Astrophysics Inc.
XIS and VI X-ray Imaging System
Icon-Based AOCP User Manual

XIS 5335	XIS-1080
XIS-5335S	XIS-1080D
XIS-6040	XIS-1210D
XIS-6040M	XIS-100XD
XIS-6545	XIS-100XDX
XIS-6545DV	XIS-5335SD
XIS-7858	XIS100XDV
XIS-100X	XIS-5878
6545VI	7858VI
XIS 1517 180/200kV	XIS 1818 180/200kV
XIS 1517DV 180/200kV	XIS 1818DV 180/200kV

Document Description

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Confidential and Proprietary Notice

Conventions Used In This Manual

Throughout this manual, the Astrophysics *XIS X-ray Imaging System* is referred to as the *XIS*. The 6545VI and 7858VI will be referred to as the VI. When referred to collectively and/or generically, they will be referred to as the *XIS/VI.*

Operator console and on-screen button presses are specified in "square" ("[", "]") brackets. For example, pressing the STOP button on the keypad 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.

NOTE: Very important operational information is highlighted in yellow and preceded by the word "**NOTE**" bolded and in caps.

WARNING!

INFORMATION RELATED TO PERSONAL SAFETY will be contained in a read box with the WARNING heading and preceded by the warning triangle.

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Introduction

Icon-Based AOCP

This manual covers Astrophysics XIS and VI security X-ray machines using the new Icon-Based AOCP (Advanced Operator Control Panel).

Astrophysics XIS and VI Line

The XIS/VI line of baggage and parcel inspection machines combines the latest security X-ray technology and software with product reliability, and world-class customer service. Following are short descriptions of some of the features shared by this wide range of machines.

Real Time Diagnostics

This feature allows users to easily and thoroughly monitor machine health, which increases lifespan and facilitates maintenance.

6 Color Imaging

6 Color Imaging enables operators to achieve optimal material identification by allowing them to view screened objects in 6 colors, each color correlating to a specific range of Atomic Z-Numbers.

Image Processing and Zoom

The various XIS/VI models boast enhanced image processing, including 6 Color Imaging for increased threat discrimination, and Zonal Zoom, which allows operators to use the alphanumeric keypad to zoom in to any part of any image without having to reposition =the image or cursor. XIS/VI software increases zoom capability by utilizing true data so that images are neither stretched nor distorted.

Upgraded DAS

An advanced Data Acquisition System reduces electro-magnetic interference and gives the XIS/VI improved noise immunity.

Upgraded VI Frame

The VI features an upgraded frame, transparent tunnel extensions that increase safety and yet allow an unobstructed view of packages before they enter the tunnel, and lightweight panels designed to ease access to the machine for service personnel.

The XIS/VI Line

The Astrophysics Inc line of XIS (X-ray Inspection Systems) and VI machines consists of several models. This manual will cover generalities that apply to non-pallet Astrophysics X-ray inspection systems. In most cases, an Astrophysics XIS-6545 or 6545VI will be

used for illustrations and in photographs. When possible, variations peculiar to specific models will be described. If your X-ray machine is a different model from the models shown in a particular figure, you can determine the location of a component using the appearance of the component shown in the figure and the relative location of other components shown in the figure.

The following figures show the Astrophysics XIS/VI models covered by this manual. Please note that XIS pallet units and VI<u>Z</u> models (as opposed to VI models) are covered in separate manuals.

XIS 5335

XIS-5335S

XIS-5335DS

XIS-6040

XIS-6040M (mobile)

XIS-6545

6545VI

XIS-6545DV

XIS-7858

7858VI

XIS-5878

XIS-100X

XIS 100XD

XIS-100XDX

XIS-100XDV

XIS-1080

XIS-1080D

XIS1210D

1517 180/200kV Single View

1517 180/200kV Dual View

1818 180/200kV Single View

1818 180/200kV Dual View

Acronyms and Abbreviations

ACRONYM/ ABBREVIATION	DEFINITION
AC	Alternating Current
AOCP	Advanced Operator Control Panel.
B/W	Black & White, an imaging function
BMP	Bitmap file extension (.bmp)
CBT	Computer Based Training, an XIS simulator mode
DA	Density Alert
DAS	Digital Acquisition System board, a PCI board within the PC which clocks and receives detection signals from the LXDA array.
DC	Direct Current
DCI	Diagnostics and Control Interface board, a board inside the XIS machine
DHS	Department of Homeland Security
DIAG	Diagnostic
DV	Dual View, an XIS machine with two generators, each generating its own view of scanned bags
EMI	Electromagnetic interference
EOB	End of Bag. As the end of the scanned bag is detected by the PEC, the X-ray generator is turned off.
ESD	Electrostatic discharge
E-stop	Emergency Stop button
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FSE	Field Service Engineer
GUI	Graphical User Interface

ACRONYM/ ABBREVIATION	DEFINITION
HE	High Energy diode
HIPEN	High Penetration
IA	Image Archive (sometimes also refers to Image Annotation)
IED	Improvised Explosive Device
INORG	Inorganic
IR	Image Review
kV	Kilovolts
LAN	Local Area Network
LE	Low Energy diode
LED	Light Emitting Diode, has various uses in an XIS, including system status lights, PCB components, and type of monitor.
LXDA	Linear X-ray Detector Assembly, includes main board, daughter board, and bracket. These are the boards that receive X-ray beams after they have passed through the tunnel and any bags in the tunnel.
mA	Milliamperes (X-ray generator tube current)
MC/B	Main circuit breaker
NUM	Numeric, an AOCP key function and mode (two modes: Alpha and Numeric)
ORG	Organic
OS	Operating System
PC-PLC	Programmable Logic Controller, an interface board between the PC and PLC
PEC	Photoelectric Cell, an “electric eye” that senses the presence of items as they enter and exit the XIS inspection tunnel, triggering the X-ray generator to turn on. When an item passes in front of the PEC, the PEC is “blocked.”
PP	Picture Perfect, an image processing function

ACRONYM/ ABBREVIATION	DEFINITION
PS	Power Supply
PSEU	Pseudo Color, an image processing function
P/W	Password
RGB	Red/Green/Blue, a graphic color designation. “SAVE RGB” is a screen capture key on the AOCP, which saves a bitmap of the current screen to the “Exports” folder in Xray Client.
REM	Roentgen Equivalent in Man, a measure (unit of) of radioactivity
SA	Screener Assist, an automated atomic number-based threat detection feature.
SCS	System Configuration Screen
SOB	Start of Bag. When the bag is first detected by the PEC, the X-ray generator turns on.
TIP	Threat Image Projection, a program which projects simulated images of threat objects onto the screen, for training and testing purposes
TSA	Transportation Safety Administration
UPS	Uninterruptible Power supply. In the event of a power failure, the UPS will maintain power to the XIS until it can be cleanly shut down
U/N	User Name. A screener’s name, which the screener uses at login.
V	Volts
VDC	DC Voltage
VI	Virtual Image system
XIS	X-ray Imaging System
XRG	X-ray Generator

Safety

WARNING!

The Astrophysics XIS/VI 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 Astrophysics XIS/VI X-ray imaging system machines. It is intended for all users of XIS/VI machines.

Safety Features

Astrophysics XIS/VI X-ray Imaging systems (hereinafter referred to as XIS/VI) have 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 stop (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 sense when objects enter and exit the inspection tunnel. The X-ray generator is activated only for the minimum amount of time necessary to image items traversing the inspection tunnel, except when in Continuous Scan mode (described later). X-rays are NOT produced when the conveyor is stopped,.
- Emergency Stop switches (at both the entrance and exit of the X-ray tunnel), that can be pressed to immediately stop (power off) the X-ray generator and the conveyor belt. There is also an Emergency Stop switch on the AOCP (Advanced Operator Control Panel).
    - Pushing the Emergency Stop switch (E-stop) down will stop all X-rays and the conveyor. To disengage, turn the knob clockwise and the knob will “pop” back out to the “OFF” position.


- Green Power-ON LED lamps at each end of the X-ray tunnel and on the AOCP to indicate when the system is powered on and ready for use.
- Red warning X-ray ON LED lamps at each end of the X-ray tunnel and on the AOCP to indicate when X-rays are being generated.
- Circuit breakers that disconnect power from the main AC input into the XIS/VI if the unit becomes overloaded.
- A key-switch that requires that a key be inserted and turned to the “ON” position to power up and operate the XIS/VI unit.
- The optional foot-mat switch that requires the continuous presence of an operator, manning the controls, while the conveyor and X-ray generator are being used.
- Password protected access to the application software.
- Prominent labels that warn users to not insert any part of their body when the X-rays are produced.

Safety Precautions

The XIS/VI is designed to be safe and easy to use. However, all major electromechanical devices can be hazardous and should be treated with care and respect. When operating the XIS/VI, follow the safety precautions below:

- Do NOT operate the unit outdoors. The XIS/VI must be protected from moisture, precipitation, and extremes of temperature.

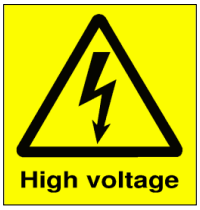
- Connect the unit to a well grounded power outlet. The XIS/VI requires a reliable protective earth ground to operate.

- Do not operate an X-ray machine without a good earth (electrical) ground.
- Do NOT operate the unit when the X-ray curtains are torn or missing.

- Do NOT insert any part of the body into the inspection tunnel while X-rays are energized. Avoid all unnecessary radiation exposures.
- Clear the X-ray tunnel of all items before starting the unit.

- If material should become jammed during operation, the machine must be turned off before an attempt is made to clear the inspection tunnel area. 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 **BEFORE** attempting to clear the tunnel.
- Although the system utilizes an extremely low X-ray dose, wait until scanned items are completely out of the inspection tunnel in order to avoid any unnecessary radiation exposure.
- Ensure that the conveyor and X-rays are off before reaching into the inspection tunnel. The X-ray **ON** warning lights is lit when X-rays are being produced. The X-ray ***ON*** lights are located above the entrances of the inspection tunnel, on the operator console, and on bottom right of the status bar on the X-ray imaging screen.
- If required, post appropriate signs around the XIS/VI to warn people that they are in the vicinity of a device that produces and uses X-ray radiation.
- Check the *Power **ON*** and the *X-ray **ON*** lights for proper operation before using the baggage X-ray machine. The Power **ON** light becomes lit when the key-switch is turned to the **ON** position. The X-ray **ON** light will momentarily turn on and off when the conveyor belt is just started. (The momentary operation of the X-rays allows for "*X-ray data normalization*"). The X-ray **ON** light becomes lit again when the X-ray generator is producing X-rays for imaging. This occurs when objects are carried through the X-ray tunnel by the conveyor.

- The XIS/VI internally uses high voltages. All cover panels must be closed and securely fastened before system operation.



- Be careful of sharp objects that can cut the X-ray curtains and conveyor belt.

- If a threatening object is identified, follow the procedures established at your facility for handling such objects.
- Always perform a comprehensive radiation survey and safety inspection after an XIS/VI is serviced.
- Turn "OFF" the equipment as soon as an unsafe operating condition or procedure develops or might develop. Inform your supervisor who will contact the maintenance technician. The machine is a sophisticated piece of electronic equipment and must be treated with care. All service adjustments or repairs must be done only by qualified personnel.
- Do not open the access panels during operation. These panels are designed with safety switches to prevent exposure to high voltage and radiation.
- The optional foot mat switch is a design safety component that requires the operator to stand on it when operating the machine. Do not place heavy objects on the foot mat switch to defeat it.
- Keep hands, finger, clothing and hair away from conveyor rollers.
- Do not sit on or attempt to ride the conveyor. Never use the machine as a toy.
- Do not stand closer than necessary to the X-ray machine. Do not allow anyone to loiter within 2 meters (approx. 6 feet) of the X-ray chamber or conveyor belt at any time. Never leave the machine unattended.
- Do not place any objects such as plants, coffee cups, pop cans, bottles etc. on top of the machine. The liquid, if spilled from these containers, could create a potential shock hazard which may be fatal.
- Do not obscure or cover the X-ray "ON" warning lights or the x-radiation warning signs. These items must be clearly visible at all times.

WARNING!

Always turn off and disconnect power to the XIS/VI BEFORE servicing the X-ray generator or removing any radiation shielding.

- Do NOT operate the XIS/VI unless all radiation shielding is properly installed and functioning correctly. Ensure that all access panels are closed before operating the XIS/VI.
- Perform a comprehensive radiation survey after servicing the XIS/VI.
- Do NOT allow the XIS/VI to operate if external radiation leakage exceeds 0.1 mR/hr (0.001 mSv/hr).
- The XIS/VI is recognized by the U.S. Food and Drug Administration (FDA) as a cabinet X-ray device.
- In the U.S., the XIS/VI is regulated by *U.S. FDA Center for Devices and Radiological Health*. The XIS/VI complies 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 Device.
- In Canada, the XIS/VI is regulated by *Health Canada*. The XIS/VI complies with Canadian statutes including but not limited to *Canada Safety Code 29*.
- In Canada, Health Canada requires registration of all baggage X-ray machines.
- United States and Canadian law requires that the XIS/VI should ONLY be installed, relocated, and serviced by a (factory) trained and certified technicians. There are no user serviceable parts inside the machine.
- American and Canadian law requires the usage of only factory certified replacement parts in the XIS/VI.
- For service and support contact Astrophysics Customer Support.

U.S. Federal Health and Safety Regulatory Compliance

The XIS/VI is classified as a *Cabinet X-ray Device*. It complies with the following U.S. Federal Health and Safety Regulations applicable at time of manufacture:

- U.S. Food and Drug Administration, Department of Health and Human Services, Center for Devices and Radiological Health, Code of Federal

Regulations Title 21 Section 1020.40, *Radiological Health Standards for Cabinet X-Ray Systems*;

- U.S. Federal Aviation Administration, Code of Federal Regulations Title 14 Section 108.17, *Use of X-ray Systems*; and;
- U.S. Federal Aviation Administration, Code of Federal Regulations Title 14. Section 129.26, *Use of X-ray Systems*.

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 initial and annual radiation safety surveys.
- Some jurisdictions, including Canada, require certification of baggage X-ray machine operators.
- In Canada, personal dosimeters are not required for baggage X-ray machine operators.
- XIS/VI 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 operations you may identify hazardous contraband, weapons, explosives, and other threats in the bags, packages, and articles that you are examining with your XIS/VI. Plan ahead. Have your facility security manager prepare clear and concise instructions for handling these situations. Be prepared to follow them.

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Product Support

Chapter Overview

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

Product Warranty

Per the terms of your sales contract, the XIS/VI 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 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/VI. Momentary high voltage spikes, for example, can severely damage the electronics and X-ray generator inside the XIS/VI. Astrophysics Inc. does not warrant the XIS/VI against damage caused by improper input power. Astrophysics recommends that the XIS/VI 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/VI 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/VI. The requirements for a voltage transformer, line conditioner, and UPS vary by the XIS/VI 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/VI:

- 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/VI, 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/VI system,

NOTE: The *Serial Number* of the XIS/VI is 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

The Icon-Based AOCP (Advanced Operator Control Panel)

Software and Hardware Revisions

Astrophysics Inc is constantly improving its hardware and software. Its user and maintenance manuals reflect those continuing improvements by covering both past and newer versions of its products.

This section describes the Icon-Based Astrophysics Advanced Operator Control Panel (AOCP). This is the latest version of the XIS operator console, replacing the Alpha Numeric AOCP.

In tandem with the new AOCP, Astrophysics has upgraded the imaging application (Xray Client) to version 2.1.2.6, which also affects some of the form and functionality of the XIS and the AOCP. If your XIS uses the Alpha Numeric AOCP, contact Astrophysics Customer service for the appropriate user manual or to upgrade to the Icon-Based AOCP.

For information on foreign-language AOCPs, contact Astrophysics Customer Service (see inside front cover of manual for contact information).

Figure 1: XIS/VI Icon-Based AOCP

Suspect Button and Key switch

Figure 2 shows the Suspect button and System Power key switch in the upper right corner of the XIS/VI Icon-Based AOCP.

Figure 2: Suspect Button and Key switch

Suspect Search Station

The Suspect Button works in conjunction with Astrophysics' optional Suspect Search Station, as well as with Astrophysics' Threat Image Projection (TIP) and Image Annotation programs.

The Suspect Button works by sending out a 12 volt signal every time the button is pushed. It sends that signal out whether or not an optional Suspect Station, TIP or Image Annotation are present or enabled on the XIS machine.

The 12 volt signal can also be used to activate an audio and/or visual alarm if such an alarm is installed.

Key-switch

The key switch turns power on and off to the XIS/VI via the AOCP. In the vertical "up and down" position, power is OFF. To turn power on, turn the key switch to 90 degrees clockwise to the horizontal "ON" position.

Touchpad, Light/Dark, and Zoom

Figure 3 shows the section of the AOCP below the Suspect button and key-switch.

Figure 3: Touchpad, Contrast, and Zoom Buttons

Touchpad

In the center of this group of buttons is the touchpad, which operates exactly as does the touchpad on a modern laptop computer, substituting for a mouse.

The upper right corner of the touchpad operates as does the right button of a two-button mouse. Tap here to bring up right-button mouse menus.

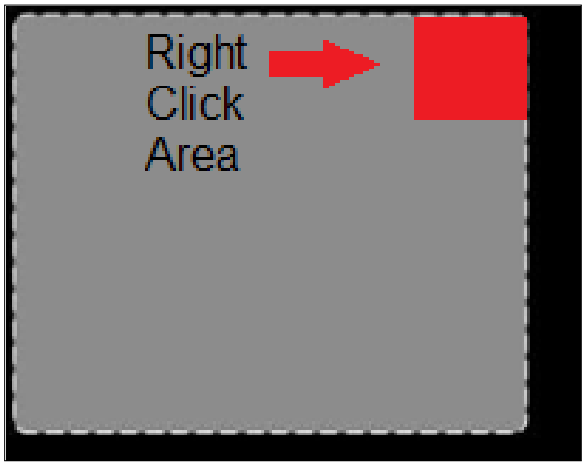


Figure 4: Double Click Area

Moving your finger up and down the right side of the touchpad will cause the screen to scroll, thus acting as a scroll bar.

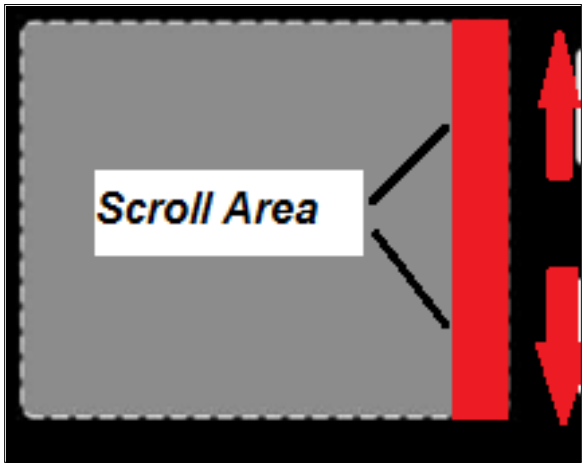


Figure 5: Scroll Area

Tapping or double-tapping the touchpad will act as “ENTER” on certain screens, or same as a left-button mouse function. Double tapping and then keeping your finger on the touchpad after the second tap will create a “drag-and-drop” situation, allowing the User to move windows or to select an area of the screen or image.

Light/Dark

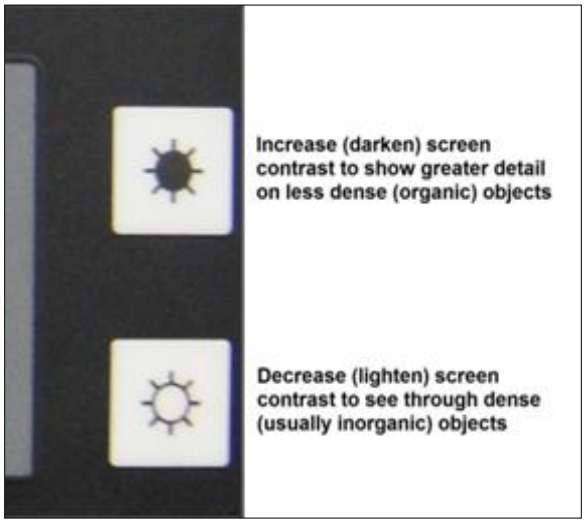
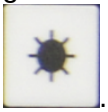


Figure 6: Light/Dark Buttons

On the right side of the touchpad, there are two buttons called [**LIGHT**]  and [**DARK**]  .

As the name implies, the [**LIGHT**] button lightens the images on a screen, which can help the XIS to more effectively see through dense objects. The [**DARK**] button darkens images to help show greater detail in less dense objects.

NOTE: With the introduction of Astrophysics X-ray software version 2.1.2.6 in January 2014, the Light/Dark function has changed slightly. The transition between degrees of darkness or light are now so small that it gives the feel of a continuous transition between shades of light and dark. An operator can press the [**DARK**] or [**LIGHT**] button repeatedly to move the indicator slightly to the left or right on the Dark/Light scale, or can hold either the [**LIGHT**] or [**DARK**] button down and have the indicator move seemingly continuously up and down the scale. At the time of writing this manual, 2.1.2.6 has not yet been introduced to VI machines.

Figure 7 shows an image that has been brightened (the [**LIGHT**] button has been pressed). Note the Light/Dark scale located to the right of the bag counter. The slide on that scale is to the right of center, indicating the screen and image have been lightened.

Figure 7: Bright

Figure 8 shows an image that has been considerably darkened by pressing and holding the [**DARK**] button. Note that the slide on the Light/Dark scale is to the left of center; indicating the [**DARK**] button has been pressed.

Figure 8: Dark

Image Zoom Control Buttons

The buttons on the left side of the touchpad are zoom buttons. The Zoom In button is in the upper left corner. The button beneath that is the Zoom Out button.

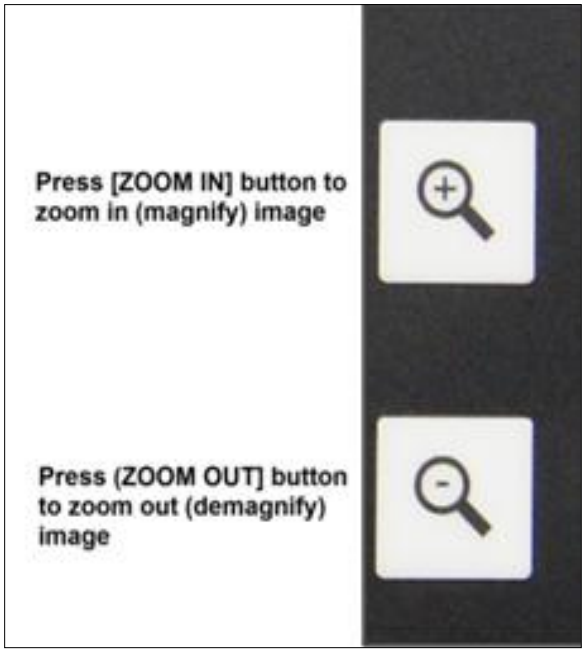


Figure 9: Zoom Control Buttons

Please note that the zoom steps are not equal in magnitude. The first zoom is approximately 2x, while the second step is closer to 3.5x. This is done to give the user finer gradients of zoom, which helps in maintaining the object's clarity before it becomes too pixelated to be recognizable.

Dual View versus Single View

The Zoom feature varies slightly depending on whether the system is a dual view vs. a single view system, and on the number of monitors used. For example, on a dual view system using two monitors, both monitors will zoom independently (because each view is totally independent of each other, generated by separate generators). On a single view system using two monitors, both views will zoom simultaneously.

Even within these general rules, there are exceptions. For example, unlike other image processing modes, Picture Perfect will zoom simultaneously on dual monitor/single view systems.

To understand these differences more clearly, remember that on a single view system with two monitors, both monitors are showing the same view, though they may be showing it in a different mode. For example, on a single view/dual monitor system, the left monitor may be in color, while the right monitor may be in black and white, or black and white reverse. Both monitors, however, are still showing the same view of the scanned object.

Contrast that with a dual view/dual monitor system, in which each monitor is showing a different view of the scanned object, and each view can be treated completely individually.

In addition, depending on the version of the operating software, Zoom may act differently while scanning as opposed to while the belt is stopped and scanning has ceased (with the scanned image still on screen). Experiment with Zoom (and with all other functions) to determine how your specific machine functions, with its specific operating system version and hardware configuration.

Zoom In

- Press the [**ZOOM−IN**] button. 
- The pointer cursor will appear on the screen. Use the touchpad to move the cursor over the area of interest on the screen. Each press of the [**ZOOM-IN**] cursor increases the screen magnification up to a maximum of 32x zoom.
- The screen returns to normal magnification (1x) when the [**HOME**] button is pressed.

Zoom Out

- Press the [**ZOOM-OUT]** button.  This reduces magnification down to a minimum of 1x
    - Pressing the [**ZOOM-OUT**] reduces the magnification back to normal (1x zoom). When going from max zoom back to normal, you will need to press the Zoom Down button eight times.
    - You can ZOOM out to a minimum of 1x magnification.
    - The screen returns to normal magnification (1x) when the [**HOME**] button is pressed.

NOTE: The alpha-numeric keypad also allows a user to zoom in (space) on scanned objects. See “Zonal Zoom” on page 56.

Indicator Lights

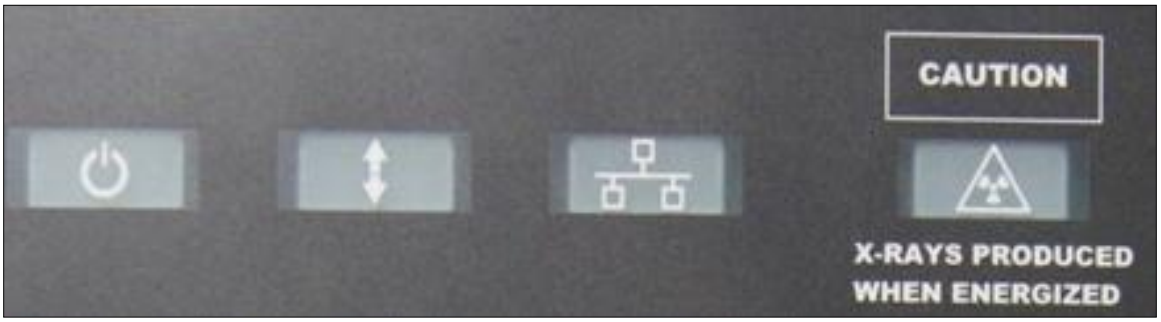


Figure 10: Icon-Based AOCP Indicator Lights

There are four indicator lights on the Icon-Based AOCP:

	**Power**: As the name suggests, the POWER indicator light indicates that the XIS/VI is powered up for scan operation.
	**Shift**: This key indicates whether the SHIFT function is enabled. The Shift key toggles between alpha and numeric mode, and between the functions represented by icons on the top halves of the icon keys, and the functions represented by icons on the bottom halves of the icon keys. For example, the following key represents the 3-Color and Six-Color functions (described later). The Shift key will toggle between those two functions, as well as the functions on other multifunction icon keys such as between Picture Perfect and Continuous Scan.

	
	**Connectivity:** This light flashes green when the AOCP loses connection with the PC to which it is connected. It will normally flash briefly during boot up and shutdown. If it occurs during normal use, press the black reset button n the back of the AOCP.
	**X-Ray:** The X-RAY light indicates that the XIS/VI is scanning, which means the X-ray generator is actively producing X-rays within the inspection tunnel.

Image Processing and Function Buttons

The image processing group of buttons, shown below, allows the operator to change the color, sharpness and other attributes of an image in order to be able to better identify potential threats within the image. The three function buttons beneath the image processing buttons, are assignable buttons customizable by the individual operator.

Figure 11: Image Processing Buttons

Image processing functions can be grouped into Primary and Secondary functions. Primary functions are mutually exclusive, i.e. they can be applied one at a time only. Secondary functions can be combined with each other. For example, HIPEN may be used in parallel with any of the primary functions, so that, for example, Organic may be combined with HIPEN.

NOTE: Picture Perfect is the exception to the Primary/Secondary function rule. Picture perfect overrides HIPEN and other secondary functions, which will be deactivated when Picture Perfect is chosen. However, secondary functions are automatically reactivated when Picture Perfect is deactivated.

Primary Functions consist of:

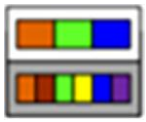
- Color 
- Organic 
- Inorganic 
- B/W 
- B/W Rev 
- Pseudo Color 

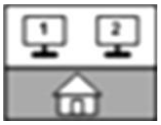
Secondary functions include:

- High Penetration 
- Picture Perfect 

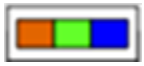
NOTE: Edge Trace is an image processing function that helps better define the edges of objects contained in images of scanned objects. In older AOCPs, there are dedicated [**EDGE TRACE**] buttons. In software version 2.1.2.6, Edge Trace was permanently enabled, no longer requiring a dedicated [**EDGE TRACE**] button, which was left off the Icon-Based AOCP. [**EDGE TRACE**] can, however, be assigned to one of the Icon-Based programmable function keys, which could then be used to toggle [**EDGE TRACE**] on and off.

The following table describes the image processing keys and their functions.

Button Icon	Name	Description
	**Color (3 color)**	Allows the operator to see a scanned image in standard three-color.
	Six Color	Shows images in six colors, helping to better distinguish between object Z#s. To select 6-Color mode, press [SHIFT] + [COLOR].
	**Organic**	Emphasizes organic materials, and de-emphasizes inorganic materials in scanned images.
	Inorganic	Emphasizes inorganic materials and de-emphasizes organic materials.
	**Black and White**	Causes a scanned image to display in gray-tones on screen, the darkness of the grays dependent on the density of the scanned object.
	B/W Reverse	Inverts an image that's displaying in B/W so that it displays white on black instead of black on white. Intermediate gray scales are similarly inverted. Depending on an object's color, density and position within a bag, reversing the black/white display can cause a potential threat object to be more easily identifiable.
	**Picture Perfect**	Normalizes and enhances both inorganic and organic images.
	Continuous Scan	Allows bypassing the photo cells for scanning thin objects like envelopes which would pass underneath. In "Continuous Scan" mode, the X-ray generator stays on until [SHIFT] + [CONT SCAN] is pressed again or until the [STOP] button is pressed.
	**Image Review.**	A limited version of Image Archive, that allows Users to review images scanned since (and ONLY since) the last log in.
	Archive	Allows you to review scanned images that have been automatically stored on your XIS' Archive PC from all users.

Button Icon	Name	Description
	**Pseudo Color**	Displays a black-and-white image in “colors.” Pseudo colors are based strictly on screen brightness, not on Z-number (the atomic number of the elements from which an object is primarily made).
	High Penetration	Lightens screen contrast in dense areas of the image. This allows the operator to better see through dense (usually inorganic) objects.
	**Save RGB**	Allows a user to save the current screen as a BMP to a pre-selected folder (C:\PROGRAMFILES\XRAY CLIENT\EXPORTS). The bag # and date are automatically embedded in the filename.
	Diagnostics	The DIAGNOSTICS screen is a diagnostics tool available on your PC monitor, via the AOCP. The Diagnostics function provides real-time status information on the XIS’ most critical components.
	**SHIFT**	Toggles between the top and bottom functions on each key. Take for example the 6/PQRS key on the numeric keypad. The Shift key will shift the key from the number “6” to the letters P, Q, R and S. It will also shift between the Picture Perfect and Diagnostics function on the Picture Perfect/Diagnostics key.
	**Monitor Toggle**	Allows you to toggle between two monitors, for those machines that include the optional second monitor or for a dual-view system.
	Home	Returns to the default image process setting. For example, if you are zoomed in on an object, pressing the [DEFAULT] key will return you to normal zoom. Similarly, if you have lightened or darkened the contrast of any image with one of the contrast keys, pressing the [DEFAULT] key will return you to normal contrast.
	**Programmable Function Buttons**	Buttons that can be assigned functions to meet specific customer needs. Functions can are assigned to these keys on an individual basis, per screener, not globally.

Color (3 Color)



Allows the operator to see a scanned image in color.

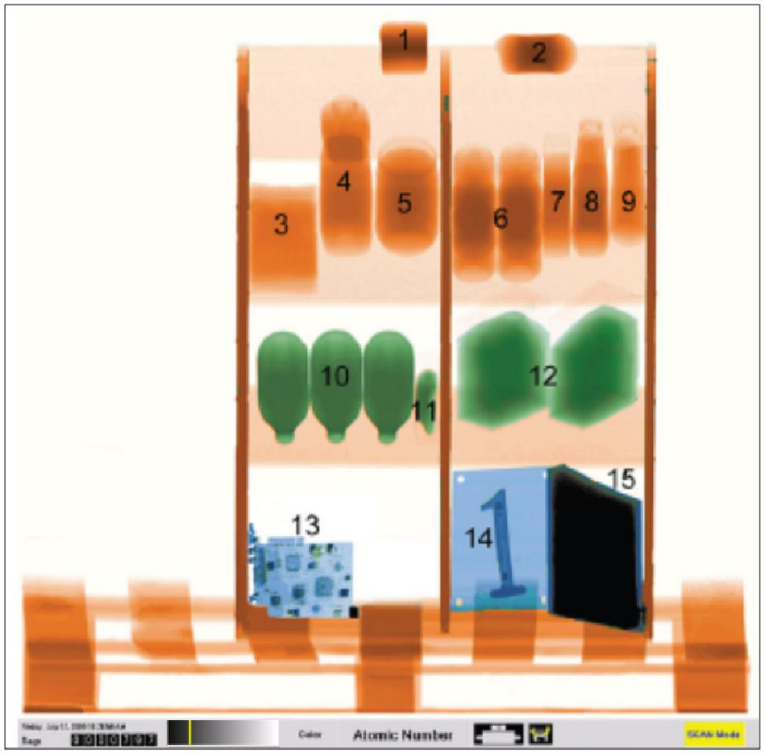


Figure 12: 3-Color Imaging

Figure 12 shows a traditional 3-color scanned X-ray image. Each number on the image represents a different type of object and mostly different types of material as well. For example, #1 at the very top of the left side of the image is C4 explosive. The black mass on the lower right corner of the image, labeled #15, is a steel block, too thick to be penetrated by X-rays and thus showing up as black.

Note how all the objects from #1 to #9 are basically the same color. Note also how the objects labeled #10, #11 and #12 are all similarly colored, making them impossible to differentiate.

Six Color

Shows images in six colors, helping to better distinguish between objects. To select 6-Color mode, press [SHIFT] + [COLOR].

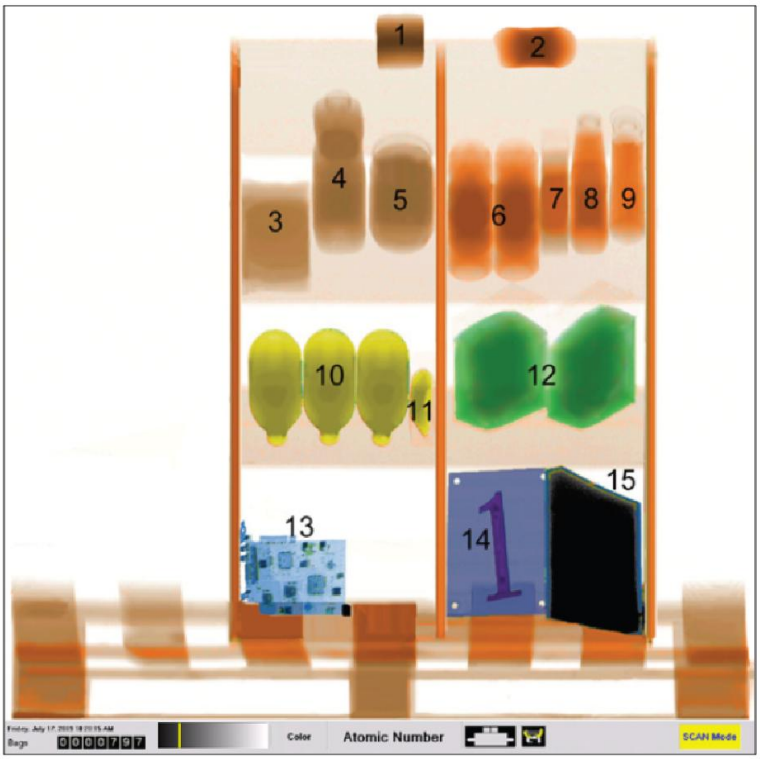


Figure 13: 6-Color Imaging

Figure 13 shows the same package as in the 3-color image in Figure 12, displayed with Astrophysics' 6-color imaging. Note how the materials labeled #10 and 11 are now differentiated from that of the object labeled #12. Similarly, the objects labeled #3, 4 and 5 are now distinct from objects #6, 7, 8 and 9. Finally, notice how Objects #1 and #2 are differentiated from each other and from the other objects, which is important given that object #1 is C4 explosive, and object #2 is heroin, while the other nine objects are various harmless food products and toiletries.

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	Cocaine, Heron
10-12	High Inorganic	Green	Yellow	Glass	Propellants
12-17	Light Metals	Green	Green	Aluminum, Silicon	Gunpowder, Trigger Devices
17-29	Heavy Metals	Blue	Blue	Iron, Steel	Guns, Bullets, Knives
29+	Dense Metals	Blue	Violet	Gold, Silver	High Value Contraband
-	Impenetrable	Black	Black	Lead	Shielding for Above Threats

Figure 14: Z-Number and Color Comparisons

Figure 14 is a chart correlating Z-Number (the atomic number of an element such as aluminum or hydrogen) with material type, color, examples and possible threats that exist within each type of material.

Figure 15 shows an image scanned while in 6-color mode. Notice how there are 6 colors shown in the mode window (as indicated by the yellow arrow).

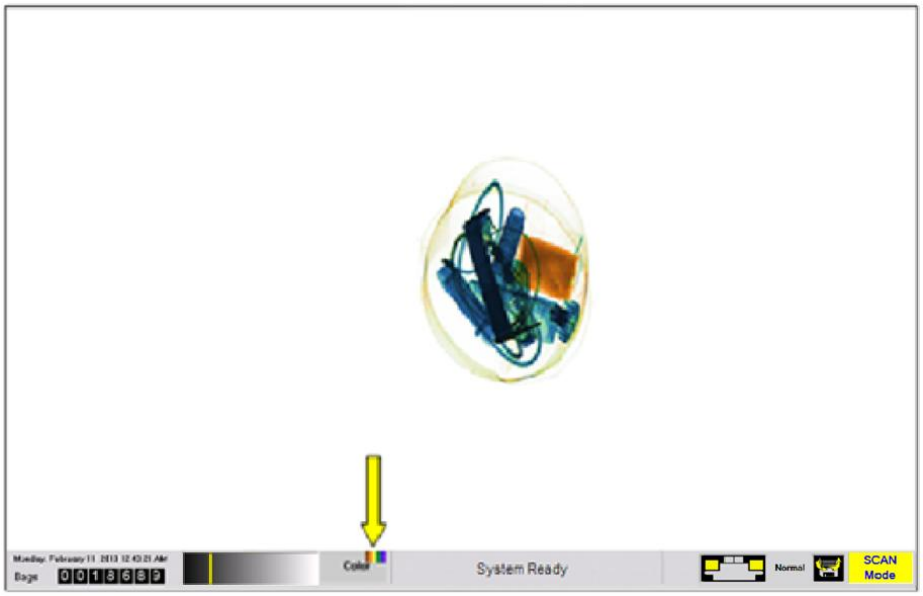


Figure 15: 6-Color Mode

Organic

Emphasizes organic materials, and de-emphasizes inorganic materials in scanned images

Figure 16: Organic

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 many 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 do not display the enhanced detail that organic items do.

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

Inorganic

Emphasizes inorganic materials and de-emphasizes organic materials.

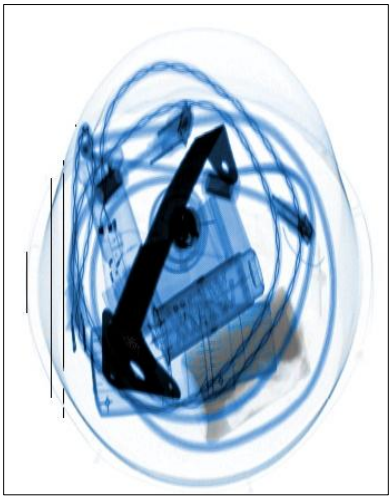


Figure 17: Inorg

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.

Black and White

Causes a scanned image to display in gray-tones on screen, the darkness of the grays dependent on the density of the scanned object.

- 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.

Figure 18: B/W

Black and White Reverse

Inverts an image that's displaying in B/W so that it displays white on black instead of black on white. Intermediate gray scales are similarly inverted. Depending on an object's color, density and position within a bag, reversing the black/white display can cause a potential threat object to be more easily identifiable.

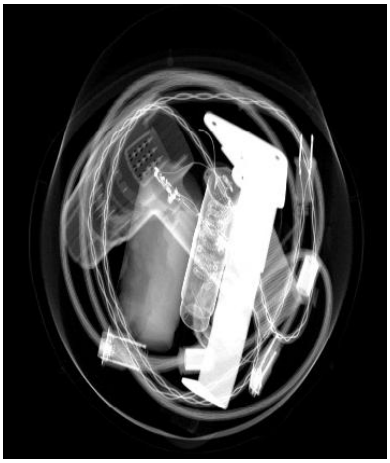


Figure 19: B/W Reverse

Picture Perfect / "U" Key

Normalizes and enhances both inorganic and organic images.

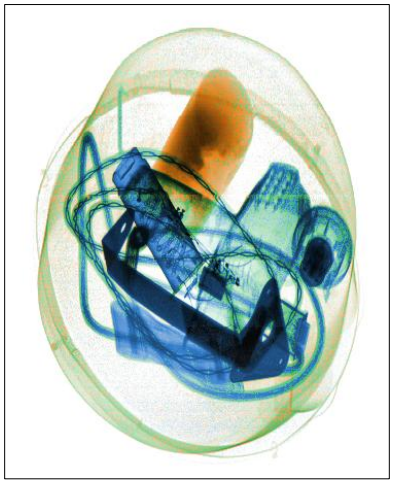


Figure 20: Picture Perfect

- 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/VI between “Normal” and PP 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.

PP mode accomplishes the following:

- It analyzes and re-displays the last image.
- It displays organic items with enhanced “texture” and detail.
- When scanning long objects, PP can only be activated on static images.
- 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 the Color, Black/White, and the Reverse Black/White Screen image modes.

The PP MODE is exited by:

- Pressing [**PICTURE PERFECT**] button to resume to normal screening,

OR:

- Pressing [**LOGOUT**] to logout and return to the “Please Log In” Screen.

Pressing the [**LEFT**] or [**RIGHT**] button will also exit the user from Picture Perfect, and start the machine scanning.

If enabled, Hi Penetration will be overridden by Picture Perfect, but will be restored as soon as the screener exits Picture Perfect.

AOCP Buttons NOT supported by PP	
[ATOM]	**[HIPEN]**
[PRINT]	**[ORG]**
[CBT]	**[INORG]**
[PSEUDO]	

Figure 21: Buttons Not Supported by PP

Continuous Scan

Allows bypassing the photo cells for scanning thin objects like envelopes which would pass underneath. In “Continuous Scan” mode, the X-ray generator stays on until [SHIFT] + [CONT SCAN] is pressed again or until the [STOP] button is pressed.

WARNING!

In Continuous Scan mode, X-rays continue to be produced EVEN WHEN THE TUNNEL IS EMPTY.

Image Review

A limited version of Image Archive, allowing Users to review images scanned since (**and ONLY since**) the last log in.

To access this function, press [**REVIEW**]. The Image Review screen will appear, and the bag images automatically start moving RIGHT. Use [**LEFT**] and [**RIGHT**] buttons to navigate backward and forward through the images scanned during the current scanning session (A “session” is defined as all scanning done since the last login.)

NOTE: The conveyor belt must be stopped before using the [**REVIEW]** button.

Image processing and zoom functions can be applied to the archived images.

(Image) Archive

Allows users to review scanned images that have been automatically stored in a predetermined archive location. Image Archive allows you to access all the images stored in this location, as opposed to Image Review, which allows users to view only those images scanned during the current session.

A manager can turn Image Archiving on or off.

Previously scanned images can be recalled as follows:

1. Press the [**IA**] button shown in the above picture of the AOCP. The Image Archive Selection Dial menu screen will now be displayed.

Figure 22: Image Archive Selection Dial

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 far left 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 right top side of the screen.

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

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

5. To determine (Narrow) the range of images you will view, by User, Date, Time or Serial Number, position the cursor on the [**FILTER**] button on the Image Selector screen and double tap the touchpad. The "Image Archive Retrieval" will appear as a pop-up window.

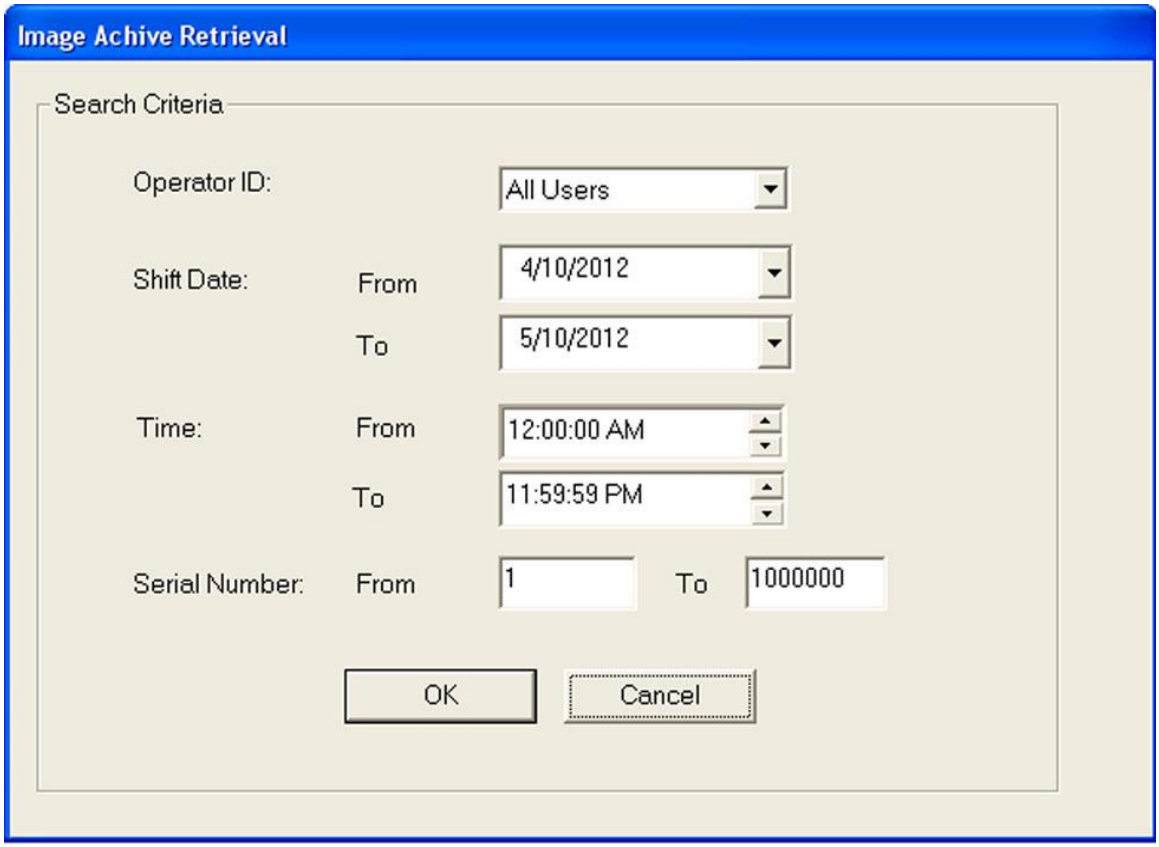


Figure 23: Image Archive Retrieval/Filter screen

6. Select the date, time and serial number to review bag images that were scanned. The Operator ID has the option to select certain users or by default "All Users".
7. Once you have selected the desired range of images, press the [**OK**] button.
8. To return to regular X-ray image scanning, press the [**STOP**] button, then press the [**ARCHIVE**] button.

Users can apply image processing and zoom functions to archived images but only after pressing [**STOP**] on the AOCP.

Pseudo Color

Displays a black-and-white image in colors. Pseudo colors are based strictly on screen brightness, not on Z-number (the atomic number of the elements from which an object is primarily made).

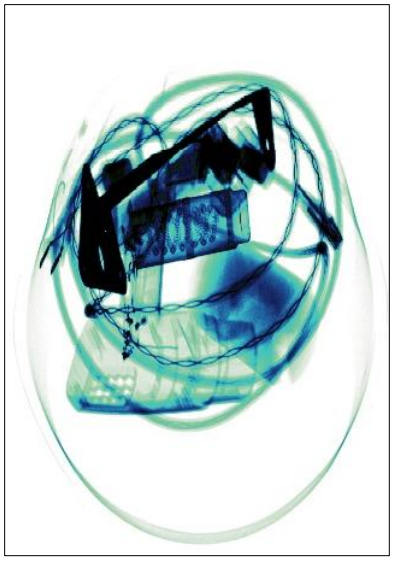


Figure 24: Pseudo Color

High Penetration

Lightens areas of scanned images that fall below a predetermined signal threshold. This allows the operator to better see through dense (usually inorganic) objects.

NOTE: With the introduction of Astrophysics X-ray software version 2.1.2.6 in January 2013, HIPEN is enabled by default on XIS machines. An operator can disable HIPEN by pressing the HIPEN button, but HIPEN will automatically be re-enabled on the next scan. At the time of writing this manual, 2.1.2.6 had not yet been introduced to the VI machines but would be soon.

NOTE: The conveyor belt must be stopped before using the [**HIPEN**] button.

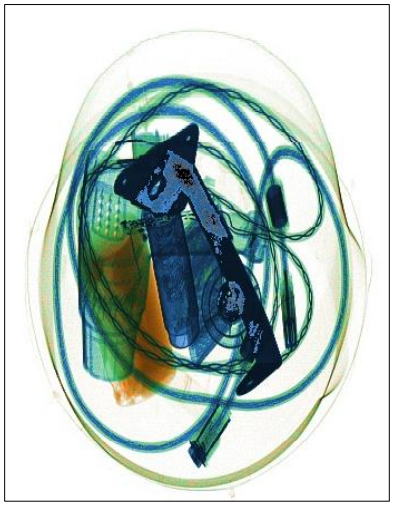


Figure 25: HIPEN

Save RGB

[**SAVE RGB**] allows a user to save the current screen as a BMP to a pre-selected folder,

This function does not allow a user to name the file or determine the destination while saving. However, the file name automatically includes date and time. If a screener would like a specific file viewed by a supervisor at a later time, it would be wise to note the time that particular bag was scanned. The supervisor will then be able to locate the scanned image by the time it was scanned.

Figure 26: Saved Image

After saving a screen as a bitmap (BMP), the word “Saved” will appear in the bottom center of the screen in place of “System Ready” (Figure 26). Once “System Ready” has been replaced, it will not reappear until the next login.

Diagnostics

NOTE: There are slight differences between the VI and XIS diagnostic key functions. There are also differences in the location of the Diagnostics screen, depending on whether the system is a single view or dual view, or single monitor versus dual monitor.

NOTE: On Single View, Single Monitor systems, Diagnostics can only be used while NOT scanning.

[**DIAG**] (Diagnostics) The Diagnostics screen is a diagnostics tool available on your PC monitor, via the AOCP. The Diagnostics function provides real-time status information on the XIS/VI’s most critical components. This key toggles into and out of Diagnostics.

NOTE: This function can only be accessed from the **Administrator/Scan** mode, not from the Administrator/Management or any other mode.

Diagnostics tracks the performance of:

- 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

To access this screen, press the [**DIAG**] button on the AOCP. To exit Diagnostics, press the [**DIAG**] button again, which will return to return to the regular X-ray imaging screen.

Following is the Diagnostics screen with each element numbered, followed by a table with descriptions of each numbered element.

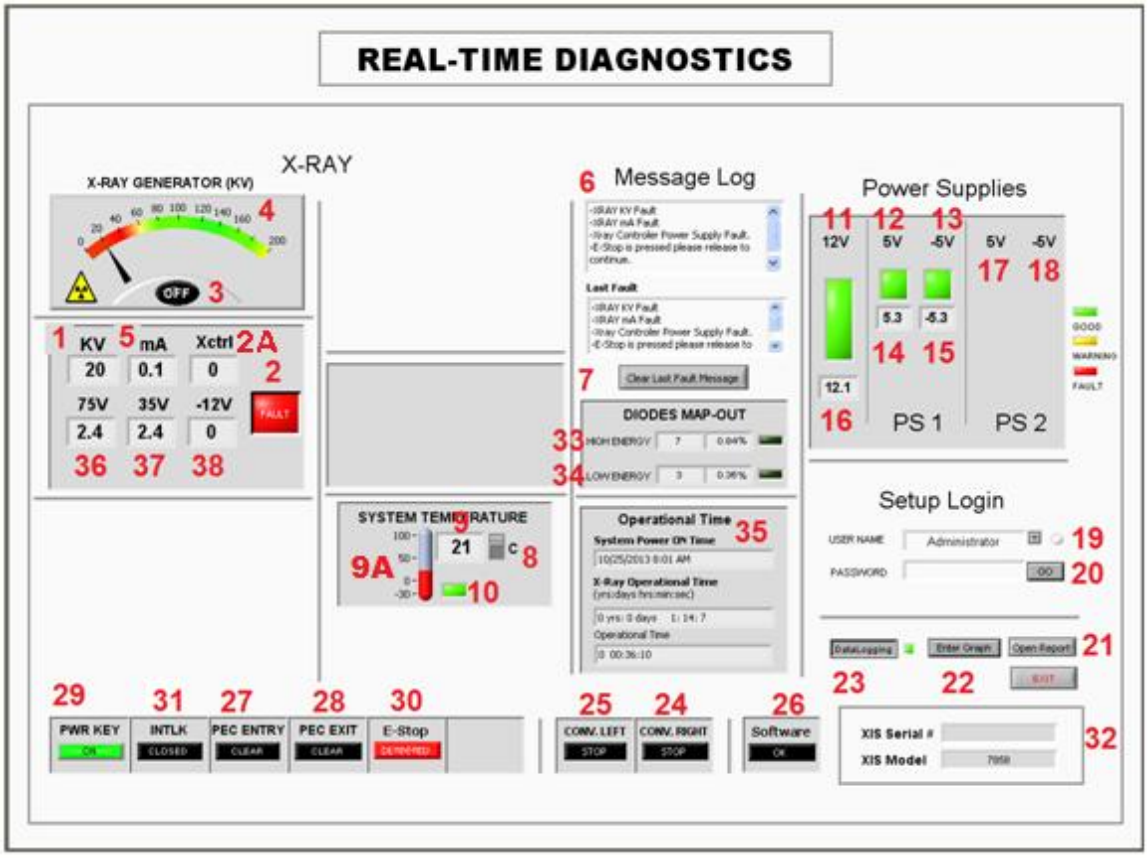


Figure 27: Numbered Diagnostics Fields and Controls

NOTE: Some of the blank areas of the sample Diagnostics screen are where metrics for dual-view systems would appear. For example, under "Power Supplies," there are two sets of 5V power supplies shown, but only one of them is actually being monitored (as shown by the green bars).

#	Real-Time Diagnostic Field	Comments
1	X-ray Tube kV Setting	Displays X-ray tube kV setting (anode potential)
2	kV & mA OK/Fault Indicator	Displays kV & mA feedback OK indicator
2A	Xctrl	X-ray generator power supply
3	X-ray ON/OFF Indicator	Displays X-ray ON status. Green indicates that X-ray generator is powered and producing X-rays.
4	X-ray Tube kV Output (analog meter display)	Displays X-ray tube cathode kV (feedback) output
5	X-ray Tube mA Setting	Displays X-ray tube cathode mA setting in milliamperes

#	Real-Time Diagnostic Field	Comments
6	Error Message Log	Displays Error Message Log
7	Clear Last Fault Message	Clears last Error Message
8	C & F (Centigrade / Fahrenheit) Toggle	Centigrade / Fahrenheit indicator C = Centigrade temperature display F = Fahrenheit temperature display
9	System Temperature (digital display)	Displays internal frame temperature with digital display
9A	System Temperature (analog display)	Displays internal frame temperature with analog display
10	System Temperature Status Indicator	Red = Fault Yellow = Warning Green = Good
11	+12VDC Power Supply Status	Displays +12VDC power supply #1 output status Green = Good Yellow = Warning Red = Fault
12	+5VDC Power Supply #1 Status	Displays +5VDC power supply #1 output status Green = Good Yellow = Warning Red = Fault
13	-5VDC Power Supply #1 Status	Displays -5VDC power supply #1 output status Green = Good Yellow = Warning Red = Fault
14	+5VDC Power Supply #1 Output Voltage	Displays +5VDC power supply #1 output voltage. Output should be within +/- 10% of +5V.

#	Real-Time Diagnostic Field	Comments
15	-5VDC Power Supply #1 Output Voltage	Displays -5VDC power supply #1 output voltage. Output should be within +/- 10% of +5V.
16	12VDC Power Supply Output Voltage	Displays 12VDC power supply voltage. Output should be within +/- 10% of +5V.
17	+5V Power Supply #2 Status **NOTE:** On Dual View systems, two sets of power supplies will be monitored.	Displays +5VDC power supply #2 output status Green = Good Yellow = Warning Red = Fault
18	-5V Power Supply #2 Status **NOTE:** On Dual View systems, two sets of power supplies will be monitored.	Displays -5VDC power supply #2 output status Green = Good Yellow = Warning Red = Fault
19	Username Entry	Username login entry field for access to diagnostic report and sub-graph menu
20	Password Entry	Password entry field for access to diagnostic report and graph sub-menu
21	Open Report	Display Report Sub-menu (after successful display). This is a log of operators logging in and out and information related to that. XrayClient now stores this material as well, so that this function is not as important as it once was.
22	Enter Graph	Display Graph Sub-menu (after successful display). These are graphs of power supply and generator readings.
23	Data Logging On Indicator	ON/OFF status light. Stores all the power supply and generator readings so that they can be displayed in graphs.
24	Conveyor Right Direction	Green = Conveyor motor is on and moving right (i.e. from left to right)
25	Conveyor Left Direction	Green = Conveyor motor is energized and moving left (i.e. from right to left)

#	Real-Time Diagnostic Field	Comments
26	Software	Status indicator. Monitors running applications, security key, and network connection.
27, 28	PEC Photocell Detection Indicators	Displays photocell (photo-sensor) status. Green = photo-cell is blocked Black = photocell is clear. Depending on the X-ray machine model, there may be more than just 2 PECs.
29	Key-switch ("PWR KEY") ON/OFF Status	Displays AOCP (Operator Console) key-switch status Green = key-switch is ON position.
30	E-Stop	Displays E-stop status (Closed or Open)
31	Interlock	Displays interlock status (Closed or Open)
32	XIS/VI Serial # and Model	Displays XIS/VI serial # and model#
33	High Energy Diode Mapout Info	Information about High Energy diodes
34	Low Energy Diode Mapout Info	Information about Low Energy diodes
35	Operational Time	Information about System Power On time, X-ray Operational Time (total X-ray on time per machine), and Operational Time (total run time whether X-rays on or off)

Figure 28: Table of Diagnostic Screen Display Fields (cont'd)

NOTE: There is an [**EXIT**] button. Do ***NOT*** use this button to toggle into and out of Diagnostics, because the [EXIT] button will actually close the Diagnostics program, not just minimize the screen. Instead, use the[DIAG] button on your AOCP.

Shift

Toggles between the top and bottom functions on each key. Take for example the 6/PQRS key on the numeric keypad. The Shift key will shift the key from the number "6" to the letters P, Q, R and S. It will also shift between the Picture Perfect and Diagnostics function on the Picture Perfect/Diagnostics key.

Monitor Toggle

Allows you to toggle between two monitors, for those machines that include the optional second monitor.

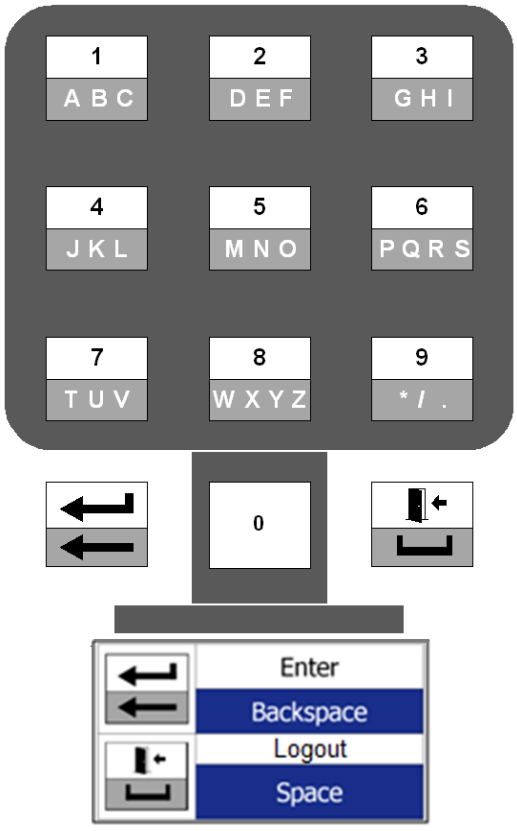
Home

Returns all functions to the system's default settings. This includes zoom, light or dark, and all image processing functions.

Programmable Function Keys (F1, F2, F3)

Programmable buttons that can be assigned functions to meet specific customer needs. Currently F1 is used for Screener Assist Liquid Discrimination, but can be assigned to other functions if and when requested.

Alpha-Numeric Keypad



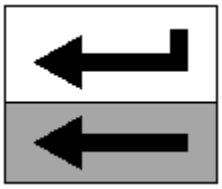
The alpha-numeric keys are divided between numbers (top of keys) and letters (bottom of keys). The Shift key determines which part of the key and thus which mode the user is in. The "0" (zero) key acts as an enter button when in Shift (alpha) mode.

Because there are multiple letters on each key, it may be necessary to do multiple keystrokes to "get" to an individual letter, if it is not the first letter on the key. For example,

if the user wants to get to the letter “s,” the user must press the “6” key four times, then press the “0” key to “accept” the “s.”

There are two additional keys directly below the alpha-numeric keypad.

Enter/Backspace



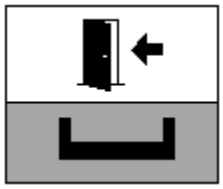
ENTER

The Enter/Backspace key. The Enter key is in effect when in numeric mode. This key is the equivalent of the [ENTER] key on a PC keyboard. It also performs other functions. For example, in Scan Mode, the [ENTER] key will toggle between regular 3 Color and 6 Color modes. At the Log In screen, [ENTER] will exit to the desktop, if enabled by management as an option for screeners.

BACKSPACE

The Backspace key allows the User to move backward to insert or delete text or numbers.

Log Out/Space



LOG OUT

Pressing this key will take log the the User out, and take the User to the Log In screen.

SPACE

The Space key allows the User to insert spaces between words.

Figure 29: Alpha Numeric Keypad

Zonal Zoom

Zonal zoom uses the Zoom mode and the numeric keypad to divide the scanning screen into 9 zoom zones. Once the [**ZOOM IN**] button on the AOCP is pressed, the user has only to press the “1” key on the alpha numeric keypad (make sure that the keypad is in numeric and not “Alpha” mode) to zoom in on the upper left corner of the screen. Press the “9” key and it will zoom in to the lower right corner of the image, etc. Press the Home button or “0” (zero) button to return to normal image size.

NOTE: On some versions of the Status Bar, the term "**QUAD ZOOM**" is used instead of "Zonal Zoom." The two terms are synonymous.

Conveyor Controls

The AOCP includes three conveyor controls, as shown below.

Figure 30: Conveyor Controls

As the names imply, the "Left" button will cause the conveyor to move from right to left. The "Right" button will move the conveyor from left to right, and the "Stop" button will stop the conveyor.

As shown in the photo below, both the left and right conveyor buttons include lights that will light up when either of those buttons are pushed and the conveyor moves.

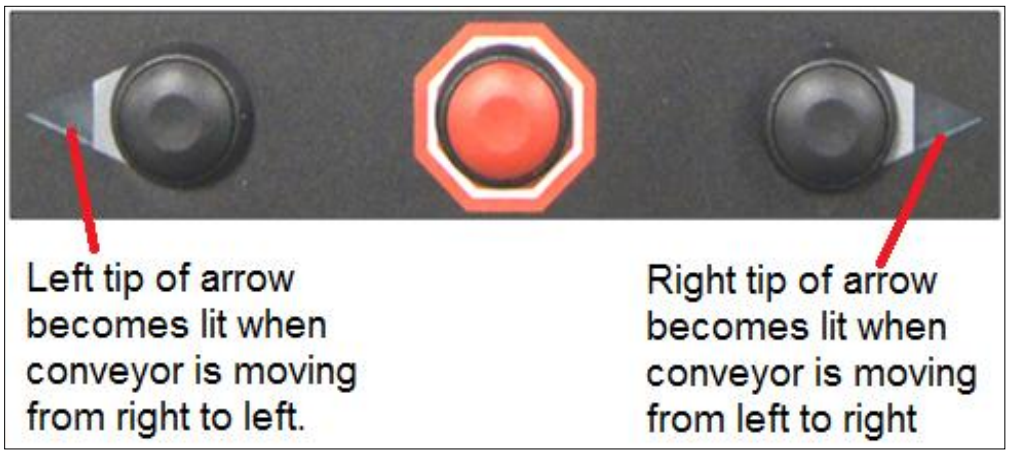


Figure 31: Conveyor Control Lights

LEFT:

- 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.

NOTE: Many Astrophysics machines are bi-directional, with the "exit" and "entry" ends reversible.

- The *Exit* end of the XIS/VI is the one with the power cord and main AC switch located on the bottom of the XIS/VI (beneath the conveyor bed).

- The *Entry* end of the XIS/VI 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 may momentarily "back-belt", i.e. the belt will briefly move in the reverse (right) direction for an programmed amount of time. This reversal usually lasts .5 seconds, (adjustable by the client), and occurs in order to clear items that may be blocking the X-ray window inside the inspection tunnel. The belt will then move in the left direction and will continue to do so until the [**STOP**] or [**RIGHT**] button is pressed.

- If you press the [**LEFT**] button when the conveyor is already moving in the right direction, the conveyor will first stop, move backward and then move in the left direction. This is to allow the object to be rescanned so as to prevent partial or "cut" images.

RIGHT:

- 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.

- The *Exit* end of the XIS/VI is the one with the power cord and main AC switch located on the bottom of the XIS/VI (underneath the conveyor bed).

- The *Entry* end of the XIS/VI 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 may momentarily, "back-belt", (i.e. the belt will briefly move in the reverse (left) direction for a programmed amount of time (.5 seconds, adjustable by the client), in order 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, move backward, and then move in the right direction. This is to allow the object to be rescanned so as to prevent partial or "cut" images.

Emergency Stop

The Emergency Stop (E-Stop) is located in the upper left corner of the AOCP. Pushing it down will stop all X-rays and the conveyor. To disengage, turn the knob clockwise (as indicated by the white arrows on the E-stop knob) and the knob will “pop” back out to the “OFF” position.

System Startup

System Startup involves the following three steps:

1. Insert the key into the key-switch.
    - The XIS/VI AC power cord should already be “plugged-in”. If it is not plugged in, plug it in now.
    - The AC power cord is located under the exit end conveyor bed.
    - 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.
    - The main AC switch is located under the exit end conveyor bed. As noted previously, some Astrophysics machines are bidirectional and the “exit” and “entry” ends can be reversed.
    - Leave the main circuit breaker 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/VI is not plugged in. If the UPS battery becomes fully discharged, it will require up to eight hours to fully recharge.

Figure 32: Main Circuit Breaker

    - If the UPS has completely discharged because the XIS has been disconnected from mains power for a substantial amount of time, it will be necessary to turn the UPS on. On the newer XIS machines, there will be a dedicated UPS button located under the exit end of the conveyor bed. If the UPS button is off, the UPS is on. If lit, the UPS is off, and it will be necessary to press the UPS button to start the UPS.
    - On older machines, you can determine whether the UPS is on by examining the E-stop button – if the E-stop backlight is on, the UPS is on. If the E-stop backlight is off, the UPS is off, and it will be necessary to open the machine to turn on the UPS.

WARNING!

Screeners are not to open the XIS for any reason. Only trained maintenance technicians may access the inside of the machine.

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/VI.
    - 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.

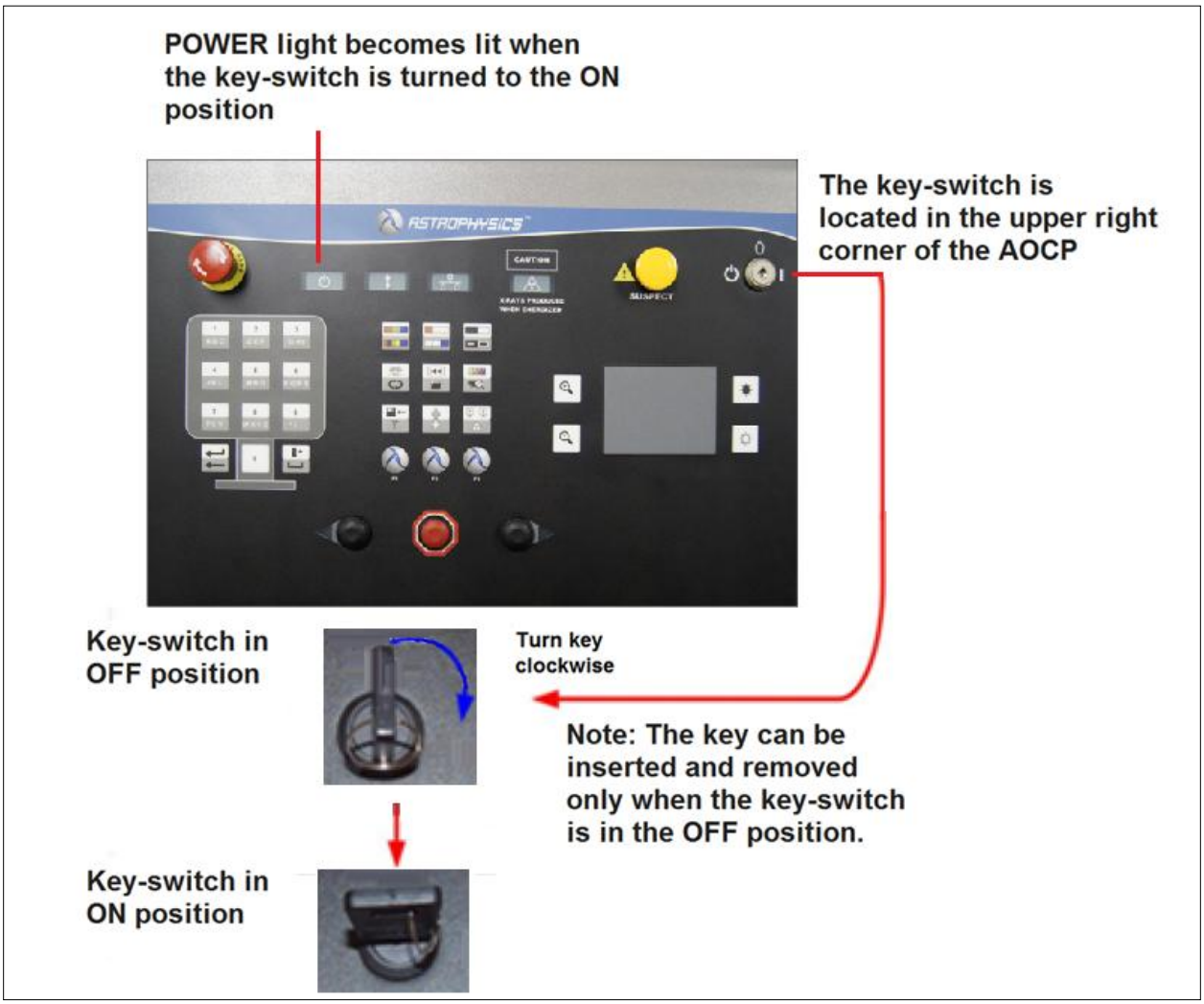


Figure 33: Turning Power On

3. Wait for the ***Please Log In*** Screen to appear. This screen will always appear on the left-hand monitor (on dual monitor systems).

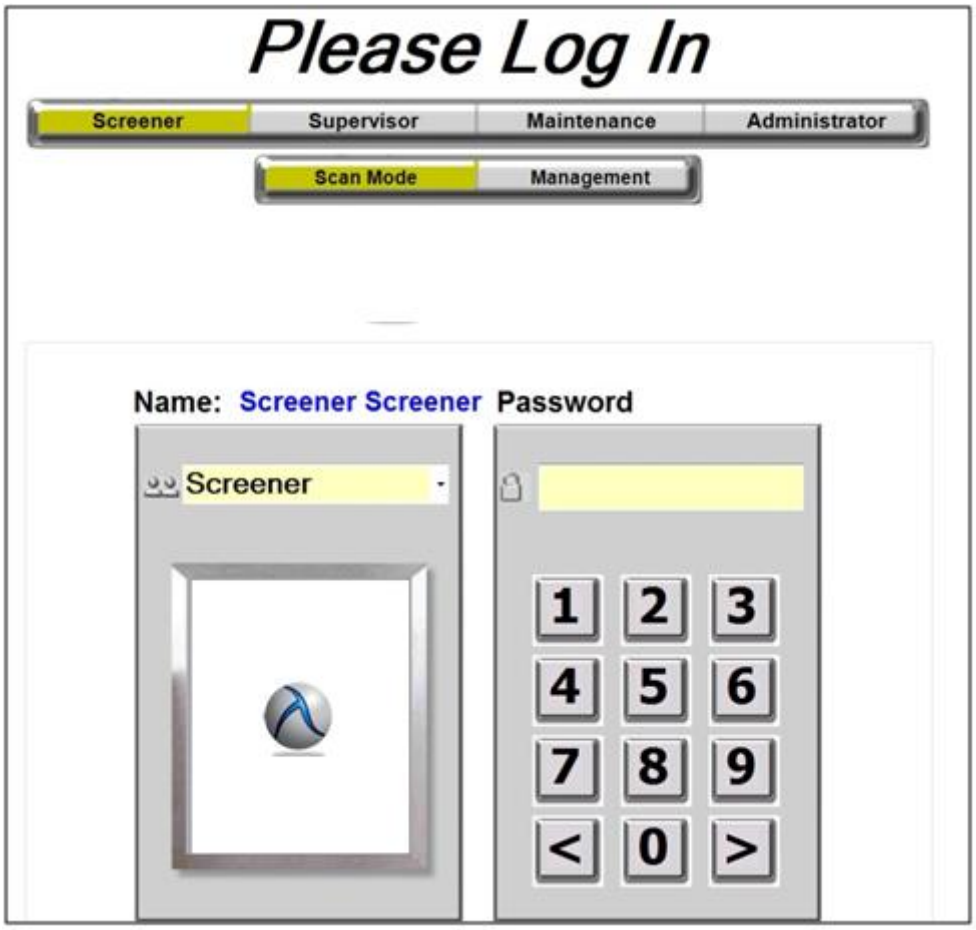


Figure 34: "Please Log In" Screen

Login: Screener

Log In is performed at the “Please Log In” screen. Note the customized background on the left side of the screen. This area can be left blank, or used to show the company logo, or a photo of a user, for example.

Figure 35: Please Log In” Screen

There are four permissions levels on the XIS/VI:

- Screener
- Supervisor
- Maintenance
- Administrator

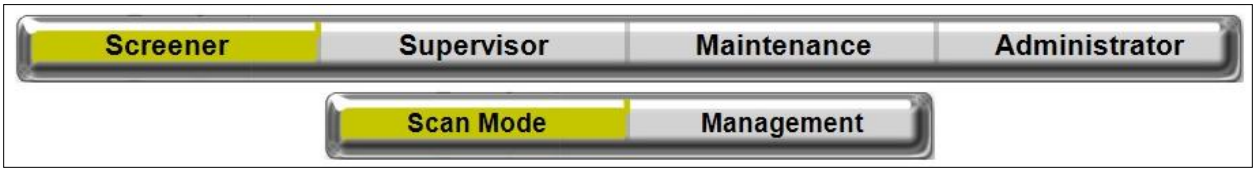


Figure 36: Permission Levels and Modes

These four levels are represented at the top of the Log In page. This section will deal with ***Screener*** log in.

The Administrator level always has the greatest number of permissions. Screeners always have the least permissions to begin with, but all levels can be assigned a greater or lesser number of permissions as the Administrator sees fit.

Within each permission level, there are two modes:

- Scan Mode
- Management

As the names imply, the Scan mode is the mode in which a User at any level actually scans objects with the machine.

The Management mode is for non-scan functions such as adding new employees, allotting or removing permissions, editing records, and so on.

The Log In screen is divided into three areas: the User Name (Left) side; the Password (right) side; and the permission and mode selection area at the top. The Password side includes a keypad with which to input the password.

To Log In:

1. Select a permission level and mode (e.g., Screener/Scan Mode, or Administrator/Management). Be aware that you must have permission to access different levels and your password will allow you to access only those levels for which you have been given permission to access.

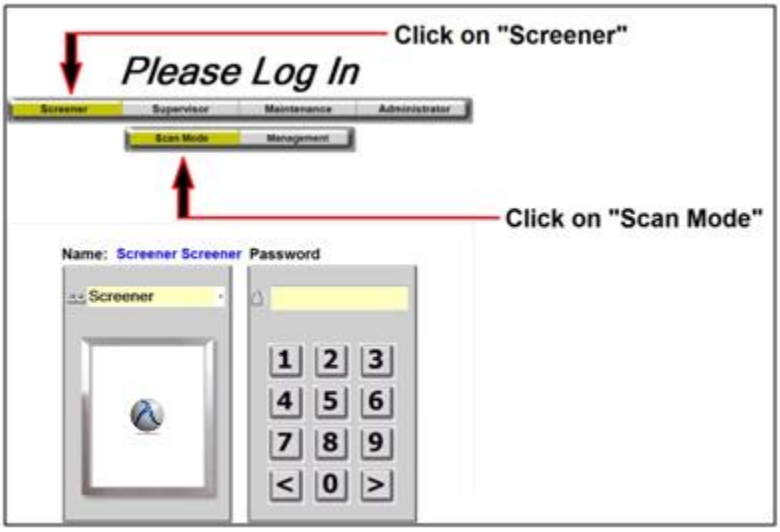


Figure 37: Permission Levels and Modes

2. Using the touchpad, position the cursor over the down arrow, [⩛] located right of the *User Name* entry box). Tap the touchpad. A drop-down list of User Names will appear.

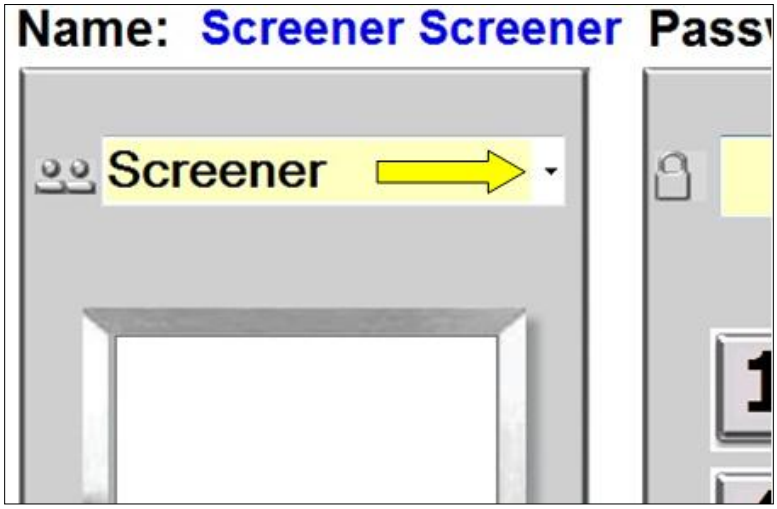


Figure 38: User Name Field Down Arrow

3. Position the cursor over your User Name in the drop down list and tap the touchpad.
    - Contact your supervisor if your user name does not appear in the drop-down list.

4. Enter your password.

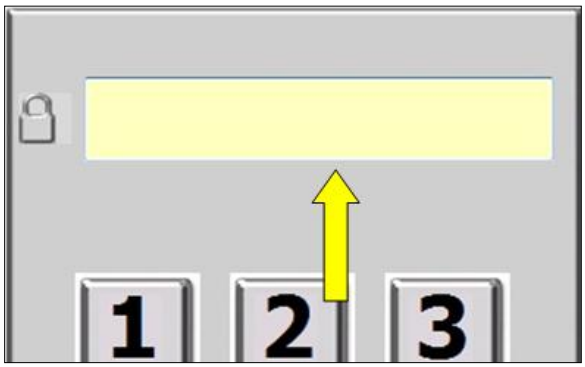


Figure 39: Password Field

- Contact your supervisor if your password does not work.
- To ensure security, asterisk characters (*) are printed on the screen when you type in your password.
- Passwords can consist of 1 to 30 alphanumeric characters.
- Passwords can consist of either alphabetic or numeric characters.
- To enter alphabetic characters, press the [**ALPHA**] shift button to enter the “Alpha Entry Mode”. The ALPHA status light will be lit when you are in alpha entry mode.

- Pressing the [**ALPHA**] button again will toggle you back into numeric entry mode. The ALPHA status light turns off (unlit) when you are in “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 your password is strictly numeric).

- If available, you can enter your password with a PC keyboard. All alphabetic character entries are automatically shifted into upper case characters for entry.

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

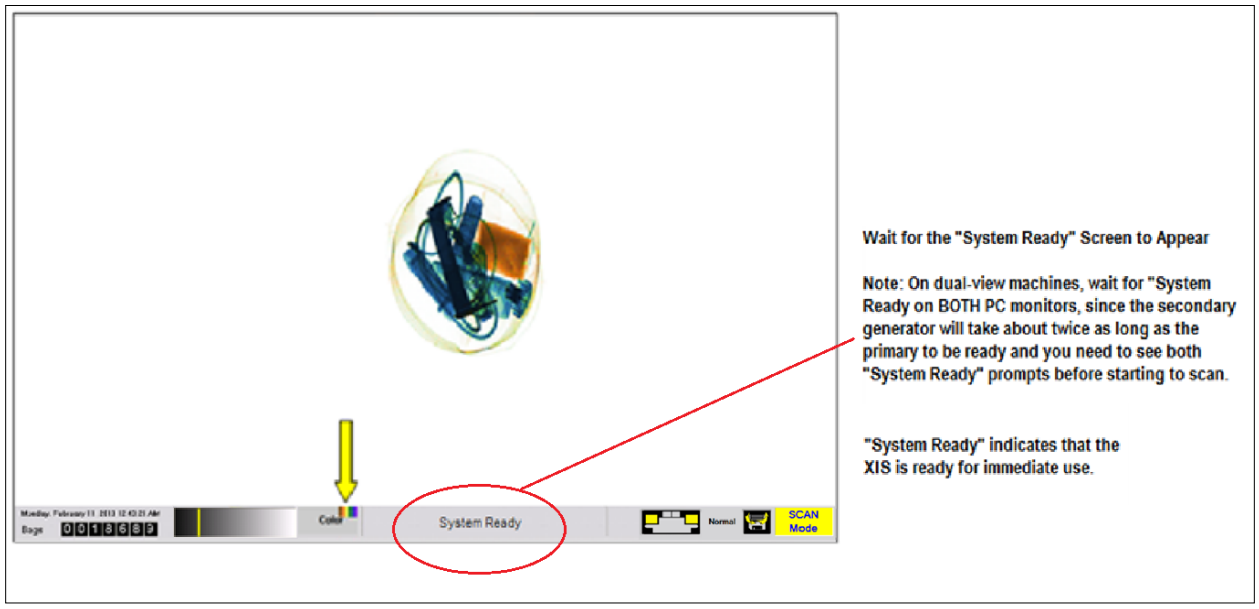


Figure 40: System Ready Screen

X-Ray Image Screening

Successful X-ray imaging security screening requires knowledge of:

- How to *operate* the XIS/VI
- How to *analyze* and *interpret* the X-ray images

This manual provides you with information on how to operate the XIS/VI. Since everyone's security needs are different, and since adequate training necessitates hands-on experience, 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.

Foot mat

If your system has a safety foot-mat, as shown below, stand on it.

Figure 41: Foot Mat Switch

Foot mats do not connect to any of the outlets or ports on a standard XIS machine. If a foot mat is to be used with the machine, a custom electrical connection plate must be installed.

If a foot-mat switch is present, the XIS/VI 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/VI will stop and display an "INTERLOCK" warning message on the bottom right corner of the screen. Stepping on the foot mat will clear the INTERLOCK message from the screen and allow further operation of the machine. If the INTERLOCK warning is not cleared in a programmable amount of time, the XIS/VI application will logout the user and return to the "Please Login Screen".

Ensure that the foot-mat is properly plugged into the XIS/VI 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, narrow shoe heel or other sharp object on the foot-mat. Sharp objects/shoes will damage the foot-mat switch.

The interlock / Foot-Mat open error warning shows up as a red crossed circle on the XIS/VI machine icon, as shown below. This XIS icon will display various representative icons within it, including X-rays ON icon.

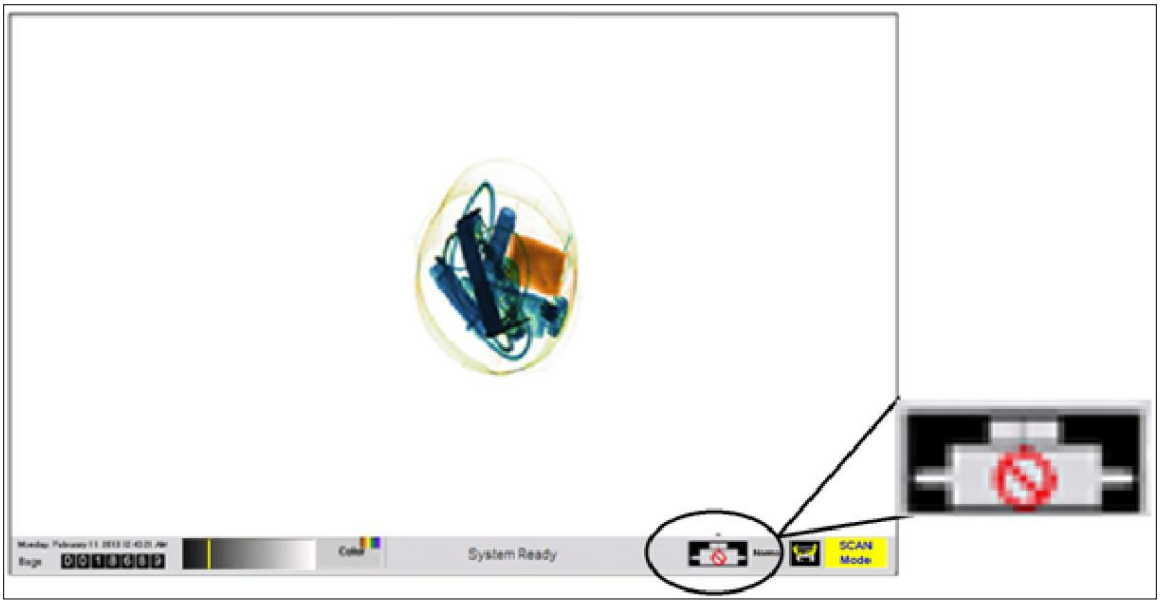


Figure 42: Interlock Errors and Indicators

Scanning Bags

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.

NOTE: The XIS machine “back-belt” feature may cause the conveyor belt to move backward for a pre-determined amount of time (usually .5 seconds) when the [**LEFT**] button is pressed. Because of this, be careful when starting the conveyor to make sure no baggage will fall off the conveyor because of the initial back-belt movement.

NOTE: Certain XIS machines, such as the 1517 and 1818 180kV and 200kV models, use roller beds rather than conveyor belts.

Inside the X-ray tunnels, items are exposed to penetrating X-rays. The XIS/VI then generates and displays an image revealing the contents of each scanned bag or parcel. Scanned X-ray images are presented on the “X-ray Imaging Display” screen, which is shown below (the image shown is from a single-view, dual-monitor system).

Figure 43: "System Ready" screen

In a single-view system, both monitors show an image of the same scanned bag. However, the left monitor shows the image in color. The right monitor shows it in black and white.

Following is a graphic representation of the components/icons on the left image.

Figure 44: "System Ready" screen, left monitor

The right monitor components are quite similar. Note that in this instance, the bag is being viewed in Screener Assist mode (the Screener Assist icon is highlighted by a red rectangle in the image below).

Figure 45: "System Ready" screen, right monitor

Mode icons will appear in the bar at the bottom of the screen. Following is an example of both a TIP icon (to the left) and a Screener Assist icon appearing in the bar at the bottom of a screen.

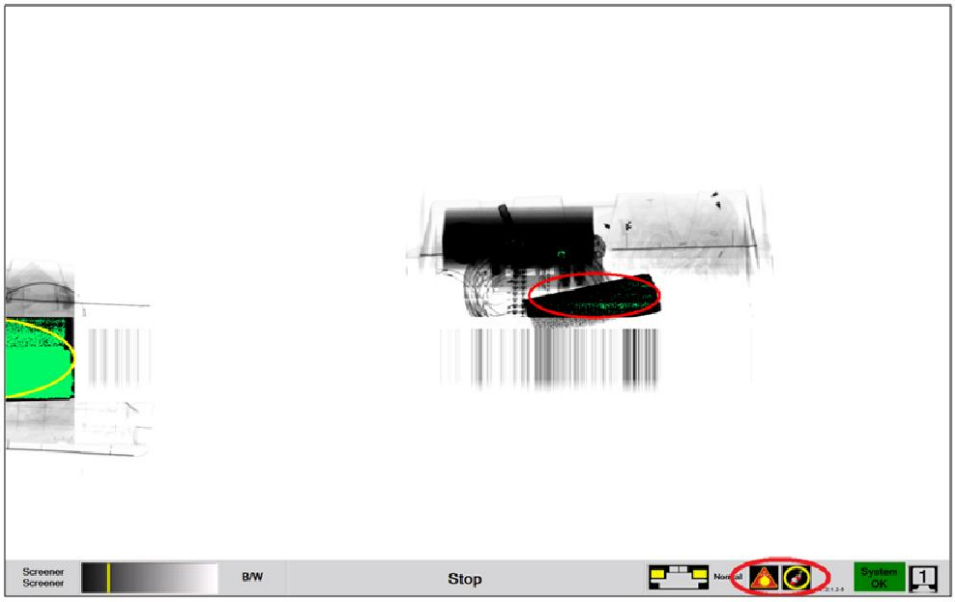


Figure 46: Screener Assist and TIP Icons

NOTE: The location of items on the Status Bar may vary, depending on machine model, software version, number of monitors used, and the selected screen

resolution of those monitors. This is especially the case with single-monitor systems which may “stack” the components atop each other.

***X-ray image screening involves four steps:

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

Figure 47: Conveyor Controls

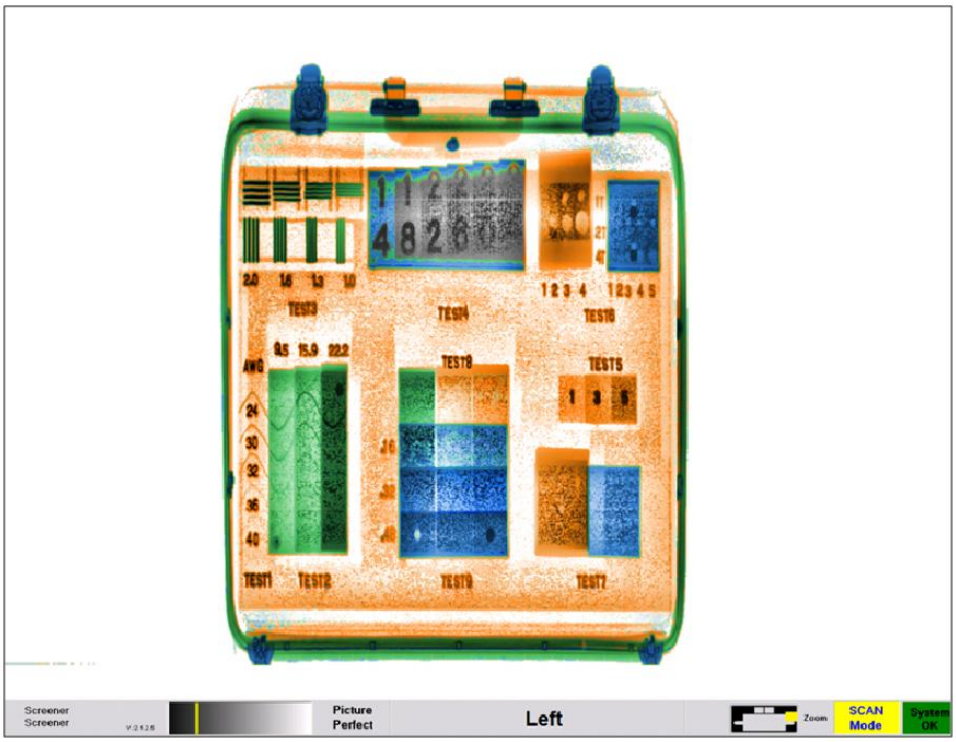


Figure 48: Scan Mode

Note the changes in the System Ready screen as the machine moves the bag into the tunnel to be scanned:

- The “System Ready” status in the bottom center of the screen is replaced by the word “Left,” the direction the conveyor is moving in.
- The mode button in the lower right corner now reads “SCAN Mode.”
- The XIS/VI icon now shows a yellow object at the entry tunnel. Once the bag has finished scanning and exited the tunnel, the yellow object will appear at the tunnel exit.

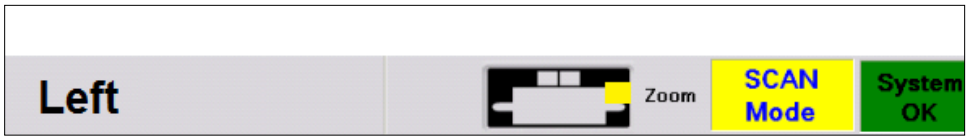


Figure 49: Scan Mode Indicators

- Pressing the [**STOP**] button stops the conveyor.

The [**RIGHT**] button moves the conveyor in the right direction, which is, by default, the “reverse” direction. However, since the XIS/VI is bidirectional, either end of the machine can be used as the exit or entrance. If the scanning direction and thus the exit and entry ends are switched, [RIGHT] then becomes “forward.”

Figure 50: Conveyor Direction switched

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 as shown below.

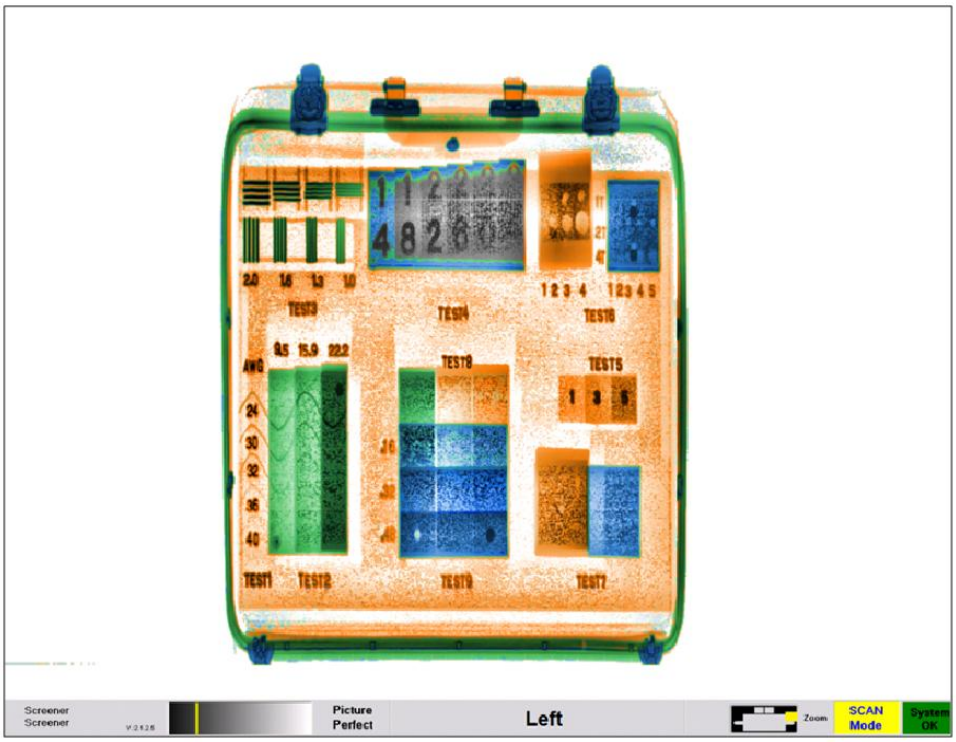


Figure 51: Scanned Image

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

3. Carefully examine each scanned image.

The control panel has several image adjustment buttons to help you analyze the displayed X-ray image (see Image Processing and Zoom on page 9).

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

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Log In: Administrative Group

Chapter Overview

This chapter describes tasks normally assigned to the XIS/VI Administrative Group, including Administrators, Supervisors and Maintenance Personnel. Windows may vary depending on model, software version, and screen resolution. There may also be limitations on password length (# of characters).

XIS/VI Administrators

XIS/VI 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 or disabling the various XIS/VI software options including: IA, SA, CBT, and TIP options.

Logging In

All users log in from the "Please Log In" page as shown below.

Figure 52: "Please Log In" screen

There are three steps to logging in:

1. Select which Permissions Level you wish to log in as. These are, in order or seniority:
    a. Screener
    b. Supervisor
    c. Maintenance
    d. Administrator
2. Select the Mode you wish to operate in:
    a. Scan Mode
    b. Management Mode
3. Use the User Name pull-down menu to select your user name. If your User Name does not appear in the pull-down menu, consult your supervisor.
4. Input your password.

Immediately upon inputting the last letter or digit of your password, you will be taken either to the System Ready scanning screen (if you chose “Scan Mode”) or to the Main Menu screen as shown below.

Note that although information for Threat Image Projection and Screener Assist is included I nthis manual, both of these are optional programs, which may be purchased separately from Astrophysics. Both programs will be inaccessible until enabled by Astrophysics.

Main Menu

Figure 53: Main Menu screen

All levels of users can access the Main Menu page (unless barred by Administrator decision), but there may be significant differences in the number of functions available to levels at different permission levels.

For example, a Supervisor may have access to only “Download Datafiles” and “Access Control” as shown below. Note that this level of access has been determined by an Administrator and will vary from facility to facility and Administrator to Administrator. It is possible for an Administrator to grant every level of operator a full set of permissions if the Administrator wishes to.

Figure 54: Supervisor Main Menu

Note that the buttons for those functions denied to the Supervisor in this example are grayed out and thus inaccessible.

The Main MENU has 8 options.

OPTION	DESCRIPTION
Employee	Add, Edit, Delete Users
System Configuration	Modify system configuration information
Daily Screener Report	Print Daily Screener Report
TIP Configuration	Modify TIP system configuration
Download Datafiles	Download reports and records
Access Control	Modify user group access privileges
History Report	Rerport on User, machine, permission level, date and time, et. al.
Exit	Return to “Please Log In” screen

Employee Menu

Clicking on the [**EMPLOYEE**] button on the main Menu screen brings up the Employee Record screen, as shown below.

Figure 55: Employee's Record screen

The Employee's Record screen contains the following fields:

- ID Code (Employee #)
- First Name
- Last Name
- Job Position
- Home Phone

The screen allows a member of the Administrative group to edit, delete, add and/or print employee records.

Adding Employee Records

1. Click on [**ADD**] button at the bottom of the Employee's Record screen. This will bring up the "Add New Employee" screen. There are 25 fields and buttons on the "Add New Employee" screen. They are shown below (numbered) below.

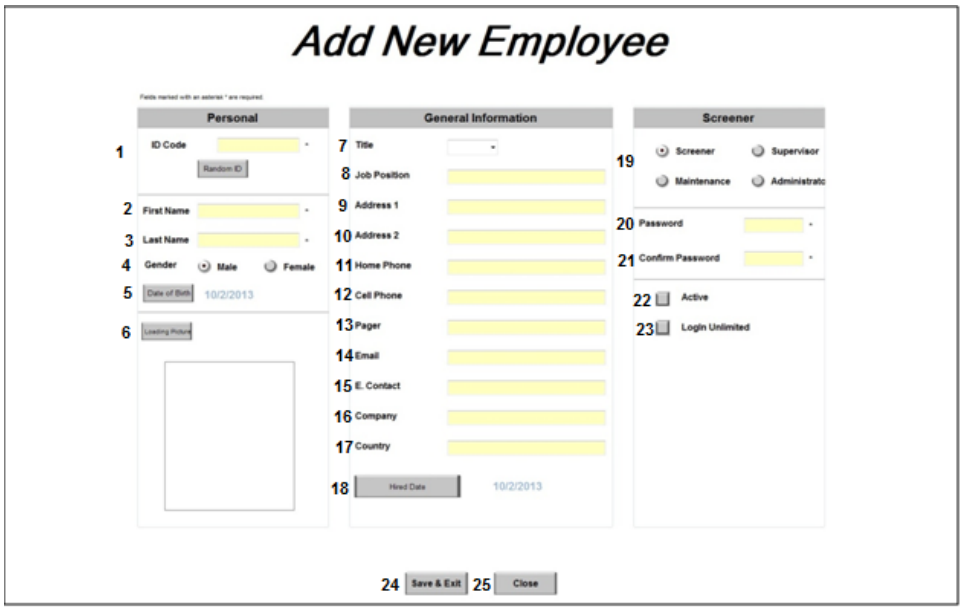

Figure 56: Add New Employee screen

NOTE: Fields on this and other XIS screens may have limitations in terms of # and type of characters a user is allowed to enter. Also, the screens themselves may display differently in terms of formatting and organization, depending on model, system software and screen resolution.

The fields on the Add New Employee screen are described in the table below.

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
1.	ID Code	Employee's login identification entry NOTE: IDs can be input manually or automatically via the Random ID button.
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.

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
6.	"Loading Picture"	Employee's picture. Picture entry is optional. It can also be a logo or other image.
7.	Title	Employee's title Employees are optional. Blank entries do not impair operation of the XIS/VI.
8.	Job Position	Employee's job position Entries are optional. Blank entries do not impair operation of the XIS/VI.
9.	Address 1	User's address line 1 Entries are optional. Blank entries do not impair operation of the XIS/VI.
10.	Address 2	Employee's address line 2 Entries are optional. Blank entries do not impair operation of the XIS/VI.
11.	Home Phone	Employee's home phone number Entries are optional. Blank entries do not impair operation of the XIS/VI.
12.	Cell Phone	Employee's (Mobile) Cell Phone number Entries are optional. Blank entries do not impair operation of the XIS/VI.
13.	Pager	Employee's Pager (telephone) number Entries are optional. Blank entries do not impair operation of the XIS/VI.
14.	Email	Employee's email address Entries are optional. Blank entries do not impair operation of the XIS/VI.
15.	E Contact	Employee's emergency contact information Entries are optional. Blank entries do not impair operation of the XIS/VI.
16.	Company	Employee's company Entries are optional. Blank entries do not impair operation of the XIS/VI.
17.	Country	Employee's country Entries are optional. Blank entries do not impair operation of the XIS/VI.
18.	Hired Date	Employee's hire date Optional date
19.	Screener Group	User's group Select "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.

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
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. This MUST be selected in order to activate an Employee's record, password, user name and other data.
23.	Login Unlimited	Allows unrestricted login attempts. Login limits are entered in System Configuration Screen. This must also be activated for a user to be able to log in without limitation.
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

2. Fill in all the fields on the "Add New Employee" screen.
3. Be sure to click the "Active" and "Login Unlimited" radio buttons.
4. Click the "Save & Exit" button.

NOTE: When selecting "Date of Birth" and "Hired Date" an interactive calendar will appear as follows, allowing the User to click on the desired date and/or to use the arrows in the upper left and right hand corners to move forward and backward in time, as follows:

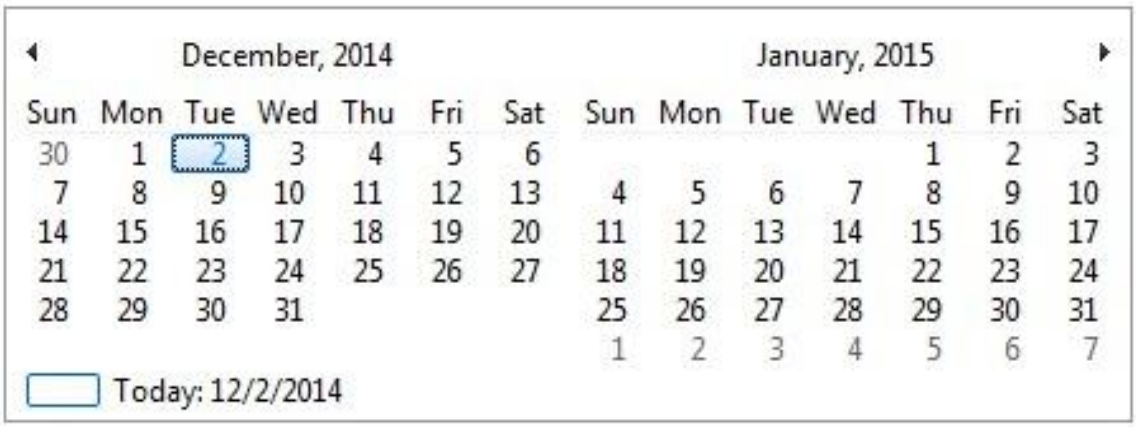

Figure 57: Interactive Calendar

The calendar format may vary according to software version, machine model, and screen resolution.

Editing Employee Records

Clicking on the "Edit" button on the second-to-last column on the right side of the "Employee's Record" screen will bring up a screen essentially the same as the "Add New Employee" screen, allowing a User to modify already existing Employee data fields.

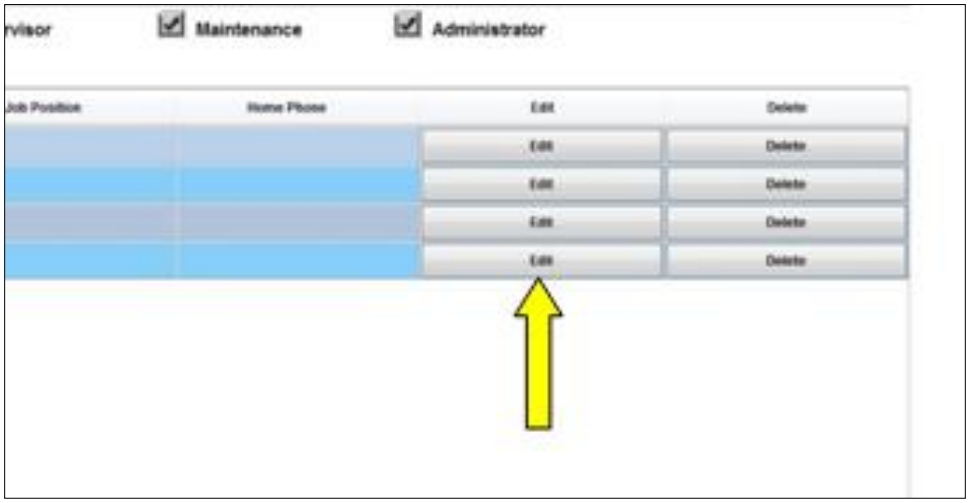

Figure 58: Editing Employee Records

Deleting Employee Records

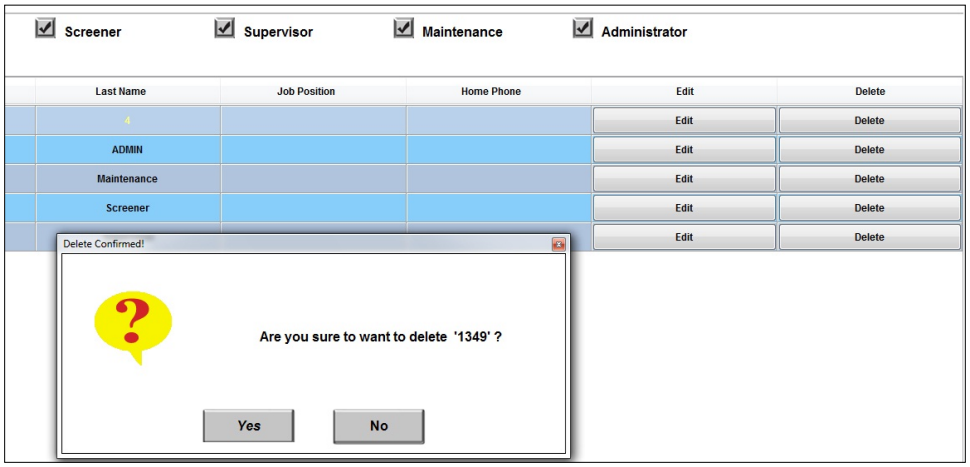

Figure 59: Deleting Employee Records

Clicking “Delete” in the last column of every employee record on the “Employee’s Record” screen will bring up the following message:

Click yes to permanently delete the selected employee record.

NOTE: There is a built-in restriction which prevents the deletion of the default Administrator.

System Configuration

The second option on the Main Menu screen is [**SYSTEM CONFIGURATION**].

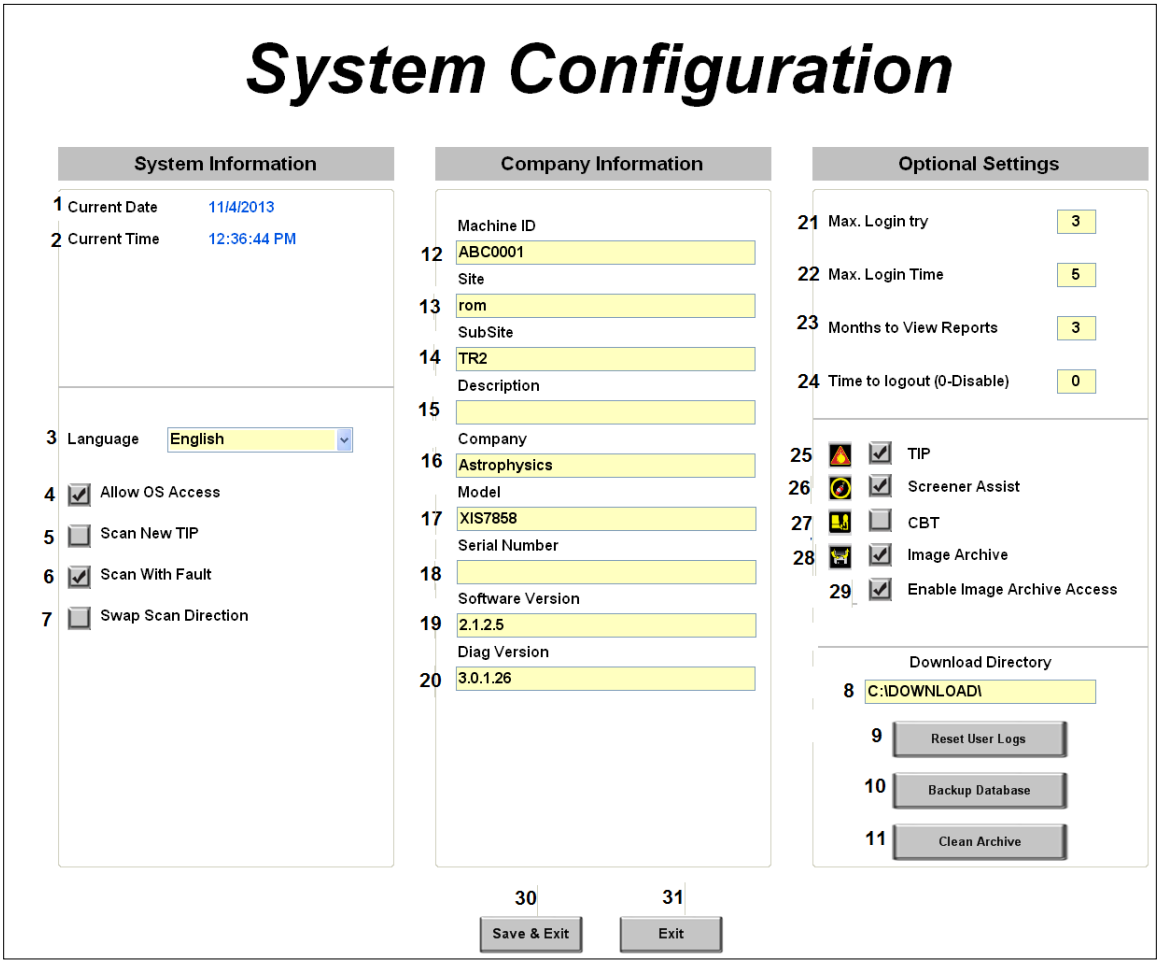

Figure 60: System Configuration screen

The *System Configuration Screen* (SCS) shown in Figure 60 (each function numbered, and described below) allows administrators (and other authorized users) to customize the XIS/VI system via 29 parameters and buttons:

The Data Entry Fields and “Buttons” are numbered and described below:

NOTE: The System Configuration screen and the options and fields on it may differ slightly on your machine depending on the software version and machine model number.

FIELD NUMBER	FIELDNAME ON “SYSTEM CONFIGURATION” SCREEN	DESCRIPTION OF FIELD
1.	Current Date	Displays current system date. See PC operating system manual for instructions on how to set system date.
2.	Current Time	Displays current system time. See PC 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 Astrophysics Inc.
4.	Allow OS Access	This is a “Yes” & “No” drop down list. If “Yes,” user is allowed to exit the “Please Login Screen” to the system “desktop” (by pressing the “enter” button on the AOCP) If “No,” user is not allowed to exit the XIS program.
5.	Scan New TIP	This is a “Yes” & “No” drop down list. If Yes: Save scanned images in TIP library folder If No: Save scanned image in normal archive folder.
6.	Scan with Fault NOTE: This setting is not adjustable by screeners. Usually applies to kV and mA faults.	Does not apply to interlocks, footmats or E-stops. This is a “Yes” & “No” drop down list. If Yes: Ignore system non-critical “fault” messages. This is usually done for the purposes of servicing a machine. If No: Halt X-ray imaging when any system “fault” is detected.
7.	Swap Scan Direction	Change the conveyor direction.
8.	Download Directory	Folder name where system reports are stored.
9.	Reset User Logs	Deletes all current User Log information.
10.	Backup Database	Back up Database to a predetermined location.

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
11.	Clean Archive NOTE: #s 9, 10 and 11 in this table , take effect immediately upon choosing them, regardless of whether the user chooses Save or Save and Exit.	Delete all current archive images.
12.	Machine ID	This data field is displayed on system reports. Entries are optional. Blank entries do not impair operation of the XIS/VI.
13.	Site	This data field is displayed on system reports. Entries are optional. Blank entries do not impair operation of the XIS/VI.
14.	Subsite	This data field is displayed on system reports. Entries are optional. Blank entries do not impair operation of the XIS/VI.
15.	Description	This data field is displayed on system reports. Entries are optional. Blank entries do not impair operation of the XIS/VI.
16.	Company	Data field that is displayed on system reports. This is an optional entry field.
17.	Model	This data field is displayed on system reports. Entries are optional. Blank entries do not impair operation of the XIS/VI.
18.	Serial Number	This data field is displayed on system reports. Entries are optional. Blank entries do not impair operation of the XIS/VI.
19.	Software Version	Data field that is displayed on system reports. This is an optional entry field.
20.	Diag Version	Diagnostics Version. This data field is displayed on system reports. This is an optional entry field.
21.	Max. Login try NOTE: Not presently operative.	This field sets the maximum allowable number of bad login tries before the XIS/VI disables login. Enter a value between 1 and 3

FIELD NUMBER	FIELDNAME ON "SYSTEM CONFIGURATION" SCREEN	DESCRIPTION OF FIELD
22.	Max. Login time NOTE: Not presently operative.	This field sets the maximum amount of time a user has to wait in order to login, after login has been disabled because of bad logins. After a preset time, this feature stops operation of the machine, but does not log the user out. Enter a value between 1 and 5
23.	Months to View Report	This field sets the maximum number of months which reports will be archived. Enter a value between 1 and 12
24.	Time to Logout	Sets the maximum idle time (in minutes) before the XIS/VI automatically logs out if there has been no AOCP inputs during that time. Enter a value between 0 and 60. A zero ("0") entry means unlimited access.
25.	TIP	Check - Enable TIP software Uncheck - Disable TIP software
26.	Screener Assist	Check – Enable Screener Assist Uncheck – Disable Screener Assist
27.	CBT	Check - Enable CBT software Uncheck - Disable CBT software
28.	Image archive	Check - Enable Image Archive software Uncheck - Disable Image Archive software
29.	Enable Image Archive Access	Enables users to view archived images.
30.	Save & Exit	Clicking this button saves the configuration and returns to "Please Login Screen".
31.	Exit	Clicking this button returns to main menu (without saving any changes).

Daily Screener Report

To Display a User Report

The third option on the Main Menu screen is [**DAILY SCREENER REPORT**]. Click the [**LOG REPORT**] button, which brings up the Screener Daily Report screen:

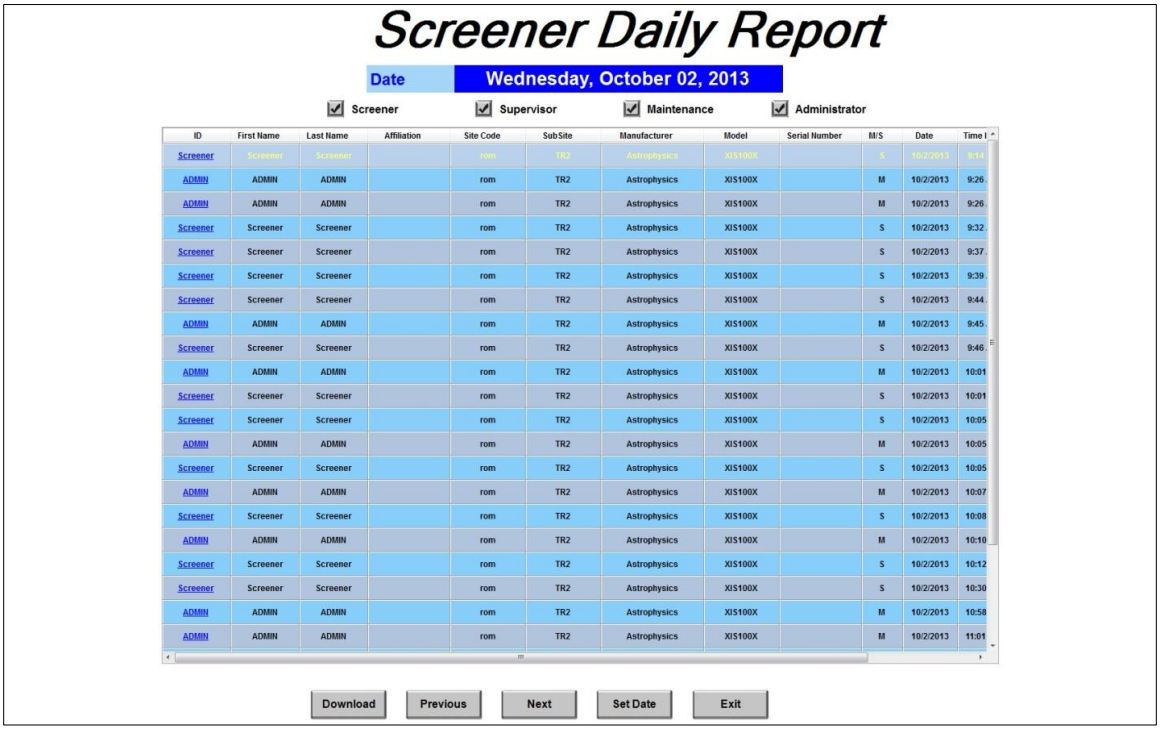

Figure 61: Screener Daily Report

Selecting [**DOWNLOAD**] will download the reports to a predetermined location and bring up this message:

Figure 62: "Download Complete" message

To set the Date parameters for the Screener Daily Report, click the [**SET DATE**] button, which brings up the following screen:

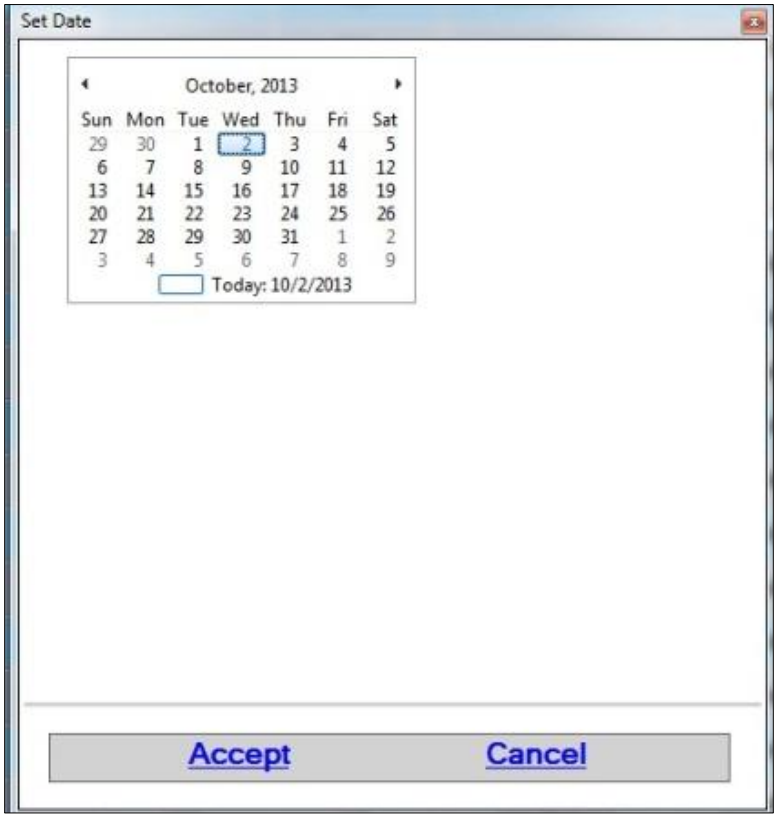

Figure 63: Set Date

TIP Configuration

TIP Configuration is a specific button available on the main MENU screen. This section will describe the screens and functions associated with that button. TIP is also, however, a separate, optional, software program and is explained more fully in the “TIP” section on page 112.

NOTE: TIP is an option for the XIS/VI system and does not come with the basic system.

Click “TIP Configuration” on the main Menu screen. The TIP Configuration menu appears.

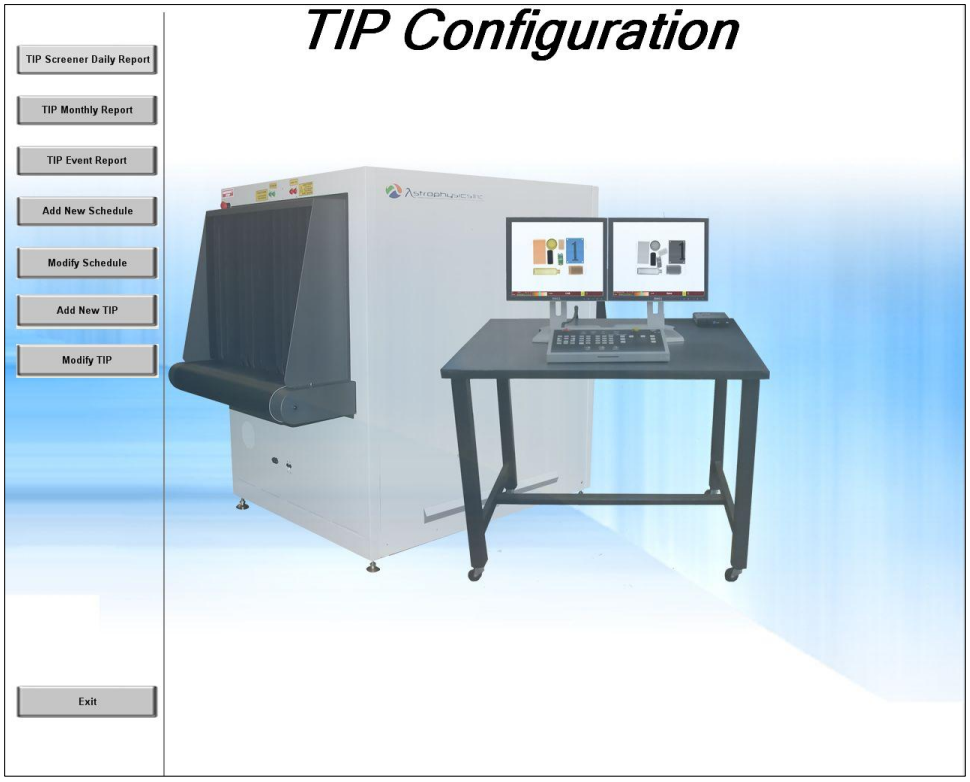

Figure 64: TIP Configuration Screen

The following options are available on this screen:

TIP Screener Daily Report

This screen allows users to review and download TIP daily reports. The user can select reports by date, and by permission level.

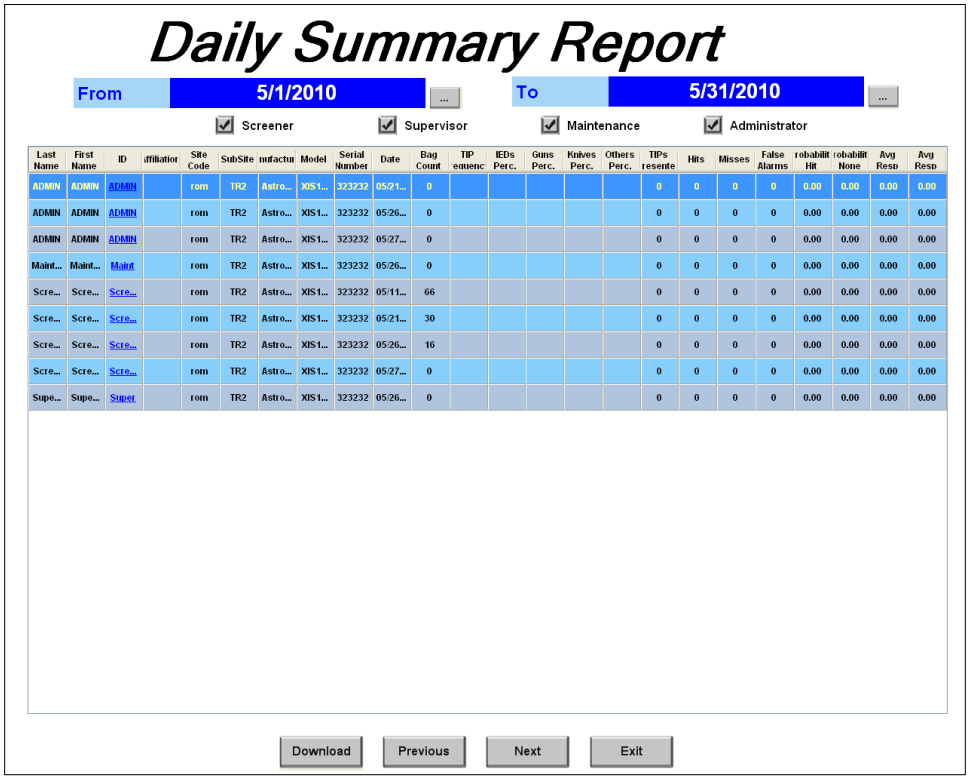

Figure 65: TIP Screener Daily Report

TIP Monthly Report

This screen allows users to review and download TIP monthly reports. The user can use the “Previous” and “Next” buttons to view reports from earlier or later months

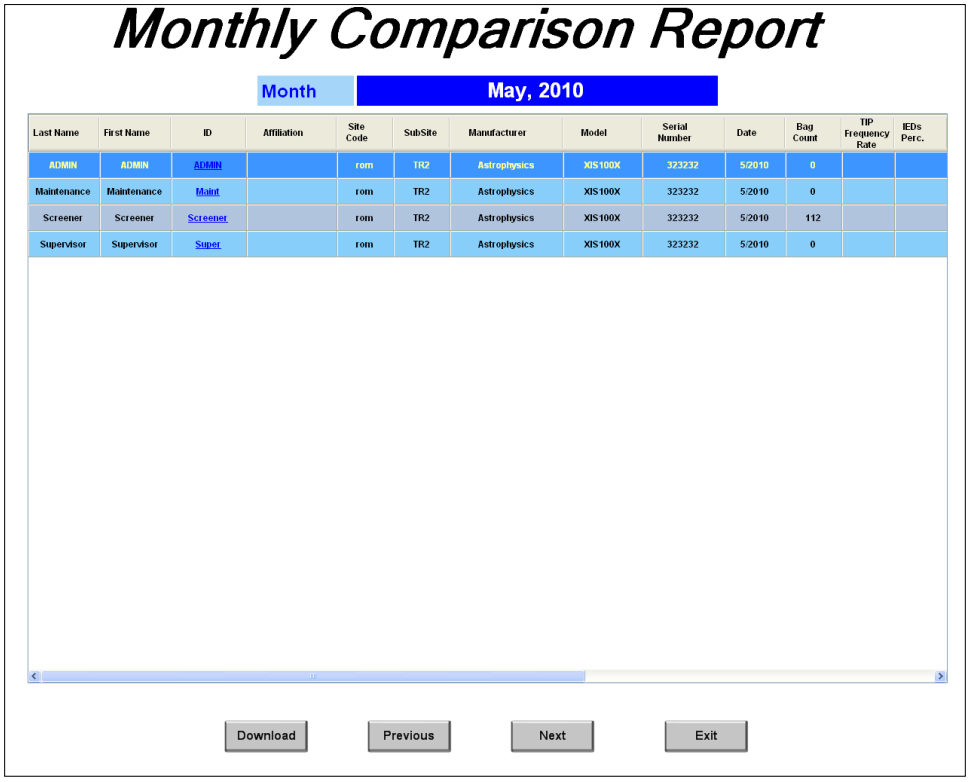

Figure 66: TIP Monthly Report

TIP Event Report

This screen allows users to review and download TIP event reports. The user can select reports by date, and by permission level.

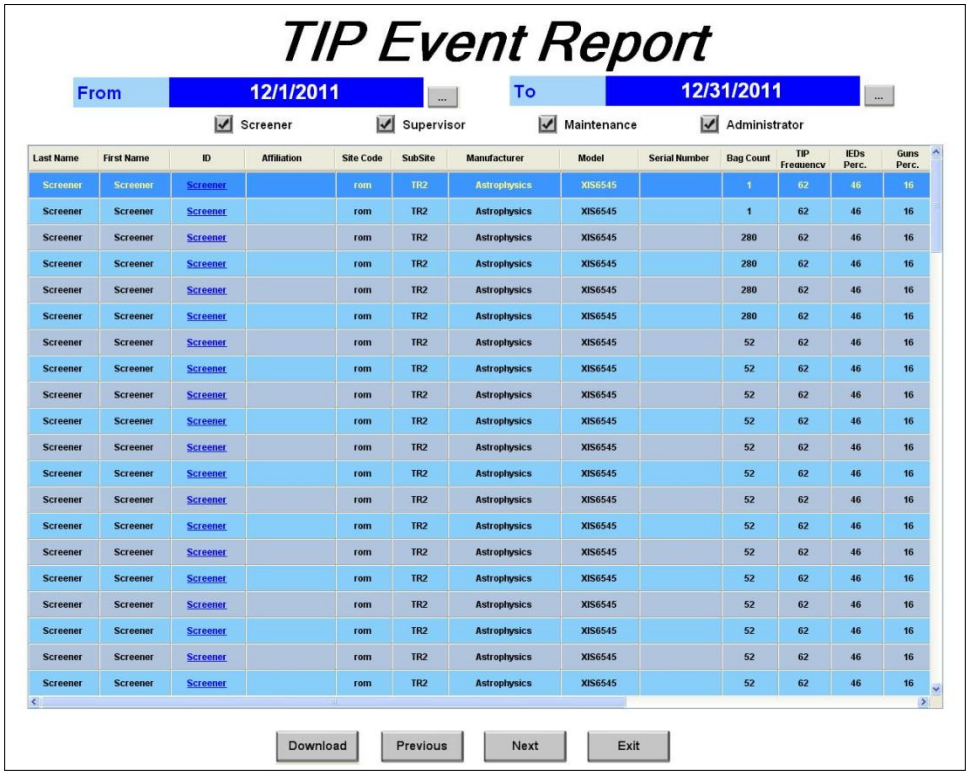

Figure 67: TIP Event Report

Add New Schedule

Selecting this option brings up the Threat Image Library screen.

Selecting one of more of the threat category buttons under the “Image Selection” column on this screen will cause the “Threat Library Available” column to become populated with fictional TIP threats. Selecting threats in that column, a user can then click on the large arrow pointing toward the “Selected Threat Image” column and transfer those threats to the second column, thus enabling those threats and making them available for a specific schedule.

Once a user is done enabling threats, click on the “Schedule” button to finalize the selection and the schedule.

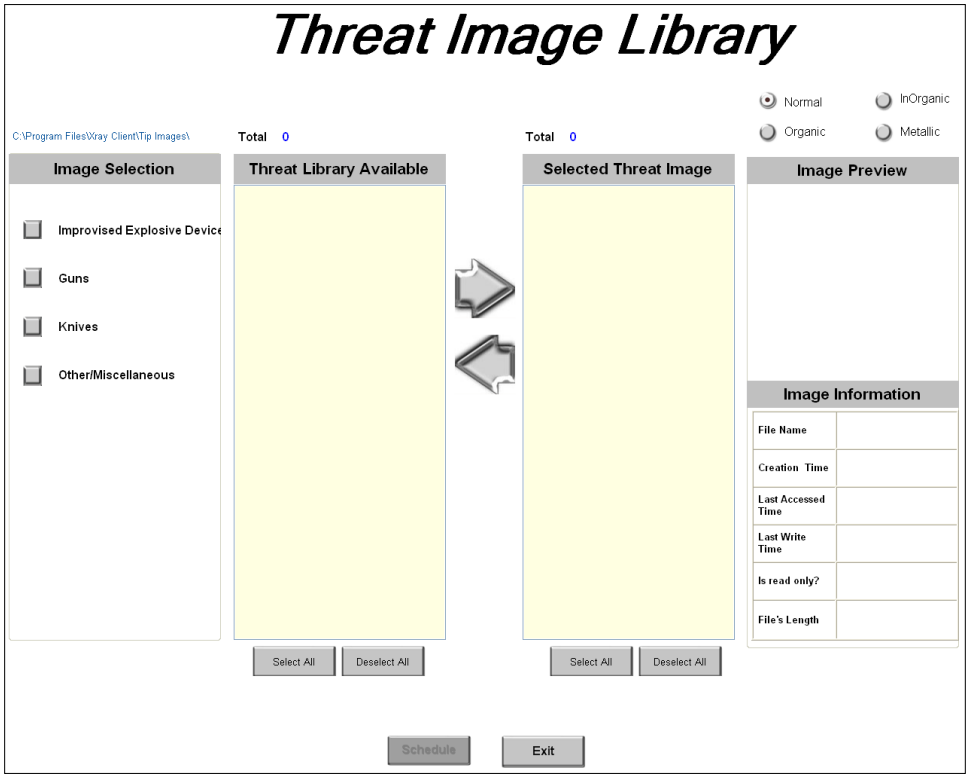

Figure 68: Threat Image Library

Modify Schedule

To modify a schedule, select the button and the “TIP Schedule” screen will appear. Activate a specific schedule by clicking the “Active” radio button in the appropriate row. Then click the “Edit” button in the same row.

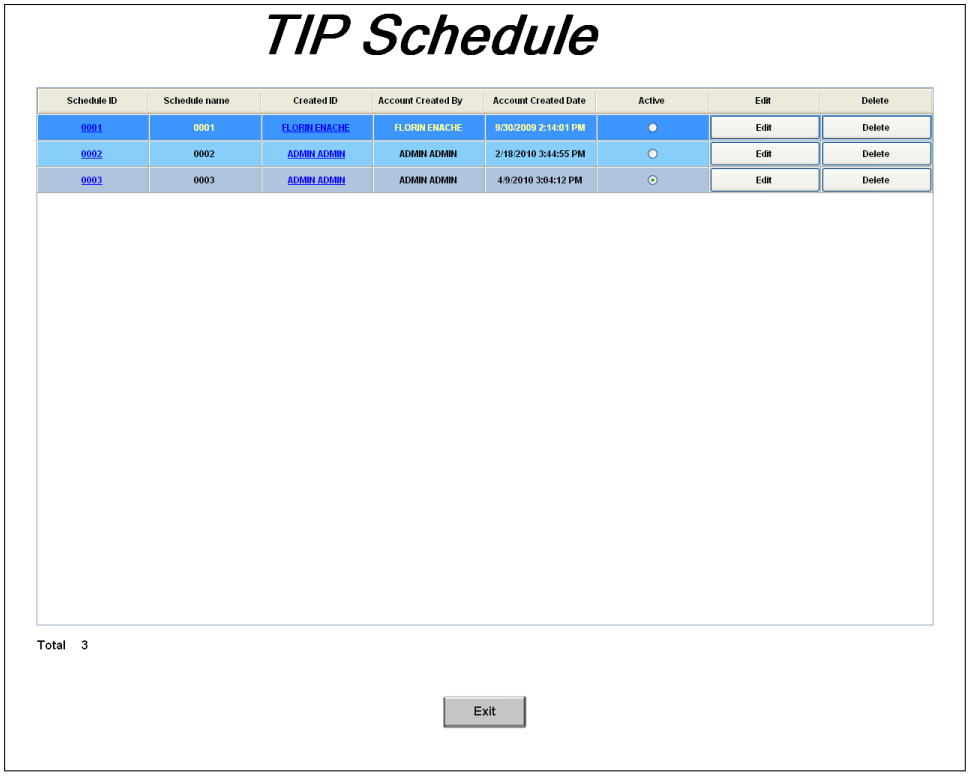

Figure 69: TIP Schedule

Clicking the “Edit” button brings up the “Threat Image Library” screen. Here a user can enter the Schedule’s name, then change the parameters of that schedule, including the percentage of TIP hits in each category, the frequency with which TIP hits will appear, decision time, and secondary decision.

After modifying the schedule, the user must remember to click the “Make this schedule active” radio button.

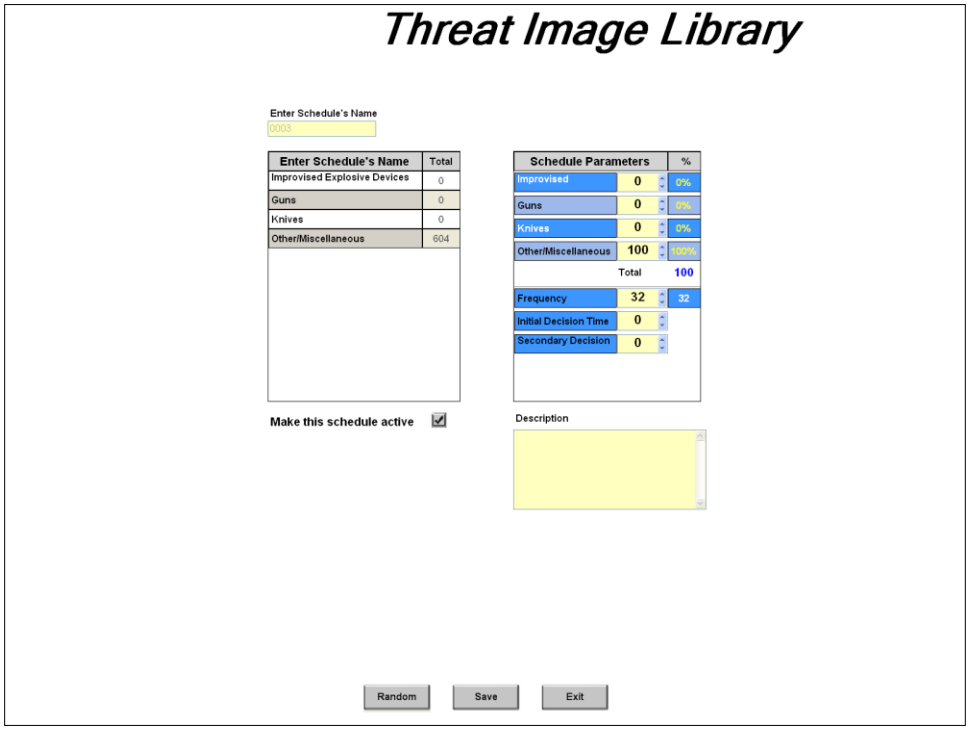

Figure 70: Modify Schedule screen

Add New TIP

Selecting this option brings up the “Add New TIP” screen. This process allows a user to add a scanned image to the TIP library. The user identifies the desired scanned image by file name (.wim), date and description, and then assigns it an ID and category.

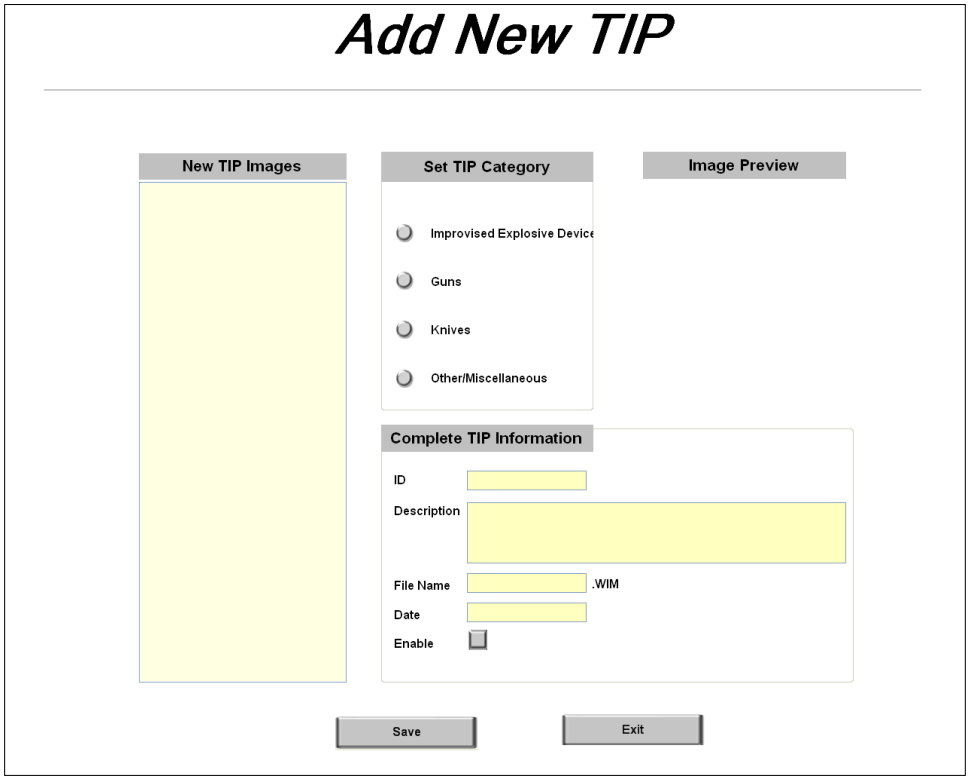

Figure 71: Add new TIP

Modify TIP

The “Modify TIP” screen works like the “Add New TIP” screen, allowing the user to change category and other information about selected TIPs.

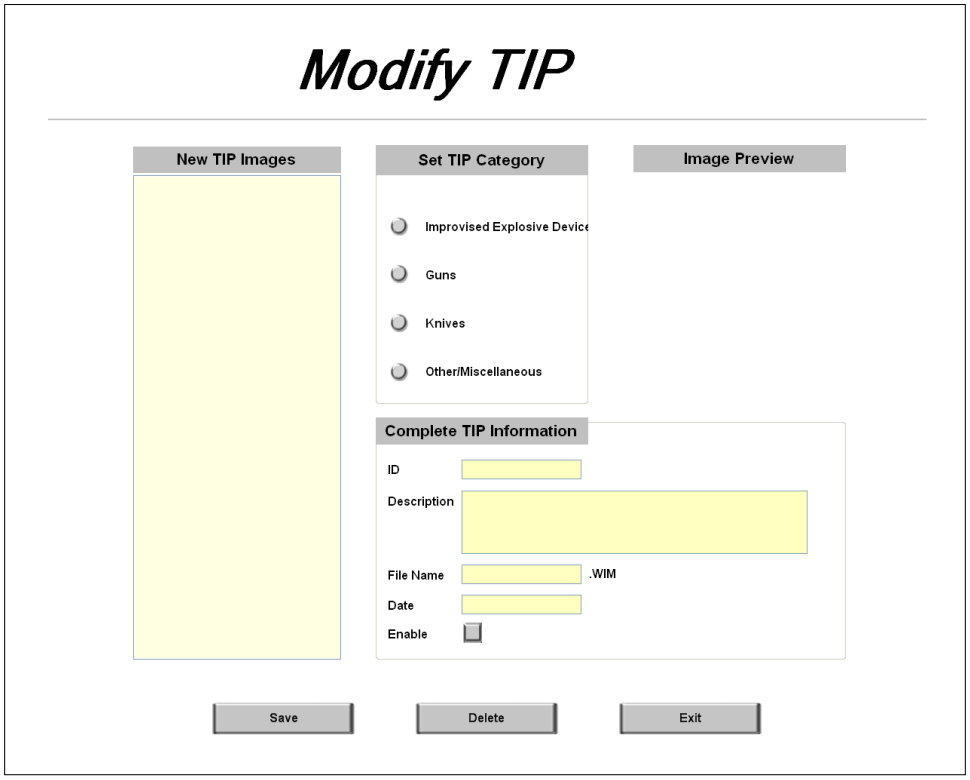

Figure 72: Modify TIP

Download Datafiles

The [**DOWNLOAD DATAFILES**] function allows Users to download Screener Logs and Event Logs. Selecting the [**DOWNLOAD DATAFILES]** button on the Main Menu will bring up the following screen:

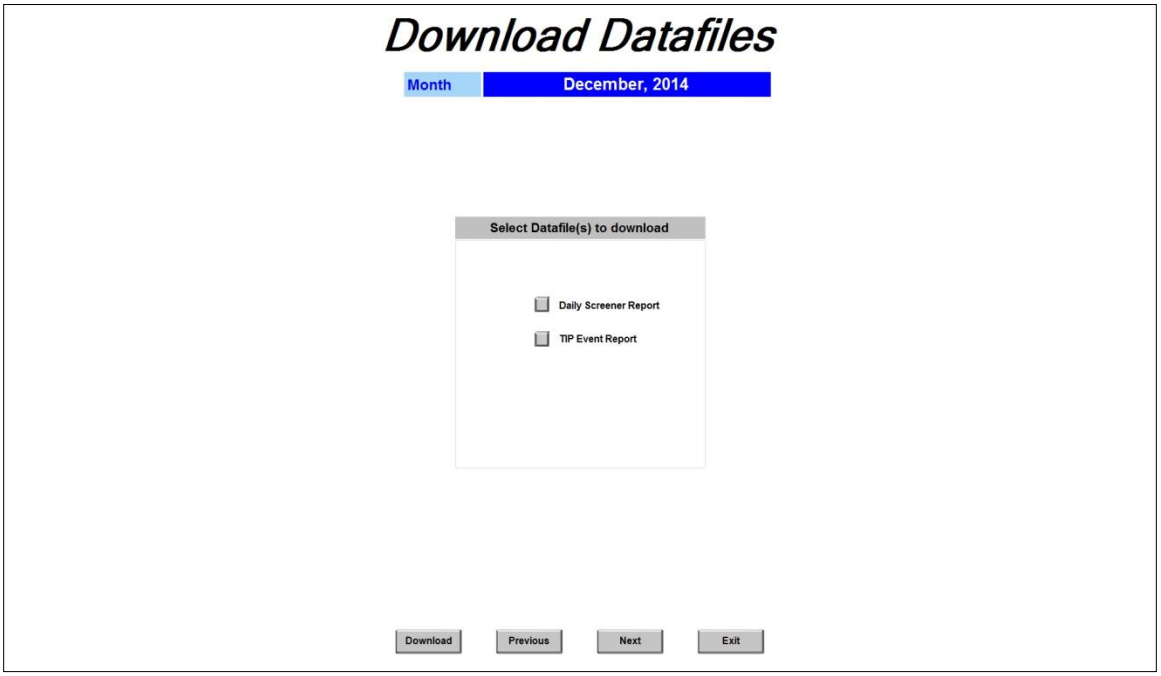

Figure 73: Download Datafiles

Select the type of files you wish to download, and use the [**PREVIOUS**] and [**NEXT**] buttons to scroll backward or forward through the months for which the data files are to be downloaded.

Click the [**DOWNLOAD**] button and the following message appears:

Figure 74: Download Complete

Access Control

The Access Control function allows the allocation and removal of XIS/VI functions/permission for all four permission levels: Screener, Supervisor, Maintenance and Administrator.

Clicking on the [**ACCESS CONTROL**] button on the Main Menu screen brings up the following screen:

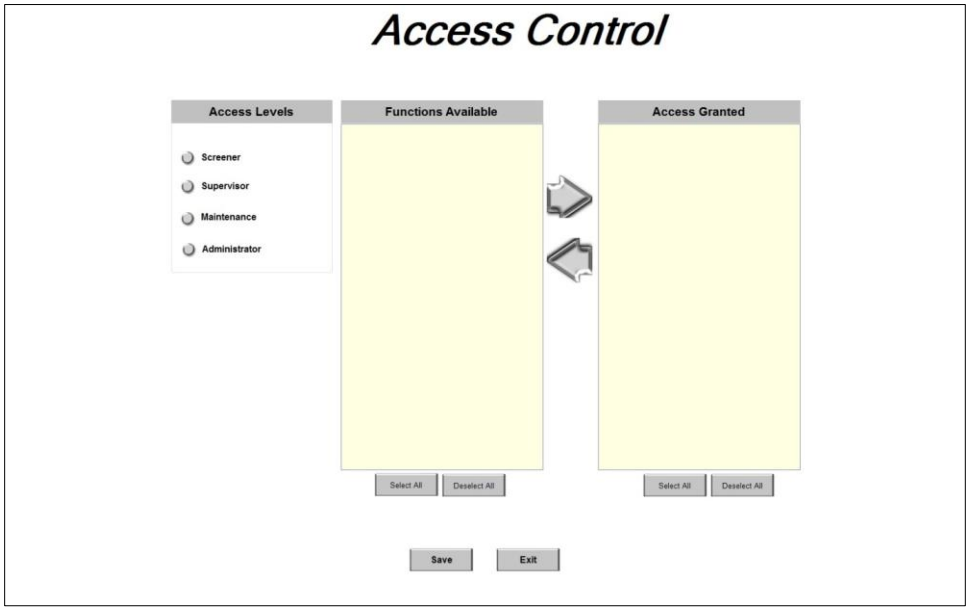

Figure 75: Access Control screen

The Access Control main screen allows the user to choose one of four Access Levels, and which functions/permissions to grant any of those levels. For example, selecting “Maintenance, causes the “Functions Available” column to become populated with all functions available on your X-ray system.

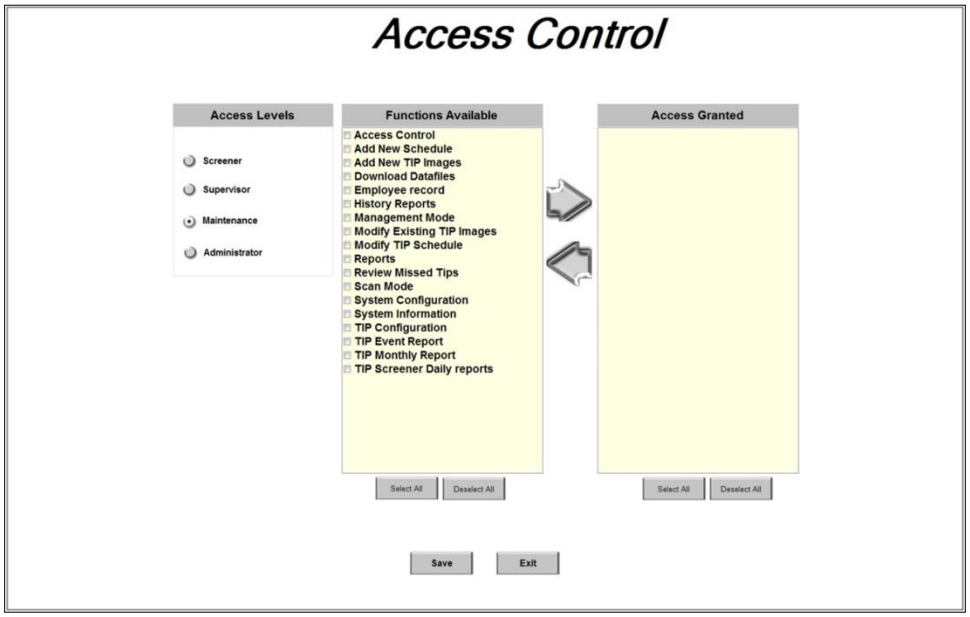

Figure 76: Selecting an Access Level

To assign some or all of those functions to the chosen level, click the radio boxes next to the individual functions.

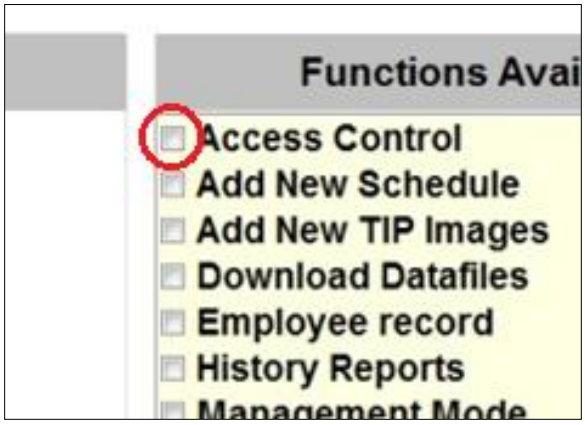

Figure 77: Selecting Available Functions

Once the desired functions have been selected, click the arrow facing the “Access Granted” column.

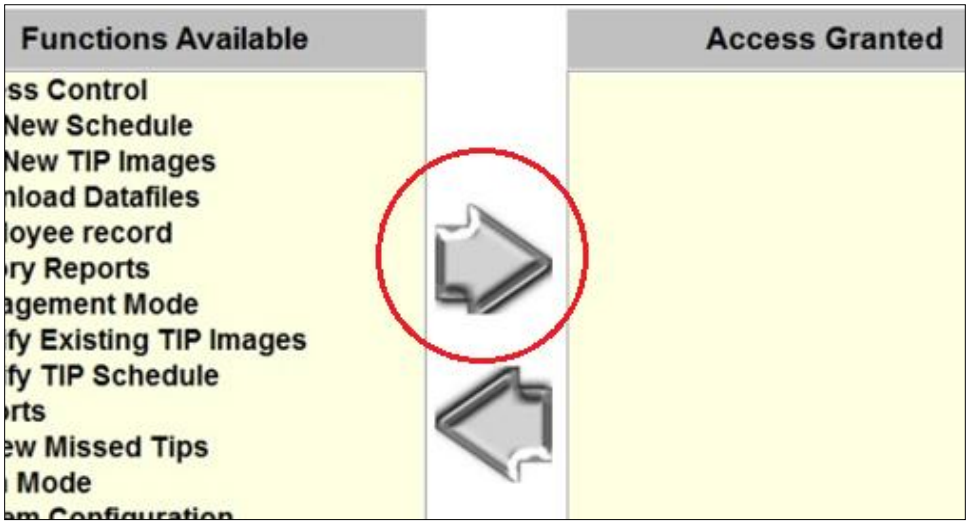

Figure 78: Transfer Arrow

The selected functions will be transferred to the “Access Granted” column and will thereafter be available to all members of that access level.

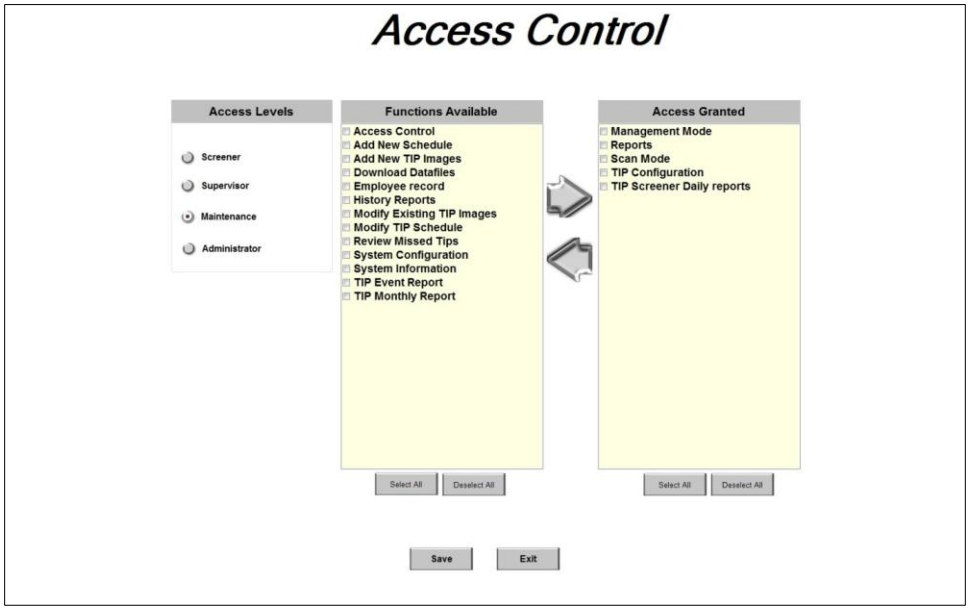

Figure 79: Functions Transferred

It is possible to transfer some of the available functions, or even all of those functions:

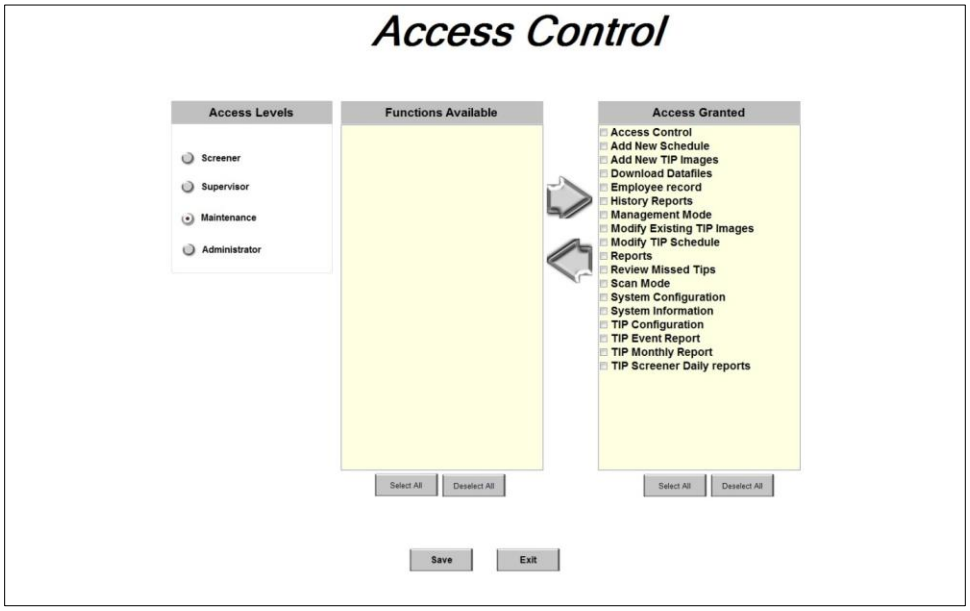

Figure 80: Access Control Maintenance Level

5. Once you have finished transferring the functions for each of the levels, click [**SAVE**] and then [**EXIT**].

Note that it is also possible to transfer functions from the “Access Granted” column back to the “Functions Available” column. Doing so prevents the members of the selected access level from accessing those functions.

Following is a list of access privileges available to XIS/VI users, as well as brief descriptions of the associated functions.

ACCESS PRIVILEGES	DESCRIPTION
Access Control	Allows user to adjust access control to all users.
Add new schedule	Allows user to modify access schedules
Add New TIP	Allows user to capture and save new X-ray images for the TIP system.
Download files	Allow user to download TIP report data files
Employee's record	Allow user to add, edit, and delete employee
History Report	Allow user to review screening history reports
Management	Allow user access to main menu
Modify Schedule	Allows user to modify existing TIP images
Modify TIP	Allow user to add & modify TIP projection schedules
Reports	Allow user to review reports
Review Missed TIP	Allow user to review missed TIP images
Scan Mode	Allow user to scan bags
System Configuration	Allow user to modify system configuration.
System Information	Allow user to view configuration system information
TIP Configuration	Allow user to change TIP system configuration
TIP Event Report	Allow user to review TIP event report
TIP Monthly Report	Allow user to review TIP monthly report
TIP Screener Daily Report	Allow user to review TIP screener daily report

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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 MESSAGE	COMMENTS / RECOMMENDATION
1.	XRAY KV FAULT	PRIMARY VIEW X-RAY GENERATOR KV FEEDBACK FAULT. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE.
2.	XRAY MA FAULT	PRIMARY VIEW X-RAY GENERATOR MA FEEDBACK FAULT. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE.
3.	XRAY CONTROLLER POWER SUPPLY FAULT.	X-RAY CONTROLLER FOR PRIMARY VIEW HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
4.	+5VDC PS1'S MALFUNCTION.	+5VDC POWER SUPPLY#1 HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
5.	-5VDC PS1'S MALFUNCTION.	-5VDC POWER SUPPLY#1 HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
6.	+5VDC PS2'S MALFUNCTION.	+5VDC POWER SUPPLY#2

	ERROR MESSAGE	COMMENTS / RECOMMENDATION
		HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
7.	-5VDC PS2'S MALFUNCTION.	-V5DC POWER SUPPLY#2 HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
8.	SYSTEM 12VDC POWER SUPPLY'S MALFUNCTION.	+12VDC POWER SUPPLY#2 (PRIMARY VIEW) HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
9.	UPS FAULT	UNINTERRUPTIBLE POWER SUPPLY HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
10.	XRAY CONTROLLER DV POWER SUPPLY FAULT.	X-RAY CONTROLLER FOR SECONDARY VIEW HAS MALFUNCTIONED. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
11.	XRAY DV KV FAULT	SECONDARY VIEW X-RAY GENERATOR KV FEEDBACK FAULT. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE.
12.	XRAY DV MA FAULT	SECONDARY VIEW X-RAY

	ERROR MESSAGE	COMMENTS / RECOMMENDATION
		GENERATOR MA FEEDBACK FAULT. CALL ASTROPHYSICS SERVICE FOR ASSISTANCE.
13.	E-STOP IS PRESSED PLEASE RELEASE TO CONTINUE.	CHECK AND RESET ALL EMERGENCY STOP SWITCHES.
14.	FOOTMAT DETECTED	STEP ON FOOT-MAT TO OPERATE SYSTEM
15.	INTERLOCK IS OPENED.	CLOSE PANEL.
16.	TEMPERATURE EXTREME DETECTED.	CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
17.	SOFTWARE ERROR	CALL ASTROPHYSICS SERVICE FOR ASSISTANCE
	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.

Figure 81: Error Log

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Shutdown and/or Logout

You may shut the entire XIS/VI system down, or simply log out in order to permit someone else to log in and use the system. In either case, always log out first (do not simply turn the AOCP key-switch to the OFF (vertical) position without first logging off). This ensures that the user logs out cleanly without losing any data.

Logging Out

Log out when you are finished with X-ray screening.

To LOG OUT press the [**LOG-OUT**] button on the AOCP. You will be taken to the Log In screen.

Figure 82: Log In screen

Logout allows another user to login and continue using the system, and prevents unauthorized persons from using the system when it is unattended.

If you have finished using the XIS/VI for the rest of day, log out and then shut down the XIS/VI by turning the key-switch to the OFF position. Remember to securely store the key.

NOTE: In an emergency, immediately press the Emergency Stop button; do not bother with logout or the key switch.

The E-STOP halts everything, including the conveyor / rollers and the X-ray generator(s). The XIS/VI 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.

Figure 83: Emergency Stop button

Additional Emergency Stop Buttons are located next to the inspection tunnel entrance and exit.

The conveyor belt and X-ray generator can also be stopped by:

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

It will take about a minute after turning off the AOCP key-switch for the XIS/VI’s green Power On light to go out.

TIP

NOTE: TIP is an option for the XIS/VI system and does not come with the basic system.

Introduction

The Astrophysics TIP (Threat Image Projection) system operates as an adjunct to the regular XIS/VI operating system.

When the Astrophysics TIP system is turned ON, threat images (i.e. discrete scanned images of guns, knives, and bombs) are periodically and randomly blended into the scanned images that are being displayed on the video screen, without the operator's knowledge.

One of TIP's purposes is to test operators' ability to rapidly recognize and acknowledge fictitious threat projections. If the operator correctly acknowledges the TIP threat, a congratulatory "HIT" screen message is displayed. If the operator fails to recognize a TIP, the system highlights the TIP on the screen and warns the operator with a "MISS" message.

Conversely, if an operator mistakenly reacts to a non-existent TIP, the system displays a false alarm message.

The TIP system scores and summarizes the performance of each operator. The results are available to be viewed and/or downloaded.

TIP also acts as a training tool. A typical security screener rarely sees images of actual threats. The TIP system exposes the operator to a variety of different threats, helping prepare the operator for the eventuality of a genuine threat and training the operator to be able to recognize such threats.

There are four broad categories of TIP tests:

- Guns
- Knives
- Explosives, including Bombs and IED (Improvised Explosive Devices)
- Other/Miscellaneous

TIP Procedures

The XIS/VI 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 TIP icon will be displayed in the Status Bar.

- When the TIP system is turned OFF, the TIP icon will be removed from the Status Bar.

- 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 Astrophysics XIS/VI system operates as usual when TIP is turned ON. All conveyor controls and imaging adjustment buttons work the same.

TIP images are projected at preset intervals based on 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 along with the image of the actual (real) bag.

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 [**SUSPECT**] button. Never react as if a threat might be just a TIP, because there is no way to know whether a threat is real until a TIP message is or is not displayed in response to your reaction or lack of reaction to a TIP. By failing to react to a "TIP," you may in fact be failing to react to an actual threat.

- If an operator is tested by the insertion of fictional TIP into the image of a scanned bag that you are examining, and if you respond within the allotted response time (usually 3 seconds, preset by a supervisor), a congratulatory message will be displayed. 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 record your successful (or unsuccessful) TIP threat identification.

- The original scanned image **without the TIP projection** will then be redisplayed on the screen.

NOTE: Re-examine the scanned image very carefully and thoroughly to eliminate the possible coincidence of there being both a TIP threat and an ACTUAL threat in the bag.

- 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, after responding to a TIP, the scanned bag appears to have an actual threat inside, follow your facility's security procedures for handling this situation.

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

NOTE: If you spot a potential threat but are told by the tip system that you are not being tested, 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.

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.

NOTE: If you see a potential threat(s) in a bag --> press the [stop] button.

- It is important to remember that potential threats on the screen can either be a real or fictitious TIP. Act accordingly.

NOTE: 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.

NOTE: Examine the image quickly and respond promptly. 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.

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

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 visual clutter of the bag's other contents. To help differentiate potential threats:

- 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.

It takes time and practice to become proficient at recognizing threats in X-ray images.

The picture 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. The arrow (not part of the TIP screen) indicates an IED (Improvised Explosive Device) TIP image.

Figure 84: Typical TIP "Hit" screen

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. Press STOP Key to continue!

It's important to check the bag again, in order to insure that there are no **REAL** threats inside the bag.

The picture below is an example of a typical TIP "***Miss***" Screen. The arrow (not part of the TIP screen) indicates the presence of an IED (Improvised Explosive Device) TIP Threat.

Figure 85: TIP "Miss" screen

Though the TIP IED appears to be present in the scanned bag, the operator did **NOT** press the [**SUSPECT**] button, thus causing the TIP to "time 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.

It's important to check the bag again to insure that there are no real threats inside the bag.

The next image is an example of a typical TIP "***FALSE ALARM***" Screen. Note the absence of any TIP Threat in the image.

Figure 86: TIP False Alarm screen

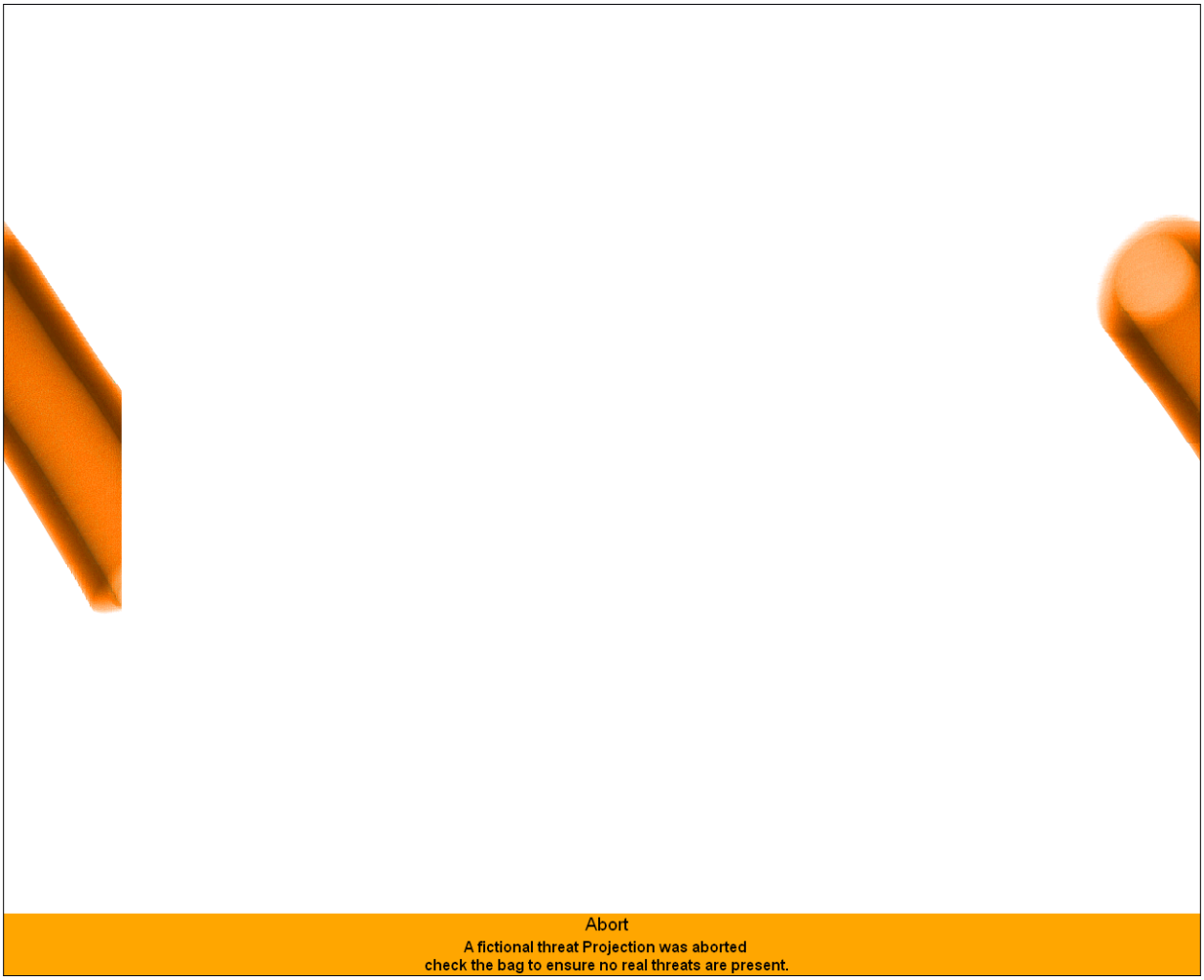
During regular screening operations, the operator pressed the [**SUSPECT**] button when NO TIP was being displayed. A "False Alarm" warning was then immediately displayed.

Note the message:

FALSE ALARM
A Fictional threat was canceled. Check the bag to make sure there are NO REAL threats. Press [LEFT] to continue!

NOTE: False Alarms messages are very important. They indicate that you are not being tested by the TIP System and that the threat you have found on the screen may actually be real.

The picture below is an example of a typical TIP "***Abort***" Screen. An "Abort" occurs when the TIP system tries to insert a fictitious threat into a bag which is too small to contain the threat image. The TIP system aborts the attempt, and the following message appears.



Note the message:

FALSE ALARM

A Fictional threat was aborted. Check the bag to ensure no real threats are present.

Computer-Based Training

Introduction

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

Using Astrophysics CBT

1. Have your supervisor turn the CBT option ON.
    - The CBT option must be turned ON before it can be used.
    - The CBT can be enabled only by ADMINISTRATOR level personnel.
    - When the CBT is turned ON, the XIS/VI cannot be used for regular X-ray screening, because normal conveyor belt operation is disabled.
2. Login as usual. The regular login procedures are described in “Login: Screener” on page 64.
    - Select your user name entry from the drop down menu.
    - Enter your numeric password using the console.
    - Wait for the ***System Ready*** screen to appear.
3. Press the [**LEFT**] button to start the CBT simulation.
    - Simulated bag images 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.
4. CBT training is concluded when the user logs out. Press the [**LOGOUT**] button to logout.
    - When TIP is turned ON, the CBT does NOT accumulate any performance statistics.
5. Have your supervisor turn the CBT option OFF, when you are ready to use the XIS/VI for real screening operations.

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Screener Assist (SA)

Screener Assist is an optional software feature that allows the XIS/VI to highlight areas of special interests to the user. When the XIS/VI detects a significant mass of any organic material that has same Z-number as military explosives, it draws a highlighting ellipse around the area to alert the XIS/VI operator.

Screener Assist draws **RED** ellipses around areas that possess Z-number (atomic number) and mass density characteristics similar to those of narcotics and common explosives.

YELLOW ellipses are drawn around dense areas of low x-ray penetration.

PURPLE ellipses are drawn around bottles (placed on clear trays for scanning) containing flammable liquids.

NOTE: Liquid discrimination is an option for Screener Assist that is enabled separately.

The figure below shows examples of the yellow and red ellipses, drawn around suspect items in a scanned bag as shown on a dual-monitor system, color on the left, black and white on the right.

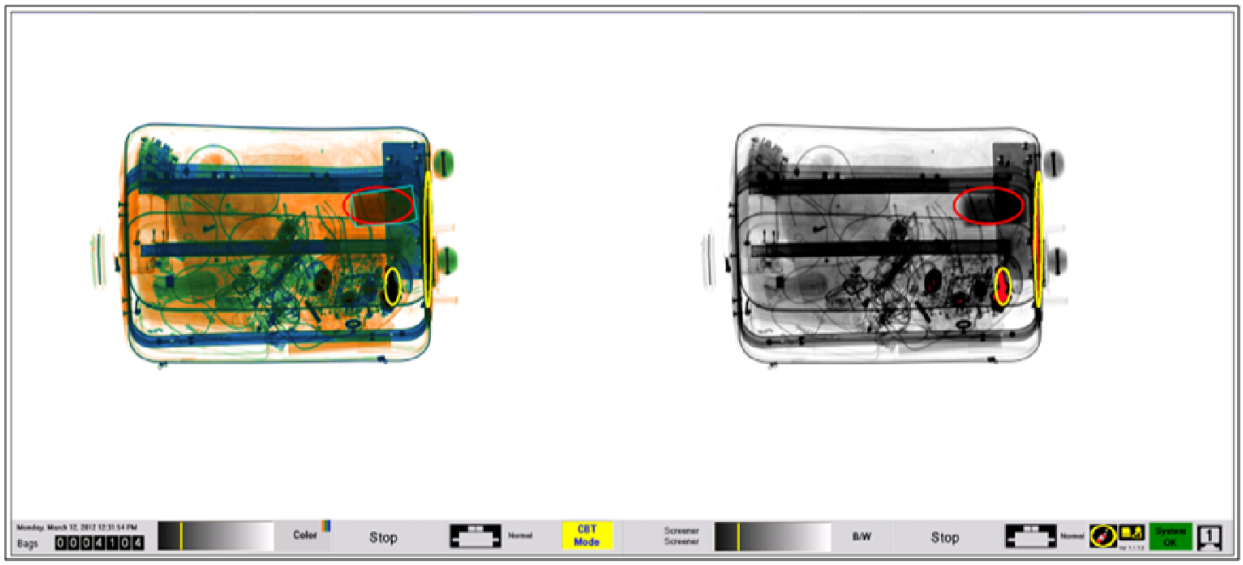

Figure 87: Screener Assist Yellow and Red Ellipses

Following is an example of purple ellipses drawn around a bottle of flammable liquid.

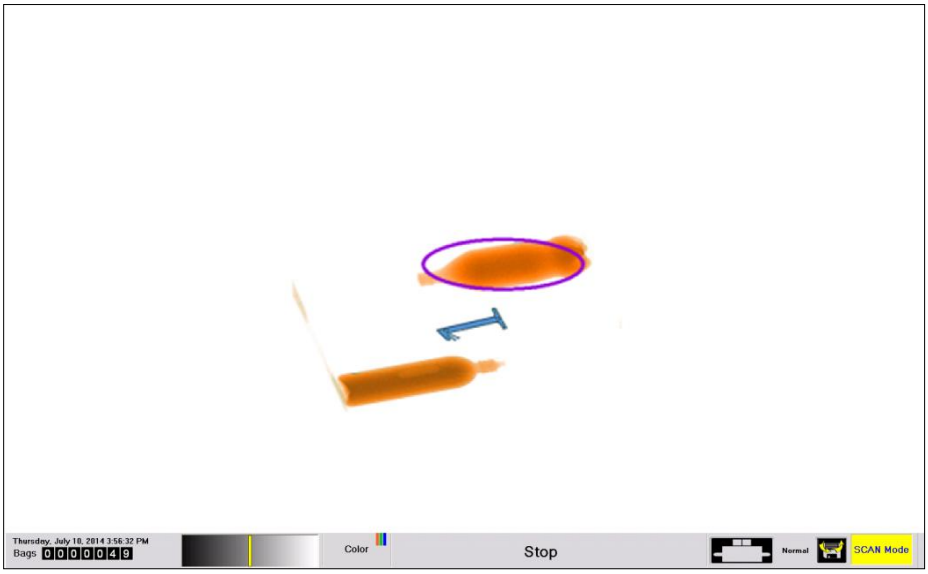

Figure 88: Screener Assist Purple Ellipse

In addition to explosives, Screener can detect and highlight narcotics and, with its Liquid discrimination option, certain types of potentially dangerous liquids (such as lighter fluid or gasoline).

Screener Assist's Liquid Discrimination mode includes four options :

1. Detection OR Discrimination
2. Detection AND Discrimination
3. Hidden Discrimination
4. Auto Enabling of Detection AND Discrimination

Liquids must be scanned separately, on the conveyor belt or in a tray, in order for Liquid Discrimination to be able to identify possible threats.

Screener Assist also works on dual-view systems, giving the screener a second view of the bag and its contents, and highlighting potential threats in both views. It's like getting a second opinion – instantly.

Screener Assist is a valuable tool in detecting threats in screened items. The software enhances a screener's judgment, skill and vigilance, helping the screener be more effective in protecting the public.

It is important to note that many common organic such as certain foods, certain gels (i.e. shampoos, toothpaste, etc), large pieces of plastic, certain batteries (such as from notebook computers and cameras) have the same Z-number as military explosives and may therefore be highlighted by Screener Assist.

When Screener Assist highlights a potential threat, follow the security procedures in your facility for handling these situations.

Screening Assist does not replace constant vigilance or common sense. Carefully inspect ALL X-ray images.

Density Alert

INTRODUCTION

In security X-ray imaging, dense objects are of special interest because they could indicate the presence of hidden guns, knives, and other threats. Dense objects are typically metallic, (more) “opaque” to X-rays, and colored dark gray or black on the screen. These dark, featureless forms are easily overlooked.

THE DENSITY ALERT – TWO (2) MODES OF OPERATION

Density Alert (“DA”) is an optional software feature that highlights the presence of dense objects in X-ray images.

DA has two modes of operation: (1) a (red dot) Pixel highlighting mode and (2) (yellow) *Ellipse* highlighting mode.

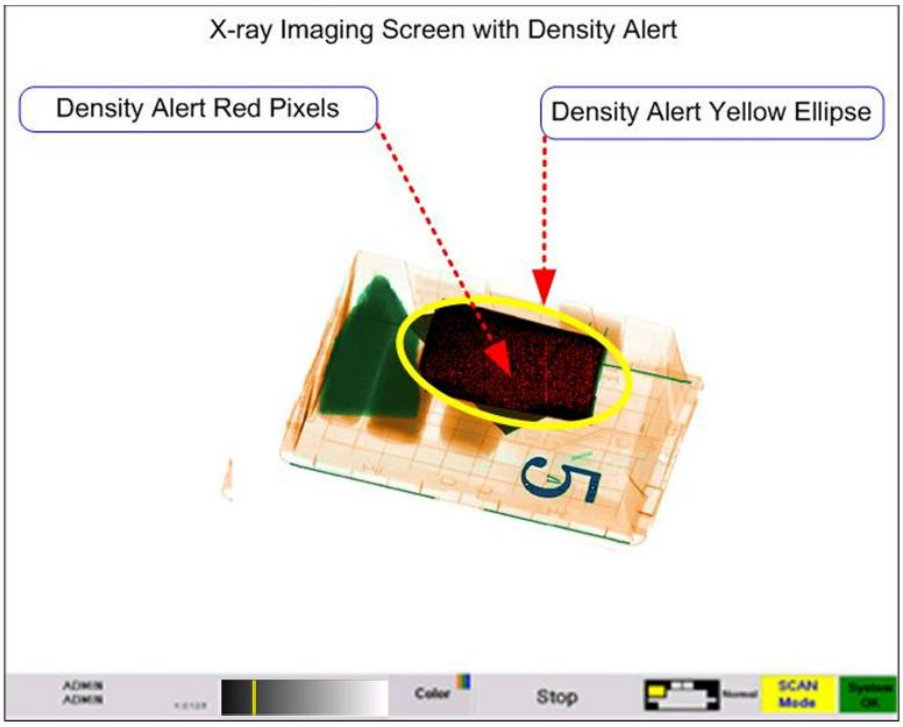

Figure 89: X-Ray Imaging Screen with Density Alert

In pixel highlighting mode, “dense” black pixels are replaced with highly visible red pixels.

In ellipse highlighting mode, DA identifies dense objects by drawing bright yellow ellipses around them. DA can optionally beep the control panel speaker, and stop the conveyor belt. In ellipse drawing mode, dense objects must be of a specific size before they will be highlighted. DA ignores single, isolated, dense “dots”. If there are multiple dense objects on the screen, DA will draw up to twenty (20) simultaneous ellipses. DA will also frequently draw a single large ellipse around a cluster of small dense objects.

The DA function is activated at system installation time. *Pixel* highlighting mode and *Ellipse* highlighting mode can operate together or separately. The Ellipse highlighting mode also requires installation of the Screener Assist Software option. It is important to note that DA *assists* in the recognition of dense object threats but is NOT an absolute threat detection device.

Figure 90: Density Alert Off (left) and On (right)

The graphic below shows another example of Density Alert. Note how both the yellow ellipses and red pixelation are used to highlight a simulated pipe bomb in the left-hand bag, and a grenade and pistol in the right-hand bag. Note also that the knife in the right-hand bag is not highlighted. This is because Density Alert reacts to objects too thick for the XIS X-rays to penetrate. The blade of this knife was not thick enough to fully block the X-rays. So though the knife shows up more than clearly enough for a screener to easily see, it did not trigger Density Alert.

Figure 91: Density Alert

Appendix A: 200kV Cargo Models

200kV Generators

This manual covers the operation of a wide assortment of Astrophysics X-ray machines, including the 1517 200kV and 1818 200kV (both Single View and Dual View) pallet machines (NOTE: this manual does NOT cover the 320kV versions of the 1517 and 1818 pallet machines).

In 200kV systems the Calibration function is always enabled. This is to provide the necessary warm-up time for the X-ray generator. A message will appear upon boot-up, indicating that calibration will occur. Once this message has been acknowledged on-screen by the User, an “X-ray On” warning will appear.

Once the “X-ray On” warning has been acknowledged by the user, X-rays will turn on, and calibration will begin.

If the machine has not been used for more than 24 hours, such as over a weekend, calibration will take approximately 30 seconds.

If the machine has not been used for longer periods (such as at installation, or after being stored for extended periods of time), calibration may take up to 20 minutes.

If a machine has been used within 24 hours, calibration at boot-up will be completed within a few seconds.

NOTE: Once X-rays are turned on, there will be no feedback messages indicating how much time remains for the warm up. Once calibration is complete, the log-in screen will appear.

Roller beds on the 1517 and 1818 machines usually have the first two to four rollers on the entry bed unpowered (the configuration determined by the clien and set at the factory).

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Appendix B: Quick Reference Card

Customer Service Department 1-909-527-6750 service@astrophysicsinc.com

XIS Operation Quick Reference Card

("Xray Client" software Rev 2.1.2.X and later)

A. PRE-START INSPECTION
   1. Power Cable.....Good condition and secure.
   2. Circuit Breaker .....Check "ON" (up position)
   3. All Red Emergency Stop Buttons (Tunnel Entry/Exit & Operator Panel)..... Check released (gentle clockwise turn)
   4. Curtains..... Good condition (no strips damaged or missing)
   5. Conveyor Belt.....Good condition and aligned.
   6. Inspection Tunnel.....Clear.
   7. All Photocell Sensors (Located at tunnel entry & exist just inside the curtains near conveyor level, with either one or two cells stacked vertically, on each of the four corners of the inspection tunnel) ....Check clear (no small objects trapped on the conveyor bed gutter)
   8. Access Panels.....Secure and locked

B. SYSTEM STARTUP & LOGIN (*New login required PER NEW OPERATOR to allow software to run maintenance functions).
   1. "SYSTEM POWER" Key Switch.....Insert and turn 90° clockwise to the "ON" position.
   2. System Boot Up & Initialization ..... Wait for the "Please Log In" screen to appear, and for the blue status bar to clear.
   3. Operator Type ..... Select: Screener, Supervisor, Maintenance, or Administrator
   4. Mode ..... Select Scan Mode or Management
   5. "Name" .....Select from drop-down list.
   6. "Password" ..... Activate textbox (point cursor inside the box and single-tap on the touchpad). Key-in the password. To key-in letters, switch to "ALPHA" mode using the ALPHA key on the Operator Panel.

C. X-RAY SCREENING
   1. Entering "Scan Mode" Wait for the toolbar indicator to switch from "Please Wait" to "System Ready."
   2. Software Normalization Press the Operator Panel "LEFT" or "RIGHT" button to start the conveyor in the normal scanning direction. Allow X-rays to activate and then deactivate before scanning the first article.
   3. Scan Articles
      a. With the conveyor moving in the normal scanning direction, place article on the conveyor. Note that the conveyor will move for a short time in the opposite direction when first starting motion.
      b. For Single View units, the primary X-ray imaging functions are as follows:
         i. Left Monitor: *Color* (default), *Organic*, or *Inorganic* as selected.
         ii. Right Monitor: *Black & White* (default), *Black & White Reverse*, or *Pseudo Color* as selected.

      NOTE: For Dual View units, all six above imaging functions are available independently on each monitor.

      c. To stop the conveyor, press the Operator Panel "STOP" button.
      d. To reverse the conveyor, press the Operator Panel "RIGHT" button.
   4. Additional Imaging Functions ..... Most may be operated with the conveyor in motion. The following require the conveyor to first be stopped: "PRINT," "SAVERGB," "PICTURE PERFECT," "ATOM," ZOOMIN," and "ZOOMOUT." Do not use "PRINT" without a printer.

D. SYSTEM SHUTDOWN
   1. "LOG OUT" Key .....Press Operator Panel "LOG OUT" key to log out of "Scan Mode."
   2. "SYSTEM POWER" Key Switch..Only after returning to the "Please Log In" screen, turn the key 90° counter-clockwise to the "OFF" position and remove it from the switch. Do not attempt to turn the key switch on again until the system shutdown cycle is complete (I min. after the green system power lights located on the cabinet frame turn off), or else the PC will not power back up.

EMERGENCY STOP: If any unsafe condition develops, press any red "EMERGENCY STOP" button to bring the system to a safe state. X-rays will turn off and the conveyor will stop. To release an E-stop button, turn gently clockwise.

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