normal function outputs that are labeled with a white background.

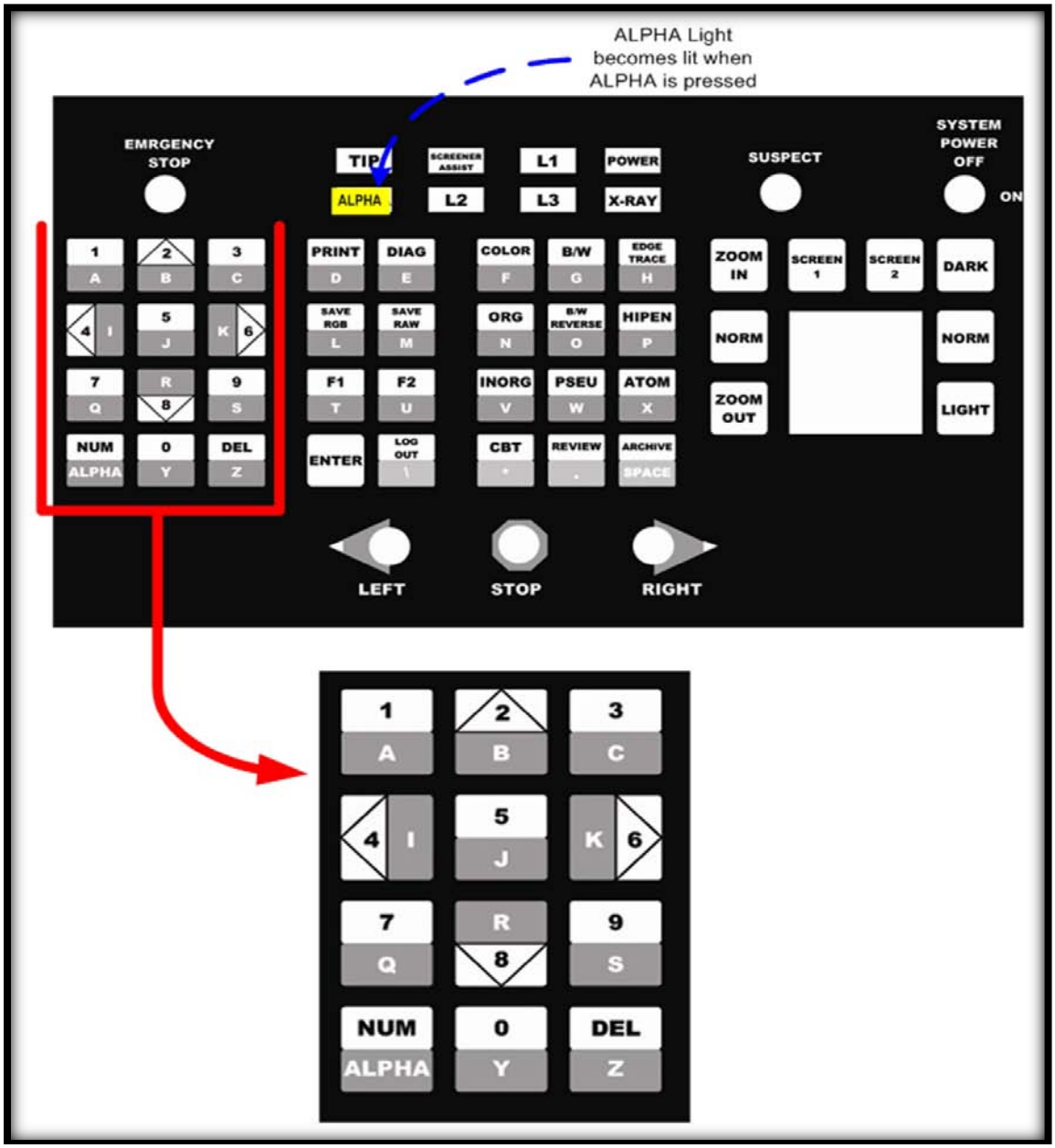


AOCP REV 2 CONVEYOR CONTROLS - [LEFT], [STOP], AND [RIGHT]



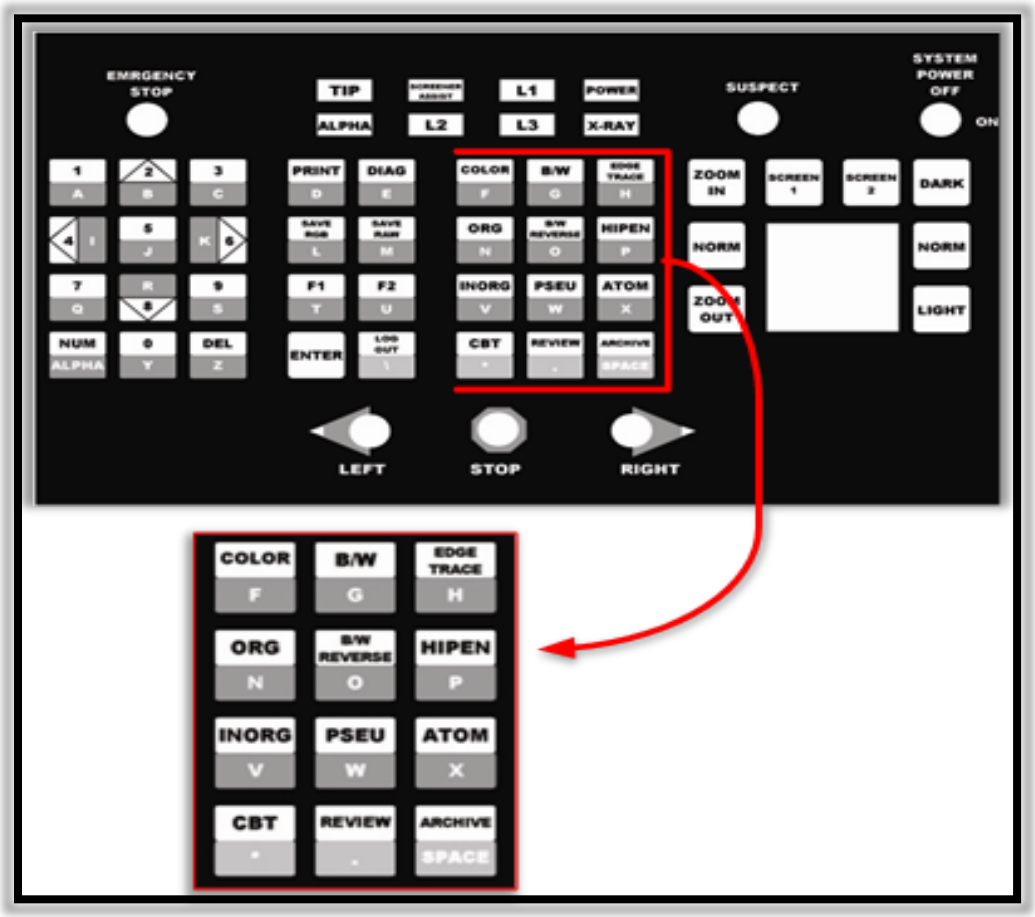
BUTTON	CONVEYOR CONTROL BUTTONS - DESCRIPTION
[**LEFT**]	Start the conveyor moving in the (right-to) left direction. • Left Tip Arrow Light becomes lit. • The LEFT conveyor direction is usually the *Forward* direction of the machine. Bags traversing the inspection tunnel in the *Forward* direction enter from the *Entry* opening of inspection tunnel and leave through the *Exit* opening. o The *Exit* end of the XIS is the one with the power cord and main AC switch located on the bottom of the XIS (underneath the conveyor bed). o The *Entry* end of the XIS is opposite the *Exit* end. • When you press the [**LEFT**] button, "**Left"** is displayed on the bottom of the screen. • When you press the [**LEFT**] button, the conveyor will momentarily, "back-belt", (i.e. the belt will briefly move in the reverse (right) direction for 2 seconds to clear items that may be blocking the x-ray window inside the inspection tunnel) and then the belt will continuously move in the left direction. • If you press the [**LEFT**] button when the conveyor is already moving in the right direction, the conveyor will first stop and then move in the left direction.
[**STOP**]	Stop the conveyor (if it is moving). • also functions as an [**Enter**] key during user log in
[**RIGHT**]	Start the conveyor moving in the (right-to-) left direction. • Right Tip Arrow Light becomes lit. • The *Right* conveyor direction is usually the *Reverse* direction of the machine. Bags traversing the inspection tunnel in the *Reverse* direction enter from the *Exit* (end) opening of inspection tunnel and leave through the *Entry* opening. o The *Exit* end of the XIS is the one with the power cord and main AC switch located on the bottom of the XIS (underneath the conveyor bed). o The *Entry* end of the XIS is opposite the *Exit* end. • When you press the [**RIGHT**] button, **"Right"** is displayed on the bottom of the screen. • When you press the [**RIGHT**] button, the conveyor will momentarily, "back-belt", (i.e. the belt will briefly move in the reverse (left) direction for 2 seconds to clear items that may be blocking the x-ray window inside the inspection tunnel) and then the belt will continuously move in the right direction. • If you press the [**RIGHT**] button when the conveyor is already moving in the left direction, the conveyor will first stop and then move in the right direction.

AOCP REV 2 NUMERIC BUTTONS



BUTTON	DESCRIPTION
[**0**] , [**1**], …, [**9**]	Enter number (for entering user password in “Please Log In” Screen).
[**ENTER**]	Enter (when selecting username entry at “Please Log In screen”)
[**DEL**]	Erase previous (character) entry (in NUM mode entry. “Z” entry (in ALPHA mode entry)..
[NUM] / [ALPHA]	Alphabetic/Numeric shift key. Press once to select alphabetic character entry. Press again to select numeric/enter/del keys.

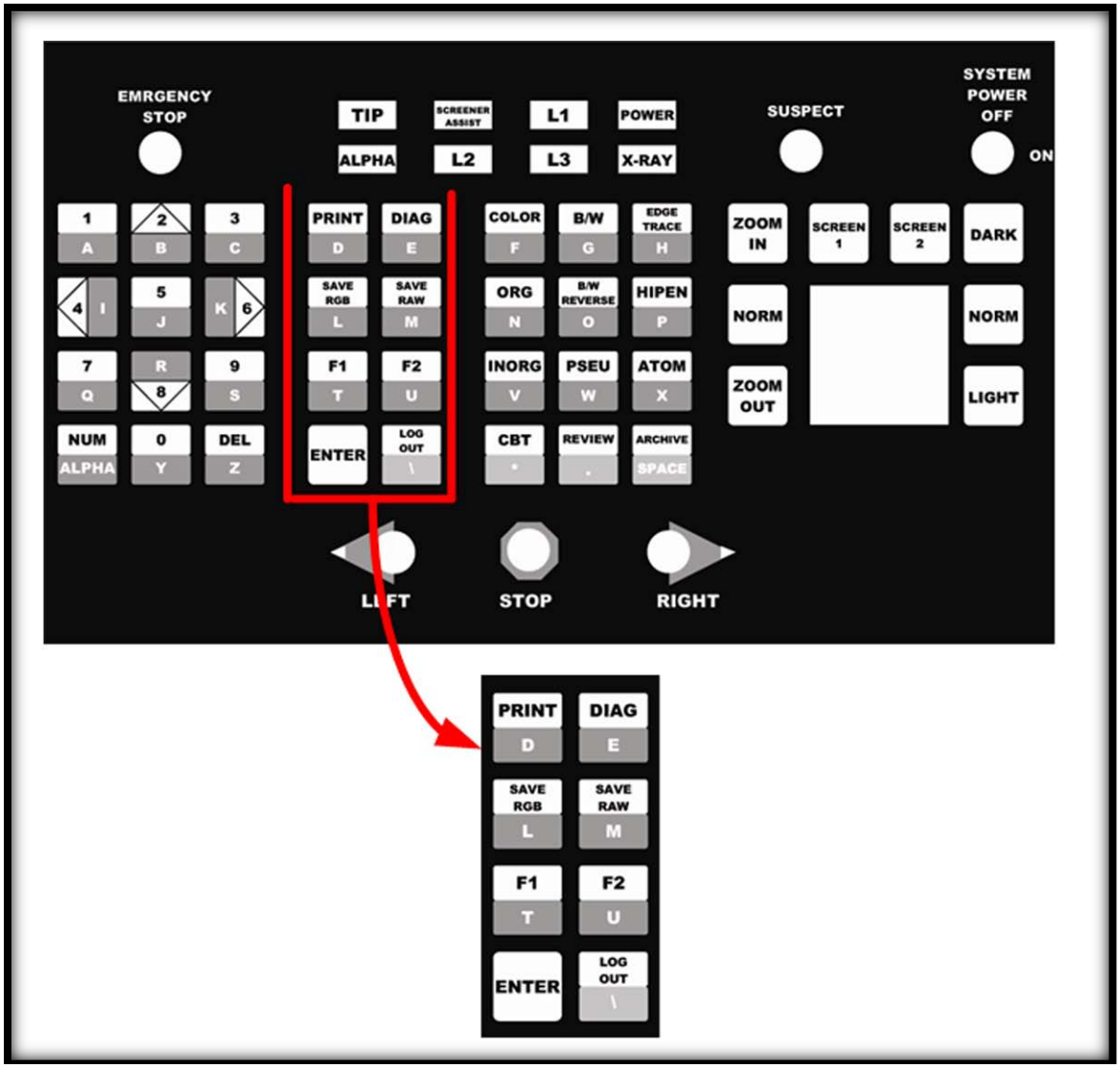
AOCP REV 2 SYSTEM CONTROL BUTTON



BUTTON	DESCRIPTION
[**ATOM**]	Calculate and display z-number • Press the [STOP] button. (The conveyor belt must be stopped before using the [ATOM] button.) • Press the [ATOM] button. • Using the touchpad, position the cursor to the upper left corner of the area of interest. • Double tap the touchpad. • An expanding area selection box will appear on the screen. “Glide” (slide your finger while keeping in contact with the touchpad) the cursor to expand the box to cover the area of interest. • Lift your finger from the touchpad and the Z-Number will be displayed in the lower right corner of the screen.
[**COLOR**]	Display the default color mode screen on the Color Screen. • Press the [COLOR].
[**EDGE TRACE**]	Edge Sharpen the image (i.e. increase the contrast between boundaries of light and dark objects • Press the [EDGE TRACE] to “edge sharpen” the image.

BUTTON	DESCRIPTION
[**HIPEN**]	Lighten (screen gamma) the screen contrast two “steps”. This allows you to see through dense (usually inorganic) objects. • Press the [**STOP**] button. (The conveyor belt must be stopped before using the [**HIPEN**] button.) • Press the [**HIPEN**].
[**INORG**]	Adjust the Color Screen to emphasize inorganic materials and de-emphasize inorganic materials. • Press the [**STOP**] button. (The conveyor belt must be stopped before using the [**INORG**] button.) • Press the [**INORG**].
[**LOG OUT**]	Exit x-ray image scanning screen. Go to the “Please Log In” screen.
[**ORG**]	Adjust the Color Screen to emphasize organic materials and de-emphasize inorganic materials. • Press the [**STOP**] button. (The conveyor belt must be stopped before using the [**ORG**] button.) • Press the [**ORG**].
[**REVIEW**]	Display the Image Archive screen. • Press the [**STOP**] button. (The conveyor belt must be stopped before using the [**REVIEW**] button.) • Press the [**ORG**].
[**CONT SCAN**]	Continuous scan x-ray imaging. In the “Continuous Scan” mode, the x-ray generator stays continuously on until [CONT SCAN] is pressed again or when the [STOP] is pressed. Continuous scan allows imaging of very thin objects that may escape detection by the photocells in the inspection tunnel. To start continuous scan mode: • Press [CONT SCAN] button to start “Continuous Scan” mode. To stop continuous scan mode: • Press [CONT SCAN] button to toggle off, OR • Press [STOP] to stop the conveyor which also exits continuous scan mode.
[**PICTURE PERFECT**]	Picture Perfect Function.

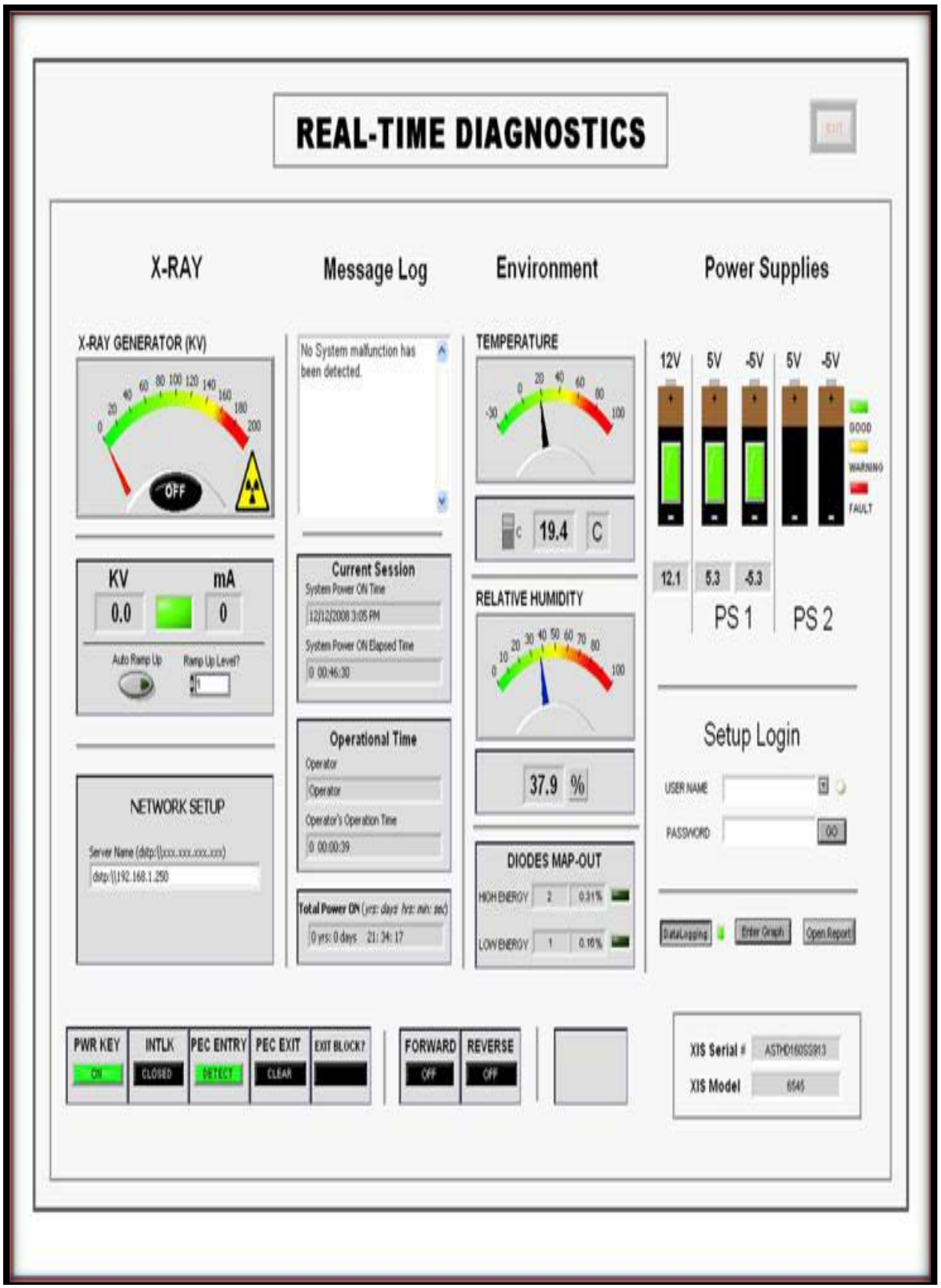
AOCP REV 2 SYSTEM CONTROL BUTTONS

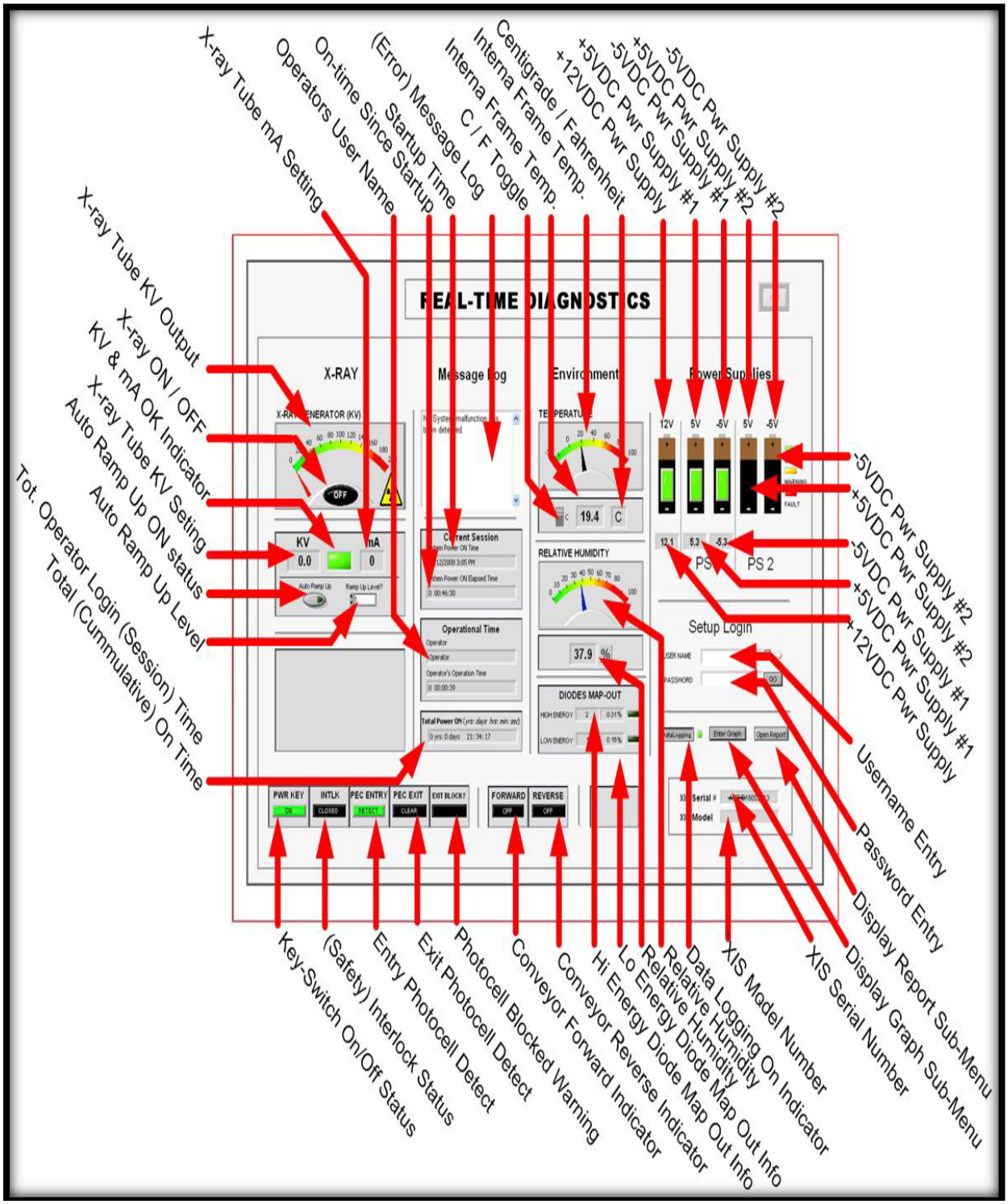


AOCP REV 2 ZOOM & SCREEN CONTRAST CONTROL BUTTONS

BUTTON	DESCRIPTION
[**PRINT**]	Print the current screen image to the printer. The print function only operates when a printer is installed, connected, and powered on.
[**DIAG**]	Display Diagnostic Screen (Optional Feature)
[**F1**]	Enable / Disable Continuous X-ray On (CXO) when conveyor belt is running. CXO allows imaging of thin items. Exceptionally thin items may go under the x-ray inspection tunnel's photocells that trigger the x-rays to turn on. CXO allows imaging of these items. X-rays are ONLY generated when the conveyor belt is running. Stopping the conveyor STOPS the production of x-rays. • Pressing [F1] enables CXO imaging. • Pressing [F1] again, disables (i.e. turns off) the CXO function. • Note → after enabling CXO, you must start the conveyor to begin imaging. .
[**F2**]	Enable / Disable Picture Perfect Imaging "Picture Perfect"imaging mode displays enhanced contrast imaging of organic items. To use Picture Perfect : • Stop the belt after imaging a bag. (i.e. Press [**STOP**] button.) • Press [F2] to display the same image with enhanced "Picture Perfect" detail. • Press [F2] to resume normal imaging. (You can also press any other image adjustment buttons to automatically exit "Picture Perfect" imaging mode.)
[**SAVE RAW**]	NO FUNCTION. This key is not used. This XIS auto-saves all scanned bag images into the \Program\Files\XrayClient\XrayDoc
[**SAVE RGB**]	NO FUNCTION. This key is not used. This XIS auto-saves all scanned bag images into the \Program\Files\XrayClient\XrayDoc
[**ENTER**]	Performs as the [ENTER] key on a regular keyboard.
[**LOG OUT**]	Exit x-ray image scanning screen and go to "*Please Log In*" screen.

BUTTON	DESCRIPTION
[**DARK**]	Darken (gamma screen contrast of) bag image on screen to show greater detail for less dense (usually organic) objects. • The [DARK] button affects the "selected" screen. • First press either [Screen 1] or [Screen 2] to select screen and then press [DARK]
[**LIGHT**]	Lighten (gamma screen contrast of) bag image on screen to see through dense (usually inorganic) objects. • The [LIGHT] button affects the "selected" screen. • First press either [Screen 1] or [Screen 2] to select screen and then press [LIGHT].
Left side [**NORM**]	Display screen in Normal (1x magnification) zoom mode.
Right side [**NORM**]	Display screen with Normal (default) screen brightness for selected screen
[**SCREEN 1**]	Select B/W Screen (for [Light] and [Dark] screen controls)
[**SCREEN 2**]	Select Color Screen (for [Light] and [Dark] screen controls)
[**ZOOM OUT**]	Select Zoom Down (I.e. Zoom Out) mode.
[**ZOOM IN**]	Select Zoom UP (I.e. Zoom In) mode.
Touchpad	The Touchpad replaces the PC mouse. • Move your fingers on the touchpad to position the cursor. • Tap twice (quickly) to left click an entry.


REAL-TIME DIAGNOSTICS
EXIT
X-RAY
Message Log
Environment
Power Supplies
X-RAY GENERATOR (KV)
OFF
No System malfunction has been detected.
TEMPERATURE
19.4
C
12V
5V
-5V
5V
-5V
GOOD
WARNING
FAULT
12.1
5.3
-5.3
PS 1
PS 2
KV
mA
0.0
0
Auto Ramp Up
Ramp Up Level?
Current Session
System Power ON Time
12/12/2008 3:05 PM
System Power ON Elapsed Time
0 00:46:30
RELATIVE HUMIDITY
37.9 %
Operational Time
Operator
Operator
Operator's Operation Time
0 00:00:39
Setup Login
USER NAME
PASSWORD
GO
NETWORK SETUP
Server Name (dstp:\\xxx.xxx.xxx.xxx)
dstp:\\192.168.1.250
DIODES MAP-OUT
HIGH ENERGY
LOW ENERGY
Total Power ON (yrs: days hrs: min: sec)
0 yrs: 0 days 21: 34: 17
DataLogging
Enter Graph
Open Report
PWR KEY
ON
INTLK
CLOSED
PEC ENTRY
DETECT
PEC EXIT
CLEAR
EXIT BLOCK?
FORWARD
OFF
REVERSE
OFF
XIS Serial #
ASTHD160SS913
XIS Model
6545


X-ray Tube mA Setting
Operators User Name
On-time Since Startup
Startup Time
(Error) Message Log
C / F Toggle
Interna Frame Temp.
Centigrade / Fahrenheit
+12VDC Pwr Supply
+5VDC Pwr Supply #1
-5VDC Pwr Supply #1
+5VDC Pwr Supply #2
-5VDC Pwr Supply #2
X-ray Tube KV Output
X-ray ON / OFF
KV & mA OK Indicator
X-ray Tube KV Seting
Auto Ramp Up ON status
Auto Ramp Up Level
Tot. Operator Login (Session) Time
Total (Cummulative) On Time
-5VDC Pwr Supply #2
+5VDC Pwr Supply #2
-5VDC Pwr Supply #1
+5VDC Pwr Supply #1
+12VDC Pwr Supply
Username Entry
Password Entry
Display Report Sub-Menu
Display Graph Sub-Menu
XIS Serial Number
XIS Model Number
Data Logging On Indicator
Relative Humidity
Relative Humidity
Lo Energy Diode Map Out Info
Hi Energy Diode Map Out Info
Conveyor Reverse Indicator
Conveyor Forward Indicator
Photocell Blocked Warning
Exit Photocell Detect
Entry Photocell Detect
(Safety) Interlock Status
Key-Switch On/Off Status
REAL-TIME DIAGNOSTICS
X-RAY
Message Log
Environment
Power Supplies
KV
mA
Current Session
Operational Time
RELATIVE HUMIDITY
DIODES MAP-OUT
Setup Login
PWR KEY
INTLK
PEC ENTRY
PEC EXIT
EXIT BLOCK?
FORWARD
REVERSE

CHAPTER 8 THE TIP SYSTEM

Chapter Overview

This chapter describes the TIP (Threat Insertion Projection) System. It is intended for all XIS users who have the TIP software option installed with their x-ray machine

Introduction

"TIP" (Threat Insertion Projection) is an optional software feature that monitors operator performance by regularly testing them as they use the x-ray machine. TIP periodically blends in fictional x-ray images of threatening objects (such as guns, knives, and bombs) into the current x-ray images. The operator is then tested on whether he/she can recognize and acknowledge the presence of the fictitious threat. TIPs are acknowledged by pressing the [**SUSPECT**] button. If the operator correctly acknowledges the TIP threat in a timely manner, he/she is congratulated with a "TIP HIT" screen message. If the operator fails to immediately acknowledge that TIP threat, the TIP system highlights the presence of the TIP projection on the screen and warns the operator with a "TIP MISS" message. TIP also scores operator on "FALSE ALARMS". A False Alarm occurs when the operator indicates the presence of threat when he/she is not being tested. In this case, the operator should double check the x-ray image because A REAL threat may actually be present.

The TIP system scores and summarizes the test results for each operator. The results are then reported to security supervisor and to the TSA/FAA as required. On a day-to-day basis, the typical security screening operator rarely sees images of "real threats". The TIP system, however, provides the operator with regular exposure to "real", previously saved threat images. The operator thus receives on-the-job training with continuous performance monitoring. Another benefit of the TIP system is that operators are continuously prodded to be alert because he/she knows he/she is being regularly tested. He/She just does not know when.

TIP PROCEDURES USING TIP WITH THE XIS

The XIS displays the status of its TIP system on the bottom right side of its scanning screen.

- The TIP system will only project images when the TIP system is turned **ON**.
- When the TIP system is turned **ON**, a message "**TIP ON**" will be displayed. When the TIP system is turned **OFF**, the message "**TIP OFF**" will be displayed.
- The TIP system is turned on and off by the supervisor and is not controlled by regular operators. See your supervisor if TIP needs to be turned **ON** or **OFF**.

NOTE: The XIS system operates as usual when TIP is turned **ON**. All conveyor controls and imaging adjustment buttons work the same.

TIP images are projected at specific intervals based on the bag count. The projection schedule is not based on time.

When a TIP "threat" image is being projected, a small picture of a threatening article is electronically blended into the current bag image as it is scrolled onto the screen.

The TIP projection schedule is partially randomized to prevent operators from guessing when the next TIP projection will occur.

NOTE: If any threat appears on the screen, press the TIP [**SUSPECT**] button.

- *If you were being tested by the insertion of fictional TIP into the bag that you are examining and if you respond within the allotted response time (usually 3 seconds), then → you will be greeted with a congratulatory message*.

  Press the [STOP] button to clear the congratulatory message from the screen.
  - The TIP Projection image will be erased when the congratulatory message is cleared from the screen.
  - The TIP system will positively record your successful TIP threat identification.
  - The original scanned image without the TIP projection will then be redisplayed on the screen.

  RE-EXAMINE THE SCANNED IMAGE VERY CAREFULLY AND THOROUGHLY!
  - The bag may still have a real threat inside.
  - When you have finished with your examination and you are satisfied that there is NO real threat, then → press [**LEFT**] or [**RIGHT**] to continue examining other bags.

    If the bag still appears to have a real threat inside, follow your facility's security procedures for handling this situation.

.

If the TIP system indicates that you are NOT being tested, then →

RE-EXAMINE THE SCANNED IMAGE VERY CAREFULLY AND THOROUGHLY!

If the bag appears to have a real threat inside, follow your facility's security procedures for handling this situation.

If you determine on further examination that there is NO real threat inside the bag, then:

- Press the [**STOP**] button to clear the "False Alarm" message from the screen.

- The TIP system will record your "False Alarm" response.

TIP PROCEDURES HELPFUL HINTS

Always use your own login and password.

- If you do NOT have your own login and password, ask your supervisor to assign you one.
- Do NOT let others use your *User Name* and *Password* to login.
- Do NOT disclose your password to others.
- The TIP system scores the user who is currently logged in. You are responsible for all TIP test results performed under your login. It is important to note that other users may not be as motivated as you are in identifying and acknowledging TIPs threats, especially when they are logged under your account.

After you login, check the TIP status. If the system indicates that TIP is turned **ON**, be alert for possibly frequent TIP tests.

IF YOU SEE A POTENTIAL THREAT(S) IN A BAG--> PRESS THE [STOP] BUTTON.

- It is important to remember that potential threats showing on the screen can either be a real or fictitious TIP. Act accordingly.
    - **DO NOT LET THE BAG IMAGE WITH THE POTENTIAL THREAT SCROLL OFF THE SCREEN.** The moment a TIP image scrolls off the screen, it is scored as a "MISS".

    - If the image of the potential threat is a fictitious TIP, pressing the [**STOP**] button will give you an **extra 30 seconds** to respond. Otherwise you will have less than 3 seconds left to respond and press the [**SUSPECT**] button. Repeatedly pressing the [**STOP**] button will not give you more time.

    - **EXAMINE THE IMAGE QUICKLY AND RESPOND PROMTPLY.** You will need to quickly decide if the threat in the bag image "looks" real. Use the image adjustment buttons on the control keypad to carefully inspect the bag image.

      If you miss a TIP test, study the highlighted missed threat image. Learn from it.

There are three broad categories of TIP tests:

- Guns
- Knives
- Explosive bombs (IED)

The TIP system includes x-ray images of these items in various profiles. Some images are easily recognized because they display the item's most characteristic profile. Other images are less distinctive. For example, the x-ray image of a knife blade taken along a thin blade edge is often difficult to recognize.

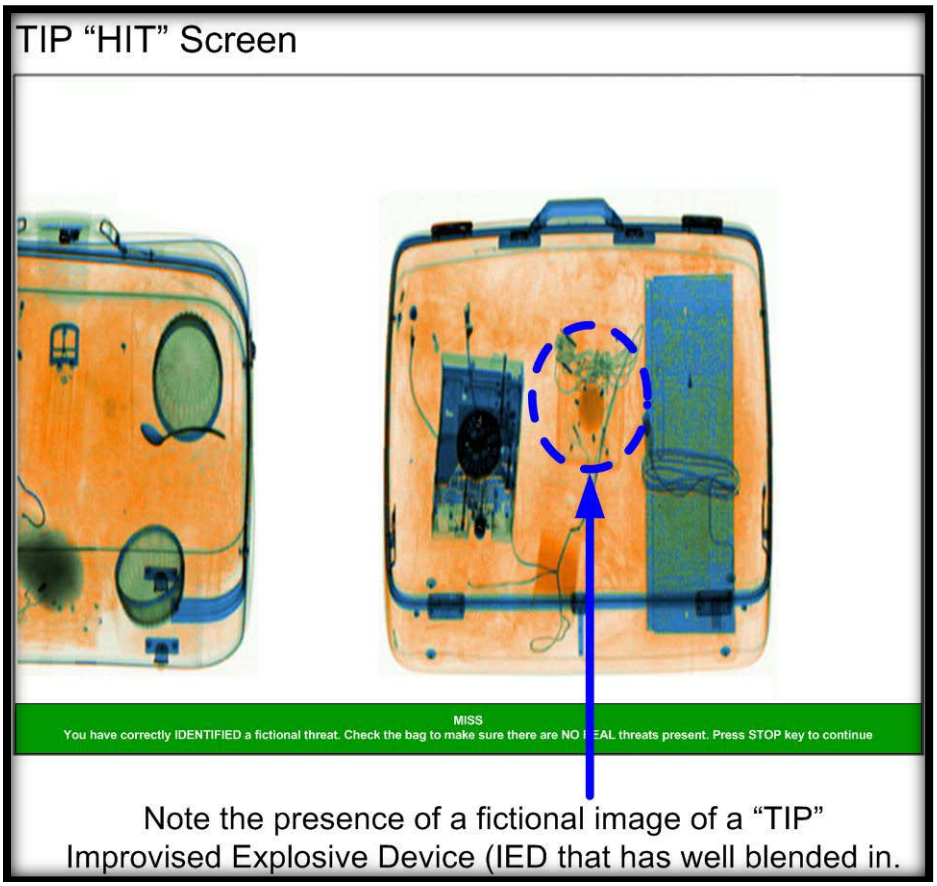
Threat recognition is further complicated by the presence of visual clutter and other innocuous items in the enclosing bag.

- Use the [**INORG**] image adjustment button to de-emphasize organic clutter, which is often clothing and food.
- Use the [**LIGHT**] Contrast Adjustment button to lighten the image to see items that may be concealed behind denser x-ray opaque objects.
- Use the [**ORG**] image to de-emphasize inorganic clutter, such as electronics or mechanical frames and fastenings.

NOTE: It takes practice and experience to become proficient at recognizing threats in x-ray images.

The pictures below show the TIP System in action.

The picture directly below is an example of a typical TIP "***Hit***" Screen. A "HIT" occurs when the operator correctly identifies and acknowledges the presence of TIP test image on the screen within the allotted response time. The TIP is acknowledged by pressing the [**SUSPECT**] key.



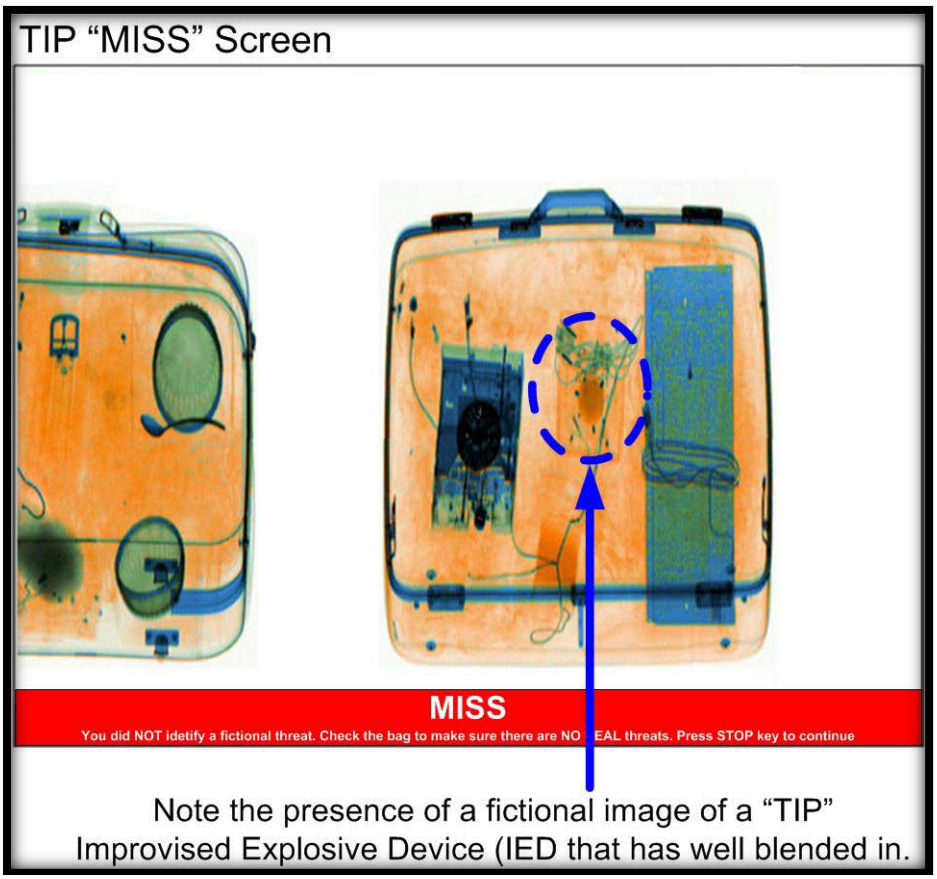
In this case, after the TIP appeared in bag image, the operator correctly pressed the [**SUSPECT**] button within the 3 seconds allotted response time.

Note the message:

HIT
You have correctly IDENTIFIED a fictional threat. Check the bag to make sure that there are NO REAL threats present. Press STOP Key to continue!

The whole message is important. It's important to check the bag again to insure that there are no real threats inside the bag. An actual real threat could have been coincidentally hidden in the bag. In this case, there actually is another REAL THREAT in the bag!

The picture below is an example of a typical TIP "*Miss*" Screen.



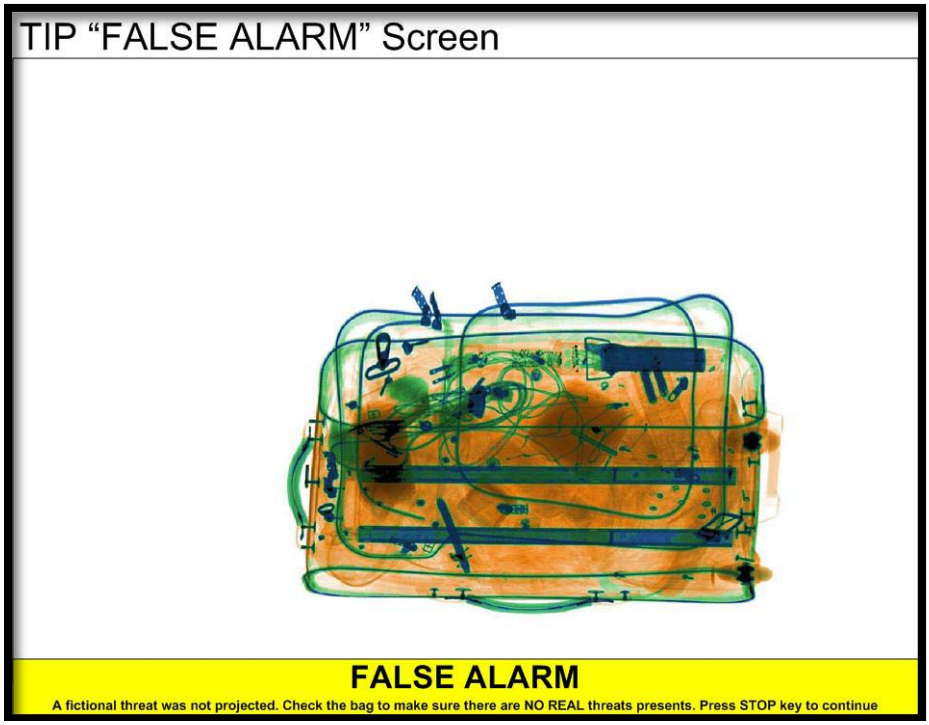
After the projection appeared, the operator did not press the [**SUSPECT**] button and the TIP "timed-out". A "Miss" was then reported.

Note the message:

MISS
You did NOT identify a fictional threat. Check the bag to make sure there are NO REAL threats. Press STOP key to continue.

The whole message is important. It's important to check the bag again to insure that there are no real threats inside the bag. An actual real threat could have been coincidentally hidden in the bag. In this case, there actually is another REAL THREAT in the bag!

The picture below is an example of a typical TIP "*FALSE ALARM*" Screen.



Note the absence of any TIP Threat in the image.

During regular screening operations, the operator pressed the [**SUSPECT**] button when no TIP threat was being "projected". A "False Alarm" warning was then displayed.

Note the message:

FALSE ALARM
A fictional threat was not projected. Check the bag to make sure there are NO REAL threats present. Press STOP key to continue.

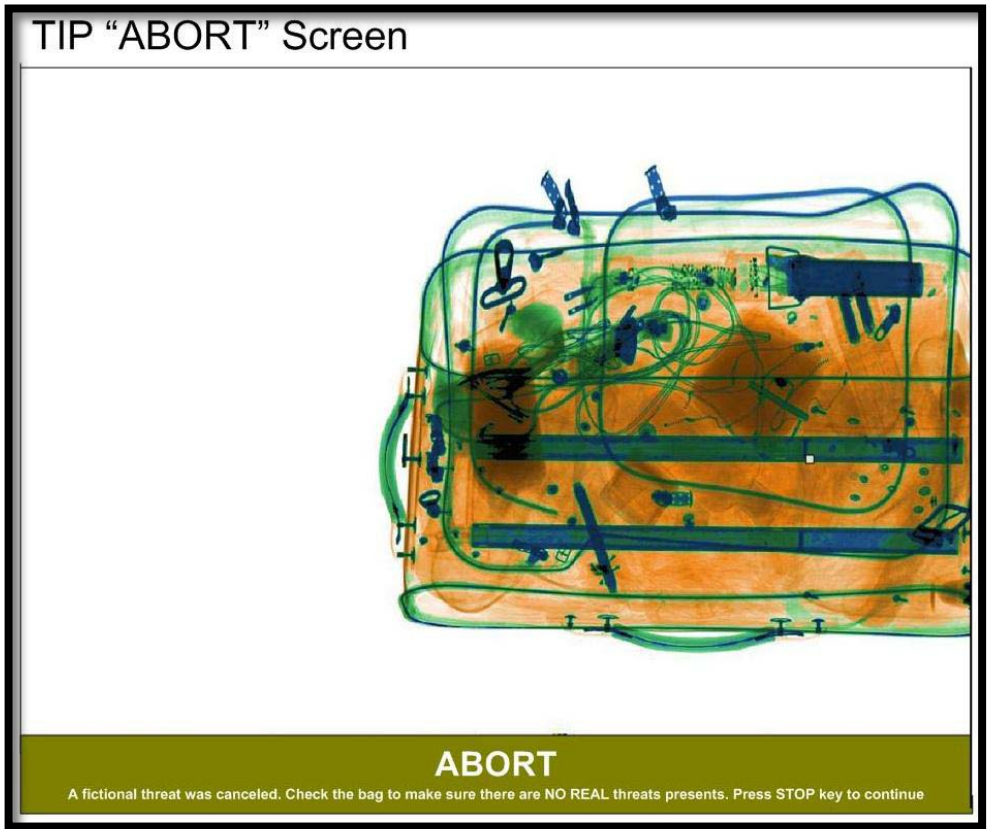
False Alarms messages are very important. They indicate that you saw something of interest. It may actually be a real threat. For example, the above bag actually contains real explosive threats.

Notes on TIP System Operation:

To keep the x-ray machine operator alert, TIP threat images are intermittently projected. That means they are not predictably placed in every bag, or in every other bag, in every third bag, etc.

TIP images are blended into the current bag image in “real-time”. That means that the threat images are inserted to the bags as they are being scrolled onto the screen. When a TIP threat image insertion is scheduled, the TIP system waits for an incoming bag that has sufficient width to accommodate the width of the TIP threat image that it wants to project. The TIP system then waits a varying amount of time to avoid always placing the TIP threat image in the front edge of the incoming bag. TIP “aborts” usually occurs when the TIP threat image is too long to project inside the incoming bag.

The TIP System will generally only score you when a TIP threat image has been fully drawn.
If a TIP image cannot be completely drawn within the incoming bag, it will cancel, or ABORT, the test. A TIP ABORT message will appears as follows:



Note the message:

ABORT
A fictional threat was canceled. Check the bag to make sure there are NO REAL threats present. Press STOP key to continue.

As usual, ALWAYS carefully inspect the bag.

CHAPTER 9 CBT OPERATION

Chapter Overview

This chapter describes how to use the CBT (Computer Based Training) System. It is intended for all users of the XIS.

Introduction

CBT is an abbreviation for Computer Based Training. The CBT system emulates the screening operation of the XIS system without the need to run bags through x-ray tunnel. This allows the user to focus on learning to use the XIS without the distractions inherent in running the XIS at an actual security checkpoint. CBT users, for example, can concentrate on learning to use the XIS controls buttons without the worry of missing real threats. CBT users can also set their own training schedule and learning pace.

CBT Setup Instructions

How To: Setup and Operate the X-Ray Imaging System (XIS) Computer-Based Training (CBT) Simulator in Single View Mode for the Dual View 100XDV

Contents:

Purpose and Description:

This guide describes what is required to setup, start, operate, and shutdown the Astrophysics XIS CBT simulator. Please read the complete instructions prior to beginning system setup.

Parts Included:

The CBT simulator is composed of the following hardware components shipped in four boxes.

Box 1. PC, USB Security Dongle, and Advanced Operator Control Panel (AOCP) pre-wired to the PC.

IMPORTANT NOTE: Do not disconnect the AOCP from the PC. Reconnecting the AOCP incorrectly will burn out the controller board.

Box 2. Flat Panel Display and a connected video cable adapter.

Box 3. Flat Panel Display and a connected video cable adapter.

Box 4. Keyboard and Mouse.

Required Materials and Tools: N/A

Procedure:

Step 1: Hardware Inspection and Assembly

After receiving the CBT simulator system, carefully remove and inspect the contents of each box.

IMPORTANT NOTE: Please be especially careful when handling the PC and AOCP combination as they are wired together.

Remove the AOCP from Box 1 before removing the PC, since it is the smallest and lightest of the two components. Try to minimize stress on the cable connection for the AOCP at the PC, although it does have cable strain-relief at the connection. There is approximately 6 feet of cable between the units allowing plenty of slack for a single person to maneuver them easily.

NOTE: The PC has two light-colored USB cables protruding from the back of the case and connected to its own lower row of USB ports. Take care not to snag the cables while removing the PC from Box 1. If one or both cables become disconnected, reconnect them to the lower row of USB ports.

On a stable desk or table with sufficient space available, set up the components of the CBT system in the recommended arrangement shown in Figure I below. Actual arrangement of the hardware may vary somewhat as needed. Also, with the monitors being LCD displays, viewing aspect angle has some impact on image quality. When setting up the system, consider what will give the user optimum viewing angle from the seated position.

Arrangement of CBT Simulator Hardware Components

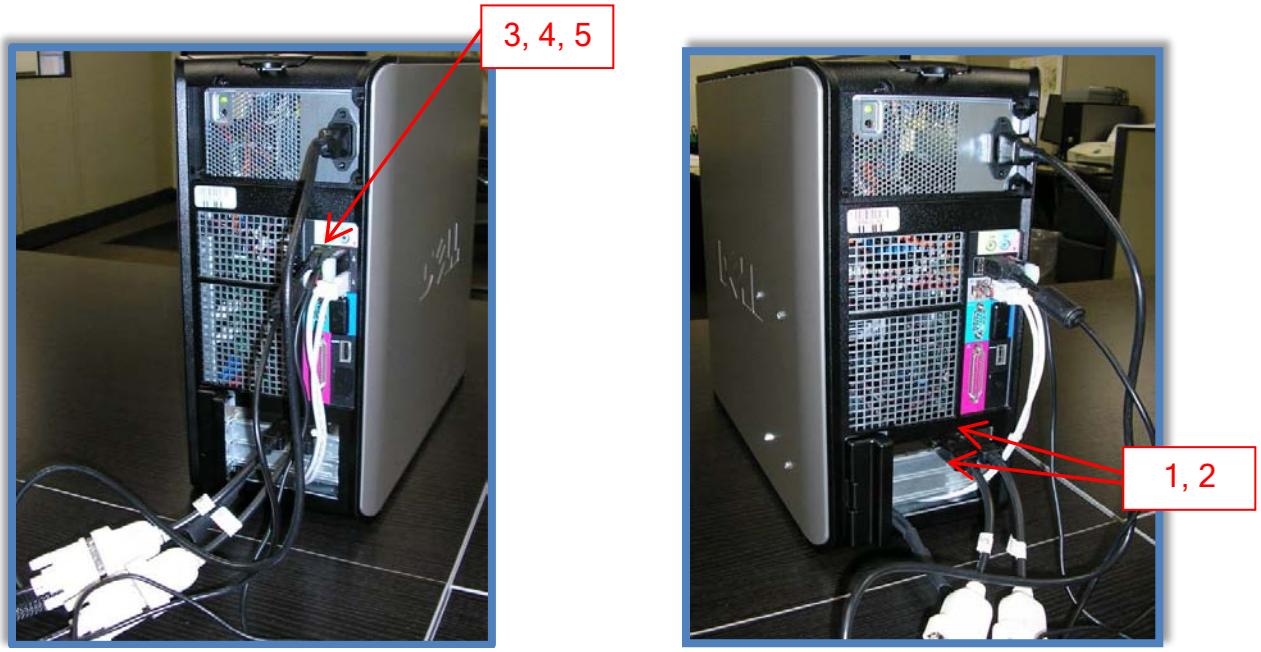
Once the hardware is arranged (including PC, AOCP, both displays, keyboard, and mouse), complete the cable connections from the peripherals to the PC. Figure II below shows two photographs of the completed connections at the back of the PC.

Step 1A: Connect the two displays to the PC as shown in Figure II.
The displays are identical and it is not important which is the right or left display, but the right-left orientation of the cable connections to the PC is important. "Screen 1" (which is the screen that is to be positioned on the left for AOCP operation) is to be plugged in on the left-hand-side as the PC is viewed

from behind (see Figure II). "Screen 2" (which is the screen that is to be positioned on the right for AOCP operation) is to be plugged in on the right-hand-side as the PC is viewed from behind (see Figure II).

NOTE: It is important that the displays are connected prior to system startup in order to maintain the correct "Horizontal Stretch" dual-display setting needed to operate the CBT Simulator. If, after system startup, the screen mode is not correct, please see the Troubleshooting section for additional information.

Step 1B: Connect the USB devices as shown in Figure II including keyboard, mouse, and security dongle. The specific USB port position for each of these is not important.



1. "Screen 1"
2. "Screen 2"
3. Keyboard
4. Security Dongle
5. Mouse

View of all Peripheral Connections to the PC as Viewed from Behind

Step 1C: Once each peripheral device is securely connected to the PC, plug in the 3 required power cables to a convenient power outlet (ideally via a surge-protection device). The components requiring power are the PC and each of the displays. The AOCP is powered through the PC and does not have a separate power cable.

Step 2: System Start-Up and Initial Loading of Archive Data Files

After completing the hardware setup, boot the PC. While booting, it is normal for the "L2" indicator light on the AOCP to flash.

NOTE: The Advanced Operator Control Panel (AOCP) is the primary user input device for the CBT simulator. A double-tap on the AOCP touchpad is the equivalent of a left button click on the mouse.

This device is a single view simulator that has been configured to support display and manipulation of either single view scanner images or one view (image) at a time from a dual view scanner.

Shortcuts on the desktop to run the CBT in the correct mode for various XIS model scanners are provided "shortcut to start XXX".

Shortcuts have also been set up on the desktop to access the corresponding folders where data files must be loaded for viewing "shortcut to parcels XXX". Data must be loaded in the correct folder for each model of scanner.

"Astrophysics" Windows XP User Account Desktop

Load the archive data files (.wim filename extension) into their respective machine's data folders using the shortcuts provided.

Open and inspect the appropriate data folder to ensure that there are no unwanted files. Delete any unwanted files and copy the required .wim files into the folder. When run, the X-ray simulator application will place all files in this folder into a circular display buffer for imaging. Close the data folder window. If required for dual view systems, load the archive data files for a first view into the folder and inspect those images. When complete replace the data files for the first view with the data files for the second view and complete inspection.

On the desktop double-click the appropriate scanner model shortcut to launch the CBT simulator application.

There are six pre-loaded shortcut icons on the desktop for you to choose from. Choose the appropriate shortcut for the machine you are testing:

- XIS 1517
- XIS 1517DV
- XIS 100XD
- XIS 100XDX
- XIS 1818DV
- StartVI

Step 3: Operation of the Simulator

Turn the "System Power" key switch to the **ON** position on the AOCP.

NOTE: Leaving the "System Power" key switch in the **ON** position at all times is recommended. There is no need to turn it **OFF** with the CBT simulator.

Launch the X-ray application using the application shortcut as described above. Imaging and control functions mirror that detailed in the *ASTROPHYSICS INC. English-XIS-User-Manual.*

IMPORTANT NOTE: There must only be one instance of the X-ray application run per Windows XP session. Each time an X-ray application is run, the user must log out of Windows XP and log back in. This is to avoid multiple instances of application processes which will cause system conflicts and image corruption (see the Troubleshooting section for additional information).

After launching the application, there may be a short delay before the login screen is active (see Figure IV below). A blue status bar will show below the login options.

CBT Simulator Login Screen

In the login options at the top of the screen, “Screener” and “Scan Mode” will usually be selected by default, if not then click on those options. Next, choose an Operator Name on the left-hand-side dropdown list. An operator name “Screener” will already be available by default. If not, then please select any one. On the right-hand-side, enter the password “1111” which will then login the user. This procedure is summarized below for quick reference.

Login screen steps:

Step 3A: Select “Screener.”

Step 3B: Select “Scan Mode.”

Step 3C: Select an Operator Name, default “Screener” is sufficient.

Step 3D: Enter the Password “1111” using the mouse, AOCP, or keyboard.

After logging in, wait for the annunciation at the bottom of the screen to switch from “Please Wait” to “System Ready” (a few seconds delay). The system will now be ready for use. All standard imaging functions are available in the simulator.

The only indicator light on the AOCP that will function during normal CBT simulator operation is the “Power” light. If any unexpected indicator lights come on during operation, please see the Troubleshooting section for more information.

To exit the simulator and return to the Windows XP desktop, follow the logout steps below.

Logout steps:

Step 3E: Press the AOCP “Log Out” button.

Step 3F: Press the AOCP “Enter” button.

IMPORTANT NOTE REMINDER: There must only be one instance of the X-ray application run per Windows XP session. Each time the X-ray application is run the user must log out of Windows XP and log back in first. This is to avoid multiple instances of application processes which may cause system conflicts (see the Troubleshooting section for additional information).

Step 4: System Shutdown

The PC is shutdown using the normal Windows XP shutdown button found in the desktop Start menu. To shutdown, first logout of the CBT simulator if it is running, and then shutdown the PC, before powering off the PC.

Troubleshooting:

This section describes troubleshooting solutions for CBT setup and operation.

Condition 1: The displays are not functioning in the dual-screen, "Horizontal Stretch" mode.

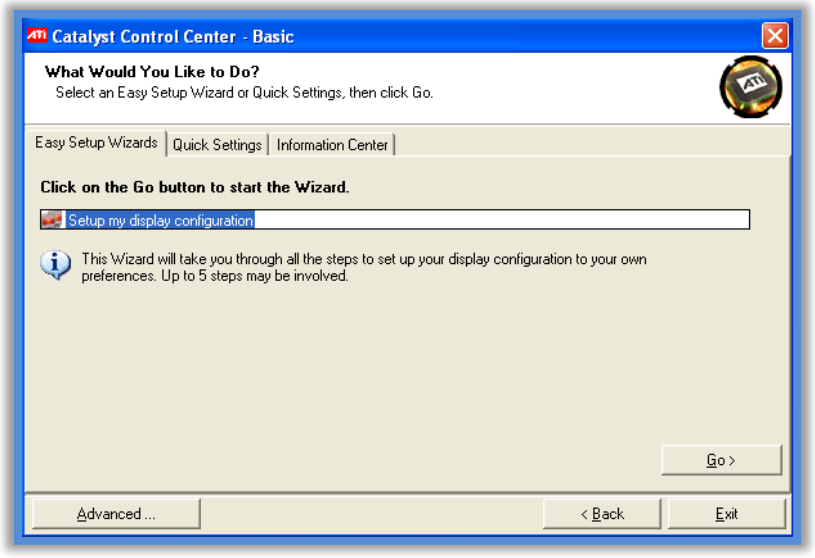
If the system has reverted to the default "Clone" display mode (both displays show an identical image) or are not otherwise coordinating properly, the display settings must be adjusted. This can happen if a video connection is disconnected while there is power to the PC. Use the following procedure.

Step 1A: Start the "Catalyst Control Center" (CCC) using the shortcut labeled "CCC" provided on the left-hand edge of the desktop (see Figure III above).

Step 1B: On the CCC's "Welcome to…" screen, confirm that the "Basic […]" radio button (top) is selected. Click the "Next" button (see Figure V below).

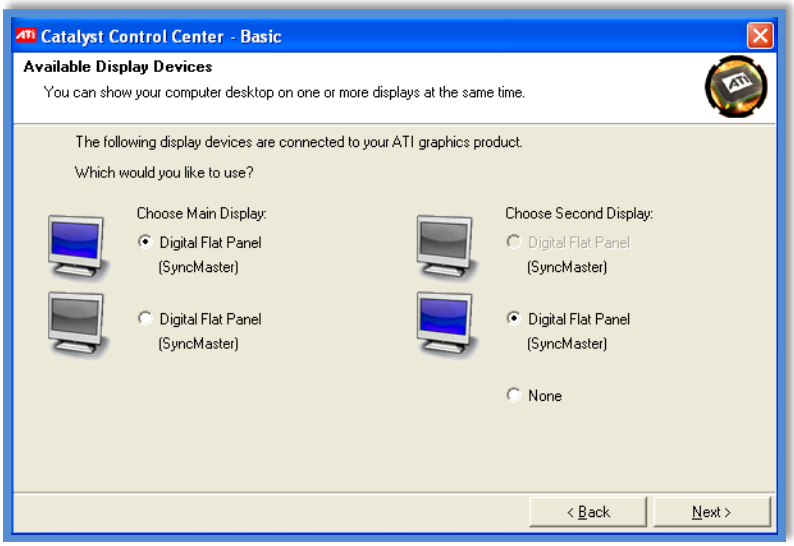
CCC "Welcome to…" Screen

Step 1C: On the "What Would You Like to Do?" screen, confirm that "Setup my display configuration" is selected. Click the "Go" button (see Figure VI below).



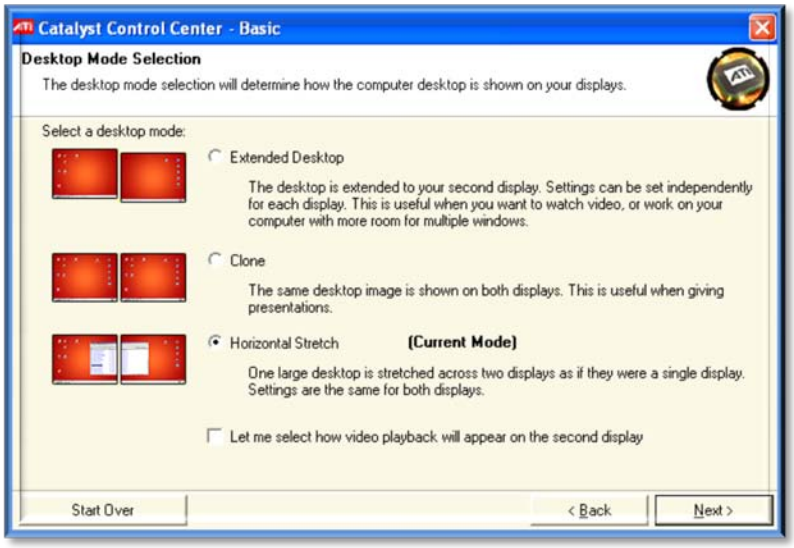
CCC "What Would You Like to Do?" Screen

Step 1D: On the "Available Display Devices" screen, confirm that the configuration shown in Figure VII below is selected. If not, for the "Choose Main Display" option, choose the top Digital Flat Panel. The "Choose Second Display" option will then default to the bottom Digital Flat Panel. Click the "Next" button.



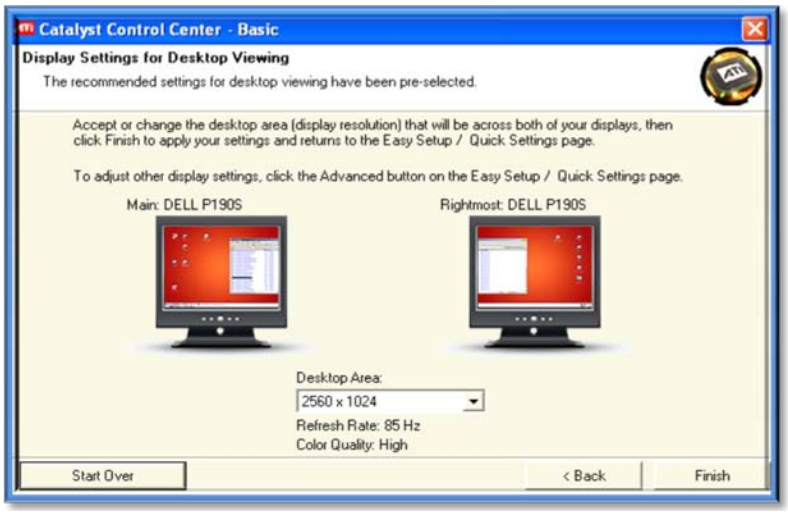
CCC "Available Display Devices" Screen

Step 1E: *** **IMPORTANT SETTING** *** On the "Desktop Mode Selection" screen, select the "Horizontal Stretch" mode radio button. Click the "Next" button (see Figure VIII below).



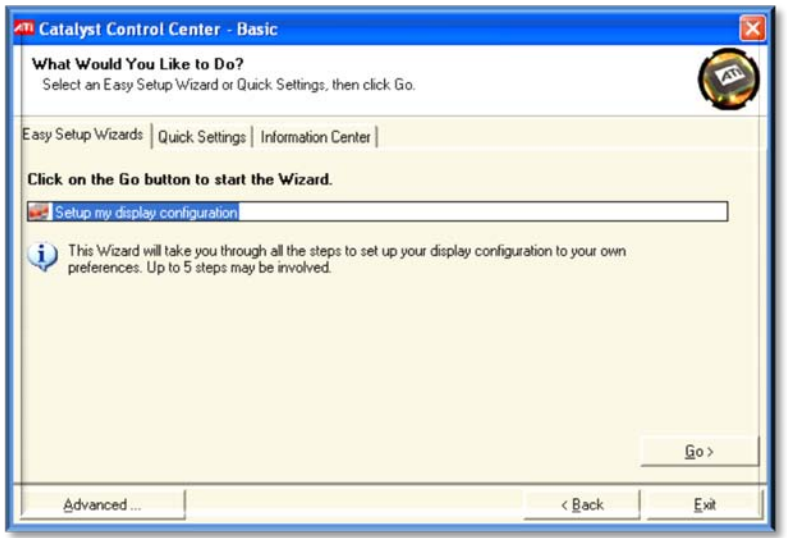
CCC "Display Mode Selection" Screen

Step 1F: On the "Display Settings for Desktop Viewing" screen, confirm that "Desktop Area" is set to "3200 x 1200." Click the "Finish" button (see Figure IX below).



"Display Settings for Desktop Viewing" Screen

Step 1G: Back on the "What Would You Like to Do" screen, click the "Exit" button (see Figure X below).



CCC "What Would You Like to Do?" Screen

Condition 2: The belt controls operate (Left – Stop – Right), but the imaging functions do not.

Check that the "System Power" key switch is in the **ON** position and that the "Power" LED is illuminated.

Condition 3: The X-ray application will not perform all imaging functions properly.

This will happen if a user logs out of the X-ray application, and then starts a second instance of the X-ray application before first logging out, then back in, to the Windows XP user account. There can only be one instance of an X-ray application run per Windows XP session. Log out of Windows XP and log back in, and then run the X-ray application.

Condition 4: The X-ray application freezes and the user is unable to logout.

The "Print" button on the AOCP was pressed while running the X-ray application with no printer connected to the PC. The PC continues to look for a printer until the application is stopped. The Windows XP Task Manager must be started by simultaneously depressing the Ctrl-Alt-Delete buttons on the keyboard. Then on the "Applications" tab of the Task Manager, select the "X-ray" application, and click the "End Task" button. This will stop the application and return the user to the Windows XP desktop. Restart the PC using the Windows XP "Restart" function from the Start > Shutdown menu.

Condition 5: An unexpected AOCP light is illuminated.

A keyboard is included with the simulator system and some keyboard LED functions are also mapped to the AOCP.

A. The "X-Ray" light is **ON.**
- Turn **OFF** the keyboard "Num Lock."

B. The "TIP" light is **ON**.
- Turn off the keyboard "Caps Lock."

Addendums for System Variants: N/A

USING CBT

STEP 1: Have your supervisor turn the CBToption ON.

- The CBT option must be turned ON before it can be used.
- The CBT is enabled by the ADMINISTRATOR user.
- When the CBT is turned ON, the XIS CANNOT be used for regular x-ray screening because normal conveyor belt operation is disabled.

STEP 2: Login as usual. The regular login procedures are described in Chapter 3.

- Select your user name entry from the drop down.
- Enter your numeric password using the console.
- Wait for the ***System Ready*** screen to appear. .

STEP 3: Press the [LEFT] button to start the CBT simulation.

- Simulated bag image will start scrolling across the screen. Notice how the bags keep scrolling even though the conveyor is stopped
- The bags will continuously scroll across the screen until the [**STOP**] button is pressed.
- All of the imaging function buttons operate as normal.

STEP 4: CBT training is concluded when the users logs out. Press the [EXIT] button to logout.

- When TIP is turned ON, the CBT does NOT accumulate any statistics on performance.

STEP 5: Have your supervisor turn the CBT option OFF, when you are ready to use the XIS for real screening operations,

CHAPTER 10 THE XIS ADMINISTRATOR

Chapter Overview

This chapter is intended for Supervisory XIS users of XIS Software Version 2.1.2.*.
Version 2.1.2.* includes Versions 2.1.2.1.; 2.1.2.2.; 2.1.2.3.etc.

This chapter describes tasks normally assigned to Administrative XIS operators.

XIS Administrators

XIS Administrators have several important responsibilities:

1. Managing Employee (user) access by adding, editing, and deleting employees (operators), and assigning them to a user group.

2. Assigning access privileges for each user's group.

3. Enabling, disabling the various XIS software options including: IA, CBT, and TIP options.

Administrative functions are accessed through the (main) *MENU* screen. Access to main *MENU* is usually restricted to member of the "Administrative" user group.

The Main MENU has 6 options.

	OPTION	DESCRIPTION
1.	Employee	Add, Edit, Delete Users
2.	System Configuration	Modify system configuration information
3.	Log Report	Print Log Report (Daily Screener's Report)
4.	TIP Configuration	Modify TIP system configuration
5.	Access Control	Modify user group access privileges
6.	Exit	Return to "Please Log In" screen
7.		


Menu
Employee
System Configuration
Log Report
Tip Configuration
Download Datafiles
Access Control
Exit
Welcome ADMIN ADMIN
XIS-100XDV
Dual-View X-Ray Inspection System

The "Employee" MENU Option

Each XIS user is a member of a "User's Group". The XIS has four groups, or classes, of users:

1. SCREENERS
2. SUPERVISORS
3. MAINTENANCE
4. ADMINISTRATORS

	USER TYPES	DESCRIPTION
1	SCREENERS	Screeners are x-ray imaging screening operators. `
2	SUPERVISORS	Supervisor manage user access and configures
3	MAINTENANCE	Maintenance personnel
4	ADMINISTRATOR	

Each user group has predefined privileges which controls what XIS system functions they can access and use. These functions include:

	ACCESS PRIVILEGES	DESCRIPTION
1.	Access Control	Allows user to adjust acesss control to all users.
2.	Add new schedule	Allows user to modify access schedules
3.	Add New TIP Image	Allows user to capture and save new x-ray images for the TIP system.
4.	Download Data files	Allow user to download TIP report data files
5.	Employee record	Allow user to add, edit, and delete employee
6.	History Reports	Allow user to review screening history reports
7.	Management Mode	Allow user access to main menu
8.	Modify Existing TIP Images	Allow user to modify existing TIP images
9.	Modify TIP Schedule	Allow user to add & modify TIP projection schedules
10.	Reports	Allow user to review reports
11.	Review Missed TIPs	Allow user to review missed TIP images
12.	Scan Mode	Allow user to scan bags
13.	System Configuration	Allow user to modify system configuration.
14.	System information	Allow user to view configuration system information
15.	TIP Configuration	Allow user to change TIP system configuration
16.	TIP Event Report	Allow user to review TIP event report
17.	TIP Monthly Report	Allow user to review TIP monthly report
18.	TIP Screener Daily Report	Allow user to review TIP screener daily report

User group access is controlled through the "Access Control" option of the main MENU.

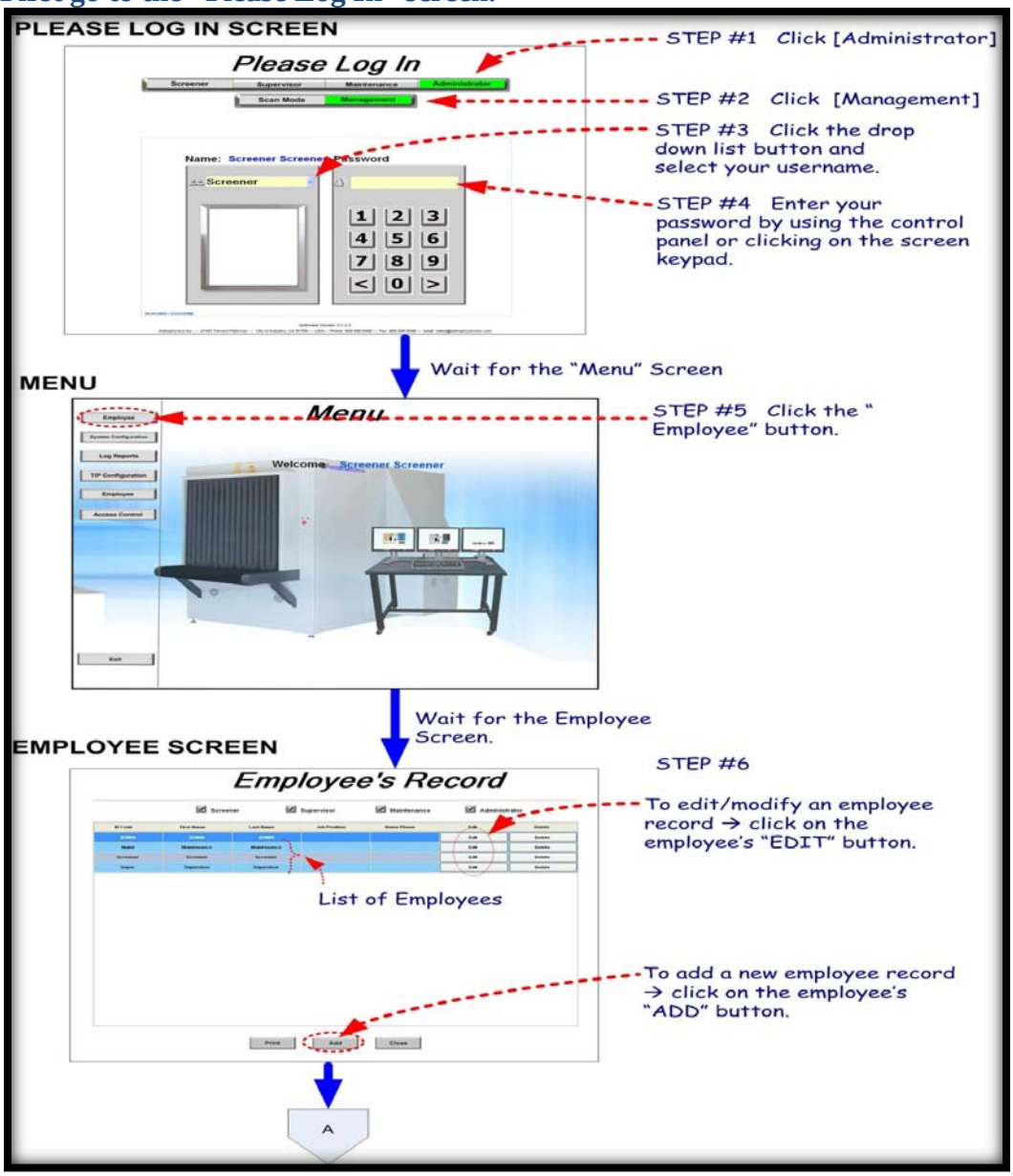
Once the user's group is well defined, each employee can then be assigned to a specific user's group through the "Employee" option of the main MENU.

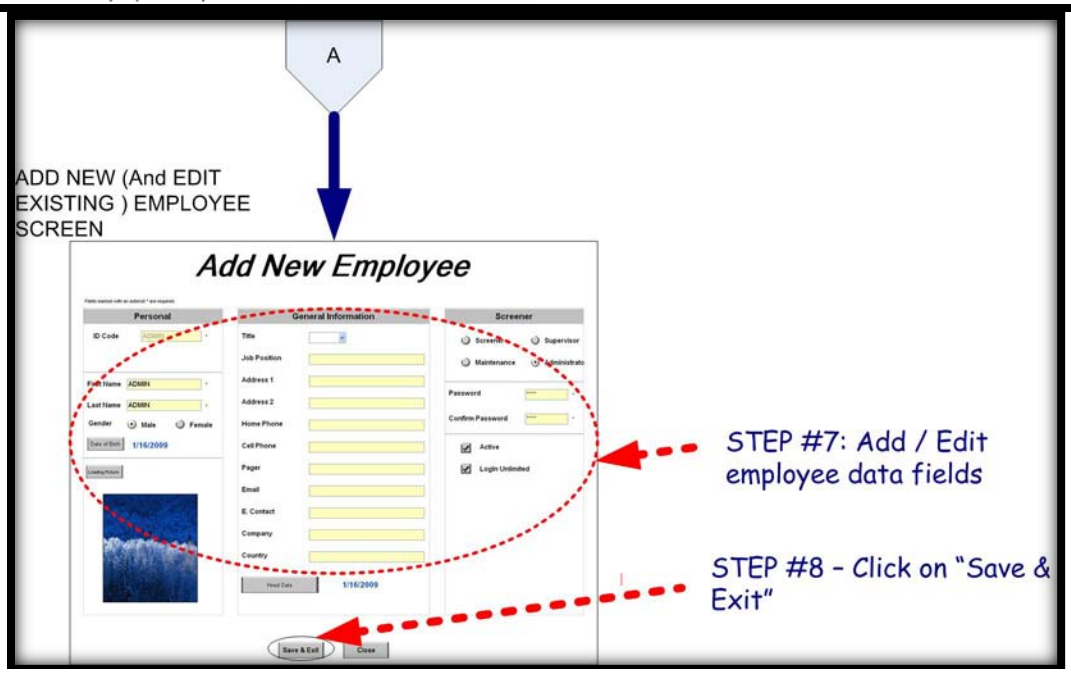
Operator logins and user group assignments are managed through the “EMPLOYEE’S RECORD” screen. The EMPLOYEE’S RECORD screen allows you to:

- View and print a list of all employees,
- Add a new employee record,
- Select and edit an existing employee record
- Select and delete an existing employee record.

To Add / Edit an EMPLOYEE follow the procedures below:

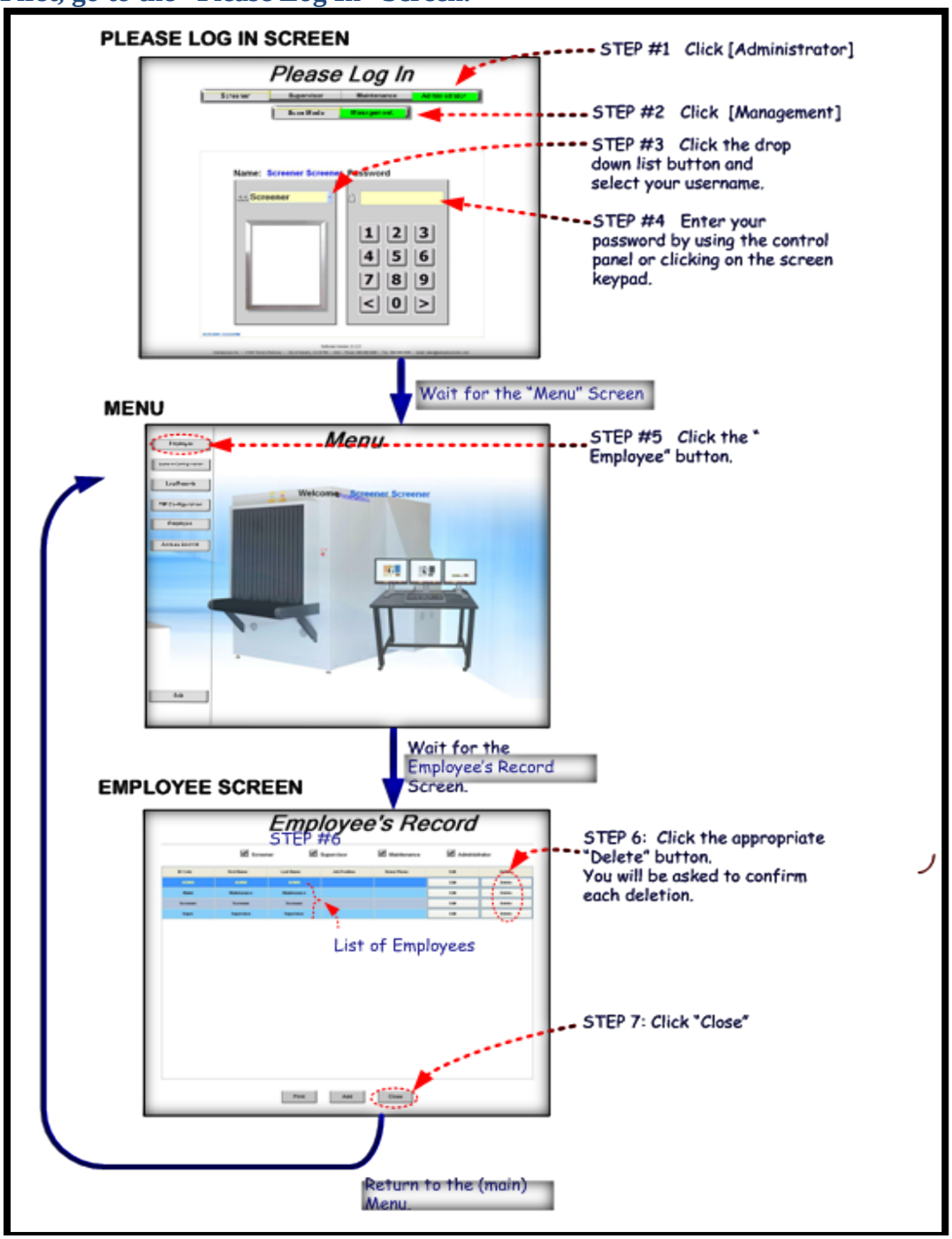
First go to the “Please Log In” screen.




A
ADD NEW (And EDIT EXISTING) EMPLOYEE SCREEN
Add New Employee
Personal
General Information
Screener
STEP #7: Add / Edit employee data fields
STEP #8 – Click on "Save & Exit"

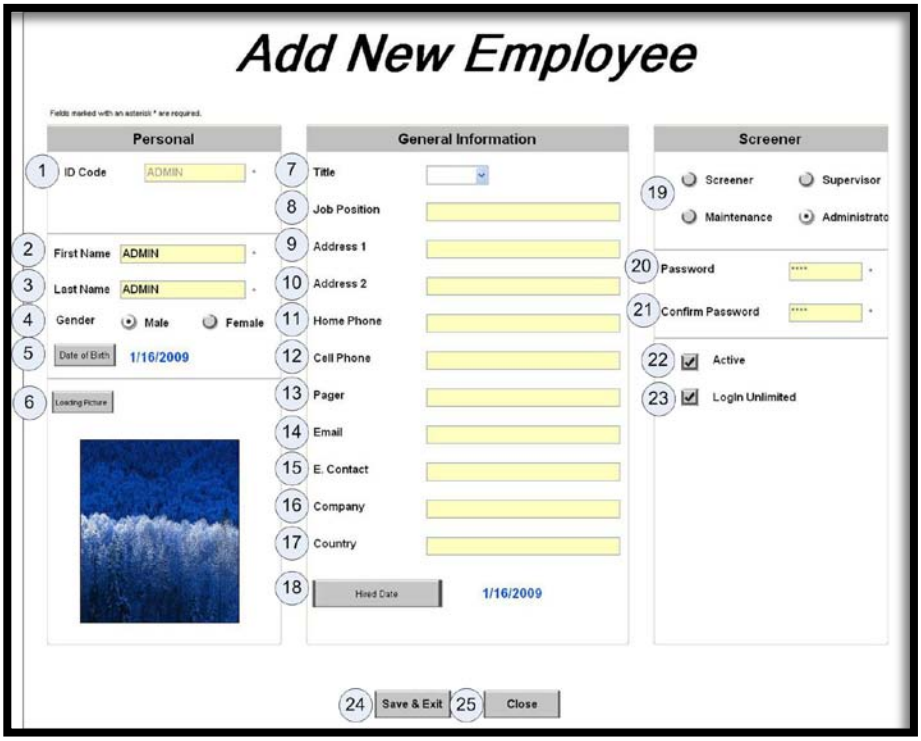
To DELETE AN EMPLOYEE, follow the steps below:

First, go to the "Please Log In" Screen.



The "ADD EMPLOYEE SCREEN" allows you to add/edit employee information.
There are 23 employee information fields. The fields are numbered and described below.

ADD EMPLOYEE SCREEN with numbered data entry fields.



ADD NEW EMPLOYEE SCREEN – DESCRIPTION OF ENTRY FIELDS

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
1.	ID Code	• Employee's login identification entry
2.	First Name	• Employee's first name • Displayed on reports and on the bottom status line of imaging screen
3.	Last Name	• Employee's last name • This data field is displayed on reports and on the bottom status line of the imaging screen
4.	Gender	• Select either "Male" or "Female" • Entry is optional • Default entry is "Male"
5.	Date of Birth	• Employee's date of birth. • Data field entry is optional.
6.	"Loading Picture"	• Employee's picture. • Picture entry is optional
7.	Title	• Employee's title • Employee's are optional. • Blank entries do not impair operation of the XIS.
8.	Job Position	• Employee's job position • Entries are optional. • Blank entries do not impair operation of the XIS.
9.	Address 1	• User's address line 1 • Entries are optional. • Blank entries do not impair operation of the XIS.
10.	Address 2	• Employee's address line 2 • Entries are optional. • Blank entries do not impair operation of the XIS.
11.	Home Phone	• Employee's home phone number • Entries are optional. • Blank entries do not impair operation of the XIS.
12.	Cell Phone	• Employee's (Mobile) Cell Phone number • Entries are optional. • Blank entries do not impair operation of the XIS.
13.	Pager	• Employee's Pager (telephone) number • Entries are optional. • Blank entries do not impair operation of the XIS.
14.	Email	• Employee's email address • Entries are optional. • Blank entries do not impair operation of the XIS.

ADD NEW EMPLOYEE SCREEN – DESCRIPTION OF ENTRY FIELDS (continued)

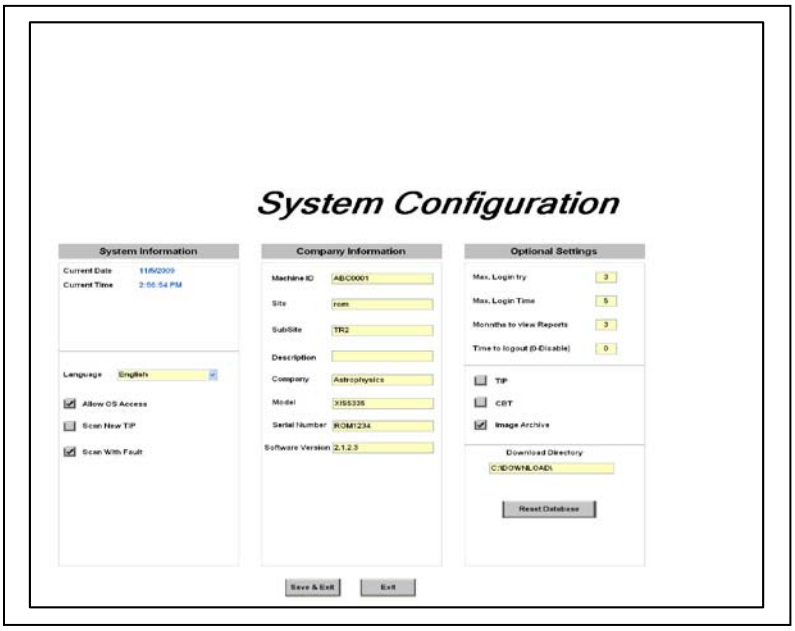
FIELD NUMBER	FIELDNAME	DESCRIPTION OF FIELD
15.	E Contact	• Employee's email contact information • Entries are optional. • Blank entries do not impair operation of the XIS.
16.	Company	• Employee's company • Entries are optional. • Blank entries do not impair operation of the XIS.
17.	Country	• Employee's country • Entries are optional. • Blank entries do not impair operation of the XIS.
18.	Hired Date	• Employee's hire date • Optional date
19.	Screener Group	• User's group • Select either "Screener", "Supervisor", "Maintenance", "Administrator"
20.	Password	• Employee's password • Must be 4 characters long. • Actual password is not displayed. • Passwords can be changed but not viewed.
21.	Confirm Password	• Employee's password re-enter • Password changes must be re-entered for confirmation.
22.	Active	• Employee's active flag • Inactive users cannot login.
23.	Login Unlimited	• Allow unrestricted login attempts. • Login limits are entered in System Configuration Screen.
24.	[Save & Exit]	• This is a control button. • Saves information and returns to main (management) menu screen.
25.	[Close]	• This is a control button. • Closes screen and returns to "Menu" screen

The Configuration Screen

The *System Configuration Screen* (SCS) allows administrators (and other authorized users) to configure the operation of the XIS by setting the following parameters:

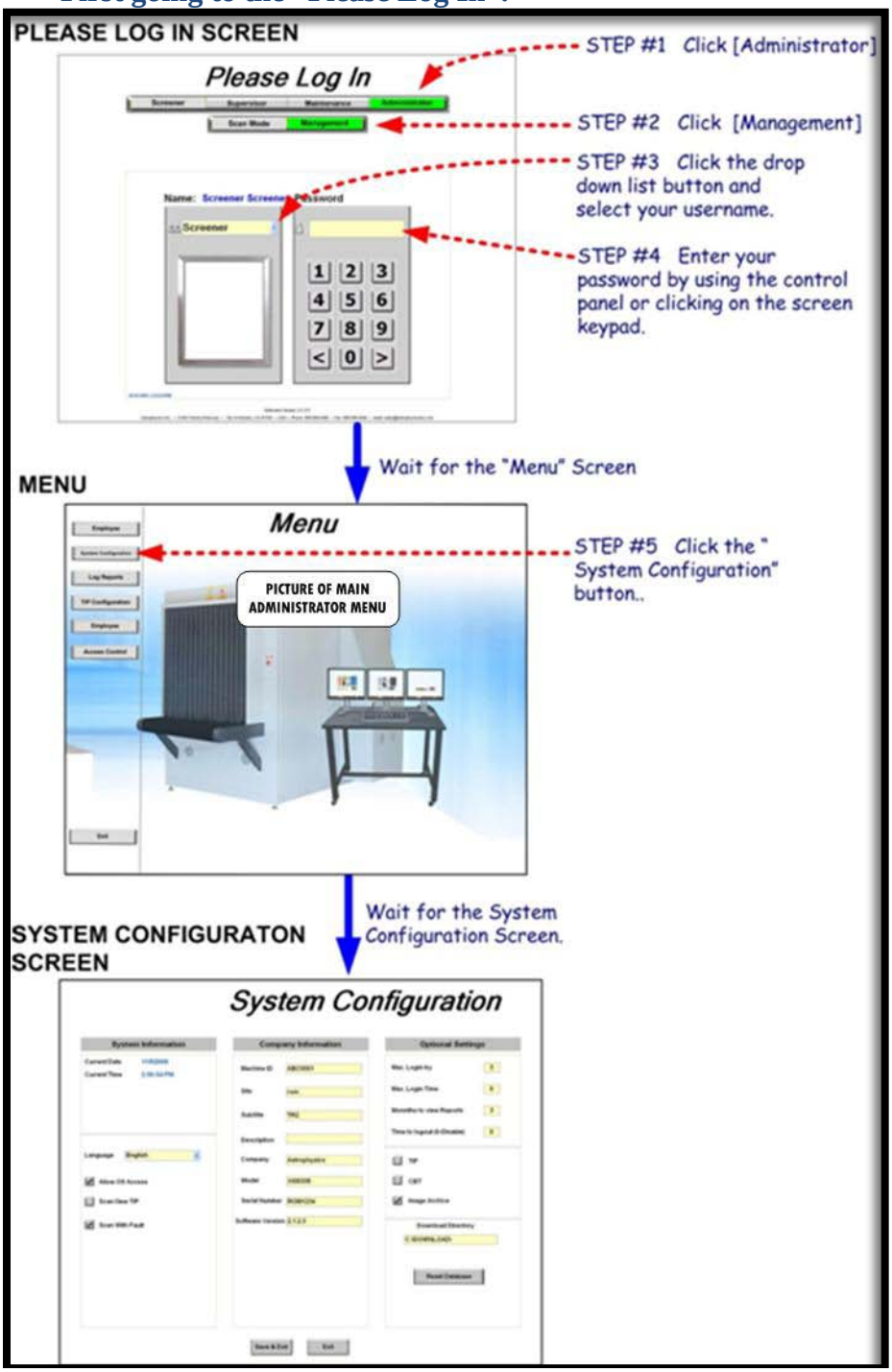
- Select System Language
- Operating System Access control (Enable/Disable access to the operating system "Desktop")
- Scan New TIP (Enable/Disable screen capture for TIP image collection)
- Scan with Fault (Enable/Disable imaging operation after fault detection)
- Machine ID
- Site
- Subsite
- Description
- Company
- Model
- Serial Number
- Software Version
- Maximum Login try
- Maximum Login time (in minutes)
- Months to view report
- Time to auto-logout (in minutes)
- TIP (Enable/Disable)
- CBT (Enable/Disable)
- Image archive(Enable/Disable)
- Download Directory

Picture of the *SCS.*



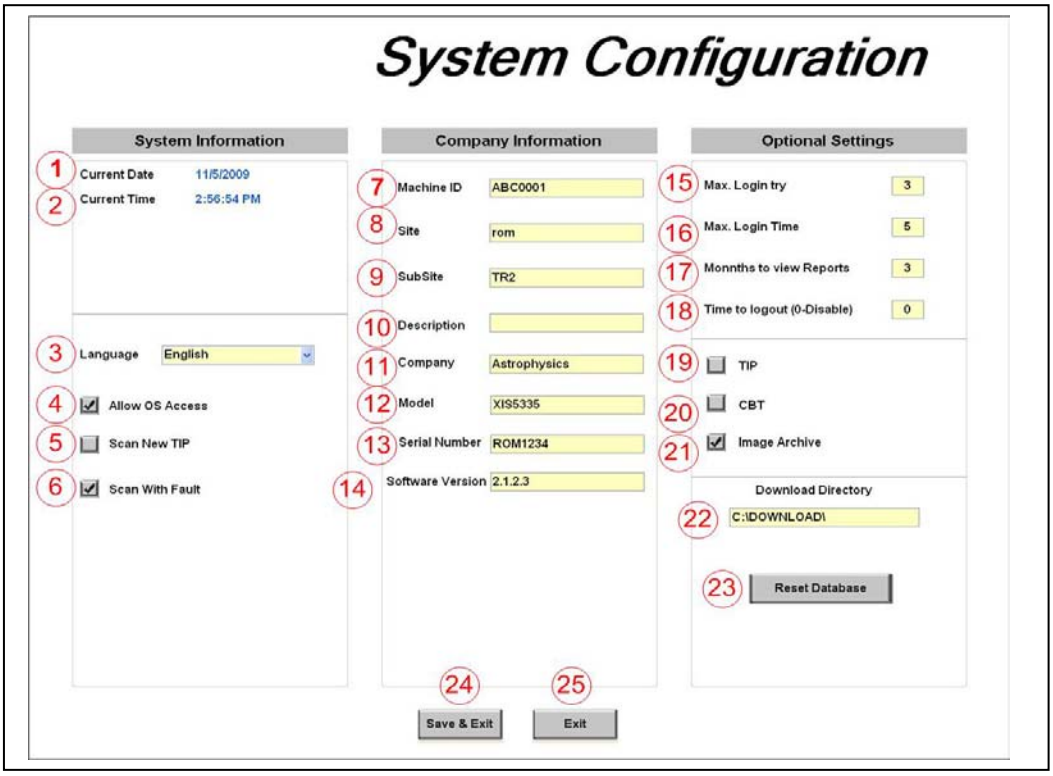
The SCS is accessed by following the steps below.

First going to the "Please Log In".



The SCS allows you to set and edit 22 key data fields and "buttons" that control the operation of the XIS.

The Data Entry Fields and "Buttons" numbered and described below:



SYSTEM CONFIGURATION SCREEN - Description of Entry Fields

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
1.	Current Date	• Displays current system date. • See XP operating system manual for instructions on how to set system date.
2.	Current Time	• Displays current system time. • See XP operating system manual for instructions on how to set system time.
3.	Language	• Select display language • Default selection includes "English" and "Spanish". For extra language support, contact the Sales Department. Business contact information is available in Section 2, page 14.
4.	Allow OS Access	• This is a "Yes" & "No" drop down list. • Yes – Allow users to exit "Please Login Screen" to system "desktop" • No - Users cannot exit program.

SYSTEM CONFIGURATION SCREEN - Description of Entry Fields (continued)

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
5.	Scan New TIP	• This is a "Yes" & "No" drop down list. • Yes – Save scanned images in TIP library folder • No - Save scanned image in normal archive folder.
6.	Scan with Fault	• This is a "Yes" & "No" drop down list. • Yes – Ignore system non-critical "fault" messages. Allow users to continue operating the XIS • No – Halt x-ray imaging when any system "fault" is detected.
7.	Machine ID	• This data field is displayed on system reports. • Entries are optional. • Blank entries do not impair operation of the XIS.
8.	Site	• This data field is displayed on system reports. • Entries are optional. • Blank entries do not impair operation of the XIS.
9.	Subsite	• This data field is displayed on system reports. • Entries are optional. • Blank entries do not impair operation of the XIS.
10.	Description	• This data field is displayed on system reports. • Entries are optional. • Blank entries do not impair operation of the XIS.
11.	Company	• Data field that is displayed on system reports. • This is an optional entry field.
12.	Model	• This data field is displayed on system reports. • Entries are optional. • Blank entries do not impair operation of the XIS.
13.	Serial Number	• This data field is displayed on system reports. • Entries are optional. • Blank entries do not impair operation of the XIS.
14.	Software Version	• Data field that is displayed on system reports. • This is an optional entry field.

SYSTEM CONFIGURATION SCREEN - Description of Entry Fields (continued)

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
15.	Max. Login try	• **This field is currently optional and unimplemented**. • In the future, this will set the maximum number of bad login tries before the XIS disables login. • Enter a value between 1 and 3
16.	Max. Login time	• **This field is currently optional and unimplemented.** • In the future, this will set the maximum login time (in minutes) after which the XIS will automatically log out. Users must login again to resume operation. • Enter a value between 1 and 5
17.	Months to View Report	• **This field is currently optional and unimplemented**. • In the future, this sets the maximum number of months which reports will be archived. • Enter a value between 1 and 12
18.	Time to Logout	• Sets the maximum idle time (in minutes) before the XIS automatically logs out. • Enter a value between 0 and 60. • A zero ("0") entry means unlimited access.
19.	TIP	• Yes - Enable TIP software • No - Disable TIP software
20.	CBT	• Yes - Enable CBT software • No - Disable CBT software
21.	Image archive	Folder name where image archive files are stored.
22.	Download Directory	Folder name where TIP report files are stored.
23.	Reset Database	Resets (i.e.. "zeros out" data); • login history • TIP user history. Does not affect list of users & password information.
24.	Save & Exit	Clicking this button saves the configuration and returns to "Please Login Screen".
25.	Exit	Clicking this button returns to main menu (without saving any changes).

TO DISPLAY A USER REPORT

At the ***PLEASE LOG IN*** screen, click on the top ***ADMINSTRATOR*** label.

1. Enter the (numeric) Administrator password.
2. Wait for the USER MANAGER screen to appear

4. At the *USER MANAGER* screen, click on the top [**REPORT**] button.
5. Wait for the REPORT GENERATION screen to appear.

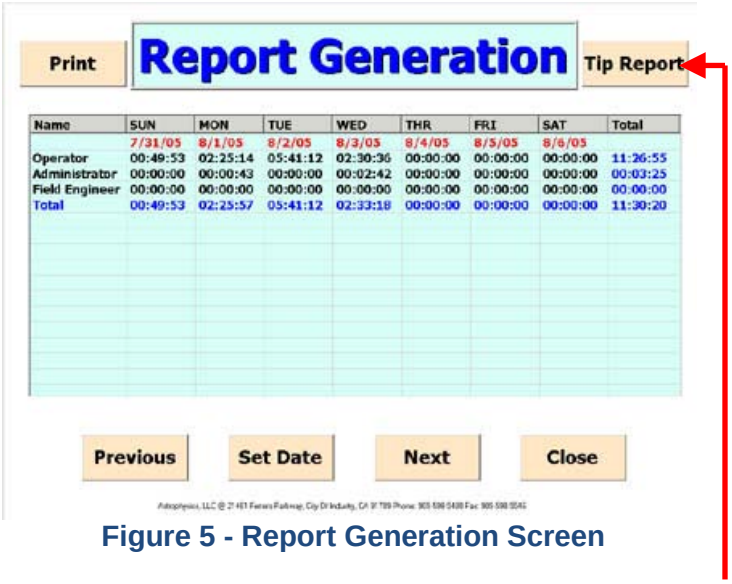


Figure 5 - Report Generation Screen

6. At the ***Report Generation*** screen, click on the upper right [**Tip Report**] Button.
7. Wait for the ***Tip Report*** screen to appear.
   - The TIP Generation screen itemizes the total daily number of TIP Hits, Misses, & False Alarms by number and percent for each operator user name in the current week reporting period.

CHAPTER 11 THE XIS 100XDV DUAL VIEW SYSTEM

CHAPTER OVERVIEW

This chapter covers the operation of the XIS Model 100XDV, dual view x-ray imaging system. Please read this chapter carefully if you have dual view system.

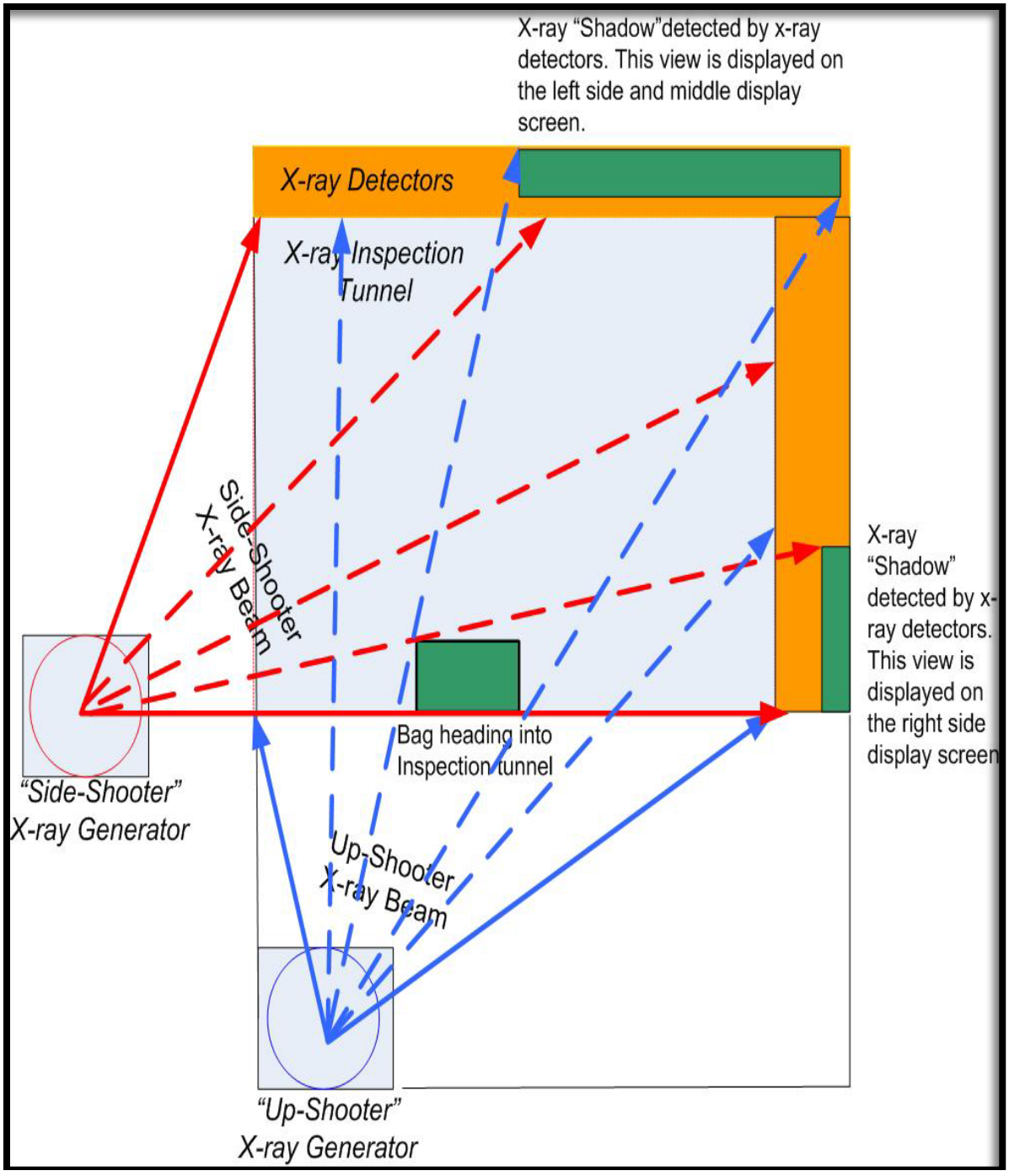
INTRODUCTION

The 100XDV Dual View is an enhanced x-ray imaging system that has two x-ray generators instead of the typical one.

The two x-ray generators point at different angles. One x-ray generator, the “up-shooter”, points upwards and directs x-rays upward through the item that is being scanned. The “up-shooter” produces the more common and traditional upward projection x-ray image view. The other x-ray generator, the “side-shooter”, points horizontally and produces a “side” (i.e. profile) view of the item being scanned.

Exit End Corner View of the 100xDV.

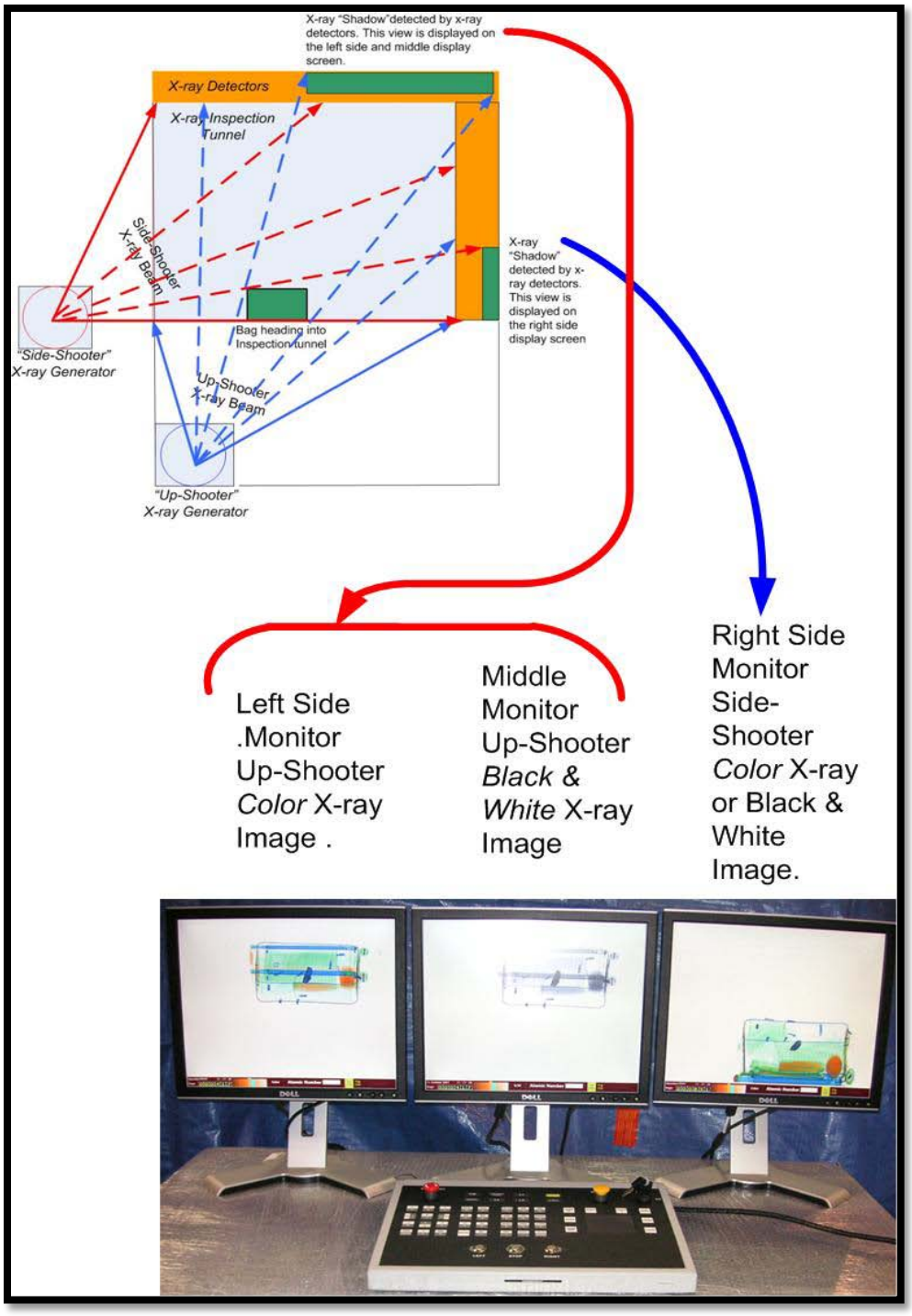
Figure. A cross-section view of the Dual View X-ray Imaging System.



The two views complement each other. Together they provide a comprehensive internal image of the item being scanned.

XIS 100XDV DUAL VIEW SYSTEM

The Dual View system has three separate display monitors. The three monitors are usually positioned in a line. The left-side and middle monitor displays the x-ray images from the “up-shooter” x-ray generator. The right most monitor displays a “side view” x-ray images from the side-shooter x-ray generator.



DUAL VIEW DISPLAY DESCRIPTION

UP-SHOOTER COLOR VIEW LEFT SIDE DISPLAY	UP-SHOOTER B/W VIEW CENTER DISPLAY	SIDE-SHOOTER VIEW RIGHT SIDE DISPLAY
The left side display shows the up-shooter's "*Color*" x-ray view. • The up-shooter's color view is colorized according to "Z-number" analysis of the image. • Z-number is the "apparent" atomic number of the material being scanned. • Z-number is calculated by comparing the x-ray signal absorption of high energy (high frequency) and low energy (low frequency x-rays. • The calculated Z-number is used to classify content of item being scanned as either "organic" or "inorganic". • Organic materials are composed of carbon and hydrogen atoms. • For the purposes of x-ray analysis, organic materials have z-numbers equal to or less than value of 10. • The presence of organic matters is sometimes problematic because most dangerous explosives are typically "organic". • Guns, knives, and other weapons are frequently constructed from inorganic material.	The center display shows the up-shooter's "*Black & White*" (BW) x-ray view. • The up-shooter's B/W view is displayed in gray-scale tones. • The gray scale tones are determined from the intensity of the x-ray signals that pass through the item being imaged. • The x-ray signal varies because some of the x-rays are absorbed and scattered as they pass through matter.	The right side displays both the side-shooter's "*Color*" and "*Black & White*" (BW) x-ray views. The right side display initially defaults to displaying the side-shooter's "Color" view. The right side display can also show the side-shooter's BW x-ray view. To select between the Side-Shooter's Color and B/W display, follow the procedure below: • Press the screen [2] button on the control panel. • Press [**COLOR**] to select the Up-shooter's Color display. • Press [**BW**] to select the up-shooter's Black & White display.

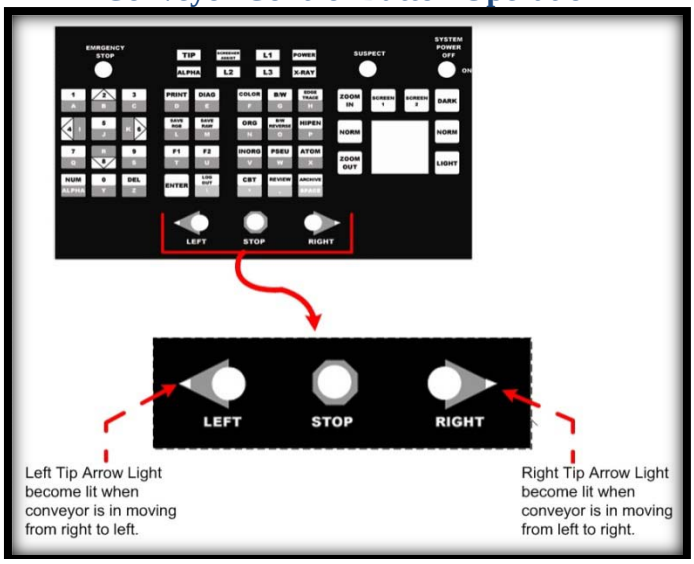
Both views of the Dual View are controlled by the same operator control panel, the XIS AOCP (Advance Operator Control Panel) Revision 2.

Figure – AOCP Rev. 2

The control panel operates with all three display monitor. For example, pressing [LIGHT] (i.e. the LIGHT button), causes the image on all three monitors to lighten.

THE DUAL VIEW OPERATOR CONTROL PANEL:

Conveyor Control Button Operation



Control Button	Left Screen Up-shooter View Color Display	Center Screen Up-shooter View B/W Display	Right Screen Side-shooter View Color or B/W Display	COMMENTS
[**LEFT**]	Bottom status bar displays “LEFT”.	Bottom status bar displays “LEFT”.	Bottom status bar displays “LEFT”.	∗ The [**LEFT**] buttons starts the conveyor moving from right to left. ∗ If the conveyor belt is already moving right, the conveyor will momentarily stop and change direction to the left.
[**STOP**]	Bottom status bar displays “STOP”.	Bottom status bar displays “STOP”.	Bottom status bar displays “STOP”.	∗ The [**STOP**] button stops the conveyor belt.
[**RIGHT**]	Bottom status bar displays “RIGHT”.	Bottom status bar displays “RIGHT”.	Bottom status bar displays “RIGHT”.	The [**RIGHT**] buttons starts the conveyor moving from right to left. ∗ If the conveyor belt is already moving left, the conveyor will momentarily stop and change direction to the right.

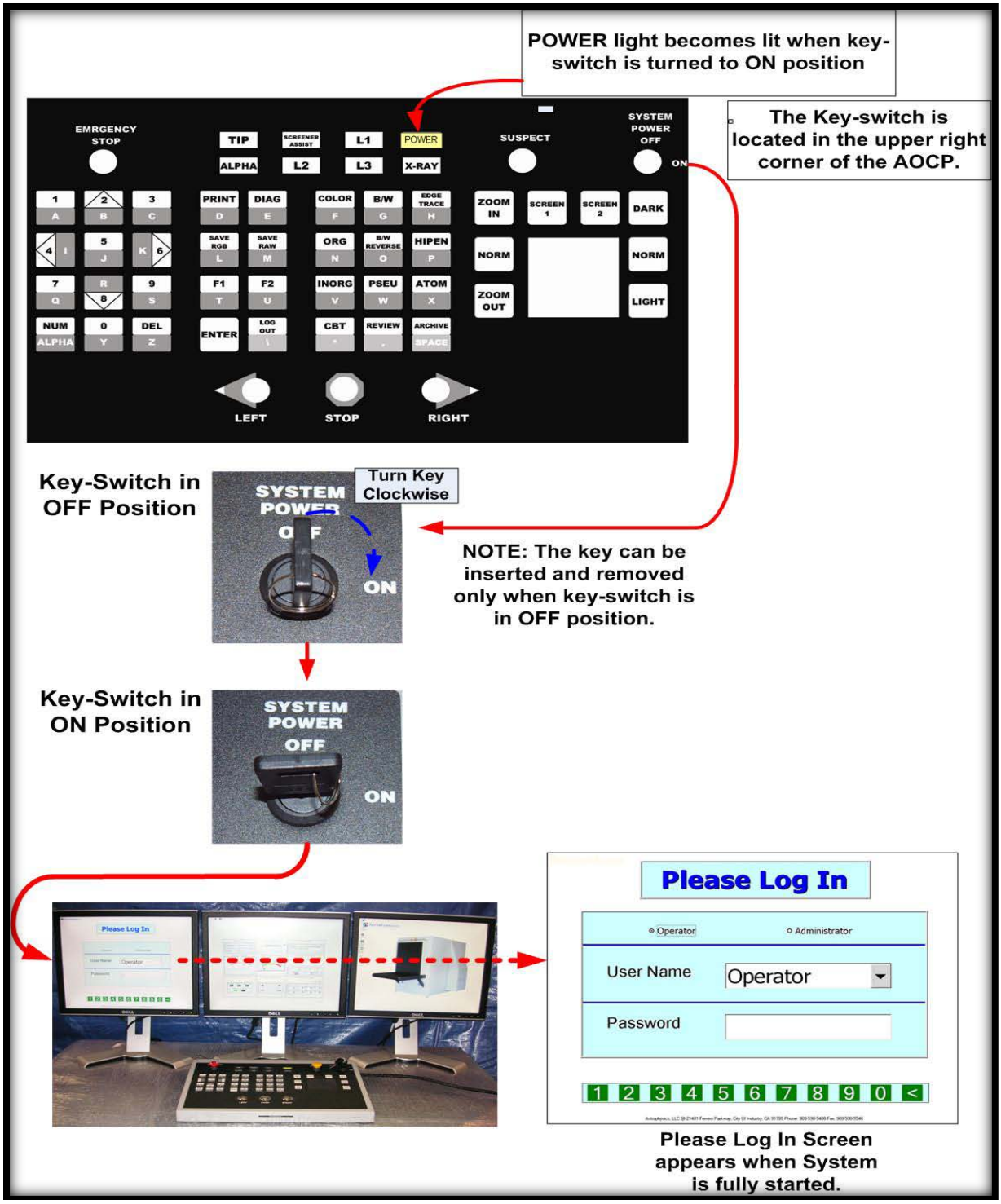
Most of the AOCP control buttons on the Dual View operates the same as on the regular XIS "Single View" Systems. For example, pressing the [ORG] button operates the same on both "views".

There are some differences that are noted below.

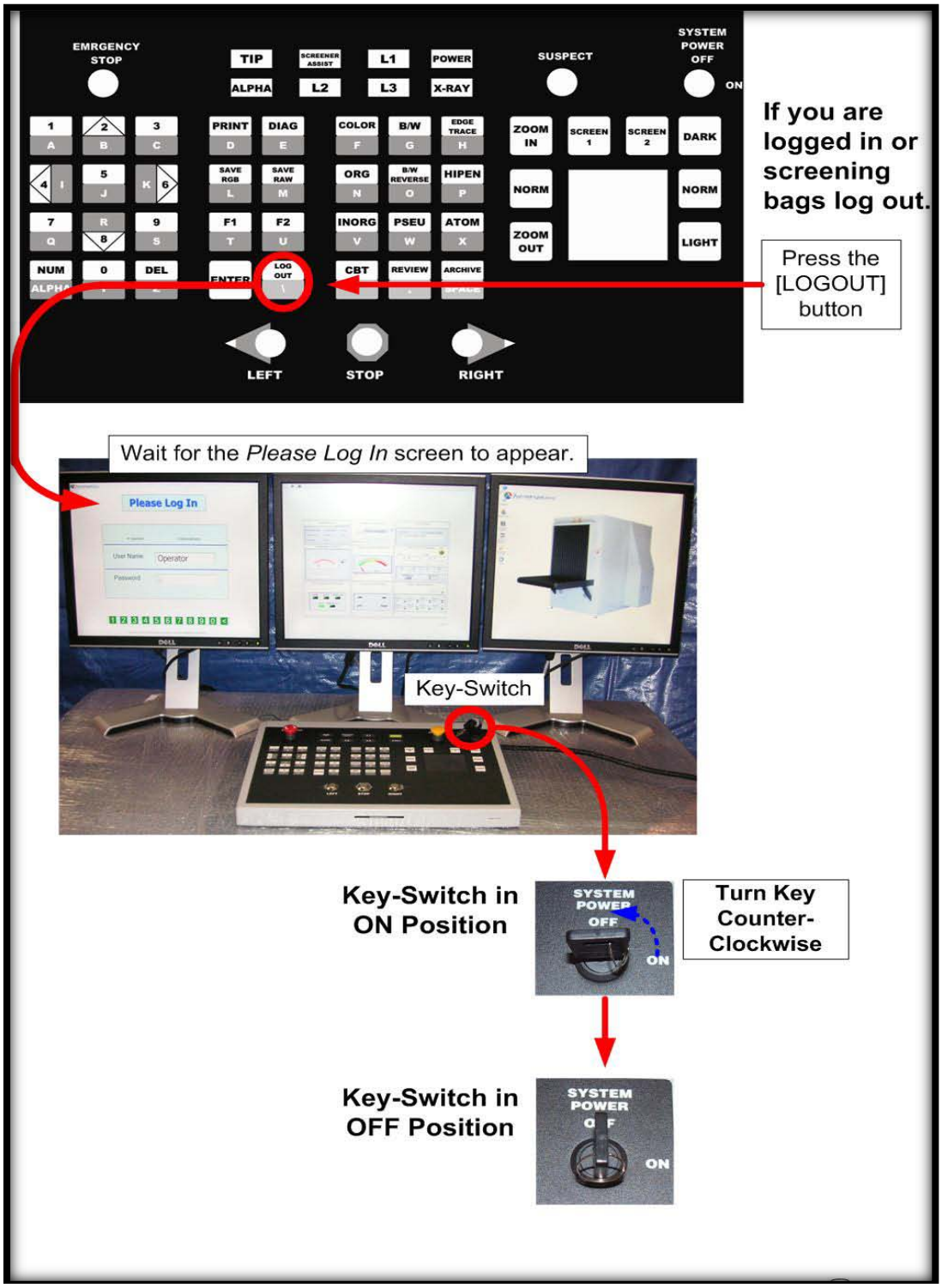
Operator Control Panel Button	Up-shooter View (Left and Middle Screen Display)	Side-shooter View (Right Screen Display)	Side-shooter View (Right Screen Display)
To adjust screen gamma (screen brightness i.e. lightness and darkness)	**Move the cursor to the <u>left side or middle</u> display.** Press [**SCREEN 1**] Press [**LIGHT**] or [**DARK**]	**Move the cursor to the <u>left side or middle</u> display.** Press [**SCREEN 2**] Press [**LIGHT**] or [**DARK**]	**Move the cursor to the very <u>left</u> side display.** Before adjusting screen brightness and darkness, remember to select the view! Use the touchpad to move the cursor between the up-shooter views (left and middle screen) and the side-shooter view (right most display) Press [**LIGHT**] or [**DARK**]
To increase or decrease screen magnification.	**Move the cursor to the <u>right side or middle</u> display.** Press [**ZOOM-IN**] to magnify the screen. • Each press of [**ZOOM-IN**] increases screen magnification by two times (2x). The screen centers on the cursor's position and magnified screen is redisplayed. The [**ZOOM-IN**] button can be multiply pressed to multiply increase screen magnification. The maximum screen magnification is 32x. Press [**ZOOM-OUT**] decreases screen magnification. • Each press of [**ZOOM-OUT]** button reduces the screen magnification by a factor of two (2x). The screen centers on the cursor's position and screen is redisplayed with reduced magnification. The [**ZOOM-OUT**] button can be multiply pressed to multiply decrease screen magnification. The screen's magnification can be reduced to a minimum of 1x (i.e. no screen magnification) of normal imaging. Using the touchpad move the cursor to middle display.		**Move the cursor to the very <u>left</u> side display.** • Press [**ZOOM-IN**] to magnify the screen. • Press [**ZOOM-OUT**] to decrease screen magnification.

STARTING THE DUAL-VIEW – TURNING THE KEY-SWITCH TO ON

The startup procedure for the Dual View is essentially the same as in the other XIS models.



SHUTTING DOWN THE DUAL-VIEW – TURNING THE KEY-SWITCH TO OFF



CHAPTER 12 THE XIS 1517 AND XIS 1818

Introduction

The XIS Model 1517 & 1818 are large, heavy duty, high capacity x-ray machines.

- They have very large inspection tunnels that can accommodate the inspection of large boxes, crates, and palletized material.
- They use high capacity rollers instead of conveyor belts to transport items through the inspection tunnel.
- The rollers are low to the ground, 30 cm (12 inches), so they are easy to load.

	XIS Model 1517	XIS Model1818
Inspection Tunnel Size	Length: 150 cm Width: 170 cm	Length: 180 cm Width: 180 cm
Mechanical Transport System	Rotating steel rollers With a variable frequency motor controller and high torque 0.5 hp motor	Rotating steel rollers With a variable frequency motor controller and high torque 1.0 hp motor
Roller bed Height	12 inches	12 inches
Roller speed	0.3 m/sec (20 ft/min)	0.3m/sec (20 ft/min)
Roller bed Load Capacity	1,000 kg	2,000 kg

XIS Model 1517

The **XIS 1517** and **XIS 1818** operate similar to the other XIS models. There are, however, a few notable differences.

1. The XIS 1517 and XIS 1818 use rollers instead of conveyors.
   - The rollers run slower, 20 ft/min (less than half the speed of a regular conveyor belt system). Hence, items travel slower through the inspection tunnel.
   - The rollers are slippery and hard. Do NOT sit, stand, or ride on the rollers.

CAUTION

Do NOT sit, stand, or ride on the rollers.

2. Ensure that the rollers are stopped before placing items on them.

CAUTION

Ensure that the roller is stopped before placing items on it.

3. The rollers are 8 inches in diameter with 6 inch spacing between the rollers.
   a. Items less than 6 inches in length will fall between the rollers.
   b. Items smaller than 18 inches in length may not smoothly travel across the roller bed.

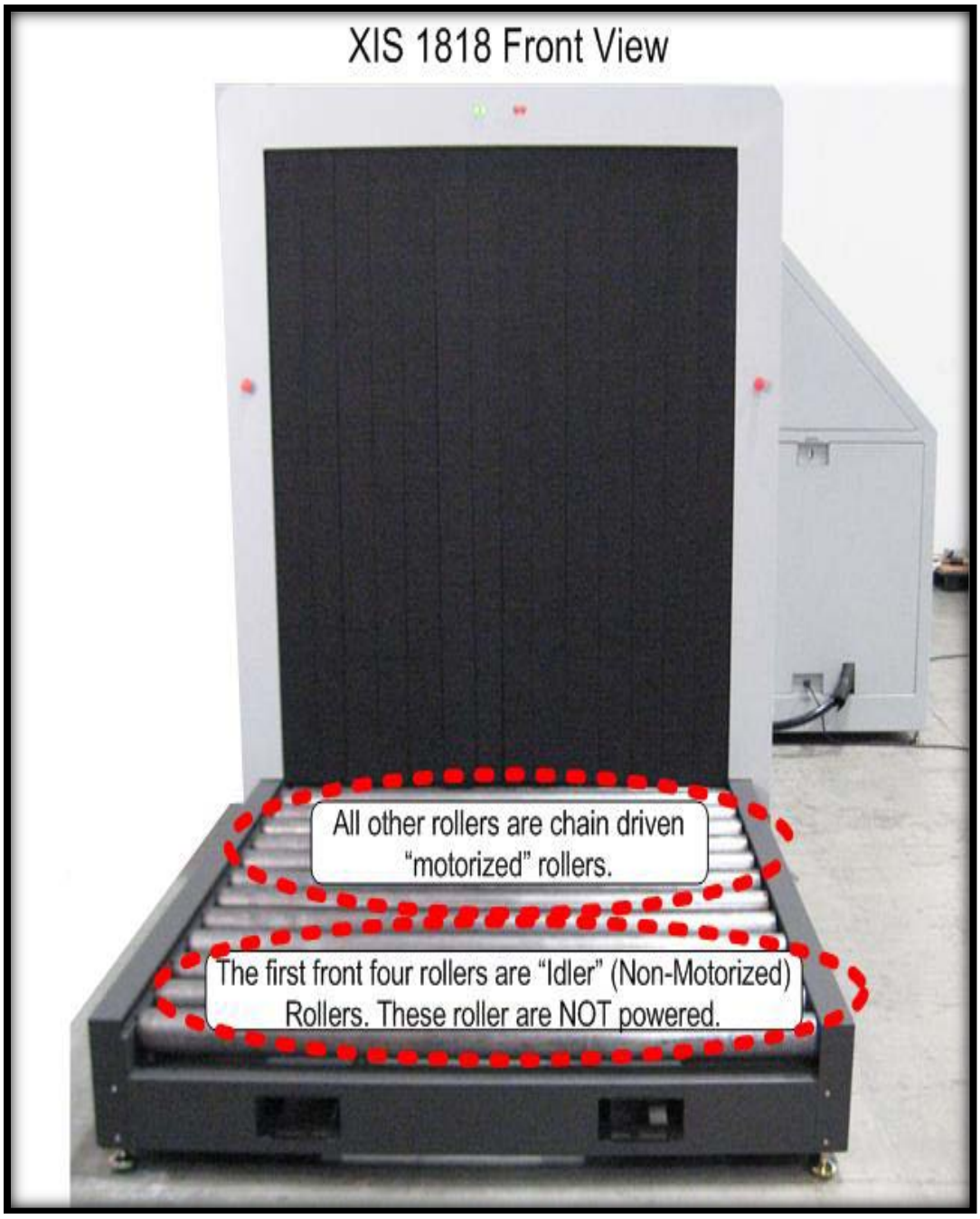
4. Ensure that no one is in the tunnel and everyone is clear of the rollers BEFORE pressing [LEFT] or [RIGHT].

5. If the Emergency Stopped button has been pressed, wait at least 60 seconds before resetting the Emergency Stop switch.
   - The 60 second delay allows the variable speed controller to completely reset on its own. This is also very important and is worth repeating.

CAUTION

After emergency stop, wait 60 seconds
BEFORE resetting the Emergency STOP switch.

6. The front four rollers are “idler” rollers. Idler rollers rotate freely and are not powered. All other rollers are “motorized” chain driven rollers.
    a. The regular “motorized” rollers push items exiting the inspection tunnel onto the idlers. The idlers stop items from falling onto floor when they exit the inspection tunnel.



CHAPTER 13 THE XIS VAN, XIS TRUCK AND XIS TRAILER

Introduction

The Models XIS-100XD, the XIS-1080XD, and XIS-1210, are available in special mobile versions that are mounted inside the following vehicle platforms: truck (XIS-Truck), van (XIS-Vans), and trailer (XIS-Trailers). The mobile x-ray system is combined with a gasoline or diesel powered electric generator that allows the XIS to conveniently operate anywhere.

The vehicle platform serves two functions:

- It allows the XIS to rapidly relocate to areas requiring immediate, short-term x-ray imaging security.
- It protects the XIS from exposure to inclement weather.
- It provides a convenient enclosed cab area for operating the XIS.

The mobile XIS units can also connect to external electrical outlets for “shore-power” operation.

This chapter covers operating the X-ray Imaging System x-ray machine in the XIS Truck, XIS Van, and XIS Trailer. The procedures for operating XIS in the XIS Truck, Van, and Trailer are essentially the same.

XIS VAN - Starting the X-ray Imaging System (XIS)

1. Park the vehicle.

    - Park the vehicle on a firm level surface.

        - For the XIS-Truck & XIS-Van
            - Set the vehicle’s transmission gear to PARK.
            - Set the vehicle’s parking (hand) brakes.
            - Turn the ignition key-switch to the OFF position.
            - If the vehicle’s headlights are not required, turn them OFF.
            - For more information on operating the vehicle, please refer to vehicle’s Owners Guide.

        - For the XIS-Trailer
            - If the tow vehicle is still connected to the XIS-Trailer, set the tow-vehicle’s transmission gear to park, and set the parking (hand) brakes.
            - If necessary, turn on the external trailer lights to illuminate the area for safety.
            - If necessary, disconnect the brake and brake light cables from the tow vehicle.
            - If available, set the trailer’s hand brakes.
            - Chock the tires.
            - Lower the trailer’s leveling feet and level the trailer.

2. Turn the Generator / Shore-Power switch to “Shore-Power”.

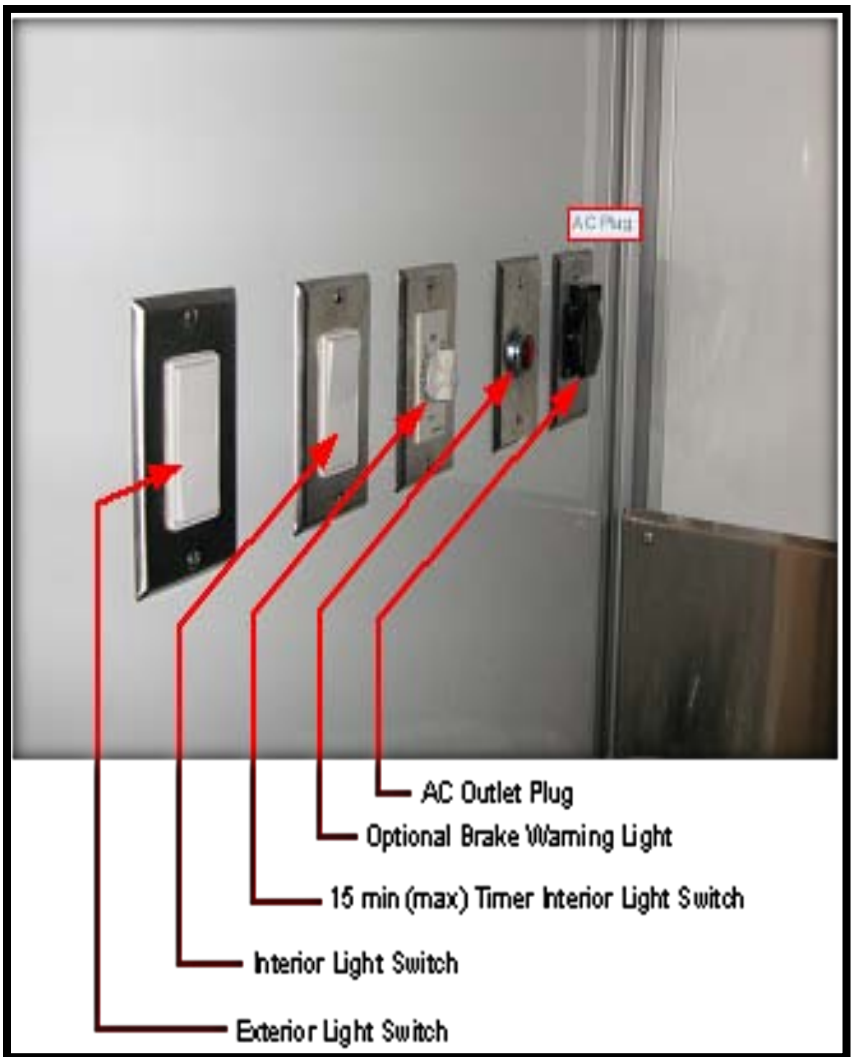
3. Start the electric generator.

- Check the generator's fuel gauge. Verify that the generator has enough fuel to properly operate.
- Locate the generator control panel (inside the rear cab).
- Press the ON button for 4 seconds.
- If the generator does not start, wait a minute and press the ON button again.
- For more information on the electric generator, please refer to the Generator's User's Guide.

4. Turn the Generator / Shore-Power switch to "Generator".

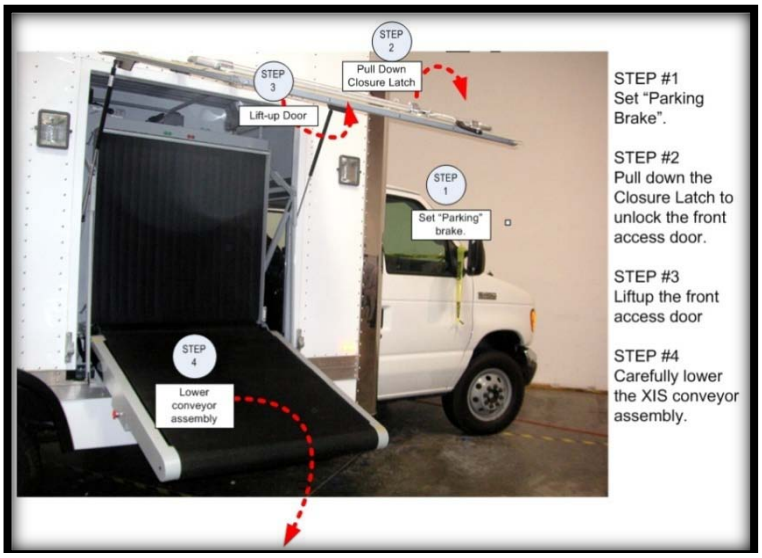
5. Check the circuit breaker switches.
   - The circuit breaker box is located in the rear cab.
   - Verify that all breakers are switched to the ON position.

6. Opening the XIS Door
   - If necessary, turn on the outside lights.

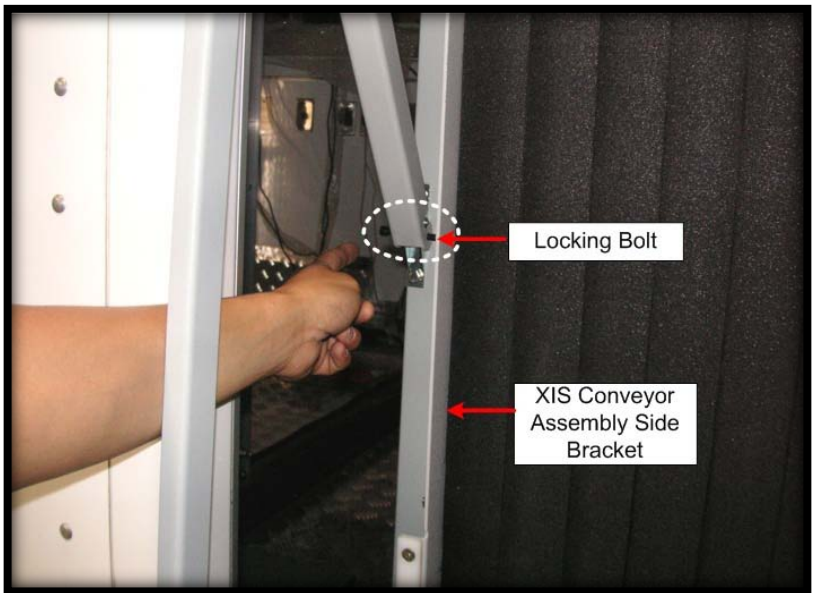


The light control switches are located inside the rear cab, mounted on the left-side, next to the door.

- If your vehicle has a “locking bolt” door, follow the instructions below to open it.



- Extend the folding conveyor assemblies. Do NOT turn the XIS ON until the conveyors assemblies are fully extended.



- Insert the locking bolt in both XIS Conveyor Assembly side brackets to secure the conveyor bed.

7. Check the XIS side panels.
    - Verify that all XIS side panels are securely closed.
    - All panel interlocks switches must be closed (i.e. pressed) in order for the system to operate.

8. Verify that the all Emergency stop buttons are “clear”.
    - Turn each Emergency stop button counter-clockwise to insure that they are “clear”.

9. Start the XIS Computer.
    - Inspect the XIS computer.
        - The control computer is located underneath the Dell LCD Flat screen monitor.
        - Verify that the computer’s power cord is “plugged-in”.
        - Verify that the keyboard and PC mouse are properly connected.
        - Verify that the monitors are plugged in.
    - Press the power button located on the front of the computer.
        - Wait for the PC to fully start up and launch the Diagnostics application.
    - Turn the key-switch on and check that all monitors are also turned on.
        - Wait for the login screen to appear.

10. Using the diagnostic screen
    - Layout description
        - In the center the user has access to conveyor controls.
        - User can move the conveyor forward, reverse, and stop.
        - Note that this does not activate the imaging software.
        - There is also an “XRAY ON” indicator.
        - On the right side of the screen there are several green LED’s.
        - These correspond to different power supplies.
        - Towards the bottom there is room to enter a password.
        - The password is 1111.

CHAPTER 14 THE XIS 1818-DV-320 AND XIS 1517-DV-320

DUAL VIEW SYSTEMS

This chapter describes the operation of the XIS 1517-DV-320 and the XIS 1818-DV-320 Dual View System ("DV"). This chapter is intended for all operators of the XIS-DV-320 systems.

INTRODUCTION

XIS-DV-320 systems large capacity, high performance "cargo" x-ray imaging system, that is capable of imaging items weighing up to 2,000 kg. XIS-DV-320 systems are capable of imaging items through as much as 80 mm of steel. 320DV systems are also exceptional because they produce x-ray images in two different perspectives, or "views": a side-ward projection and a down-ward imaging projection. The two separate perspectives complement each other by providing more visual information on items being inspected to the operator. Potential threats that may be obscured by "clutter" in one view are often readily apparent in the other view. The two views also collectively provide more "spatial" information for locating hidden objects.

XIS-DV-320 systems have two sets of rollers: an entry roller set and a tunnel roller set. The entry roller set is located on the right end of the machine and extends to the tunnel entrance. The tunnel rollers are located inside the tunnel and extend to the left end of the machine. Each roller set has its own motor and operates independent of the other set. This allows the tunnel rollers to carry items for imaging through the inspection tunnel while the entry rollers remain stationary for loading of a new cargo pallet. Thus cargo pallets can be efficiently queued for inspection.

The XIS-DV-320 has four phases of operation:

(1) System Startup
(2) Login
(3) X-ray Imaging
(4) System Shutdown

The operation of the XIS-DV-320 systems is very similar to that of a regular X-ray Imaging Systems ("XIS"). The System Startup, Login procedures, and imaging control buttons are essentially the same as in a regular XIS system. The actual process of x-ray imaging is different because the XIS-DV-320 uses rollers to carry items through the inspection and has two views with two larger, more powerful x-ray generators.

Procedures for each operation phase are described below:

PHASE 1 - SYSTEM STARTUP

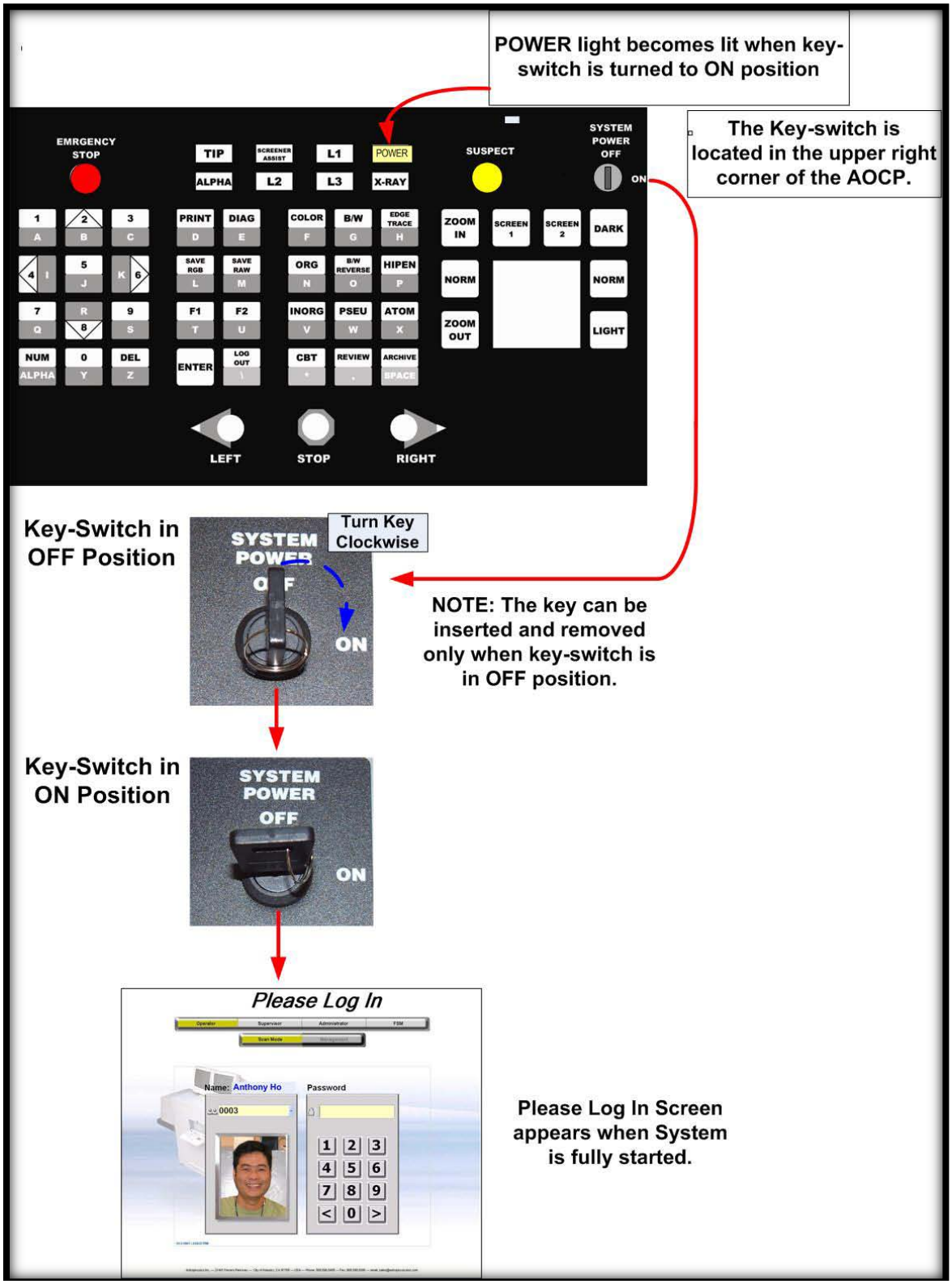
Step #1 – Insert the key into the AOCP key-switch

Ensure that the main AC circuit breaker is set to the ON position.

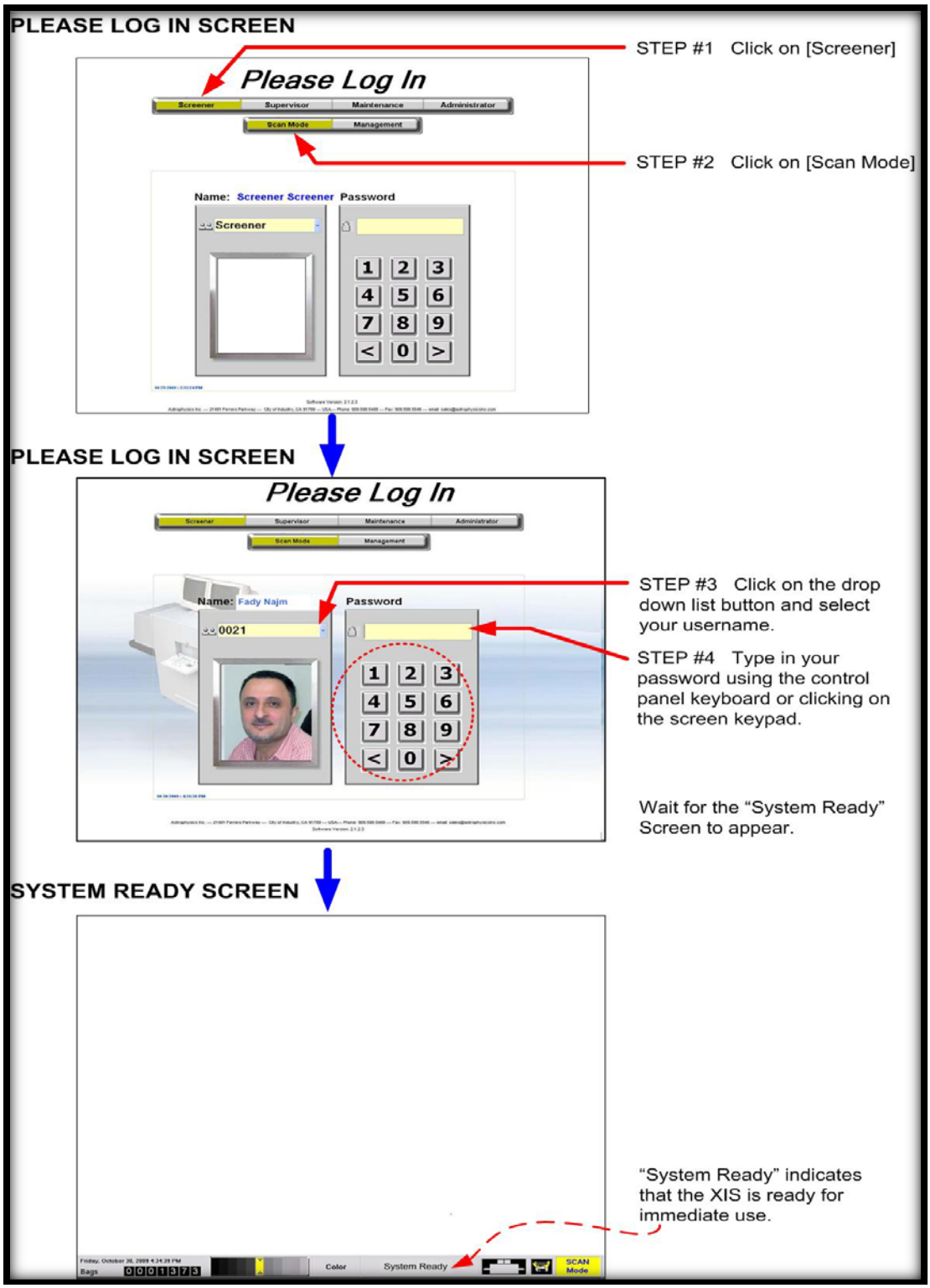
Ensure that the "AUTO MAN" key-switch is set to "AUTO".

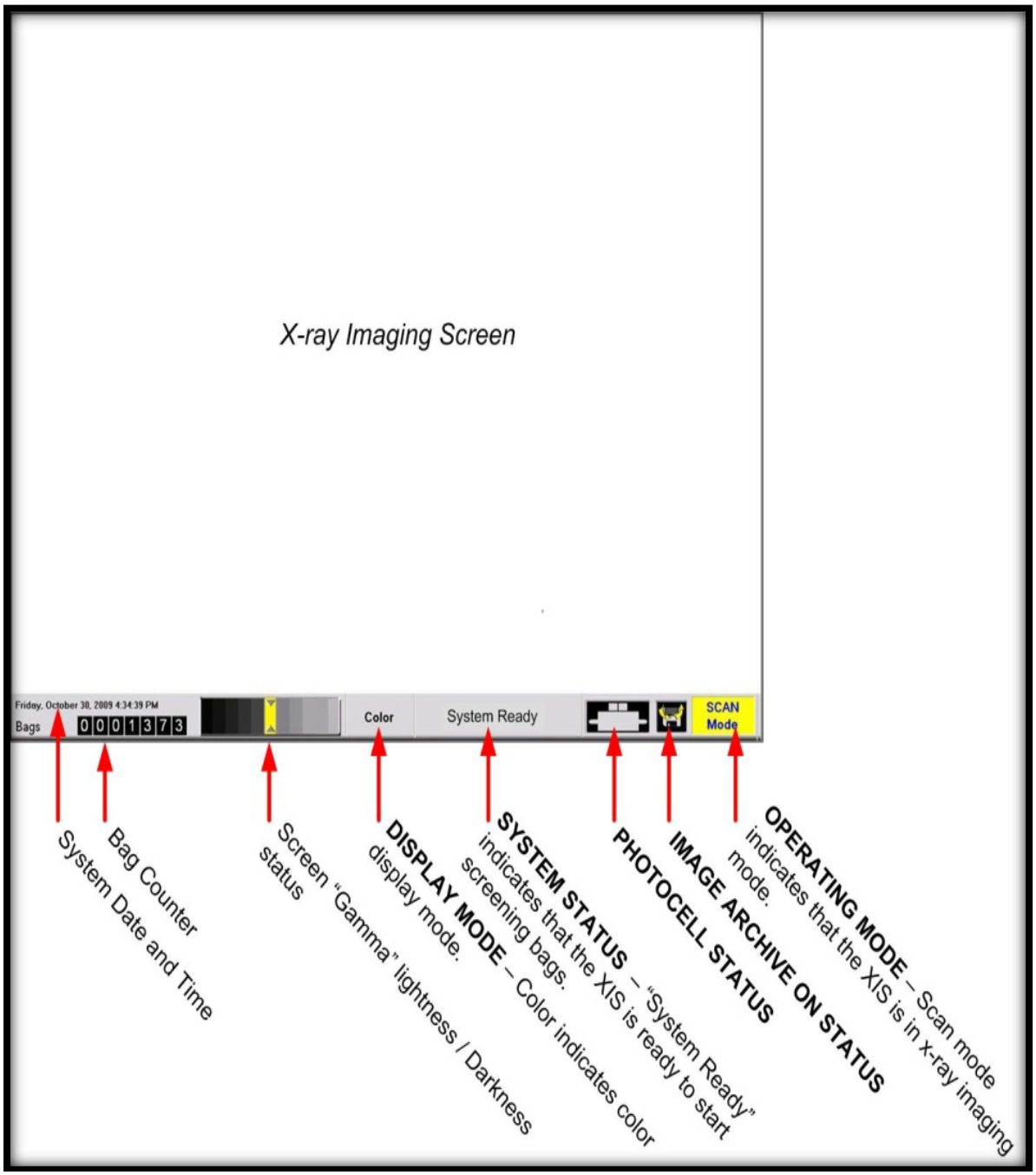
Ensure that all emergency stop switches are reset and "clear".

Picture of the AOCP, Advance Operator Control Panel.



LOGGING INTO THE XIS





For more information on operation of the imaging adjustment buttons, refer to chapters 4.

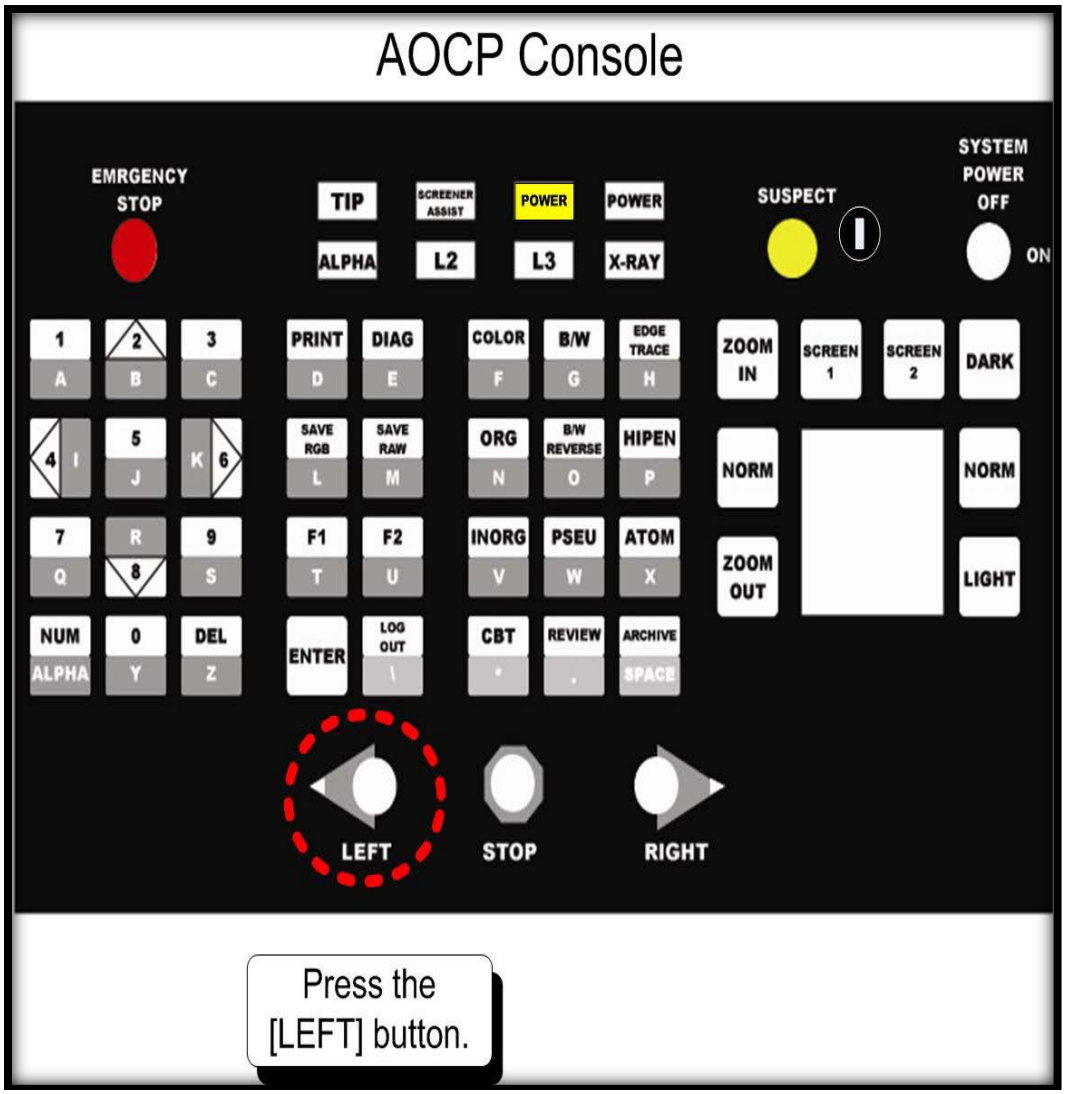
X-RAY IMAGING PROCEDURE

STEP #1: Load a cargo pallet on to the entry roller.

WARNING

- Do not load items onto moving rollers.
- Wait for the rollers to stop before loading items onto it.
- Do not overload the rollers. Observe the maximum weight limit for the XIS-DV-320.
- The XIS-DV-320 is designed to inspect Load items on pallets or items that are at least 0.8 m long. Shorter items may fall between the rollers.

STEP #2: Press the [LEFT] button on the AOCP.



NOTE: Pressing [LEFT] starts the Entry roller conveyor

- The rollers operate at only two speeds: 0 (stopped) or 0.1m/sec.
- The rollers roll only in the forward direction (while under program control).

WARNING

The rollers are hard and slippery. Use extreme care when standing or walking on non-moving rollers. Do not sit, stand or walk on moving rollers.

- When a pallet enters the tunnel, it starts the "SCAN CYCLE", which is an integrated operating/imaging sequence.
- The Scan Cycle should not be interrupted.
    - The Scan Cycle begins when the operator presses [**LEFT**] with a pallet on the entry rollers.
    - The XIS starts a "high frequency" alarm, turns on lights inside the inspection tunnel, turns on the "yellow" light on the exterior light pole, and delays 10 seconds before starting the rollers.
    - The "high frequency" alarm warns anyone inside the tunnel or anyone standing on the rollers to leave immediately.
    - The lights inside the tunnels illuminate the "Emergency Stop Strip" (ESS) switches.
    - The exterior yellow "light pole" warns users to stay clear of the x-ray machine and rollers.

Emergency Stop Strip

- The ten second delay allows anyone inside the tunnel to press and activate the "Emergency Stop Strip".
- The Emergency Stop Strips are activated by a single (8+ ounce) press.
- Pressing the Emergency Stop Strip immediately halts the x-ray generator, and roller bringing the XIS to a "safe state".
- The green light on the Emergency Stop Strip Reset button becomes lit when the Emergency Stop Strip is activated.
- The Emergency Stop Strip Reset button is located next to the circuit breaker box, which is next to the tunnel entrance and the entry end of the XIS-DV-320.
- The Emergency Stop Strip hold is "cleared" by pressing the "Emergency Stop Strip Reset Button".
- The green light on the Emergency Stop Strip Reset button is extinguished when the hold is cleared. You can now resume operation of the XIS-DV-320.

- After ten seconds the rollers start.
    - Both the entry rollers and tunnel rollers are activated.
    - The entry rollers are stopped after 3 seconds.
    - The cargo pallet is carried in to the inspection tunnel.

- The lights inside the tunnel are turned off
- During the Scan Cycle, the [RIGHT] button is inoperative.
- During the Scan Cycle, the [STOP] stops the Scan Cycle AFTER it is complete.
- The x-ray generator is turned on and x-ray images are produced automatically.
- The x-ray image can be examined by pressing any of the x-ray imaging.
- All x-ray images are automatically archived.

- The next cargo pallet for inspection can be queued up by placing it on the idle (stopped) entry roller.
- When imaging process has been completed the XIS will automatically move the first pallet to the exit end of the XIS.

STEP #3: Remove the cargo pallet from the exit end of the XIS

STEP #4: If another cargo pallet has not already been queued; place it on the entry rollers now.

- If there are no other cargo items to be “scanned”, press [STOP].

STEP #5: Repeat Steps #2 through #4.

The MCP (Manual Control Panel)

The Manual Control Panel (MCP) is an auxiliary console that bypasses the main AOCP (Advance Operator Control Panel) console. The MCP allows the user to directly turn on and off the rollers and x-ray generator.

- The primary purpose of the MCP is to clear items that are stuck or jammed in the inspection tunnel.
- The MCP can also be used by maintenance personnel to check for system faults and verify the operation of the x-ray generator.

The MCP operates as a separate standalone control. The XIS operates either under control of the AOCP or the MCP, but not both together. The MCP is enabled by turning the MCP's "AUTO MAN" key-switch clockwise to the "MAN" (Manual) position.

- When the MCP is enabled, the AOCP is disabled and vice-versa.
- When the AOCP is disabled, all button presses on the AOCP are ignored.
- If the XIS-DV-320 is imaging when the AUTO-MAN switch is turned, the XIS-DV-320 continues to complete its current imaging cycle before surrendering control to the MCP.

Picture of a Manual Control Panel. The hand is positioned on the "AUTO-MAN" switch.

The AOCP can be re-selected and re-enabled by turning the "AUTO-MAN" key-switch counter-clockwise to the "AUTO" position.

- When the AOCP is enabled, the MCP is disabled.
- When the MCP is disabled, all button presses on the MCP are ignored.

STOPPING THE ROLLERS AND X-RAY GENERATOR

Pressing the [STOP] button will stop the x-ray generator and roller, but **NOT** immediately.

- If XIS-DV-320 is imaging, the XIS-DV-320 will first complete its current imaging cycle.
- When the current pallet in the tunnel has finished imaging, the XIS-DV-320 will move the pallet to end of the exit rollers and then stop the rollers.
- The XIS-DV-320 may delay as much as 60 seconds before finally stopping the rollers and x-ray generators.

If you need to IMMEDIATELY stop the rollers, press the [EMERGENCY STOP] button. This will halt both the rollers and x-ray generators.

- Clear the emergency situation. For example, if someone is in the inspection, evacuate that person.

- If you need to manually operate the rollers to clear the tunnel, switch to the manual control of the rollers as described in the section below.

- The [EMERGENCY STOP] button is reset by turning the switch counter clock-wise 90 degrees. After emergency stop, wait at least 60 seconds before resetting the emergency stop button. This allows the motor controller sufficient time to properly re-start.

MANUALLY CONTROLLING THE ROLLERS

The rollers and x-ray generator normally operate under program control. However, sometimes it is necessary to manually control both. For example, clearing a jammed heavy pallet inside the inspection tunnel typically requires manual control of the rollers. Checking the x-ray generator during maintenance often requires manual operation of the x-ray generator. In these cases, it is necessary to switch to MCP operation.

To switch from AOCP to MCP operation, follow the steps below:

STEP #1: Turn the MCP "AUTO MAN" key-switch to "MAN"

- If XIS-DV-320 is imaging, the XIS-DV-320 will first complete its current imaging cycle.
- When the current pallet in the tunnel has finished imaging, the XIS-DV-320 will move the pallet to end of the exit rollers and then stop the rollers.
- The XIS-DV-320 may delay as much as 60 seconds before finally stopping the rollers and x-ray generators.

STEP #2: Press the [FORWARD] or [REVERSE] buttons to run the rollers.

- The [FORWARD] and [REVERSE] buttons are toggle switches. Pressing the once starts the roller moving. Pressing the button again stops the rollers.

- Pressing the [FORWARD] button will move items left (i.e. going from right to left) to the exit rollers.

- Pressing the [REVERSE] button will move items right (i.e. going from left to right) to the entry rollers.
- Ensure that items do not abruptly fall off the end of the rollers.

STEP #3: Turn the MCP “AUTO MAN” key-switch to AUTO. This will return the AOCP to normal AOCP based operation.

Picture of XIS 1818 – 320kV – Manual Control Panel

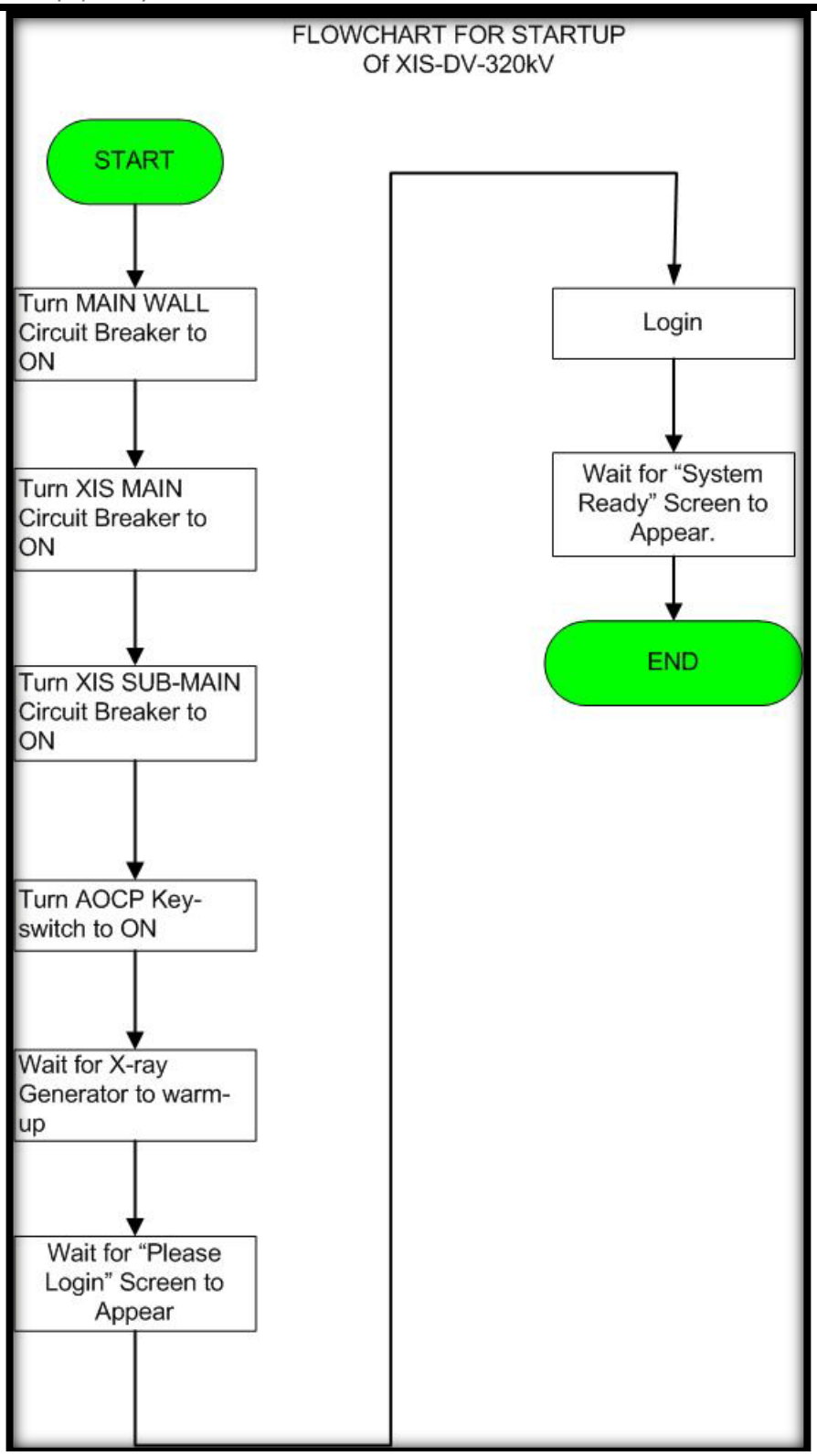
Manual Control Console – Operational Description

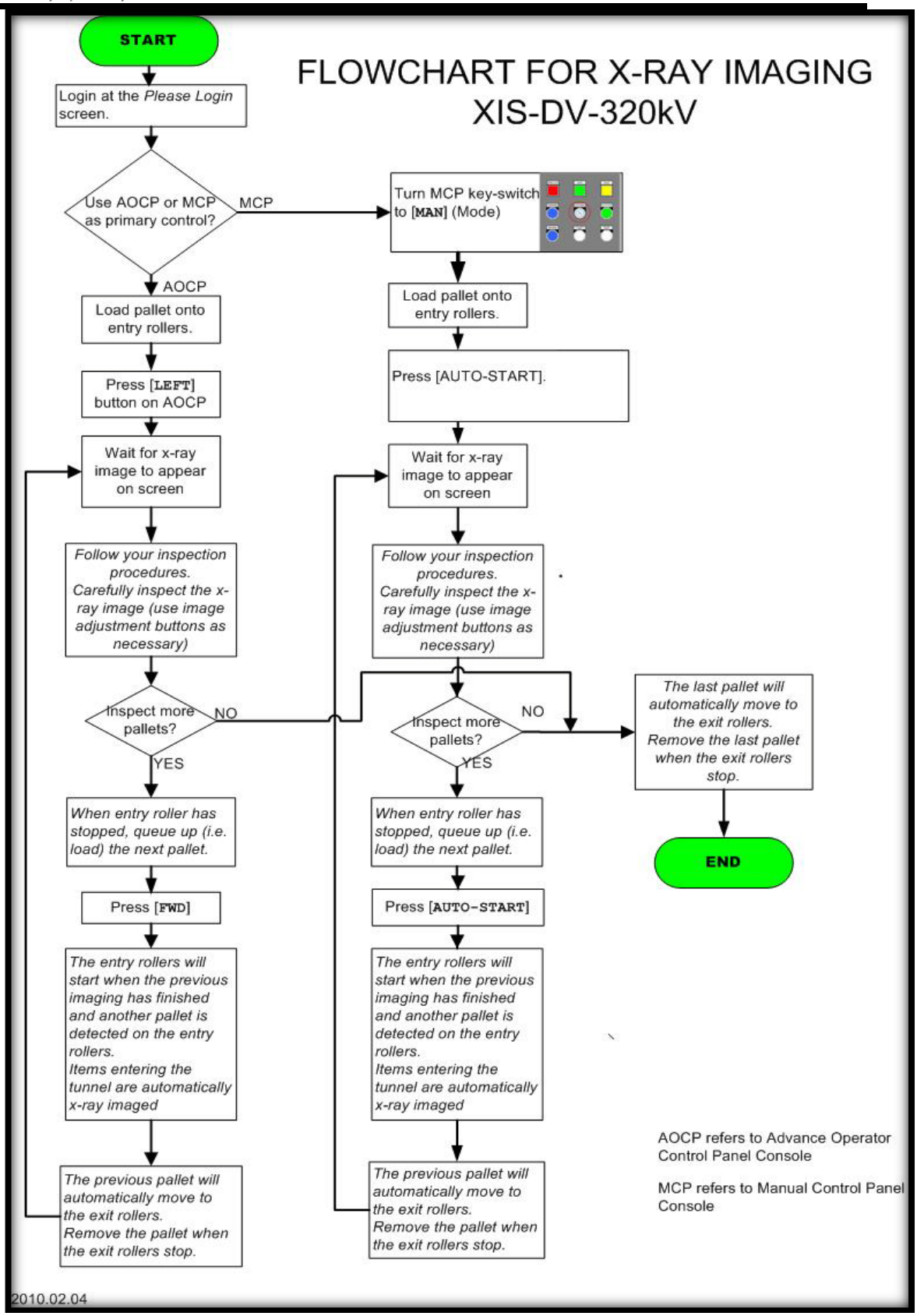
#	LABEL	Description	COMMENTS
1.	**Emergency Stop**	*Red Emergency Stop* switch status light	o Red light ON – Emergency stop has been activated. o Red light OFF – Conditions are normal
2.	**AUTO START**	Green Automatic Start status light	o Green light ON – AOCP console is enabled. Manual control console is disabled. o Green light OFF – AOCP console is disabled. Manual control console is enabled.
3.	**FAULT**	Yellow Fault light	o Yellow light ON – a system fault has been detected. Check diagnostic screen. o Yellow light OFF – Conditions are normal.
4.	**FORWARD**	Roller Forward (LEFT) light	This button is a momentary contact control switch. o Press once to start rollers in forward direction. o Press again to stop rollers.
5.	**AUTO MAN**	Automatic / Manual mode select key-switch	o Key-switched turned to AUTO position – the AOCP is enabled. o Key-switched turned to MAN position – Manual Control Panel (MCP) is enabled.

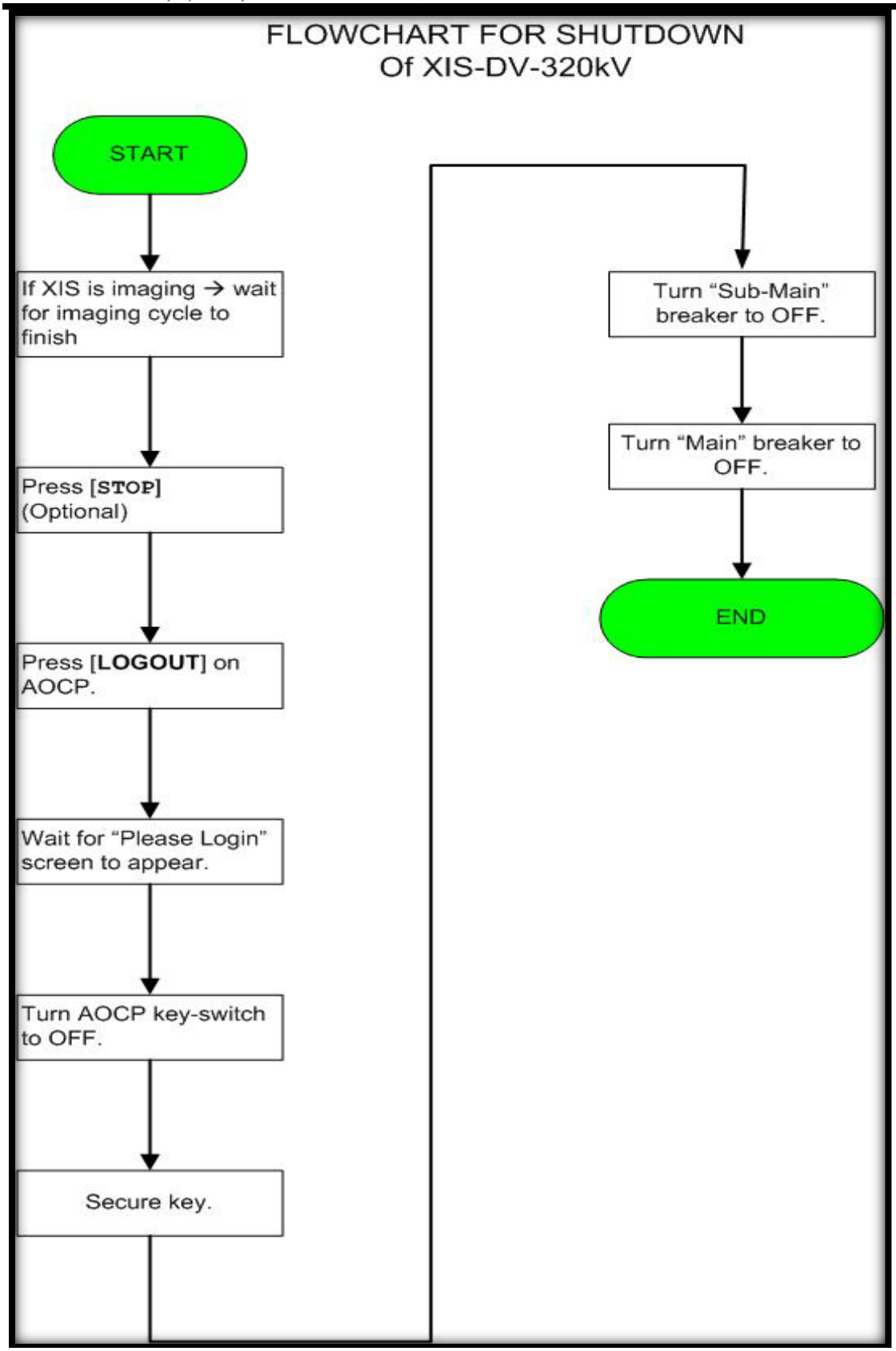
#	LABEL	Description	COMMENTS
6.	**AUTO**	Automatic select button	This is a “toggle control switch”. o Press once to enable AOCP and disable MCP. o Press again to override AOCP console and enable manual control.
7.	**REVERSE**	Roller Reverse (RIGHT) button	This is a “toggle control switch”. o Press once to start rollers in reverse direction. o Press again to stop rollers.
8.	**WARNING TEST SIGNAL**	Warning light test button	This is a momentary contact control switch. o Press to test warning lights. o Warning lights stay lit while button is pressed.
9.	**TEST XRAY**	X-ray test button	This button is a momentary contact control switch. o Press to test x-ray generator o X-ray generator stays on while button is pressed.

WARNING

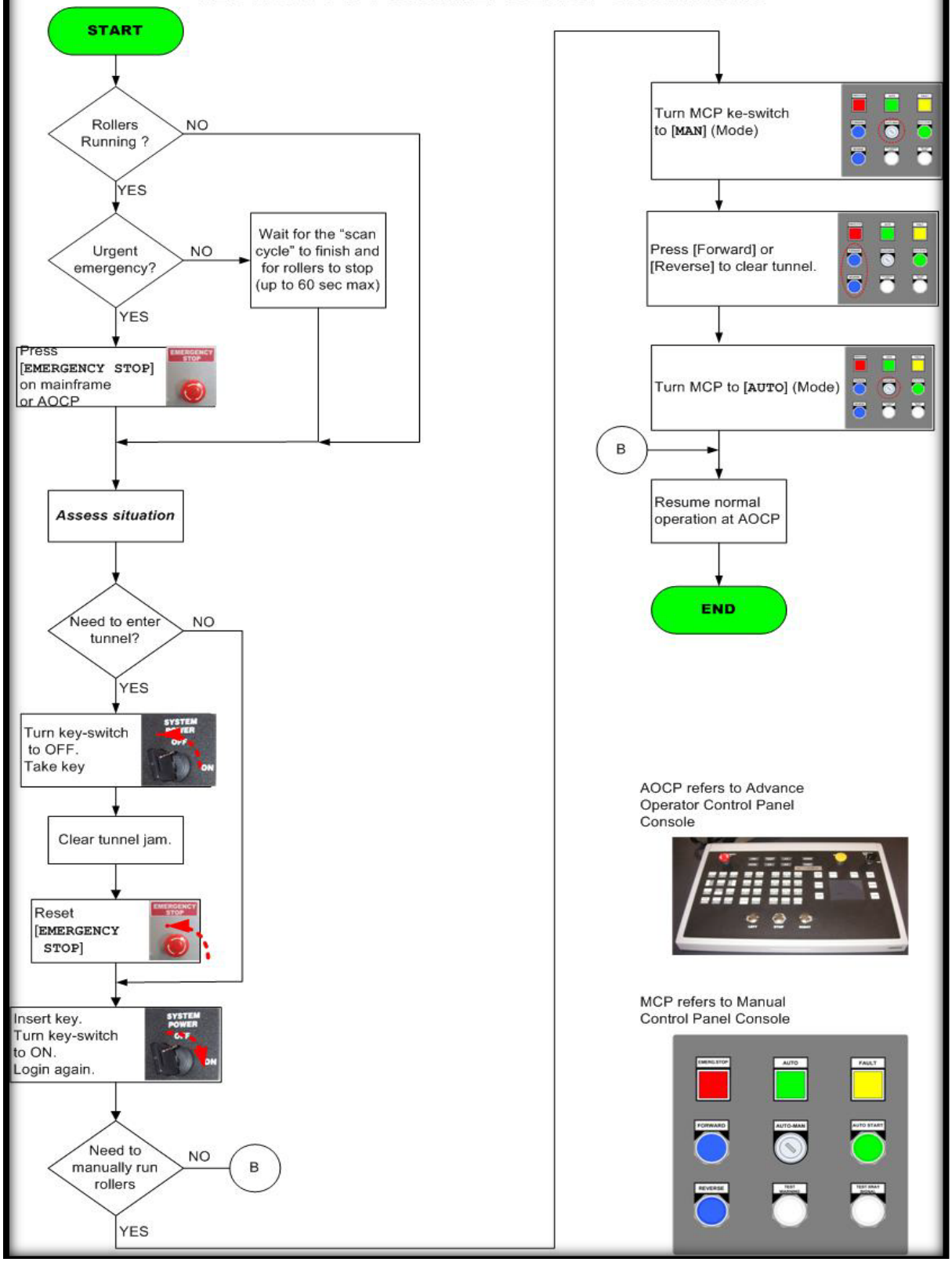
1. Check the inspection tunnel before operating the rollers or x-ray generator. Ensure that the tunnel is clear of personnel before pressing x-ray test button.
2. Check the roller bed and inspection tunnel before manually starting the rollers. Ensure that no one is sitting, standing, or riding on the rollers before pressing the [FORWARD] or [REVERSE] button.


FLOWCHART FOR STARTUP
Of XIS-DV-320kV
START
Turn MAIN WALL Circuit Breaker to ON
Turn XIS MAIN Circuit Breaker to ON
Turn XIS SUB-MAIN Circuit Breaker to ON
Turn AOCP Key-switch to ON
Wait for X-ray Generator to warm-up
Wait for "Please Login" Screen to Appear
Login
Wait for "System Ready" Screen to Appear.
END


START
FLOWCHART FOR X-RAY IMAGING
XIS-DV-320kV
Login at the Please Login screen.
Use AOCP or MCP as primary control?
MCP
AOCP
Turn MCP key-switch to [MAN] (Mode)
Load pallet onto entry rollers.
Press [AUTO-START].
Wait for x-ray image to appear on screen
Follow your inspection procedures. Carefully inspect the x-ray image (use image adjustment buttons as necessary)
Inspect more pallets?
NO
YES
The last pallet will automatically move to the exit rollers. Remove the last pallet when the exit rollers stop.
END
When entry roller has stopped, queue up (i.e. load) the next pallet.
Press [FWD]
Press [AUTO-START]
The entry rollers will start when the previous imaging has finished and another pallet is detected on the entry rollers. Items entering the tunnel are automatically x-ray imaged
The previous pallet will automatically move to the exit rollers. Remove the pallet when the exit rollers stop.
AOCP refers to Advance Operator Control Panel Console
MCP refers to Manual Control Panel Console
2010.02.04


FLOWCHART FOR SHUTDOWN
Of XIS-DV-320kV
START
If XIS is imaging → wait for imaging cycle to finish
Press [STOP] (Optional)
Press [LOGOUT] on AOCP.
Wait for "Please Login" screen to appear.
Turn AOCP key-switch to OFF.
Secure key.
Turn "Sub-Main" breaker to OFF.
Turn "Main" breaker to OFF.
END

FLOWCHART FOR EMERGENCY SITUATIONS



XIS 1517 320kV– DV & XIS 1818 320kV – DV

QUICK REFERENCE – DO's AND DON'TS OF OPERATION

	When	Do's and Don'ts
1.	When starting the system	o Ensure that the main wall AC breaker is turned to ON. o Ensure that the XIS main circuit breaker is turned to ON. o Ensure that the XIS sub-main circuit breaker is turned to ON. o Ensure that all [**EMERGENCY STOP**] buttons are reset and cleared. o Ensure that the "AUTO-MAN" key-switch (on the MCP) is turned to "AUTO" .
2.	Starting the XIS	o Turn the AOCP key-switch to ON. o Wait for the "Please Login" screen. o Click on [**Screener**] o Click on [**Scan Mode**] o Click on the Username drop down list button and select your username. o Enter your password using the AOCP or screen *keypad*. o Wait for the "System Ready" Screen.
3.	When loading items onto the rollers	Do not load items onto moving rollers. o Press the [**STOP**] button on the AOCP. o If the XIS is imaging, wait for imaging cycle to finish (1 min max) o Place small items on pallets. Otherwise, they may fall between the rollers.
4.	To Start Imaging	o Load pallet on entry rollers. o Ensure that no one is inside the inspection tunnel or standing on the rollers. o Ensure that the MCP AUTO-MAN key-switch is turned to AUTO o Start the rollers: • Press [**LEFT**] on the AOCP OR • Press [**AUTO-START**] on the MCP o Wait for x-ray image to appear on the screen.
5.	Examine the image	Refer to XIS User's Guide for information on using the DV imaging adjustment controls.
6.	During routine use	o Do not use the [**EMERGENCY STOP**] button to casually stop the XIS. o Ensure that items exiting the tunnel do not drop on the floor at the end of the exit rollers. o The [RIGHT] button is NON-FUNCTIONAL. o The [STOP] button does not immediately stop the rollers if the XIS is still in a "Scan Cycle". The rollers will keep moving until the current x-ray imaging "Scan Cycle" is complete (i.e. when the current pallet is fully imaged). o Pallets on the exit rollers must be removed before new pallets will be moved onto it. The XIS will stop imaging new pallets if the previous pallets are not cleared from the exit rollers.
7.	To Logout	o Wait for the XIS to complete imaging of the current pallet. o Press [**LOG OUT**] o Do not leave the XIS powered on, logged in and unattended.
8.	To Logout and to stop at the end of the day.	o Wait for the XIS to complete imaging of the current pallet. o Ensure that the MCP key-switch is turned to AUTO. o Press the (AOCP's) [**LOG OUT**] button. o Turn the AOCP key-switch to OFF.

There are no user serviceable parts inside the XIS. Service <u>ONLY</u> by qualified and trained personnel.
XIS refers to the X-ray Imaging System.
AOCP refers to Advance Operator Control Panel (Console).
MCP refers to Manual Control Panel.

APPENDIX – A XIS TECHNICAL SPECIFICATIONS

SINGLE VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS

XIS Models: 5335, 5335-S, 5878, 6040, 6545

	XIS 5335	XIS 5335-S	XIS 5878	XIS 6040	XIS 6545
Language Supported	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)
IMAGING SPECIFICATIONS	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
Wire Resolution Sensitivity	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed
Spatial Resolution	1 mm horizontal 1 mm vertical	1 mm horizontal 1 mm vertical	1 mm horizontal 1 mm vertical	1 mm horizontal 1 mm vertical	1 mm horizontal 1 mm vertical
Steel Penetration	10 mm guaranteed 12 mm typical	35 mm typical 33 mm guaranteed	35 mm typical 33 mm guaranteed	35 mm typical 33 mm guaranteed	35 mm typical 33 mm guaranteed
Contrast	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge
IMAGING FEATURES	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
Image Magnification	Up to 32x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification
Z-Number	On-demand Z-number display	On-demand Z-number display	On-demand Z-number display	On-demand Z-number display	On-demand Z-number display
Image Archive	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images
Material Classification	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials
Color / B/W Imaging	Single monitor (Optional Dual Monitor) Selectable Color & B/W Imaging on-demand	Dual monitors: Separate Color Monitor & B/W Monitor	Dual monitors: Separate Color Monitor & B/W Monitor	Single monitor (Optional Dual Monitor) Selectable Color & B/W Imaging on-demand	Dual monitors: Separate Color Monitor & B/W Monitor
Contrast (Gamma) Adjustments	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment

SINGLE VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS (CONTINUED)

XIS Models: 5335, 5335-S, 5878, 6040, 6545

X-RAY TUNNEL DIMENSIONS	XIS 5335	XIS 5335-S	XIS 5878	XIS 6040	XIS 6545
Height	35 cm (14 in)	35 cm (14 in)	78 cm (30.8 in)	40 cm (22.6 in)	45 cm (17.9 in)
Width	53 cm (21 in)	53 cm (21 in)	58 cm (22.6 in)	60 cm (30.5 in)	65 cm (26.7 in)
X-RAY GENERATOR SPECIFICATIONS	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
X-ray Tube Voltage	90 KV X-ray Tube Operating at 84 K V	160KV X-ray Tube Operating at 150 KV (180KV X-ray Tube optional)	160KV X-ray Tube Operating at 150 KV (180KV X-ray Tube optional)	160KV X-ray Tube Operating at 150 KV (180KV X-ray Tube optional)	160KV X-ray Tube Operating at 150 KV (180KV X-ray Tube optional)
X-ray Tube Current	0.5 mA	0.7 mA	0.7 mA	0.7 mA	0.7 mA
Cooling	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation
Duty Cycle	100%	100%	100%	100%	100%
Beam Direction	Vertically upward	Vertically upward	Horizontally sideways	Vertically upward	Vertically upward
X-RAY DETECTORS	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
Number	512 High Energy & 512 Low Energy	512 High Energy & 512 Low Energy	832 High Energy & 832 Low Energy	576 High Energy & 576 Low Energy	640 High Energy & 640 Low Energy
Geometry	L-Shape array	L-Shape array	L-Shape array	L-Shape array	L-Shape array
RADIATION SAFETY	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
Dose Per Pass	0.2 mR typical	0.2 mR typical	0.2 mR typical	0.2 mR typical	0.2 mR typical
Film Safety	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe
ELECTRICAL REQUIREMENTS	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
110 VAC	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)
220 VAC	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)
Filtering	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters
PHYSCIAL DIMENSIONS	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
Weight (uncrated)	Approx 284 Kg (628 lbs)	Approx 360 Kg (794 lbs)	Approx 750 Kg (1655 lbs)	Approx 389 Kg (858 lbs)	Approx 646 Kg (1421 lbs)
Weight (crated)	Approx 402 Kg (888 lbs)	Approx 480 Kg (1060 lbs)	Approx 900 Kg (1995 lbs)	Approx 496 Kg (1080 lbs)	Approx 546 Kg (1201 lb)
Crated Length	147.3 cm (58 in)	147.3 cm (58 in)	TBA	152 cm (60 in)	231 cm (91 in)
Crated Width	88.9 cm (35 in)	88.9 cm(35 in)	TBA	96.5 cm (38 in)	102 cm (40 in)
Crated Height	151 cm (59.5 in)	151 cm (59.5 in)	TBA	155 cm (61 in)	159 cm (62.5 in)
Overall Length	132 cm (52.2 in)	132 cm (52.0 in)	253 cm (99.5 in)	142 cm (55.8 in)	217 cm (85.2 in)
Overall Height	122 cm (48.1 in)	123 cm (48.5 in)	125 cm (49.1 in)	125 cm (49.3 in)	132 cm (51.8 in)
Overall Width	76.2 cm (30.0 in)	76.2 cm (30.0 in)	137 cm (54.0 in)	83.4 cm (32.9 in)	137 cm (34.4 in)

SINGLE VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS (CONTINUED)

XIS Models: 5335, 5335-S, 5878, 6040, 6545

ONVEYOR SPECIFICATIONS	XIS 5335	XIS 5335-S	XIS 5878	XIS 6040	XIS 6545
Height	73.0 cm (28.7 in)	73.7 cm (29.0 in)	30.0 cm (12.0 in)	73.2 cm (28.8 in)	25.4 cm (29.9 in)
Speed	13.7 m/min (45 ft / min)	13.7 m/min (45 ft / min)	13.7 m/min (45 ft / min)	13.7 m/min (45 ft / min)	13.7 m/min (45 ft / min)
Load Capacity	165 kg (363 lb) Distributed load	165 kg (363 lb) Distributed load	165 kg (363 lb) Distributed load	165 kg (363 lb) Distributed load	165 kg (363 lb) Distributed load
ENVIRONMENTAL REQUIREMENTS	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
Temperature	5° C to 40 ° C (32 ° F to 104 ° F)	5° C to 40 ° C (32 ° F to 104 ° F)	5° C to 40 ° C (32 ° F to 104 ° F)	5° C to 40 ° C (32 ° F to 104 ° F)	5° C to 40 ° C (32 ° F to 104 ° F)
Relative Humidity	5% to 85% Non-condensing atmosphere	5% to 85% Non-condensing atmosphere	5% to 85% Non-condensing atmosphere	5% to 85% Non-condensing atmosphere	5% to 85% Non-condensing atmosphere
PC CONFIGURATION	**XIS 5335**	**XIS 5335-S**	**XIS 5878**	**XIS 6040**	**XIS 6545**
CPU	5% to 85% Non-condensing atmosphere	5% to 85% Non-condensing atmosphere	Intel 2 Core Duo (3 GHz) or faster	5% to 85% Non-condensing atmosphere	5% to 85% Non-condensing atmosphere
RAM	2 GB or greater	2 GB or greater	2 GB or greater	2 GB or greater	2 GB or greater
Operating System	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release
Video	ATI Chipset with 256 Mb Video RAM or greater	ATI Chipset with 256 Mb Video RAM or greater	ATI Chipset with 256 Mb Video RAM or greater	ATI Chipset with 256 Mb Video RAM or greater	ATI Chipset with 256 Mb Video RAM or greater
LCD Displays	One standard (Dual monitors are optional) 48.3 cm (19 In) diagonal flicker free LCD displays. Automatic brightness and contrast adjustment	Dual 48.3 cm (19 In) diagonal, flicker free monitors. Color and B/W display with automatic brightness and contrast adjustment	Dual 48.3 cm (19 In) diagonal, flicker free monitors. Color and B/W display with automatic brightness and contrast adjustment	One standard (Dual monitors are optional) 48.3 cm (19 In) diagonal flicker free LCD displays. Automatic brightness and contrast adjustment	Dual 48.3 cm (19 In) diagonal, flicker free monitors. Color and B/W display with automatic brightness and contrast adjustment
Disk Storage	160 GB or greater capacity	160 GB or greater capacity	160 GB or greater capacity	160 GB or greater capacity	160 GB or greater capacity
UPS Protection	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)

SINGLE VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS (CONTINUED)

XIS Models: 7858, 1080, 1080D, 100x, 100XD

	XIS 7858	XIS 1080	XIS 1080D	XIS 100x	XIS 100XD
Languages Supported	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)
IMAGING SPECIFICATIONS	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
Wire Resolution Sensitivity	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed
Spatial Resolution	1 mm horizontal 1 mm vertical	1 mm horizontal 1.3 mm vertical	1.6 mm horizontal 1.6 mm vertical	1 mm horizontal 1.3 mm vertical	1.6 mm horizontal 1.6 mm vertical
Steel Penetration	39 mm Typical 37 mm Guaranteed	35 mm Typical 33 mm Guaranteed	35 mm Typical 33 mm Guaranteed	35 mm Typical 33 mm Guaranteed	35 mm Typical 33 mm Guaranteed
Contrast	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge	4096 gray levels, 24 distinct visible levels as measured with step wedge
IMAGING FEATURES	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
Image Magnification	Up to 32x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification	Up to 64x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification
Z-Number	On-demand Z-number display	On-demand Z-number display	On-demand Z-number display	On-demand Z-number display	On-demand Z-number display
Image Archive	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images
Material Classification	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials
Color / B/W Imaging	Dual monitors: Separate Color Monitor & B/W Monitor	Dual monitors: Separate Color Monitor & B/W Monitor	Dual monitors: Separate Color Monitor & B/W Monitor	Dual monitors: Separate Color Monitor & B/W Monitor	Dual monitors: Separate Color Monitor & B/W Monitor
Contrast Adjustments	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment

SINGLE VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS (CONTINUED)

XIS Models: 7858, 1080, 1080D, 100x, 100XD

X-RAY TUNNEL DIMENSIONS	XIS 7858	XIS 1080	XIS 1080D	XIS 100x	XIS 100XD
Height	58 cm (23 in)	81 cm (32.0 in)	80 cm (31.4 in)	101 cm (40 in)	101 cm (40 in)
Width	78 cm (31 in)	101 cm (40.0 in)	101 cm (40.0 in)	101 cm (40 in)	101 cm (40 in)
X-RAY GENERATOR SPECIFICATIONS	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
X-ray Tube Voltage	160 KV X-ray Tube Operating at 150 KV (180KV X-ray Tube optional)	180KVp X-ray Tube Operating at 165 KV	180KVp X-ray Tube Operating at 165 KV	180KVp X-ray Tube Operating at 165 KV	180KVp X-ray Tube Operating at 165 KV
X-ray Tube Current	1.2 mA	1.2 mA	1.2 mA	1.2 mA	1.2 mA
Cooling	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation
Duty Cycle	100%	100%	100%	100%	100%
Beam Direction	Diagonally Upward	Diagonally Upward	Vertically Downward	Diagonally Upward	Vertically Downward
X-RAY DETECTORS	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
Number	512 High Energy & 512 Low Energy	512 High Energy & 512 Low Energy	832 High Energy & 832 Low Energy	832 High Energy & 832 Low Energy	832 High Energy & 832 Low Energy
Geometry	L-Shape array	L-Shape array	L-Shape array	L-Shape array	L-Shape array
RADIATION SAFETY	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
Dose Per Pass	0.2 mR typical	0.2 mR typical	0.2 mR typical	0.2 mR typical	0.2 mR typical
Film Safety	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe
ELECTRICAL REQUIREMENTS	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
110 VAC	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)
220 VAC	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)
Filtering	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters

SINGLE VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS (CONTINUED)

XIS Models: 7858, 1080, 1080D, 100x, 100XD

PHYSCIAL DIMENSIONS	XIS 7858	XIS 1080	XIS 1080D	XIS 100x	XIS 100XD
Uncrated Weight	Approx 565 Kg (1250lbs)	Approx 900 Kg (1980 lbs)	Approx 810 Kg (1785 lbs)	Approx 980 Kg (2165 lbs)	Approx 885 Kg (1950 lbs)
Crated Weight	Approx 750 Kg (1655lbs)	Approx 1240 Kg (2730 lbs)	Approx 1105 Kg (2435 lbs)	Approx 1300 Kg (2860 lbs)	Approx 1105 Kg (2435 lbs)
Crated Length	221 cm (87 in)	297 cm (117 in)	191 cm (75 in)	298 cm (117 in)	191 cm (75 in)
Crated Width	116 cm (46 in)	147 cm (58 in)	147 cm (58 in)	150 cm (59 in)	147 cm (58 in)
Crated Height	183 cm (72 in)	224 cm (88 in)	211 cm (83 in)	224 cm (88 in)	224 cm (88 in)
Overall Length	188 cm (74 in)	257 cm (101.3 in)	237 cm (93.3 in)	278 cm (109.4 in)	238 cm (93.3 in)
Overall Width	103 cm (41 in)	137 cm (54 in)	128 cm (50.3 in)	137 cm (54.0 in)	128 cm (50.3 in)
Overall Height	139 cm (55 in)	170.6 cm (68 in)	172 cm (68 in)	192 cm (76 in)	191 cm (76 in)
CONVEYOR SPECIFICATIONS	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
Height	73.0 cm (29 in)	72 cm (28.0 in)	30 cm (12.0 in)	72 cm (28.0 in)	30 cm (12.0 in)
Speed	23 cm/s (45 ft / min)	23 cm/s (45 ft / min)	23 cm/s (45 ft / min)	23 cm/s (45 ft / min)	23 cm/s (45 ft / min)
Load Capacity	165 kg (363 lb) Evenly Distributed load	200 kg (440 lb) Evenly Distributed load	200 kg (440 lb) Evenly Distributed load	200 kg (440 lb) Evenly Distributed load	200 kg (440 lb) Evenly Distributed load
ENVIRONMENTAL REQUIREMENTS	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
Temperature	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)
Relative Humidity	0 to 95% Non-condensing atmosphere	5% to 95% Non-condensing atmosphere	5% to 95% Non-condensing atmosphere	5% to 95% Non-condensing atmosphere	5% to 95% Non-condensing atmosphere
PC CONFIGURATION	**XIS 7858**	**XIS 1080**	**XIS 1080D**	**XIS 100x**	**XIS 100XD**
CPU	Intel 2 i5 (3.1 GHz) or faster	Intel 2 i5 (3.1 GHz) or faster	Intel 2 i5 (3.1 GHz) or faster	Intel 2 i5 (3.1 GHz) or faster	Intel 2 i5 (3.1 GHz) or faster
RAM	2 GB or greater	2 GB or greater	2 GB or greater	2 GB or greater	2 GB or greater
Operating System	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release
Video	256 Mb Video RAM or greater	256 Mb Video RAM or greater	256 Mb Video RAM or greater	256 Mb Video RAM or greater	256 Mb Video RAM or greater
LCD Displays	One standard (Dual monitors are optional) 48.3 cm (19 In) diagonal flicker free LCD displays. Automatic brightness and contrast adjustment	Dual 48.3 cm (19 In) diagonal, flicker free monitors. Color and B/W display with automatic brightness and contrast adjustment	Dual 61 cm (24 In) diagonal, flicker free monitors. Color and B/W display with automatic brightness and contrast adjustment	Dual 48.3 cm (19 In) diagonal, flicker free monitors. Color and B/W display with automatic brightness and contrast adjustment	Dual 61 cm (24 In) diagonal, flicker free monitors. Color and B/W display with automatic brightness and contrast adjustment
Disk Storage	500 GB HDD or greater capacity	500 GB HDD or greater capacity	500 GB HDD or greater capacity	500 GB HDD or greater capacity	500 GB HDD or greater capacity
UPS Protection	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)

DUAL VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS

XIS Models: 6545-DV, 100X-DV

	XIS 6545-DV	XIS 100x-DV
LANGUAGES SUPPORTED	English Chinese Arabic Spanish (Other languages supported on special request)	English Chinese Arabic Spanish (Other languages supported on special request)
IMAGING SPECIFICATIONS	**XIS 6545-DV**	**XIS 100x-DV**
Wire Resolution	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed
Spatial Resolution	1 mm horizontal 1 mm vertical	1 mm horizontal 1 mm vertical
Steel Penetration	35 mm Typical 33 mm Guaranteed	35 mm Typical 33 mm Guaranteed
IMAGING FEATURES	**XIS 6545-DV**	**XIS 100x-DV**
Contrast	4096 gray levels with 24 distinct visible levels as measured with step wedge	4096 gray levels with 24 distinct visible levels as measured with step wedge
Image Magnification	Up to 32x Zoom In Image Magnification	Up to 32x Zoom In Image Magnification
Z-Number	On-demand Z-number display	On-demand Z-number display
Image Archive	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images
Material Classification	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials
Color / B/W Imaging	Three monitors Left – Up-shooter – Color Middle – Up-shooter – B/W Right – Side-shooter - Color	Three monitors Left – Up-shooter – Color Middle – Up-shooter – B/W Right – Side-shooter - Color
X-RAY TUNNEL DIMENSIONS	**XIS 6545-DV**	**XIS 100x-DV**
Height	58 cm (23 in)	81 cm (32.0 in)
Width	78 cm (30.5 in)	101 cm (40.0 in)
X-RAY GENERATOR SPECIFICATIONS	**XIS 6545-DV**	**XIS 100x-DV**
X-ray Tube Voltage	160 KV X-ray Tube Operating at 150 KV (180KV X-ray Tube optional @165KV 1.2mA)	180 KV X-ray Tube Operating at 165 KV
X-ray Tube Current	0.7 mA	1.2 mA
Cooling	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation
Duty Cycle	100%	100%
Beam Direction	Up-shooter View: Vertically upward Side-Shooter View: Horizontal	Up-shooter View: Vertically upward Side-Shooter View: Horizontal

DUAL VIEW X-RAY IMAGING SYSTEMS SPECIFICATIONS

XIS Models: 6545-DV, 100X-DV

X-RAY DETECTORS	XIS 6545-DV	XIS 100x-DV
Number	Up-shooter view : 640 High Energy & 640 Low Energy Side-view: 640 High Energy & 640 Low Energy	Up-shooter view : 832 High Energy & 832 Low Energy Side-view: 832 High Energy & 832 Low Energy
Geometry	L-Shape array	
RADIATION SAFETY	**XIS 6545-DV**	**XIS 100x-DV**
Dose Per Pass	0.4 mR typical	0.4 mR typical
Film Safety	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe
ELECTRICAL REQUIREMENTS	**XIS 6545-DV**	**XIS 100x-DV**
110 VAC	110-120 VAC 15 Amp (max)	110-120 VAC 15 Amp (max)
220 VAC	220-240 VAC 10 Amp (max)	220-240 VAC 10 Amp (max)
Filtering	Inline AC Noise Filters	Inline AC Noise Filters
PHYSCIAL DIMENSIONS	**XIS 6545-DV**	**XIS 100x-DV**
(Uncrated) Weight	TBA	1708 kg (3758 lb)
Crated Weight	TBA	1845 kg (4059 lbs)
Crated Length	TBA	130 in
Crated Height	TBA	76.5 in
Crated Width	TBA	88.5 in
Overall Length	TBA	302 cm (119 in)
Overall Height	TBA	190 cm (74.7 in)
Overall Width	TBA	196 cm (77 in)
CONVEYOR SPECIFICATIONS	**XIS 6545-DV**	**XIS 100x-DV**
Height	73.0 cm (28.7 in)	69 cm (27.5 in)
Speed	13.7 m/min (45 ft / min)	23 m/sec (45 ft/min)
Load Capacity	165 kg (363 lb) Distributed load	200 Kg (440 lb) Distributed Load
ENVIRONMENTAL REQUIREMENTS	**XIS 6545-DV**	**XIS 100x-DV**
Temperature	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)
Relative Humidity	5% to 85% Non-condensing atmosphere	5% to 85% Non-condensing atmosphere
PC CONFIGURATION	**XIS 6545-DV**	**XIS 100x-DV**
CPU	Intel 2 Core Duo (3 GHz) or faster	Intel 2 Core Duo (3 GHz) or faster
RAM	2 GB or greater	2 GB or greater
Operating System	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release
Video	256 Mb Video RAM or greater	256 Mb Video RAM or greater
LCD Displays	Three 19 in. diagonal monitors - flicker free LCD displays. Automatic brightness and contrast adjustment • Left Monitor – Up-shooter – Color • Middle Monitor – Up-shooter – B/W • Right Monitor – Side-shooter – Color	Three 19 in. diagonal monitors - flicker free LCD displays. Automatic brightness and contrast adjustment • Left Monitor – Up-shooter – Color • Middle Monitor – Up-shooter – B/W • Right Monitor – Side-shooter – Color
Disk Storage	160 GB or greater capacity	160 GB or greater capacity
UPS Protection	Line Interactive UPS (20 Minute Battery Support)	Line Interactive UPS (20 Minute Battery Support)

Large "Air-Cargo" X-ray Imaging Systems
XIS Models: 1517, 1517-DV, 1818, 1818-DV

IMAGING SPECIFICATIONS	XIS 1517	XIS 1517-DV	XIS 1818	XIS 1818-DV
LANGUAGES SUPPORTED	English Chinese Arabic (Other languages supported on special request)	English Chinese Arabic (Other languages supported on special request)	English Chinese Arabic (Other languages supported on special request)	English Chinese Arabic (Other languages supported on special request)
IMAGING SPECIFICATIONS	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
Wire Resolution	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed	40 AWG Typical 38 AWG Guaranteed
Spatial Sensitivity	1.3 mm horizontal 1.3 mm vertical	1.3 mm horizontal 1.3 mm vertical	1.3 mm horizontal 1.3 mm vertical	1.3 mm horizontal 1.3 mm vertical
Steel Penetration	33 mm guaranteed 31 mm typical	33 mm guaranteed 31 mm typical	33 mm guaranteed 31 mm typical	33 mm guaranteed 31 mm typical
Image (Gamma) Contrast	4096 gray levels with 24 distinct visible levels as measured with step wedge	4096 gray levels with 24 distinct visible levels as measured with step wedge	4096 gray levels with 24 distinct visible levels as measured with step wedge	4096 gray levels with 24 distinct visible levels as measured with step wedge
IMAGING FEATURES	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
Image Magnification Z-Number	Up to 32x Zoom In Image Magnification On-demand Z-number display	Up to 32x Zoom In Image Magnification On-demand Z-number display	Up to 32x Zoom In Image Magnification On-demand Z-number display	Up to 32x Zoom In Image Magnification On-demand Z-number display
Image Archive	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images	Automatic storage and on-demand retrieval of last 50,000+ images
Material Classification	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials	Automatic identification and colorization of Organic / Inorganic materials
Color / B/W Imaging	Dual monitors: • Separate Color Monitor & • B/W Monitor	Three monitors : • Left Monitor – Up-shooter – Color • Middle Monitor – Up-shooter – B/W • Right Monitor – Side-shooter – Color	Dual monitors: • Separate Color Monitor & • B/W Monitor	Three monitors: • Left Monitor – Up-shooter – Color • Middle Monitor – Up-shooter – B/W • Right Monitor – Side-shooter – Color
Contrast (Gamma) Adjustments	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment	Simple 11 Step Density Imaging Adjustment
X-RAY TUNNEL DIMENSIONS	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
Height	1500 cm (59 in)	1500 cm (59 in)	180 cm (71 in)	180 cm (71 in)
Width	1700 cm (67 in)	1700 cm (67 in)	180 cm (71 in)	180 cm (71 in)

Large "Air-Cargo" X-ray Imaging Systems (continued)

XIS Models: 1517, 1517-DV, 1818, 1818-DV

X-RAY GENERATOR SPECIFICATIONS	XIS 1517	XIS 1517-DV	XIS 1818	XIS 1818-DV
X-ray Tube Voltage	Single 180 X-ray Tube Operating at 165 KV	Dual 180 X-ray Tube Operating at 165 KV	Single 180 X-ray Tube Operating at 165 KV	Dual 180 X-ray Tube Operating at 165 KV
X-ray Tube Current	1.2 mA	1.2 mA	1.2 mA	1.2 mA
Cooling	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation	Maintenance free sealed oil bath with convection cooling and fan assisted ventilation
Duty Cycle	100%	100%	100%	100%
X-ray Beam Geometry	• Side-shooter : Horizontal	• Side-shooter : Horizontal • Up-shooter x-ray generator is oriented vertically upward.	• Side-shooter : Horizontal	• Side-shooter x-ray generator is horizontal. • Up-shooter x-ray generator is oriented vertically upward.
X-RAY DETECTORS	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
Number	1088 High Energy & 1088 Low Energy	Side-shooter View: • 1088 High Energy • 1088 Low Energy Up-shooter View: • 1088 High Energy • 1088 Low Energy	1152 High Energy & 1152 Low Energy	Side-shooter View: • 1152 High Energy • 1152 Low Energy Up-shooter View: • 1152 High Energy • 1152 Low Energy
Geometry	L-Shape array	L-Shape array	L-Shape array	L-Shape array
RADIATION SAFETY	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
Dose Per Pass	0.6 mR	0.8 mR	0.6 mR	0.8 mR
Film Safety	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe	ISO 1600 / 33 DIN (or slower speed) film safe
ELECTRICAL REQUIREMENTS	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
110 VAC	15 Amp (max)	15 Amp (max)	15 Amp (max)	15 Amp (max)
220 VAC	10 Amp (max)	10 Amp (max)	10 Amp (max)	10 Amp (max)
Filtering	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters	Inline AC Noise Filters

Large "Air-Cargo" X-ray Imaging systems (continued)

XIS Models: 1517, 1517-DV, 1818, 1818-DV

PHYSCIAL DIMENSIONS	XIS 1517	XIS 1517-DV	XIS 1818	XIS 1818-DV
Weight (uncrated)	TBA	TBA	3856 kg (8500 lb)	TBA
Weight (crated)	TBA	TBA	TBA	TBA
Overall Height	TBA	TBA	231 cm (90.8 in)	231 cm (90.8 in)
Overall Width	TBA	TBA	TBA	TBA
Overall Length	TBA	TBA	670 cm (264 cm)	TBA
ROLLER SPECIFICATIONS	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
Height	30 cm (12 in) from floor	30 cm (12 in) from floor	30 cm (12 in) from floor	30 cm (12 in) from floor
Speed	0.1 m/sec (20 ft/min)	0.2 m/sec (20 ft/min)	0.3 m/sec (20 ft/min)	0.4 m/sec (20 ft/min)
Load Capacity	1000 kg (2200 lb)	1000 kg (2200 lb)	2000 kg (4400 lb)	2000 kg (4400 lb)
Std entry bed length	TBA	TBA	TBA	TBA
Standard exit bed length	TBA	TBA	TBA	TBA
ENVIRONMENTAL REQUIREMENTS	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
Temperature	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)	5^{o} C to 40^{o} C (32^{o} F to 104^{o} F)
Relative Humidity	0% to 95% Non-condensing atmosphere	0% to 95% Non-condensing atmosphere	0% to 95% Non-condensing atmosphere	0% to 95% Non-condensing atmosphere
PC CONFIGURATION	**XIS 1517**	**XIS 1517-DV**	**XIS 1818**	**XIS 1818-DV**
CPU	Intel 2 Core Duo (E6000 Series) or faster	Intel 2 Core Duo (E6000 Series) or faster	Intel 2 Core Duo (E6000 Series) or faster	Intel 2 Core Duo (E6000 Series) or faster
RAM	2 GB or greater	2 GB or greater	2 GB or greater	2 GB or greater
Operating System	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release	Microsoft Windows XP™ Professional or later release
Video	256 Mb Video RAM or greater	256 Mb Video RAM or greater	256 Mb Video RAM or greater	256 Mb Video RAM or greater
LCD Displays	2 (up to 4 optional)	2 (up to 4 optional)	2 (up to 4 optional)	2 (up to 4 optional)
Disk Storage	160 GB or greater capacity	160 GB or greater capacity	160 GB or greater capacity	160 GB or greater capacity
UPS Protection	Line Interactive UPS	Line Interactive UPS	Line Interactive UPS	Line Interactive UPS

XIS Accessories and Options

The XIS product line can be customized for special applications and environments with the addition of following options and accessories. To order these options, please call the Customer Service Department. The Customer Service Contact information is available in *Business Contact Information Section, page 14.*

OPTIONAL FEATURE	DESCRIPTION
Advanced Image Arching	Increases image archiving storage to retains the last 100,000 bag images
Constant Voltage Stabilizer	The *Constant Voltage Stabilizer* (CVS) is an external device that protects the sensitive electronics inside the XIS from momentary damaging spikes and sags in electrical power. The CVS is placed between the incoming wall power outlet and the XIS system. The CVS plugs into the wall outlet and the XIS plugs into the CVS.
Custom Paint	Custom paint color and finish.
Computer Based Training Software	The *Computer Based Training* (CBT) system allows operators to train on the XIS system without the need to run parcels through the XIS. The CBT emulates the full functionality of the XIS system. The XIS or a standalone configured PC can be used as training terminal.
Mobility Kit	The *Mobility Kit* replaces the small plastic caster wheels on the frame with larger rubber wheels. The rubber wheels allow easier movement of the XIS units.
Polar (Cold Temperature Operation) Kit	The Polar kit provides an electric thermal blanket to protect the x-ray generator (the most temperature sensitive component of the XIS) from excessively cold temperatures.
Remote Console Table	The *Remote Console Table* (RCT) is a separate table that holds the display monitor(s), the operator control console, and the key-switch.
Roller Extension Table	The *Roller ExtensionTable* adjoins the ends of the XIS. • Roller tables on the entry end of the XIS provide space for users to prepare items for placement onto the conveyor belt. • Roller tables on the exit end of the XIS protect items from dropping onto the floor when they exit the inspection tunnel. • Roller tables are modular sections and are available in two sizes: 0.5 and 1.0 meter length. The modular sections can be interconnected into custom lengths.
Tropical (High Temperature Operation) Kit	The “Tropical” kit includes high velocity ventilation fans to protect the XIS from excessively high temperature operation.
TIP Software	*TIP* refers to Threat Insertion Projection. The *TIP Software* option provides the XIS operator online training and testing in “threat” recognition during regular screening operation. TIP also enhances operator alertness and vigilance through constant performance monitoring and reporting.

Table 1 – XIS ACCESSORIES AND OPTIONS

APPENDIX – B SOME GUIDELINES ON WHAT CAN BE X-RAYED

Below are some general guidelines on what can be x-rayed with your XIS. See your facility's security manager for specific guidelines.

	ITEM TO BE INSPECTED.	COMMENTS
1.	Water in a leak proof container	• Water is unaffected by x-rays. • Water (in a container) can be safely inspected with the XIS and is safe to drink afterwards.
2.	Open liquid container	• Do **NOT** allow the entry of open containers of liquids into the x-ray tunnel. • They may spill and damage the electrical components inside the XIS.
3.	Foods	• Foods are unaffected by x-rays from the XIS. • Foods can be safely inspected with the XIS and are safe to consume afterwards. • X-rays from the XIS do NOT cook or sterilize the food.
4.	Cosmetics	• Cosmetics are unaffected by x-rays from the XIS. • Cosmetics can be safely inspected with the XIS and are safe to use afterwards.
5.	Electronics including computers, calculators, cell phones, *PDA*s and *IPods* ™	• Electronics are unaffected by x-rays from the XIS. • They can be safely inspected with the XIS.
6.	Camera Film	• X-rays ONLY affects undeveloped film. • Developed film and printed pictures are unaffected by x-rays. • Avoid x-raying undeveloped x-ray radiography film, scientific film, and special high speed films. • Most consumer photography film is low speed (i.e. between 25 to 1600 ISO) and is unaffected by x-rays.
7.	Flowers and plants	• Flowers and plants are unaffected by x-rays from the XIS. • They can be safely inspected with the XIS.
8.	Pets	• Please be sensitive to the pet and its owner. • The TSA recommends that you use a metal detector and visually and physically inspect the pet. • Have the owner remove his pet from its carrier and separately inspect the carrier with the XIS.
9.	Sharp objects	• Be careful! • Very sharp objects can cut the conveyor belt and the x-ray curtains.
10.	Bags, packages, and other articles.	• The vast majority of inanimate objects are unaffected by x-rays and can be safely inspected with XIS. • See your facility's security manager for specific guidelines.

APPENDIX – C QUICK STARTUP GUIDE

TO TURN ON SYSTEM	1. Make sure the XIS is plugged in. 2. Turn the main AC switch to the ON (vertical) position. 3. Insert the key in to the key-switch. 4. Turn the key-switch (90^{o} clockwise) to the (horizontal) ON position. 5. Wait for the *Please Log In* screen to appear.
TO LOGIN	1. At the *Please Log In* screen, move the cursor over the Operator icon and double tap the touchpad. 2. Move the cursor to the down arrow [⩛] which is located on the right side of the *User Name* entry box. Tap the touchpad to pull down the User-Name list. 3. Move the cursor over your User Name and double tap on the touchpad. 4. Enter your numeric password. 5. Wait for *System Ready* screen to appear..
TO GET X-RAY IMAGES	1. Press the [**LEFT**] (or [**RIGHT**]) button. 2. Place bags and packages on the entry end of the conveyor belt • Let conveyor carry the items through the x-ray tunnel. • X-ray images of the bags are displayed when the bags enter the x-ray tunnel. 3. Examine the scanned image very carefully. 4. Remove the bags and packages from the conveyor belt when they exit the tunnel. 5. Press [**STOP**] when there are no longer bags or packages to examine.
TO TURN OFF SYSTEM	1. Turn the key-switch (90^{o} counter clockwise) to the OFF (vertical) position. 2. Wait for the PC monitor screen to turn off. 3. Remove the key from key-switch and safely store the key.

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Image Adjustment Buttons

IMAGE ADJUSTMENT BUTTON	BUTTON FULL NAME	AFFECTED SCREEN	DESCRIPTION OF OPERATION
[**B/W**]	Black & White (Black on White)	B/W Screen (Right Monitor)	Display the default normal B/W (black on white) video on the B/W Screen.
[**COLOR**]	Color	Color Screen (Left Monitor)	Display the default color screen on the B/W Screen.
[**DARK**]	Darken Contrast	Color Screen or B/W Screen	Darken (lower the contrast on) the screen.
[**INORG**]	Inorganic	Color Screen (Left Monitor))	Adjust the Color screen (the monitor on the right) by "subtracting" out organic items from the display
[**LIGHT**]	Lighten Contrast	Color Screen or B/W Screen	Lighten the contrast on the screen
[**NORM**]	Normal Contrast	Color Screen or B/W Screen	Resume normal contrast on the screen
[**ORG**]	Organic	Color Screen (Left Monitor)	Adjust the Color screen by "subtracting" out the inorganic items from the display
[**PSEU**]	Pseudo Color (White on Black)	B/W screen (Right Monitor)	Display the B/W image in colors. The coloration is based strictly on screen brightness, not on Z-number.
[**B/W REVERSE**]	Reverse (White on Black)	B/W screen (Right Monitor)	"Invert" B/W screen display (to white on black). White is displayed as black and vice versa. Intermediate gray scales are similarly inverted
[**CONT SCAN**]	Continuous Scan Mode	Color Screen & B/W Screen	Enable / Disable Continuous Scan Mode (CSM) when conveyor belt is running. SCM allows imaging of thin items. Exceptionally thin items may go under the x-ray inspection tunnel's photocells that trigger the x-rays to turn on. CSM allows imaging of these items. X-rays are ONLY generated when the conveyor belt is running. Stopping the conveyor STOPS the production of x-rays. • Pressing [CONT SCAN] starts CSM imaging. • Pressing [CONT SCAN] again, stops (i.e. turns off) CSM. • Note → after enabling CXO, you must start the conveyor to begin imaging.
[**PICTURE PERFECT**]	Picture Perfect Imaging	Color Screen & B/W Screen	Enable / Disable Picture Perfect Imaging "Picture Perfect " imaging mode displays enhanced contrast imaging of organic items. To use Picture Perfect : • Stop the belt after imaging a bag. (i.e. Press [**STOP**] button.) • Press [**PICTURE PERFECT**] to display the same image with enhanced "Picture Perfect" detail. Press [**PICTURE PERFECT**] to resume normal imaging. (You can also press any other image adjustment buttons to automatically exit "Picture Perfect" imaging mode.)

SYSTEM CONTROL BUTTONS

CONTROL BUTTON	FULL BUTTON NAME	DESCRIPTION
[**ATOM**]	Atomic Number	Display Atomic (Z) number
[**EXIT**]	Exit	Exit and return to the "Please Log In" screen.
[**IA**]	Image Archive	Display Image Archive Menu
[**LEFT**]	Left Conveyor	Run conveyor in the left (right to left) direction.
[**RIGHT**]	Right Conveyor	Run conveyor in the right (left to right) direction.
[**STOP**]	Stop	Stop conveyor.

PC KEYSTROKE	XKEY CONTROL PAD EQUIVALENT KEYSTROKE	BUTTON FULL NAME	DESCRIPTION
F1	[**RIGHT**]	REVERSE CONVEYOR	Run conveyor belt in right direction
F2	[**STOP**]	STOP	Stop the conveyor
F3	[**LEFT**]	FORWARD Conveyor	Run conveyor belt in left direction
F4	[**B/W**] [**REV**] [**PSEU**]	Toggle Black & White Screen Display Mode	Adjust B/W screen. Toggle Black & White Screen (left side monitor) from (1) normal B/W mode to (2) *REVERSE VIDEO* and then to (3) *PSEUDO COLOR* mode.
F5	[**COLOR**] [**INORG**] [**ORG**]	Toggle Color Screen Display Mode	Adjust Color screen. Toggle Color Screen from (1) (Normal) COLOR To (2) ORGANIC display mode and then to (3) INORGANIC display mode.
F6	[**DARK**]	DARKEN Contrast	Adjust screen contrast to darken the image. on both Color and B/W monitor screens.
F7	[**LIGHT**]	LIGHTEN Contrast	Adjust screen contrast to lighten the image on both Color and B/W monitor screens.

PC KEYBOARD – CONTROL PANEL EQUIVALENCE

APPENDIX – D ENHANCED STARTUP

Version 2.1.2.5 software has an enhanced startup sequence that includes an x-ray imaging "Calibration" sequence. The calibration verifies normal x-ray generator output and x-ray data acquisition. The calibration sequence begins automatically after user login. After login, you will be prompted to clear the inspection tunnel. The following message appears:

Calibration Required. Please clear tunnel and click continue.

Click [**Continue**].

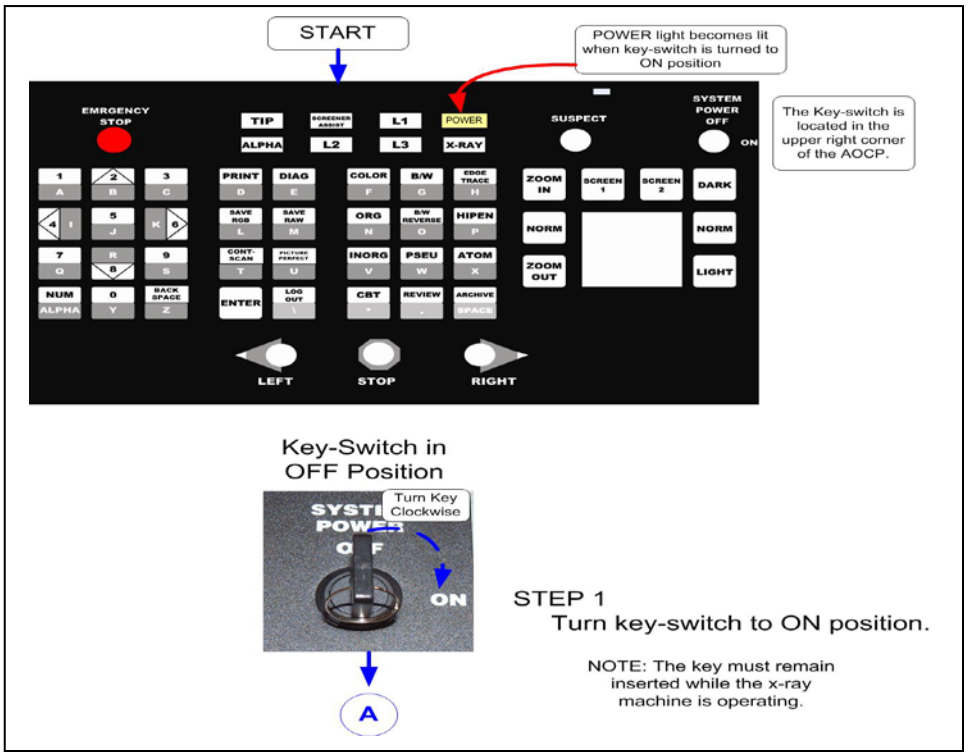
You will next be prompted with the following message.

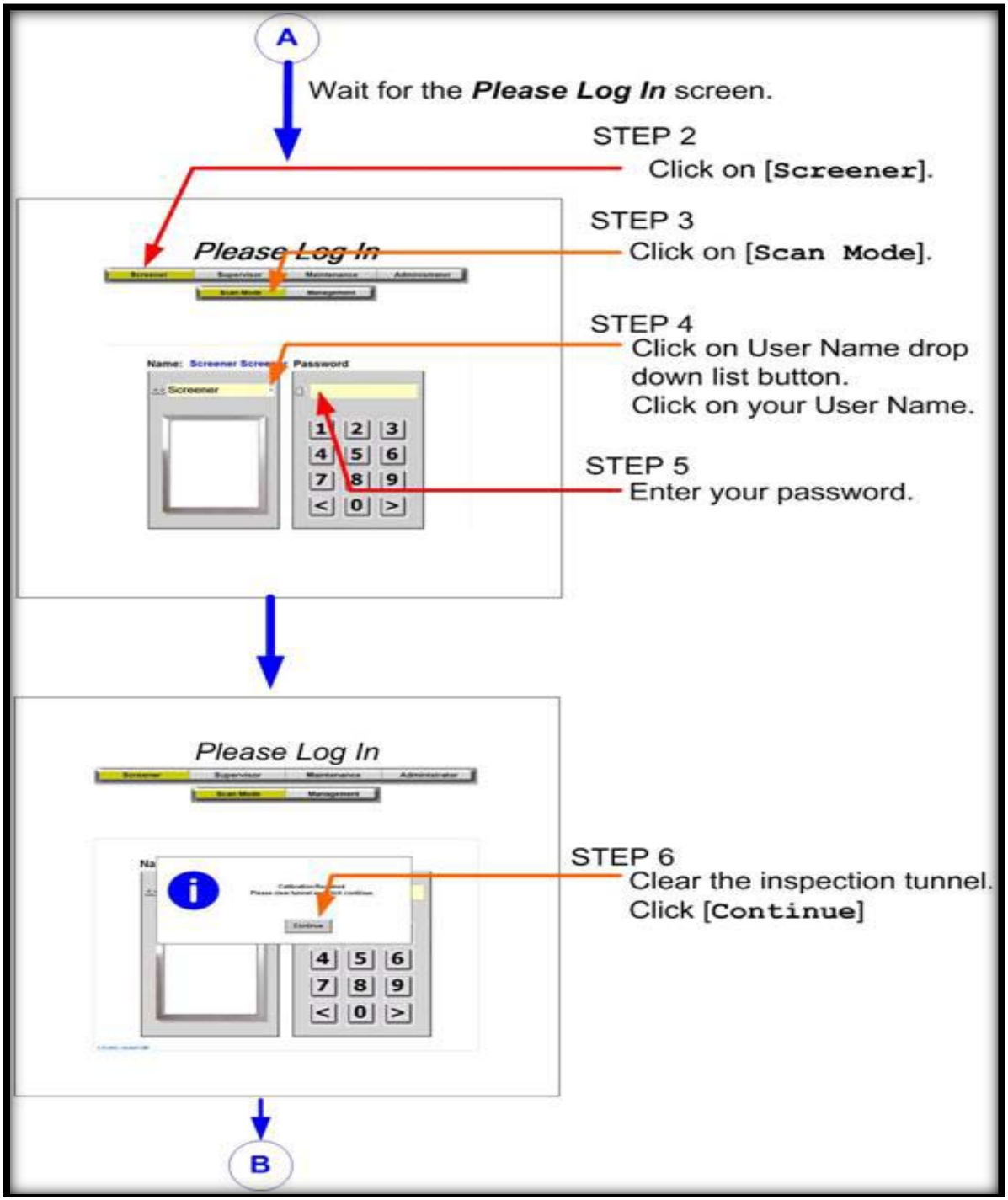
Warning x-rays and conveyor will be turned on. Click OK to start calibration

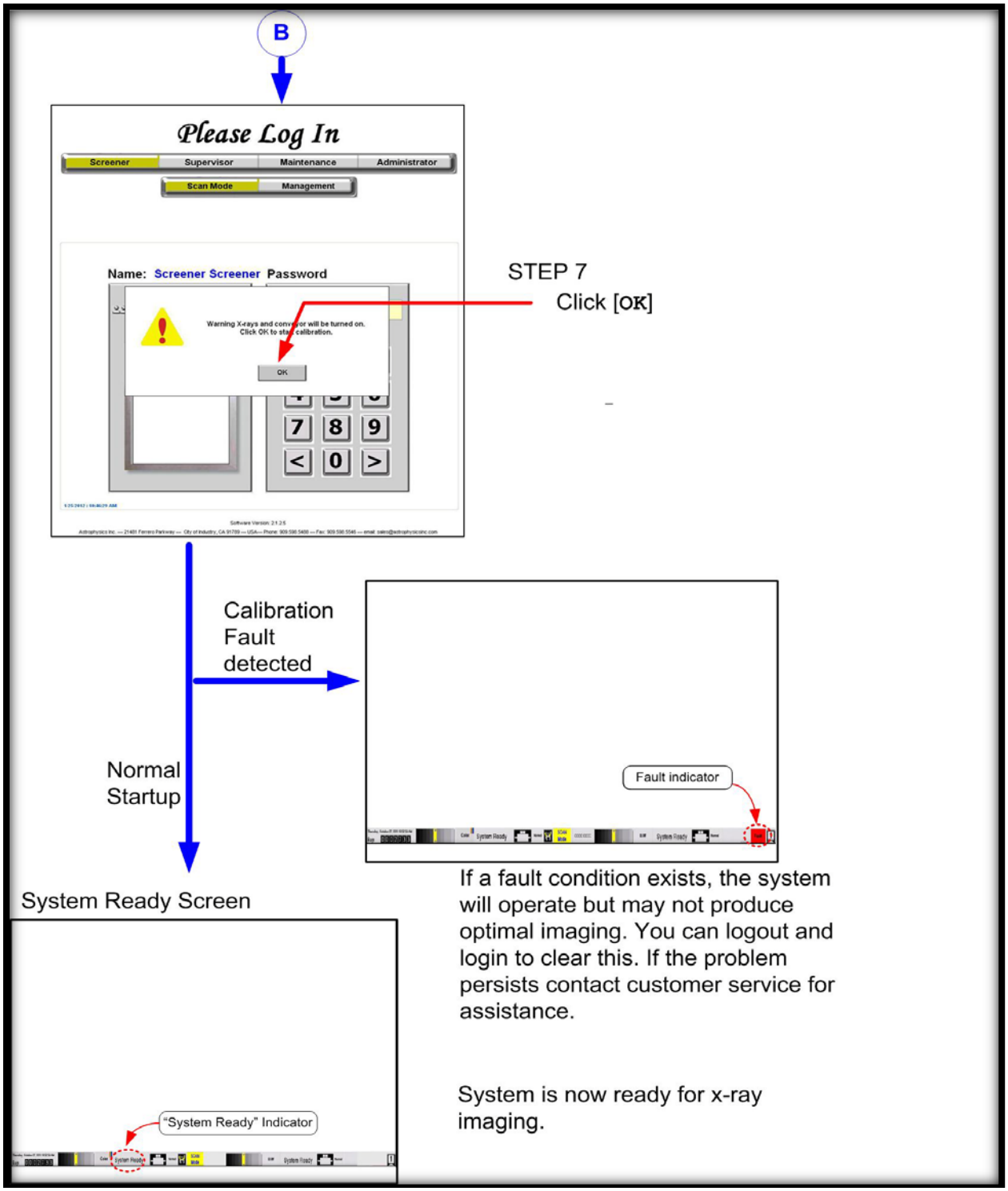
Click [**OK**].
The "System Ready" screen will appear when the Calibration process is complete.

A fault message will appear if a problem is detected. The x-ray machine can still produce x-ray images. But the imaging may less than optimal. In this case, you can logout and login and force retry of the calibration process. If imaging problems persists, contact customer service for assistance.

The drawing below summarizes the enhanced startup with calibration.




A
Wait for the Please Log In screen.
STEP 2
Click on [Screener].
STEP 3
Click on [Scan Mode].
STEP 4
Click on User Name drop down list button.
Click on your User Name.
STEP 5
Enter your password.
Please Log In
STEP 6
Clear the inspection tunnel.
Click [Continue]
B


B
Please Log In
Screener
Supervisor
Maintenance
Administrator
Scan Mode
Management
Name: Screener Screener Password
OK
STEP 7
Click [OK]
Calibration Fault detected
Normal Startup
Fault indicator
System Ready Screen
"System Ready" Indicator
If a fault condition exists, the system will operate but may not produce optimal imaging. You can logout and login to clear this. If the problem persists contact customer service for assistance.
System is now ready for x-ray imaging.

APPENDIX – E ABBREVIATIONS AND GLOSSARY

AOCP – Advance Operator Control Panel

ASTM -American Society for Testing and Materials (ASTM). ASTM International, is an organization focused on the development of technical standards for materials, products, systems, and services.

CBT – Computer Based Training

DAS – Data Acquisition System. DAS is a PCI board that converts analog data from the x-ray detectors into digital imaging data.

FAA– Federal Aviation Administration. The FAA was created by the Federal Aviation Safety Act of 1958. The FAA is responsible for regulating civil aviation in the United States.

Ionizing radiation – Refers to electromagnetic radiation or energetic particles capable of producing ions, electrically charged atoms. Ionized atoms tend to be very chemically reactive. In living tissue, ionized atoms can disrupt cellular processes. Forms of ionizing radiation include x-rays, gamma rays, alpha particles, beta particles, and neutrons.

KV – Kilovolts

LED – Light Emitting Diode

LXDA – Linear X-ray Detector Assembly

mA - milliampere

PDA– Personal Digital Assistant

PLC – Programmable Logic Controller

Roentgen – A unit of dose equivalence used to measure human radiation exposure, which considers the biological effects of different types of radiations. Roentgen exposure is calculated by absorbed dose in RADs multiplied by the quality factor.

TIP– Threat Insertion Projection

TSA – Transportation Security Administration. The Transportation Security Administration(TSA) was created in as part of the Aviation and Transportation Security Act of 2001. The TSA is responsible for protecting the U.S. transportation systems.

UPS – Uninterruptible Power Supply

XIS – X-ray Imaging System.

X-Rays - X-rays are a very penetrating form of electromagnetic energy. They are produced by the interaction of matter with electrons or other x-rays. X-rays have a wavelength typically less than 100 angstroms .

APPENDIX – F COPYING IMAGES FROM DV TO CBT SYSTEM

Step 1: If the DV System is not started and running → Turn it ON.

Step 2: Exit XIS Application software.

Press [LOGOUT] if you are already logged in.

At the “Please Log In Screen” , move the cursor to the User Entry field. and press [ENTER].

Step 3: Insert a USB memory stick in an open USB slot.

Step 4: Go to the Window Explorer.

Right Click start.

Click “explore”

Copy the contents of

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