

---

# **Sprite User's Manual**

---



# Table of Contents

<b>Introduction and Basics</b>	<b>1</b>
Introduction	1
Safety Information	1
Intended Use:	1
Installing and Moving Sprite	4
Pre-Installation Requirements	4
Additional Connections	4
Licensing	4
Moving Sprite	4
Safety	5
Compliance	5
Modification of Sprite	5
Safety Features	5
Procedures	6
Protection	6
Liquids	6
User Safety Symbols and Features	6
Brushed Stainless Steel	9
Exterior Cabinet	9
Touch screen	9
External Machine Diagram	9
Machine Specifications	10
Cabinet Specifications	10
X-ray System Specifications	10
Operating Specifications	11
Contact Information	11
Basic Operation	12
Powering Sprite On and Off	12
Using the Touch screen Interface	12
Required Pre-Scan Procedures	12
Sample Placement	13
Canisters and Platforms	13
Calibration Phantoms	13
Fixture/Phantom Placement	14
Contact Information	14
<b>Components</b>	<b>15</b>
Main Screen	15

Begin a New Scan Button	15
One Touch Scan Button	16
Utilities Button	16
Locate a Scan Button	16
Background Processing Button	17
X-ray System Maintenance Button	17
Messages	18
Begin a New Scan Screen	19
Image Area	19
Scan Settings	20
System Calibration or Validation Settings	22
Preview Image Button	22
Save Button	23
Stage Position Control	23
Scan Button	23
Scout Penetration	23
Full Imaging Scanning, System Calibration, and Validation	24
Scanning Screen	25
Scan Progress	25
Image Area	26
Scan Review Screen	27
Image Area	28
Action Button	28
Table Settings Button	28
Scan/Reconstruction Table	29
Delete	29
Copy	30
Move	30
Processing Status	30
GUID	31
Operation	31
Description	31
Comment	31
View Surface or Volume Reconstructions or Calibration/Validation Results	31
Processing Setup Screen	32
Region of Interest	32
Estimated Processing Time	34
Processed Data Type	34
Resolution	35
Processing Button	35
Results Screen	36

Image Area	36
Surface Export	37
Results Screen – Calibrations and Validations	38
Report Button	38
System Calibration and Validation Reports	38
Locate a Scan Screen	40
Scan Table	40
Page Up and Page Down Buttons	40
Search Button	41
Table Settings Button	42
Background Processing Screen	43
Reconstruction Table	43
Utilities Screen	44
System Sleep Button	44
Touch screen Calibration Button	44
System Shutdown Button	45
Storage Device Management Button	46
Network Configuration Button	48
One Touch Scan Setup Button	50
Submit Trouble Ticket Button	51
Reset Processing Engine Button	53
Reset System Board Service Button	54
Reset X-ray Service Button	54
Reset Scan Engine Button	54
System Restart Button	54
System Status Screen	55
Gauges	55
Test X-ray Lamp Switch	55
Primary Indicators	56
Log and Version Buttons	56
Note: The button that has been pressed and is actively displaying its corresponding information turns red	56
Secondary Indicators	57
X-ray System Maintenance Screen	58
Begin Conditioning Button	58
Begin Detector Calibration Button	59
Scheduled Maintenance Button	59
Common Elements	61
Abort Button	61
Arrow Button	61
Image Manipulation Buttons	61

Navigation Buttons	62
Turn X-rays Off Button	63
Background Processing Button	63
Scan Identification	64
Keyboard	64
Kilovolts Icon	65
Milliamperes Icon	65
Status Light and Message	65
Temperature Gauge	66
X-ray Icon	66
Trefoil	67
<b>Technical Support</b>	<b>69</b>

---

# Introduction and Basics

## Introduction

Welcome to the Sprite CT scanner by IMTEC™, a 3M Company.

Sprite is a sleek, compact, state-of-the-art CT scanner allows you to easily scan an object and produce a 3D image for numerous applications. Sprite uses advanced X-ray technology and the innovative FlashCT™ software developed exclusively by IMTEC engineers to create a unique CT scanner well above industry standards. Sprite is designed with the user in mind, featuring progressive technology, excellent results, and ease of use.

Sprite's user-friendly X-ray scanning technology includes:

- a touch screen with simple software in an imbedded computer for viewing your 3D images,
- straightforward ways to ensure accurate scans,
- one-touch scanning,
- automatic conditioning and calibration, and
- a compact profile and small footprint.



## Safety Information

**Please read, understand and follow all safety information contained in these instructions prior to the use of this scanner.** Retain these instructions for future reference.






### **Intended Use:**

The Sprite CT scanner by IMTEC™, a 3M Company creates a 3D visualization of a scanned object through X-ray computed tomography (CT). Sprite is intended for use by trained individuals to retrieve, process, render, review, store, and distribute images. The user should be trained in the safe operation of this scanner including instruction for adherence to local radiation protection guidelines. If this scanner is used in a manner not specified, the protection provided by the equipment may be impaired.

### Explanation of signal word consequences

 <b>WARNING</b>	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury
<b>NOTICE</b>	Indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

**Summary of device labels containing safety information**

	<p><b>WARNING</b> Risk of Danger - Refer to Manual</p>
	<p><b>WARNING</b> Risk of Shock</p>
	<p><b>CAUTION</b> X-ray Hazard</p>
	<p><b>WARNING</b> Hazardous Voltage</p>
	<p><b>CAUTION</b> X-ray Hazard (Canada)</p>



 **WARNING**

**To reduce the risk associated with hazardous voltage:**

- do not service this scanner – there are no user serviceable parts. Use only 3M authorized service personnel,
- do not modify this scanner,
- disconnect power cord when the scanner is not in use and while cleaning, and
- do not use a damaged power cord.

**To reduce the risks associated with hazardous voltage and property damage:**

- do not expose the instrument to liquids, and
- do not spray any liquid into the instrument.

**To reduce the risks associated with fire and explosion:**

- do not place flammable or explosive liquids in the scanner.

**To reduce the risk associated with fire and property damage:**

- do not use disinfecting or cleaning solvents to clean the scanner.

 **CAUTION**

**To reduce the risks associated with radiation:**

- read, understand and follow radiation protection guidelines as defined by local regulation.

**To reduce the risks associated environmental contamination:**

- follow applicable regulations when disposing of this scanner, specifically the X-ray source assembly, all electronic circuits including replacement parts.

**NOTICE**

**To avoid damage to scanner:**

- always use a sealed container when scanning liquids.

## **Installing and Moving Sprite**

### **Pre-Installation Requirements**

Please follow these conditions when preparing for Sprite's installation:

- must be placed on a flat, level surface,
- footprint is 59" wide by 24" deep,
- weighs 800 lbs,
- should be in a location where it will not be bumped or physically disturbed,
- have a local area network (LAN) Ethernet outlet available (if you choose to network Sprite),
- and have a dedicated 208-240VAC 50/60Hz electrical circuit.

Sprite is a cabinet X-ray system, consult local and state agencies for specific requirements for X-ray facilities.

Installation will take place by an IMTEC technician.

### **Additional Connections**

Sprite is equipped to install an external X-ray warning light or signal (the mating connector is supplied upon delivery). A connection is available on the back of the system that is a Normally Open contact that closes when X-rays are activated and is rated up to 240VAC and 3 A capacity.

There are two RJ-45 Ethernet ports located and labeled on the back of the system. One is for connection to an external workstation, and the other for connection to a local area network (if available).

Sprite has three 2.0 capable USB ports located on the system. They are located on the system as follows:

- On the front of the cabinet, on the right side just under the top door, to the right of the Emergency Stop button. This port provides for the easy export/import of scan data (via a USB flash drive, for instance).
- Two USB ports are located inside the lower Sprite cabinet on the left wall of the top right shelf. These ports are intended for connecting external USB hard drives only.

Two IEC power sockets are located next to the USB ports inside the lower Sprite cabinet. These sockets are exclusively intended to supply power to a maximum of two external USB hard drives.

The sockets output the same AC power used to supply the system (208-240VAC 50/60Hz) and the current capacity is a total of 3 A combined between the two outlets.

### **Licensing**

The IMTEC technician will establish Software licensing during installation and setup.

### **Moving Sprite**

After Sprite has been professionally installed, you may need or want to move the machine. We encourage you to contact us before doing so.

---

## **Safety**

### **Compliance**

Sprite complies with all federal regulations for cabinet X-ray equipment set forth in the Code of Federal Regulations (revised 2008) by the U.S. Food and Drug Administration's Center for Devices and Radiological Health (see 21CFR1020.40). Sprite also complies with UL 61010-1 (*Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements*, Underwriters Laboratories). This Class A digital apparatus complies with Canadian ICES-003. [Cet appareil numérique de la classe (\*) est conforme a la norme NMB-003 du Canada.]

### **Modification of Sprite**

FCC ID: DGFESPE130

IC: 458A-ESPE130

Modifications to this device shall not be made without the written consent of the 3M Company. Unauthorized modifications may void the authority granted under federal Communications Commission and Industry Canada rules permitting the operation of this device.

Please be advised that the U.S. Food and Drug Administration's Code of Federal Regulations for ionizing radiation emitting products states:

*"The modification of a cabinet X-ray system previously certified pursuant to 1010.2 by any person engaged in the business of manufacturing, assembling or modifying cabinet X-ray systems shall be construed as manufacturing under the act if the modification affects any aspect of the system's performance for which this section has an applicable requirement. The manufacturer who performs such modification shall recertify and reidentify the system in accordance with the provisions of 1010.2 and 1010.3 of this chapter."*

U.S. Food and Drug Administration. Code of Federal Regulations. 2008.

Title 21, Volume 8. 21CFR1020.40.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## **Safety Features**

### **Emergency Stop Button**

Pushing this button physically disconnects the power to both the X-ray source and the motion stages. This button is located on the front of the top door.

### **X-ray Shutoff Buttons on the Touch Screen**

You may stop a scan by tapping the *Abort* button or by holding down the *Turn X-rays Off* button (or, as mentioned above, by pressing the Emergency Stop button located on the front of the top door.

## Interlock System

The interlock system is a safety mechanism that protects the operator from active X-rays. The lock is in place in accordance with 21CFR1020.40.

The interlock system automatically locks the door when X-rays are turned on. You will not be able to open the door until the X-rays are turned off, at which point the interlock system unlocks the door.

## Key Switch

The key must be inserted and rotated for X-rays to be enabled. The key switch is located on the front panel of the electronics box.

## Procedures

Sprite requires minimal X-ray safety procedures, as all X-rays are contained within the lead-shielded metal cabinet.

All X-ray activation is controlled by an interlock system. The X-rays will not turn on unless the top door is shut; likewise, the top door cannot be opened while the X-rays are on. Please remember that the X-rays are on during automatic or manual conditioning.

## Protection

The use of external safety protection (e.g., lead aprons) is not necessary with Sprite; however, regulations concerning the wearing of radiation dosimeters by individuals exposed to radiation on a regular basis vary from state to state.



## Liquids

Any liquid around Sprite represents a potential electrical shock hazard. You should not spray, pour or otherwise allow any fluids in Sprite's vicinity. If you intend to scan liquids, they must be non-flammable and in a sealed container. For specific cleaning instructions, see *Cleaning*.

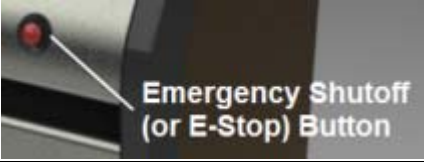
## User Safety Symbols and Features

Sprite has a variety of safety symbols and features on the interface and outer cabinet and inside the lower cabinet, as shown here:






### User Interface Safety Symbols

Symbol	Name	Description
	Radiation Trefoil	Permanently affixed to each user-interface button that activates X-rays.
	Active X-ray Indicator Icon	Permanently affixed to the user interface. This icon is yellow (or "illuminated") when the X-ray source is on.

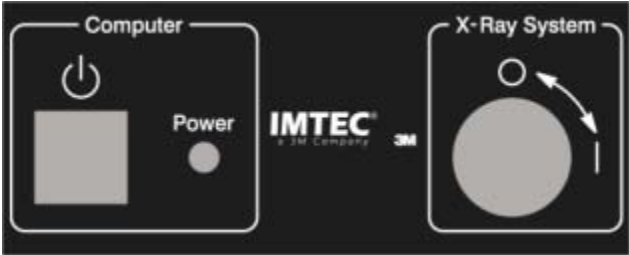
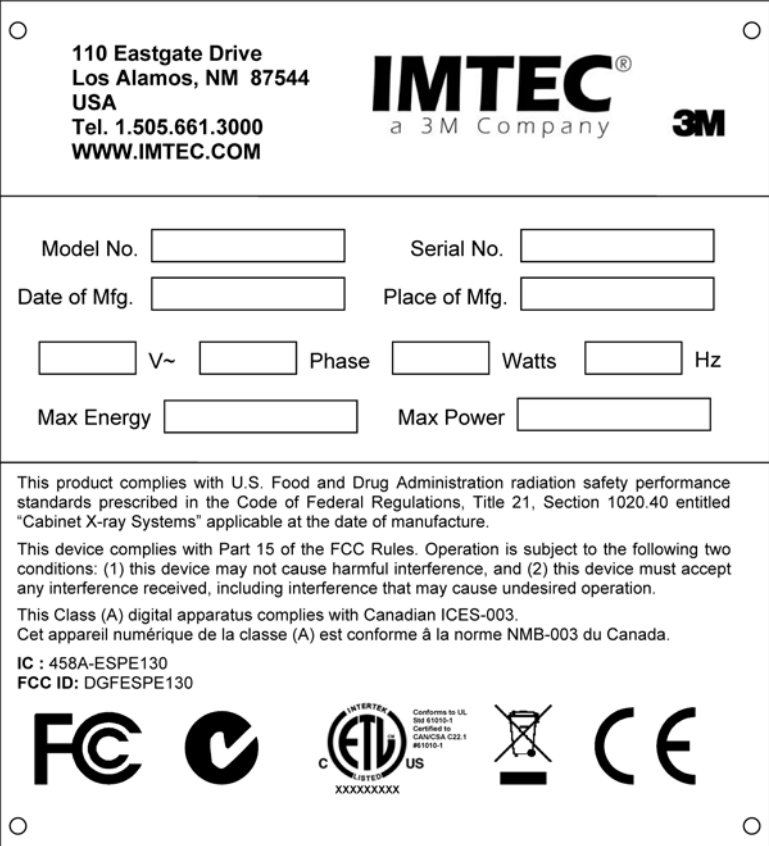






**Safety Features**

Feature	Name	Description
	"X-ray On" Indicator Lights	Illuminating indicators located on either side of the touch screen that pulsate while X-rays are being generated.
	Operator "E-Stop" Button	Located on the front of the machine near the touch screen. This button should be pressed only in the event of an emergency.

**Cabinet Safety Symbols**

Symbol	Name	Description
	<b>WARNING</b> Risk of Danger - Refer to Manual	Located adjacent to the accessory power outlets.
	<b>WARNING</b> Risk of Shock	Located adjacent to the accessory power outlets.
	<b>CAUTION</b> X-ray Hazard	Located adjacent to each port that accesses the X-ray source.
	<b>WARNING</b> Hazardous Voltage	Located wherever a potential electrical hazard exists.
	<b>CAUTION</b> X-ray Hazard (Canada)	Located adjacent to each port that accesses the X-ray source.

**Inner Cabinet Information**

Information	Item	Description
	<p>Power Status Label</p>	<p>Located on the front of Sprite's electronics enclosure near the power and key switches. This label supplies information about the power status of the computer and X-ray systems.</p>
 <p>110 Eastgate Drive Los Alamos, NM 87544 USA Tel. 1.505.661.3000 WWW.IMTEC.COM</p> <p><b>IMTEC</b><sup>®</sup> a 3M Company <b>3M</b></p> <p>Model No. <input type="text"/> Serial No. <input type="text"/> Date of Mfg. <input type="text"/> Place of Mfg. <input type="text"/> <input type="text"/> V~ <input type="text"/> Phase <input type="text"/> Watts <input type="text"/> Hz Max Energy <input type="text"/> Max Power <input type="text"/></p> <p>This product complies with U.S. Food and Drug Administration radiation safety performance standards prescribed in the Code of Federal Regulations, Title 21, Section 1020.40 entitled "Cabinet X-ray Systems" applicable at the date of manufacture.</p> <p>This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p> <p>This Class (A) digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe (A) est conforme à la norme NMB-003 du Canada.</p> <p>IC : 458A-ESPE130 FCC ID: DGFESPE130</p> <p>     </p>	<p>Identification Plaque</p>	<p>Located on the front of Sprite's electronics enclosure near the power switch. This label supplies important information about Sprite and its certifications.</p>

## Cleaning Sprite

Sprite is a state-of-the-art cabinet X-ray system with a touch screen on the exterior and all electrical, mechanical, and computer components located inside. Because Sprite contains such components, its care should be similar to that of an appliance. Any liquid around Sprite should be considered a potential electrical shock hazard. You should not spray, pour or otherwise allow any fluids in Sprite's vicinity.

### Brushed Stainless Steel

Sprite's front and staging area surfaces are primarily brushed stainless steel. IMTEC recommends the use of cleaning wipes formulated specifically for stainless steel.

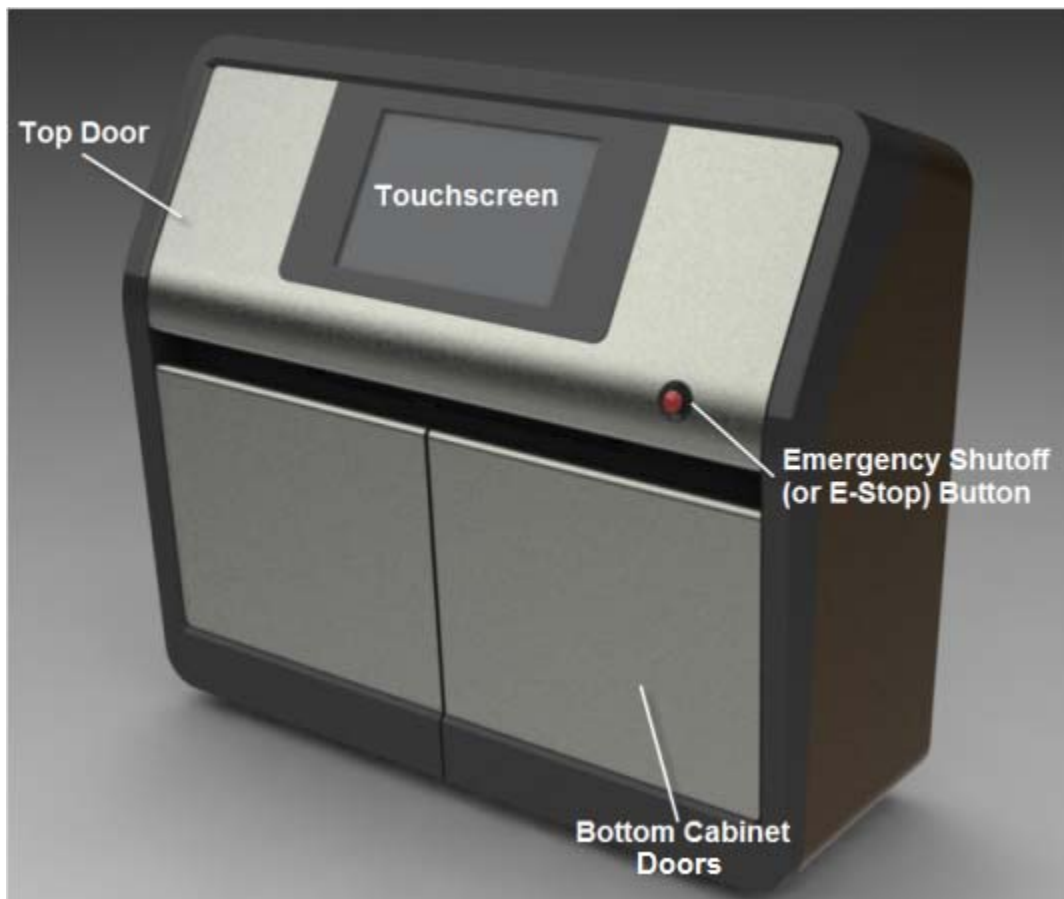
### Exterior Cabinet

Sprite's other exterior cabinet surfaces are metal and thick plastic. IMTEC recommends the use of multi-purpose pre-moistened cleaning wipes for these surfaces.

### Touch screen

Sprite's touch screen is made of glass. IMTEC recommends the use of pre-moistened glass-cleaning wipes for this surface.

### External Machine Diagram



## **Machine Specifications**

Sprite is a small industrial X-ray CT (computed tomography) scanning machine. Samples to be scanned are placed in a plastic or Styrofoam canister, which then is set on the stage in the cabinet.

Image viewing and reconstruction are performed through the embedded computer. Sprite allows you to transfer your scan data to a removable storage unit so you may download it to a computer that is equipped with ILMUAVision Industrial.

Sprite complies with all federal regulations for cabinet X-ray equipment set by the U.S. Food and Drug Administration, all UL standards for electrical equipment for measurement, control and laboratory use, and the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. This Class A digital apparatus complies with Canadian ICES-003. Please see **Safety** for more information.

## **Cabinet Specifications**

Cabinet	Lead-shielded metal cabinet. Shielded up to 150keV. The front panel with the touch screen is a hinged door that opens upward for sample placement. The two doors on the lower front cabinet open to four compartments used to house all system electronics, store sample canisters and calibration phantoms and provide additional storage space for the user's needs.
Size Weight	59" wide, 24" deep, 57" tall (with door closed) 800lbs
User Interface	21" wide screen flat panel touch screen monitor. All system operations are performed through this interface and an on-screen keyboard allows the user to input text.
Indicators	"X-ray On" illuminating indicators on either side of the touch screen that pulsate while X-rays are being generated. An additional connection provides a relay closure for an optional external sign. This connection is rated up to 240VAC 50/60Hz and 3A.
Key Switch	The insertion and rotation of the key is required for X-rays to be enabled. Located on the front of the electronics box.
Emergency Stop Button	Pushing this button physically disconnects the power to both the X-ray source and the motion stages. Located on the front of the top door.
Computer	Embedded Computer with GPU reconstruction capabilities.

## **X-ray System Specifications**

X-ray Source	KeveX PXS10-65W Microfocus 130keV Maximum X-ray source potential – 130keV Maximum operating duty cycle – 100% Expected lifetime 10,000 hours typical
Filtration	0.010 inches Copper or 0.35 inches Copper
Detector	Varian 2520 (25cm x 20cm) Fitted with DRZ High scintillator



## Electrical System Specifications

Power Consumption	110-240VAC 50/60Hz 1400 Watts consumption max
External Connections	1 x IEC power socket input (see Electrical Power Consumption for ratings) 2 x Ethernet – one for network, one for optional additional workstation 1 x External "X-ray On" sign contactor (relay closure), 240VAC @ 3A 3 x USB 2.0 – one on front panel, two inside shelf 2 x IEC power socket outputs, same voltage as system input, 3A Maximum (both sockets combined)
Rotary Stage Design	Four separate, motion stages in fixed positions within the cabinet that allow for four levels of magnification
Motors	Four 800 line/rev NEMA-23 hybrid stepper motor (one per stage)
Circuit Boards	<ol style="list-style-type: none"> <li>1. System Board – Communicates to imbedded computer via USB and contains the RFID. Microchip dsPIC33FJ256MC710 microprocessor controls rotary stage motor, "X-ray On" sign, and interlock switches. Located in the electronics cabinet beneath the stage.</li> <li>2. Canister Boards (4) – Controls the rotary motion of each stage and contains an RFID antenna and an Allegro A3984 step motor driver chip. Located each stage.</li> <li>3. RFID Board – Implements RFID system and contains a reader card and adapter card.</li> <li>4. Filter Wheel Board – Selects from several different filter types automatically. Located next to the X-ray aperture and has a step motor driver IC and optical home position sensor.</li> <li>5. Multiplexor card added for multiple motion stages.</li> </ol>

## Operating Specifications

Operating Environment	Ambient Temperature – 10° to 30° Ambient Humidity – up to 80% RH Altitude – up to 7000 ft ASL
Maintenance	Software enforced

## Contact Information

Sprite is a product of IMTEC, a 3M Company.

If you have any questions about Sprite and its capabilities or if you have encountered a problem, please contact us for assistance.

Email: support@imtecimaging.com  
Toll-Free: 800-879-9799  
Phone: Note: Our toll-free telephone numbers do not work from outside of the United States  
Phone: 505-661-3000  
Fax: 505-662-5179  
International Phone: 001-505-661-3000  
Address: IMTEC, a 3M Company  
110 Eastgate Drive  
Los Alamos, NM 87544

## **Basic Operation**

This section provides an overview of basic operation, or quick-start, of Sprite. Please read the user's manual for complete instructions and safety information.

### **Powering Sprite On and Off**

To power Sprite on and off, you must insert the key into the key switch and turn it to the "on" position. You may power Sprite on and off with the power switch located on the front of the electronics enclosure, inside the lower cabinet. The system power switch activates and deactivates the entire mechanical and software system.

### **Activating Sleep Mode**

To conserve energy without turning off the machine, you may activate the sleep mode (in the *Utilities* component). The touch screen will go dark with the exception of one remaining icon. To "wake" Sprite, tap the screen.

### **Using the Touch screen Interface**

Sprite is equipped with a touch screen for ease of use. Use your finger(s) to tap the screen's icons, enter settings and activate buttons.

### **Required Pre-Scan Procedures**

Conditioning maintains the X-ray tube and prepares it for scanning. You may not begin a scan unless the tube is conditioned; you will be notified of such. To begin conditioning, tap the *X-ray System Maintenance* button on the main screen, and then tap the *Begin Conditioning* button.

Detector calibration prepares the detector for scanning and is essential for accurate image acquisition. IMTEC recommends you calibrate the detector between once a day and once a week. To begin detector calibration, tap the *X-ray System Maintenance* button on the main screen, and then tap the *Begin Calibration* button.

Sprite offers *automatic X-ray conditioning and detector calibration*.

**CAUTION:** Any liquid around Sprite should be considered a potential electrical shock hazard. You should not spray, pour or otherwise allow any open fluids in Sprite's vicinity. If you plan on scanning liquids, they must be nonflammable and in a sealed container.

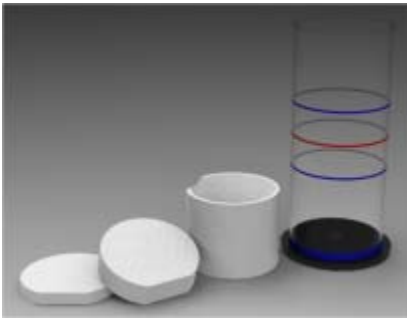
## **Sample Placement**

This topic covers the placement of items in the cabinet. Proper positioning is simple, yet it is essential to accurate imaging.

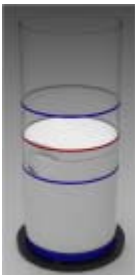
Your Sprite system includes canisters and accessories to help ensure the proper placement of your sample between the X-ray source and the detector. Items that may be used for sample placement include plastic canisters with specific scanning regions marked, Styrofoam canisters with shelves or cut-outs for specific samples, open platforms, and a variety of soft foams. These items are called fixtures. Each of Sprite's fixtures and calibration phantoms is tagged with an RFID card or sticker.

## **Canisters and Platforms**

Each stage is color coded and has a specific canister and/or platform for its size.



Each canister has Styrofoam inserts to insure the correct placement of the sample within parameters marked on the canister. These parameters guarantee that your sample will be within the X-ray scanning field.



Platforms have Styrofoam disks to help adjust height of the item. Other soft foams may also be used for proper sample placement within the canister or platform.

## **Calibration Phantoms**

Calibration phantoms can be placed directly on the stage.

Sprite comes with color-coded aluminum cylinders, or "calibration phantoms", for each stage. To test and calibrate the overall imaging system in Sprite, each stage should be regularly (we recommend monthly) calibrated. This calibration is referred to as a "System Calibration". You may run a "Validation" to confirm that the system is calibrated correctly.



## Fixture/Phantom Placement

To begin a full imaging scan, place and secure your sample in the appropriate canister and on the appropriate stage. To begin a system calibration or validation, place and secure a calibration phantom on its corresponding stage. (A fixture/phantom is secured when it has been gently turned until it locks into place. An *Audible Announcement* informs you the fixture/phantom is secure.) Shut the cabinet door, tap *Begin a New Scan*, and choose the proper scanning options.

### Notes

- If you cannot open the cabinet door, Sprite's interlock system is probably engaged. The door will unlock when the X-rays are turned off. For more information, see *Safety*.
- If you need replacement canisters, stages or foam accessories, please contact technical support.
- Do not insert flammable or explosive materials inside the Sprite cabinet.
- If you intend to scan liquids, they must be non-flammable and in a sealed container.

## Contact Information

Sprite is a product of IMTEC, a 3M Company.

If you have any questions about Sprite and its capabilities or if you have encountered a problem, please contact us for assistance.

Email: support@imtecimaging.com

Toll-Free 800-879-9799  
Phone: Note: Our toll-free telephone numbers do not work from outside of the United States

Phone: 505-661-3000

Fax: 505-662-5179

International 001-505-661-3000  
Phone:

Address: IMTEC, a 3M Company  
110 Eastgate Drive  
Los Alamos, NM 87544

# Components

## Main Screen

Sprite's main screen provides access to Sprite's main components.

This is a reproduction of main screen. The components of this screen are described below.



## **Begin a New Scan Button**

Tap this button to open the *Begin a New Scan* screen.



This button provides access to all three types of scans – full imaging scans, system calibration scans, and validation scans. For more information on these, see [Full Imaging Scanning, System Calibration, and Validation](#).

### Notes

- *The type of scan is automatically determined by what is placed on the stage inside the cabinet.*
- *Full imaging scans are the primary function of Sprite. System calibration and validation are maintenance related.*

## One Touch Scan Button

This component allows you to conduct a scan quickly by using pre-set default scan settings. With *One Touch Scan*, you can skip the *Begin a New Scan* screen and start scanning immediately. This component is ideal for scanning numerous items that require the same scan settings.

If you feel confident that you do not need a preview image and have placed your sample and entered default settings, tap the *One Touch Scan* button. The scanning process begins and you are taken directly to the *Scanning* page.



**Note:** To create or modify the default scan settings, tap the *One Touch Scan Setup* button on the *Utilities* screen.

## Utilities Button

Tap this button to access various system functions, settings, and repair services or to create, save, and transfer trouble tickets.



When you tap this button, the *Utilities* screen appears.

## Locate a Scan Button

Tap this button to access Sprite's *Locate a Scan* screen.



On the *Locate a Scan* screen you can search for scans, perform reconstructions, and manage scan files.

## Background Processing Button

The *Background Processing* button provides access to the *Background Processing* screen. This button appears on the main screen and in the bottom right corner of every screen.



If the gears of this button are moving, image processing (or reconstruction) is under way.

**Note:** You may not begin a scan while any image processing is under way.

## X-ray System Maintenance Button

Tap this button to access the maintenance procedures to regularly perform on Sprite.

These procedures – conditioning and detector calibration – are required for the X-ray source and detector to perform at their highest levels.



When you tap this button the *X-ray System Maintenance* screen appears.

### Begin X-ray Conditioning

If the X-rays have not been conditioned within the required time frame, a message reading "Begin X-ray Conditioning" will appear below the *X-ray System Maintenance* button. (In addition, a message reading "X-rays Need Conditioning" appears below the *Begin a New Scan* and *One Touch Scan* buttons.) If you receive this message, you must condition the X-rays before scanning.

Tap the *X-ray System Maintenance* button to begin X-ray conditioning. The conditioning begins automatically, and the *X-ray System Maintenance* screen appears.



To find out about scheduling automatic conditioning and detector calibration, please see *Scheduled Maintenance* in the *X-ray System Maintenance* component.

## Messages

Messages appear in yellow text on the main screen under the main components. They indicate the status of the system and what actions, if any, you must take before starting a scan.



Please refer to the following table for specific messages

Message	Button	Indicates
X-rays Need Conditioning	Begin a New Scan, One Touch Scan	Must begin the conditioning procedure by tapping the <i>X-ray System Maintenance</i> button
Nothing To Scan	Begin a New Scan, One Touch Scan	Must place an item in the cabinet and be sure that the RFID tag has been read
Not Ready To Scan	Begin a New Scan, One Touch Scan	The system is not ready to begin a scan
Too Many Items	Begin a New Scan, One Touch Scan	There is more than one item placed in the cabinet
Scan In Progress	Begin a New Scan, One Touch Scan	A scan is in progress and that a new scan cannot begin until it finishes
No Available Drives	Begin a New Scan, One Touch Scan	The data drive(s) have not been assigned or may be full
Reconstructing	Begin a New Scan, One Touch Scan	There is a current reconstruction running and that a scan cannot begin until it finishes
Begin X-ray Conditioning	X-ray System Maintenance	Must tap this button and condition the X-rays before starting a scan

### Notes

- *The trefoil indicates which buttons activate X-rays.*
- *Sprite also features audible announcements.*



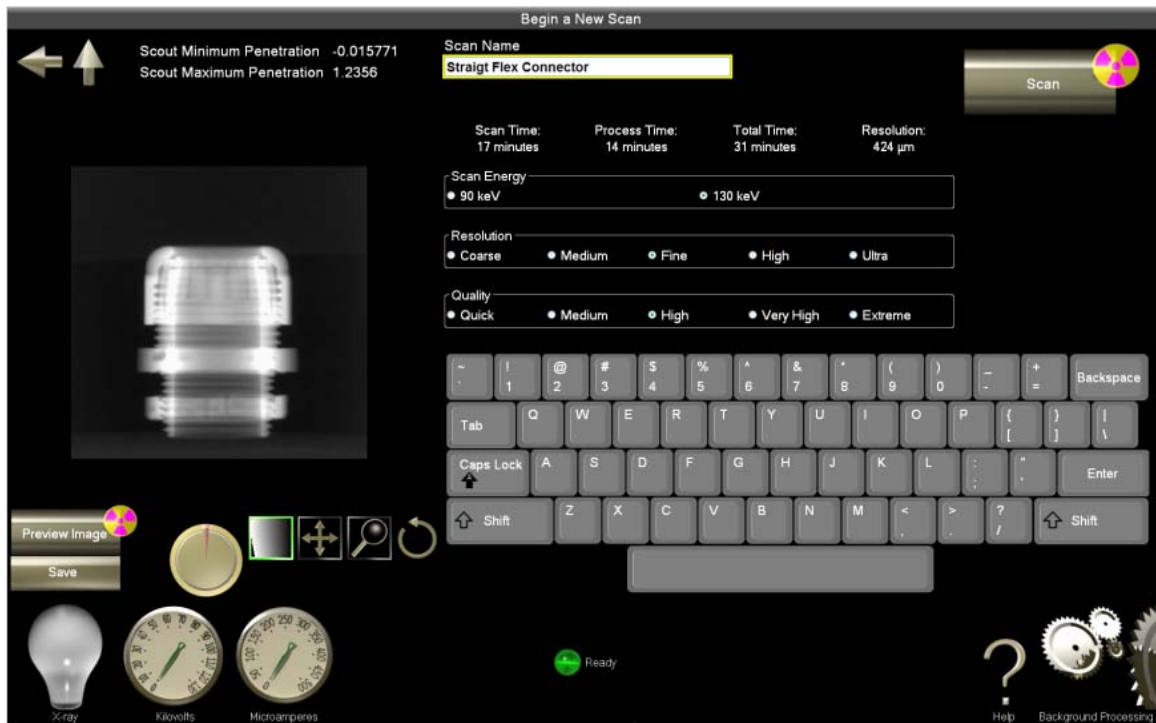
## Begin a New Scan Screen

The *Begin a New Scan* screen appears when you tap *Begin a New Scan* on the main screen. Use this screen to choose the settings (or parameters) for a full imaging scan, a system calibration or validation.

**Note:** The screen capture below applies to a full imaging scan. The screen is configured slightly differently for system calibrations and validations. Sprite determines by what you place on the stage whether you are performing a full imaging scan, a system calibration or a validation.

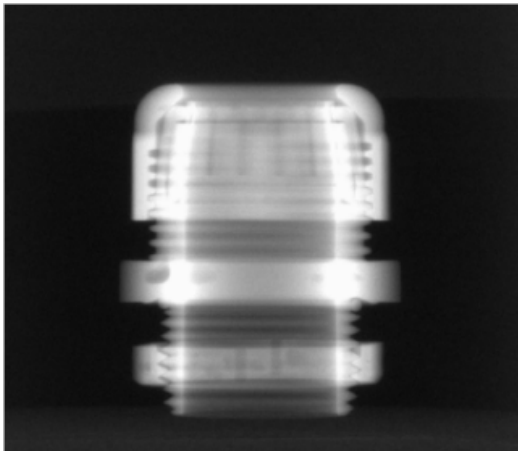
To start the actual scan, fill out the scan settings (*Scan Name*, *Resolution*, etc.), and then tap the *Scan button*. The scanning begins, and you are taken to the *Scanning* screen.

This is a reproduction of the Begin a New Scan screen. The components of this screen are described below.



## Image Area

Any preview images produced prior to scanning are displayed on the screen. You may want to adjust the sample's placement or the scan settings after seeing the preliminary image.



## Scan Settings

The scan settings differ depending upon whether you are performing a full imaging scan, a system calibration or a validation.

When you perform a full imaging scan, the scan settings section looks like this:

The screenshot displays the Scan Settings interface with the following information:

Scan Time:	Process Time:	Total Time:	Resolution:
17 minutes	14 minutes	31 minutes	424 $\mu\text{m}$

Below the time and resolution information are three sections of settings, each with a title and a list of options:

- Scan Energy:** 90 keV (unselected), 130 keV (selected)
- Resolution:** Coarse (unselected), Medium (unselected), Fine (selected), High (unselected), Ultra (unselected)
- Quality:** Quick (unselected), Medium (unselected), High (selected), Very High (unselected), Extreme (unselected)

### Scan Length

The scan time and processing time vary with the scan settings you choose. Take note of these times, especially after you make changes to the settings, because you may not want to start a scan that will take more time than you have.

### Scan Energy

The *Scan Energy* (or strength of the X-ray) setting determines how well it can penetrate the object and affects the contrast of the image.

### Resolution

The *Resolution* setting determines the quality of your image. High-resolution scans produce more data (or lines per millimeter), though they also take more time to process.

### Scan Quality

The *Scan Quality* setting determines how thorough your scan will be and how much detail is produced. CT scanning is based on hundreds to thousands of acquired images that are averaged together to create the most accurate result.

When you set the quality to a higher level, the item is scanned more intensely, more detail is produced, and the scan time increases.

Sprite offers five quality settings – *Quick Scan*, *Medium*, *High*, *Very High*, and *Extreme Quality*. To change the quality setting, tap the slider.

When you perform a system calibration or a validation, the scan settings section looks like this:

Scan Name

Validation

Validation

Calibration

Scan Time: 79 seconds  
Process Time: 4 minutes  
Total Time: 5 minutes

Resolution

● 117  $\mu\text{m}$       ● 233  $\mu\text{m}$

### Scan Name

The scan name can be entered (by tapping in the box and entering information with the keyboard) or will be automatically assigned when you choose a system calibration or validation. The abbreviation "Cal" or "Val" will appear in the name box and on the following screen in the title bar with a time stamp.

### Scan Type

Select *Validation* or *Calibration*.

### Scan Length

The scan time and processing time vary with the scan settings you choose. Take note of these times, especially after you make changes to the settings, because you may not want to start a scan that will take more time than you have.

### Resolution

The *Resolution* setting determines the quality of your image. High-resolution scans produce more data (or lines per millimeter), though they also take more time to process.

**Note:** Resolution appears only with validations (and not with calibrations).

## System Calibration or Validation Settings

When you perform a system calibration or a validation, the scan settings section looks like this:

Scan Name

Validation

Validation

Calibration

Scan Time: 79 seconds  
Process Time: 4 minutes  
Total Time: 5 minutes

Resolution

● 117  $\mu\text{m}$       ● 233  $\mu\text{m}$

### Scan Name

The scan name can be entered (by tapping in the box and entering information with the keyboard) or will be automatically assigned when you choose a system calibration or validation. The abbreviation "Cal" or "Val" will appear in the name box and on the following screen in the title bar with a time stamp.

### Scan Type

Select *Validation* or *Calibration*.

### Scan Length

The scan time and processing time vary with the scan settings you choose. Take note of these times, especially after you make changes to the settings, because you may not want to start a scan that will take more time than you have.

### Resolution

The *Resolution* setting determines the quality of your image. High-resolution scans produce more data (or lines per millimeter), though they also take more time to process.

**Note:** Resolution appears only with validations (and not with calibrations).

### Preview Image Button

Tap this button to get a preview (or scout) image of the sample and display it on your screen. Based on this image, you may want to adjust the sample's placement or scan settings. This feature can help ensure the quality of your full scan.



**Note:** When you tap Preview Image, the X-ray source is activated, icons change accordingly and the Turn X-rays Off button appears.

## Save Button

If you would like to save your preview (or scout) image, tap the save button and a copy of it will be saved on the active data drive.



You may find all saved scans through the *Locate a Scan* component.

## Stage Position Control



You may turn the stage from outside of the cabinet using the *Stage Position Control* on the screen. You may want use this control in combination with the preview image feature to ensure accurate sample placement.



The *Stage Position Control* contains an inner dial and an outer dial. The outer dial indicates the current position of the stage. If you would like to change the position of the stage, drag the inner dial either way. The outer dial (and stage) will turn to line up with the inner dial when your finger is released from the screen.



The outer dial (and stage) will turn to line up with the inner dial when your finger is released from the screen.

## Scan Button

After entering the scan settings and, if necessary, reviewing the preview (or scout) image, tap the *Scan* button to start the full imaging scan, system calibration or validation.



**Note:** You cannot start a full imaging scan, system calibration or validation unless the *Scan* button is activated (that is, unless the text on the button is white). If the scan button is not activated, make sure your scan name and settings are completely and accurately indicated.

When the *Scan* button is tapped, the X-rays turn on, the scan begins, and the *Begin a New Scan* screen appears.

## Scout Penetration

The scout penetration shows the minimum and maximum amount of X-rays that are able to penetrate the object during the preview (or scout) image. These amounts vary with the density of the object being scanned.

Scout Minimum Penetration -0.023042  
Scout Maximum Penetration 1.5547

## Full Imaging Scanning, System Calibration, and Validation

The type of scan – whether full imaging scan, a system calibration or a validation – is determined by what you place on the stage.

### Full Imaging Scanning

Full imaging scans are the most common activity you will perform with Sprite. Although validation and calibration likely will be performed regularly, they likely will not be performed as frequently as full imaging scans.

Your Sprite system includes fixtures (canisters and/or Styrofoam) and accessories to help ensure the proper placement of your sample between the X-ray source and the detector. For more about putting a samples in the cabinet see *Sample Placement*.

To begin a full imaging scan, place the fixture on the stage and an *Audible Announcement* will sound. Shut the cabinet door, tap *Begin a New Scan* and choose the appropriate scan settings on the *Begin a New Scan* screen.

### System Calibration

System calibration is a procedure that calibrates the overall imaging system. System calibration should be done regularly, preferably once a month. It must be done after the machine is installed, moved, or physically disturbed.

Sprite comes with a color-coded aluminum cylinder, or "calibration phantom".

To begin system calibration, place the calibration phantom on the stage and an *Audible Announcement* will sound. Shut the cabinet door, tap *Begin a New Scan*, and choose the *Calibration* option in the drop-down box on the *Begin a New Scan* screen.

## Validation

Validation is a procedure you can occasionally run to confirm that the entire system is scanning, acquiring data, and producing images and reconstructions correctly. The validation procedure is similar to *System Calibration* and ensures the system calibration is correct.

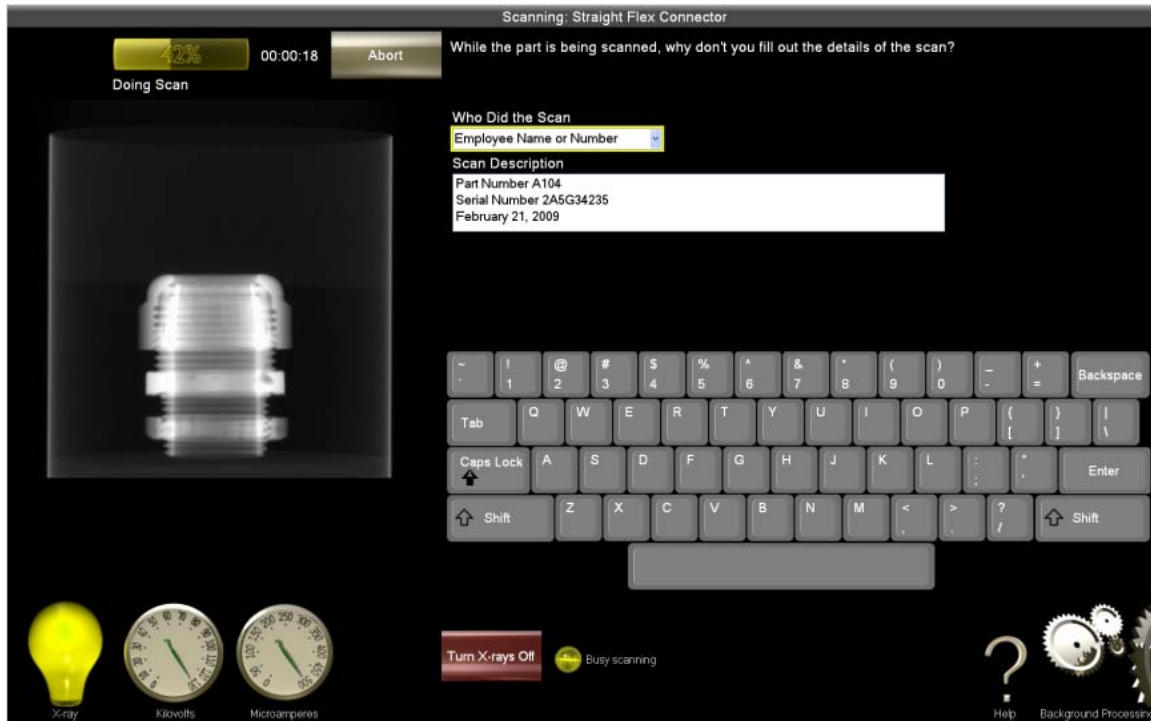
Sprite comes with a color-coded aluminum cylinder, or "calibration phantom" that is used for system calibration and validation.

To begin validation, place the calibration phantom on the stage. An *Audible Announcement* will sound. Shut the cabinet door, tap *Begin a New Scan*, and choose the *Validation* option in the drop-down box on the *Begin a New Scan* screen.

## Scanning Screen

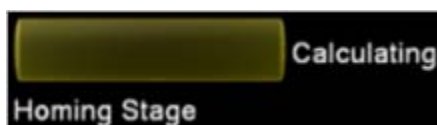
This screen displays the progress of your scan and provides for the entry of key scan information.

This is a reproduction of the *Scanning* screen. The components of this screen are described below.

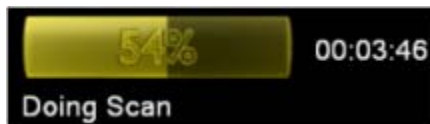


## Scan Progress

Before scanning begins, the system must prepare itself. As it does so, it displays in the scan progress area the steps it is taking. (These steps are determined by the scan settings.)



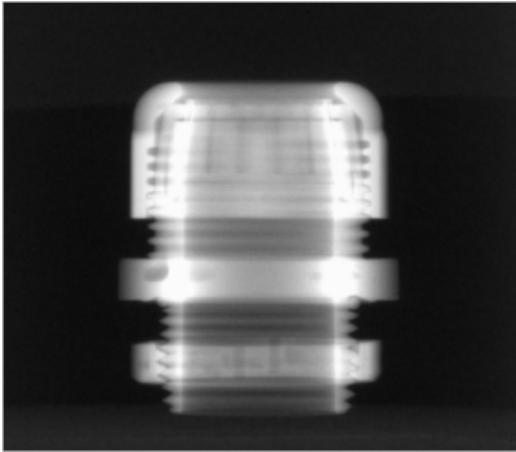
After scanning begins, the scan progress area displays the progress of the scan, including the amount of time remaining until the scan is complete.



Upon completion, the scan is automatically saved, and the *Scan Review* screen appears.

## Image Area

The image area contains images produced in real time by the scanning process.





## Scan Review Screen

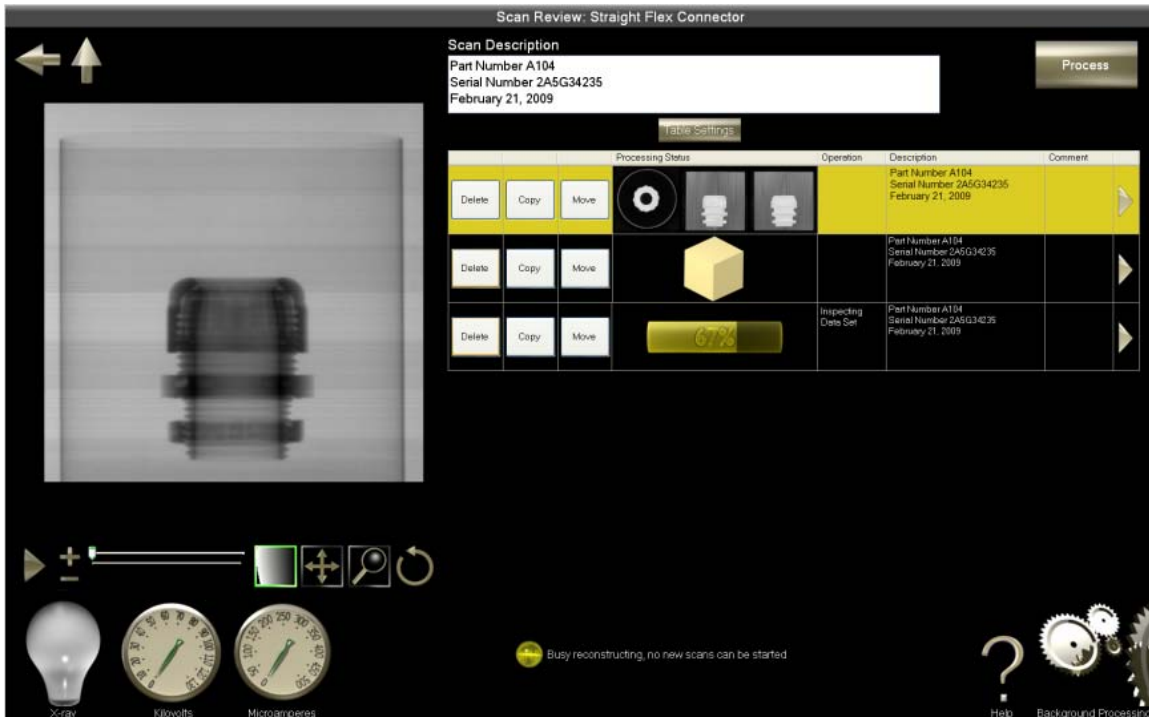
This screen allows you to view the status of the various scan types (i.e., reconstruction, system calibration, or validation), to access the results of the scan, and to manipulate the scan's raw images. When the scan is complete, you may tap the associated arrow in the table to see the full results.

After your sample is scanned, the raw image is automatically processed to allow for further reconstruction. This screen allows you to view the status of the various scan types (i.e., reconstruction, system calibration, or validation) as they process. You may also manipulate the scan's raw images and access the *Processing Setup* screen to process a reconstruction or view completed reconstructions.

You will know automatic processing is finished when three images appear in the table (these are the top, front, and side views of your sample). To begin a reconstruction job, tap the *Process button*. After entering the settings on the following screen, you will return to this screen while the processing takes place. When the processing of the system calibration or validation report processes or the reconstruction job is complete, you may tap the associated arrow in the table to see the full results.

**Note:** You may perform unlimited reconstructions on any full imaging scan. All reconstructions of a single image will appear on this screen in the scan/reconstruction table and may be accessed through the *Locate a Scan* screen.

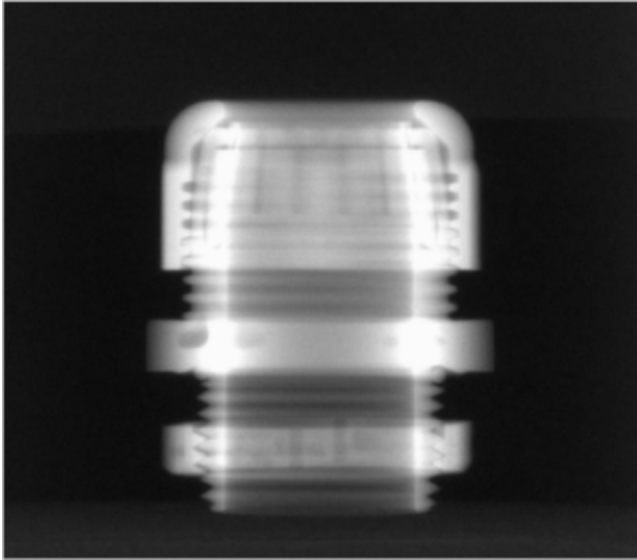
This is a reproduction of the *Scan Review* screen. The components of this screen are described below.



## Image Area

The image area contains the raw images produced by the scan.

This is an image of an aluminum part.



This is an image of the calibration phantom.



**Note:** These images can be examined and manipulated while reconstruction occurs.

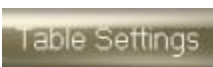
## Action Button

The *Action* button represents actions that can be performed on the data. The button represents verification for the user that the data can be processed into the next state.

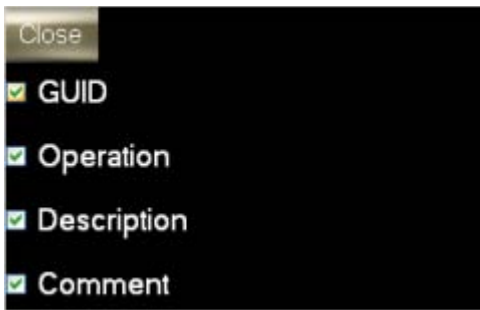
Most likely this button will read "Process", which means that the system is ready to perform a reconstruction. When you tap the *Process* button, you will be taken to the *Processing Setup* screen to enter the reconstruction request.

## Table Settings Button

The *Table Settings* button opens a dialog box that allows you to choose which columns are displayed in the table on the *Scan Review* screen.



Select the check box next to the column headings you would like to see, and then tap *Close* to enable your changes.



The column headings include:

*GUID* - Global Unique Identifier

*Operation* - messages generated by the FlashCT-DPS software regarding the reconstruction

*Description* - description of the scan entered by the user

*Comment* - system-generated text that displays what reconstruction action is taking place

## Scan/Reconstruction Table

This table contains and provides access to the scan and all of the reconstruction information, as well as system calibration and validation reports.

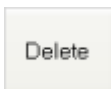
This is a reproduction of the Scan/Reconstruction table. The components of this image are described below.

			Processing Status	Operation	Description	Comment
Delete	Copy	Move			Part Number A104 Serial Number 2A5G34235 February 21, 2009	
Delete	Copy	Move			Part Number A104 Serial Number 2A5G34235 February 21, 2009	
Delete	Copy	Move		Inspecting Data Set	Part Number A104 Serial Number 2A5G34235 February 21, 2009	

**Note:** When reconstruction is under way, the gears in the Background Processing icon in the lower right corner of the screen are in motion.

## Delete

Tap the *Delete* button to delete the scan data. You will be asked to confirm your intention.



A dialog box indicates when the deletion is complete.

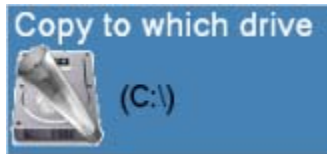


## Copy

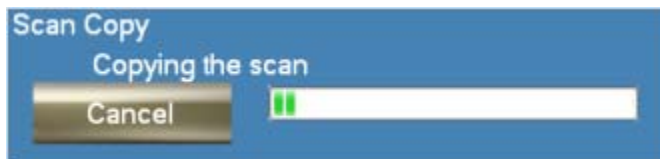
Tap the *Copy* button to copy the scan data to a different active drive (such as a USB flash drive).



When you tap the button, the list of active drives appears.

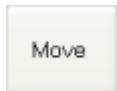


Select the drive to which you want the copy sent. You will be asked to confirm your intention. A dialog box indicates the status of the copy.

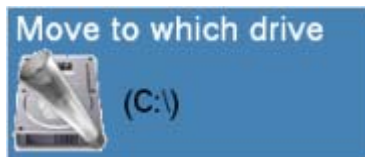


## Move

Tap the *Move* button to move the scan data to a different active drive (such as a USB flash drive).



When you tap the *Move* button, the list of active drives appears.



Select the drive to which you want the file sent. You will be asked to confirm your intention. A dialog box indicates when the move is complete.

For more information about adding data drives, please see *Storage Device Management* in the *Utilities* component.

## Processing Status

If you are performing a full imaging scan, reconstruction, system calibration or validation (and therefore, by extension, are performing a reconstruction), the *Processing Status* area displays the progress of your reconstruction.

When the automatic processing of a full imaging scan and any reconstructions are complete, the *Processing Status* area displays images (top, front, and side views) of the processed data before a reconstruction, the top view of a volume reconstruction or a polygon (indicating a surface reconstruction).

When the system calibration or validation is complete, the *Preview Image* area is colored white to indicate a successful validation and red to indicate an unsuccessful one. Tap the *Report* button in the upper right corner to generate the full report.

**Note:** When reconstruction is under way, the gears in the Background Processing icon in the lower right corner of the screen are in motion.

## GUID

The *GUID* (Global Unique Identifier) column displays a system generated identification number assigned to each scan and subsequent reconstructions.

## Operation

The *Operation* column displays messages generated by the FlashCT-DPS software regarding the reconstruction process.

**Note:** Text only appears in this column during active reconstruction and processing.

## Description

The *Description* column displays the original scan's description entered by the user on the *Scanning* screen.

## Comment

The *Comment* column displays system-generated text that displays what reconstruction action is taking place.

**Note:** Text only appears in this column during active reconstruction and processing.

## View Surface or Volume Reconstructions or Calibration/Validation Results

Tapping the arrow on any row in the table takes you to the *Results* screen.



If you open the *Results* screen from a full imaging scan, it will contain the surface and/or volume reconstruction.

If you open the *Results* screen from a system calibration or validation, it will contain a report on the respective validation or calibration.

**Note:** You cannot access the surface model of a reconstruction or the results of a validation while the reconstruction is under way (i.e., while the gears in the Background Processing icon in the lower right corner of the screen are in motion)

## Processing Setup Screen

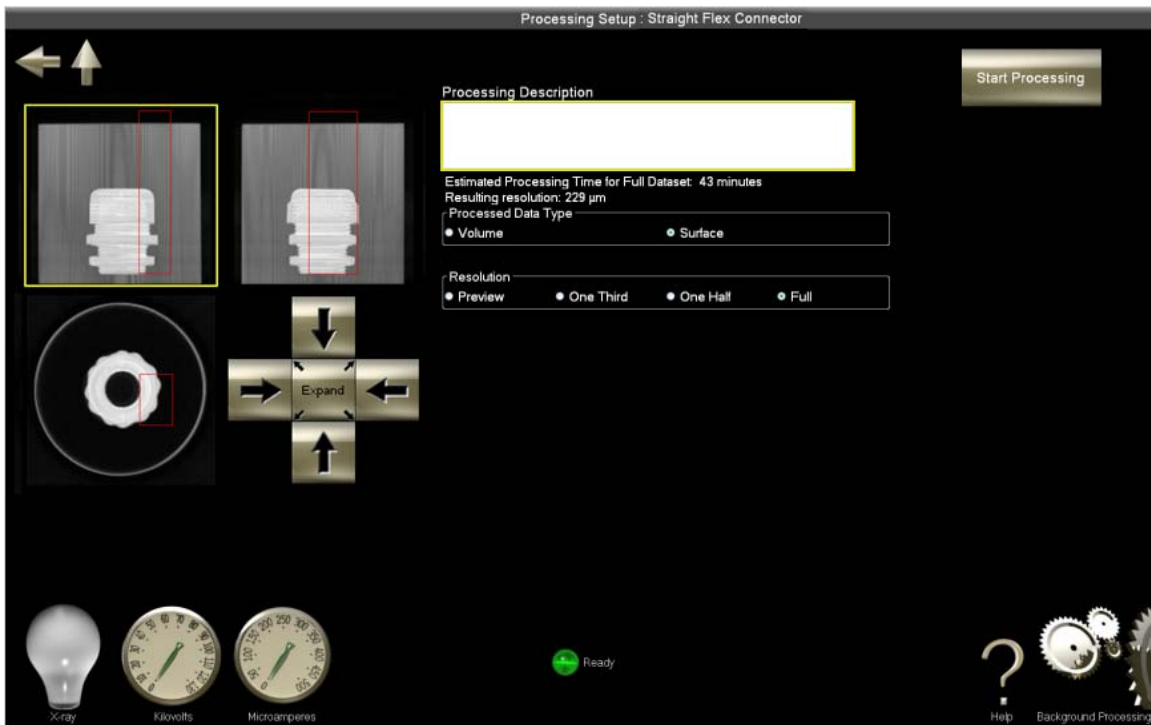
The *Processing Setup* screen allows you to choose settings for in-depth reconstructions.

Among these settings is *Region of Interest*. With this setting you may designate a subvolume to reconstruct.

To start the processing, fill out the reconstruction processing settings (set the region of interest, update the description, select the data type and resolution, etc.), and then tap the *Start Processing* button. The image processing begins, and you are taken to the *Scan Review* screen.

**Note:** You may not begin a scan while a reconstruction is processing.

This is a reproduction of the *Processing Setup* screen. The components of this screen are described below.

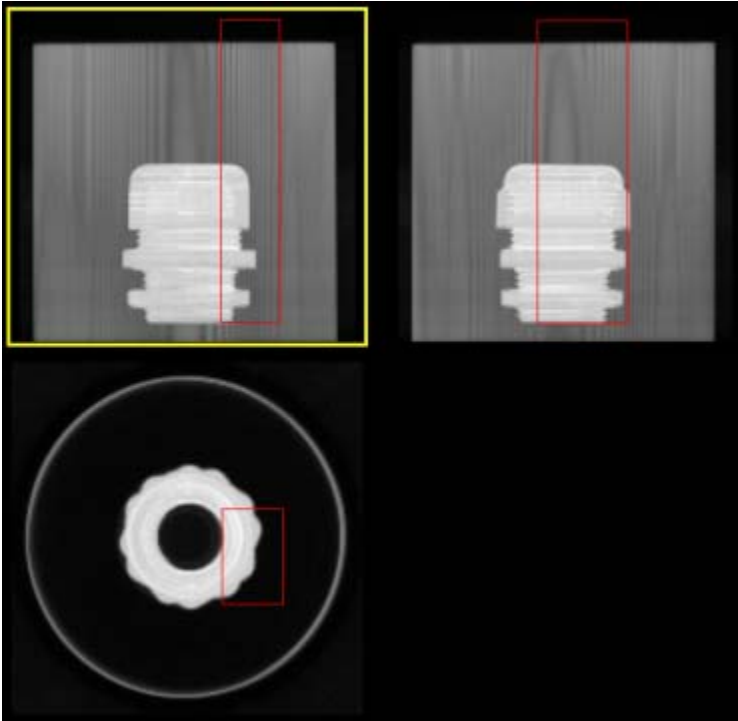


## Region of Interest

This screen displays three views (top, front, and side) of an image produced on the *Scan Review* screen. From these images, you must choose a region of interest (or ROI) to perform intensive reconstruction on.

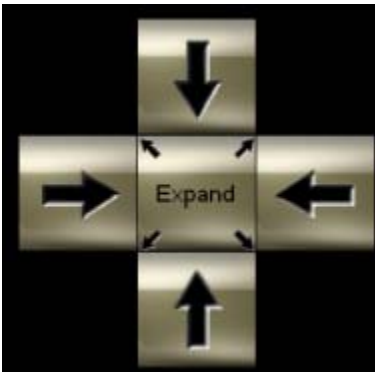
## Automatic ROI

A region of interest will automatically appear as a red box over a portion of the image.



## Adjusting the ROI

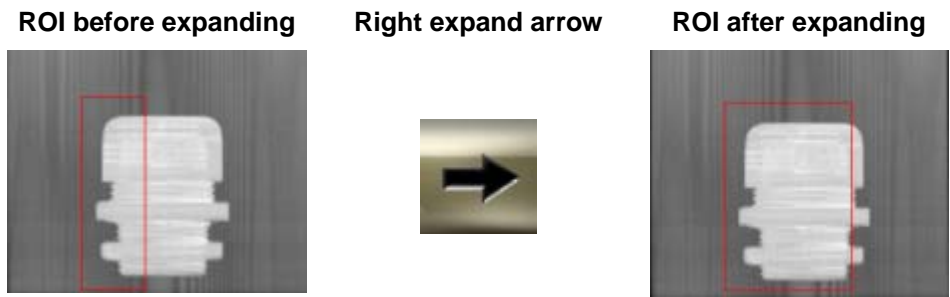
If you would like to adjust the ROI, tap the image with the ROI you would like to adjust and the surrounding box will be highlighted in yellow. Put your finger near the area you would like to reconstruct, and drag it over the area you would like to see. A square appears over the area. This is the ROI, and it applies to all three images. If you would like to manually adjust the ROI you may use the manual ROI adjustment buttons.



If you want to make the ROI boxes bigger, tap the expand button.



Tap an arrow in the direction that you would like to expand the ROI. For example, if you would like to expand the right side of the box, tap the arrow that points to the right and the side of the box will expand.



If you want to make the ROI boxes smaller, tap the collapse button.



Tap an arrow in the direction that you would like to collapse the ROI. For example, if you would like to collapse the height of the box, tap the arrow that points down and the top of the box will move down.



## Estimated Processing Time

The estimated processing time is computed from data characteristics and from your settings.

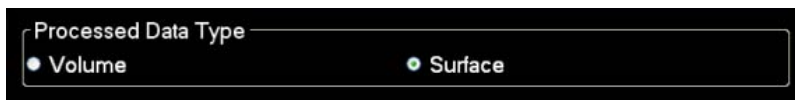
**Estimated Processing Time for Full Dataset: 3 minutes**

## Processed Data Type

*Processed Data Type* indicates the types of reconstruction jobs Sprite will produce.

- Volume – produces an internal view from the slices
- Surface – produces an external three-dimensional model of the object

Select the type of reconstruction you want to produce.





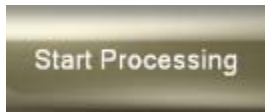
## Resolution

The resolution setting is used to resolve (similar to zooming in) a small detail of a whole item. The higher the resolution setting, the better the quality of imaging (therefore, a longer processing time).



## Processing Button

After choosing the settings for the image reconstruction, tap the *Start Processing* button to begin the reconstruction processing.



When processing begins, the screen returns to the *Results* screen, and the reconstruction process information appears in the scan/reconstruction table.

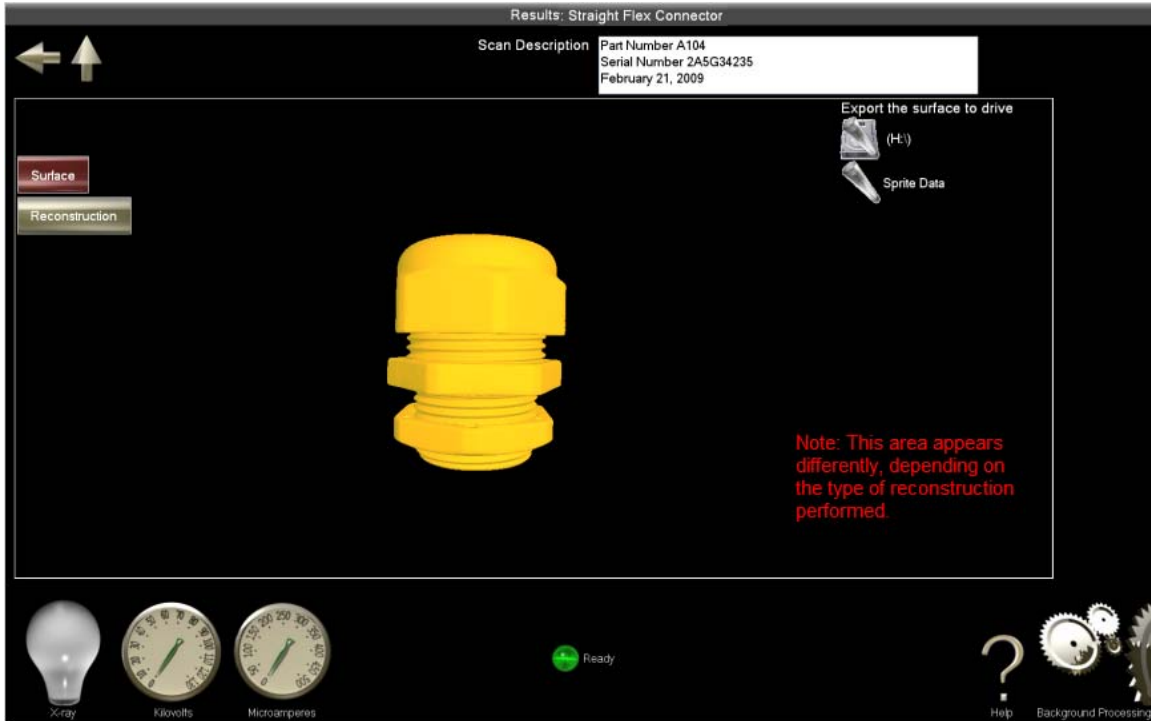
## Results Screen

The *Results* screen differs depending upon whether you are performing a full imaging scan, a system calibration or a validation.

This topic describes the *Results* screen as it pertains to full imaging scans. For a description of the *Results* screen as it pertains to system calibrations and validations, see below.

In the context of full imaging scans, the *Results* screen allows you to explore the three-dimensional surface or volume slice images produced by the reconstruction.

This is a reproduction of the *Results* screen. The components of this screen are described below.



Note: If you would like to conduct image analysis and manipulation beyond what we offer on Sprite, you may install IMTEC's ILUMAVision Industrial software on another workstation. ILUMAVision is personal computer-based imaging software that provides two- and three-dimensional visualization and analysis, as well as various multi-planar reconstruction (MPR) functions.

## Image Area

The image area contains the image associated with the active image selection button.

### 3-D Surface (or PLY) Reconstruction Viewing Techniques

You can look at these surfaces from any direction. To change the viewing direction, put your finger on the screen and drag it in any direction. You will notice that the image rotates in the direction of your drag.

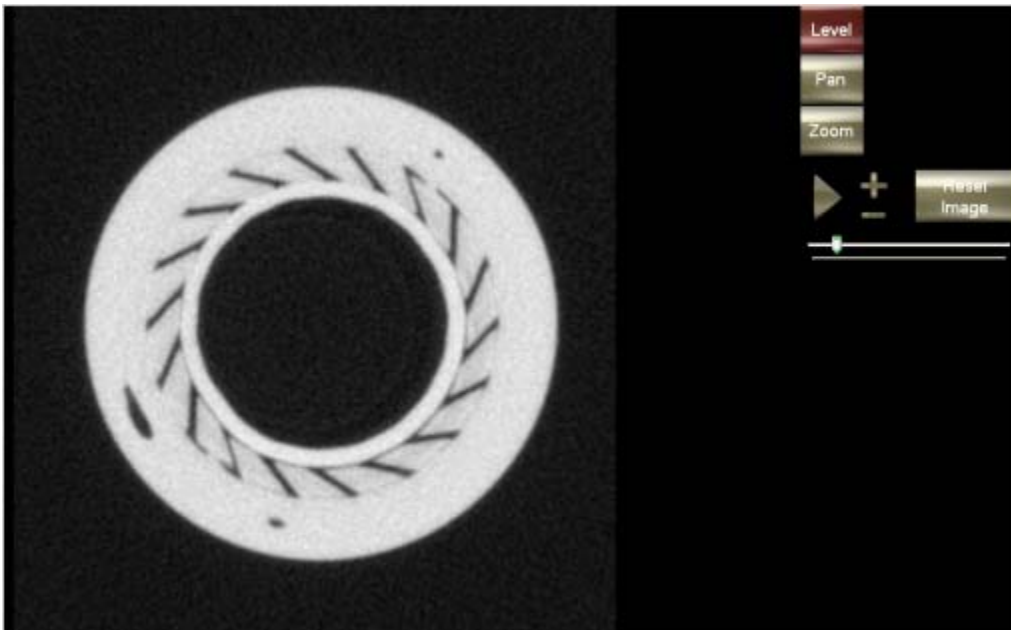
To make the image spin, take your finger off the screen while you are dragging it. To speed up or slow down the spin, repeat the previous step with a faster or slower finger movement.

Tap an image to stop it from spinning. Tap an image twice to reset it to its default state.



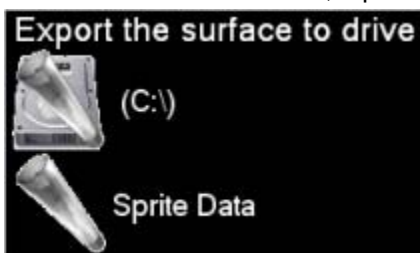
### Volume (or STL) Reconstruction Viewing Techniques

Follow the same techniques for viewing and manipulating preview and raw images.



### Surface Export

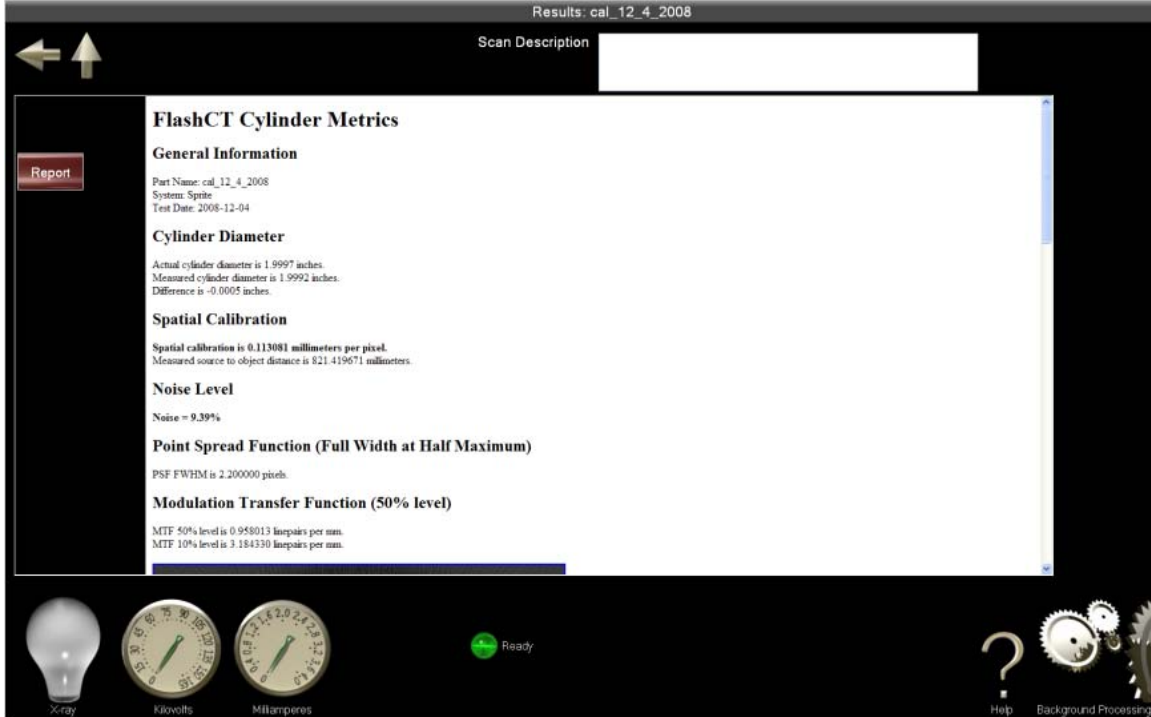
All scans and data derived from them – including reconstructions, surface (or "PLY") files and volume (or "STL") files – are automatically saved in the active data drive. To copy a scan's surface file to another drive, tap the drive's name in the *Export surface to drive* list.



## Results Screen – Calibrations and Validations

If you are performing a system calibration or validation, the *Results* screen provides a detailed report of your results.

This is a reproduction of the *Results* screen for a system calibration. The components of this screen are described below.



### Report Button

The button on the *Results* screen shows the user what is displayed on the screen. If a system calibration or validation report has been generated and appears on the screen, the button becomes red.



### System Calibration and Validation Reports

System calibration and validation reports provide detailed information on your machine's spatial calibration and noise. This information is determined by the ASTM Standard Test Method for Measurement of Computed Tomography (CT) System Performance.

The system calibration and validation reports are essentially identical. Both provide information about how Sprite's imaging system is operating. The difference is that the validation report is based on more intensive testing.

If your report has a red background, the calibration or validation failed. (Failure also is indicated by a red box in the scan table.) If your system calibration or validation fails, please contact *tech support* before beginning another scan.

### **General Information**

The general information lists the specifics of the calibration including the part, system, and date.

### **Cylinder Diameter**

The cylinder diameter lists the actual diameter, the measured cylinder diameter, and the difference between the two.

### **Spatial Calibration**

The spatial calibration analyzes the geometrical sharpness of the image. Geometrical blurriness limits the ability to image an object's fine structural detail.

### **Noise Level**

Noise is expected and acceptable. Excessive noise limits the ability to detect the presence or absence of features in an object.

### **Point Spread Function (Full Width at Half Maximum)**

The point spread function gives the measurement of the sharpness of an image.

### **Modulation Transfer Function (50% level)**

The modulation transfer function illustrates the system's spatial frequency response in the reconstruction volume.

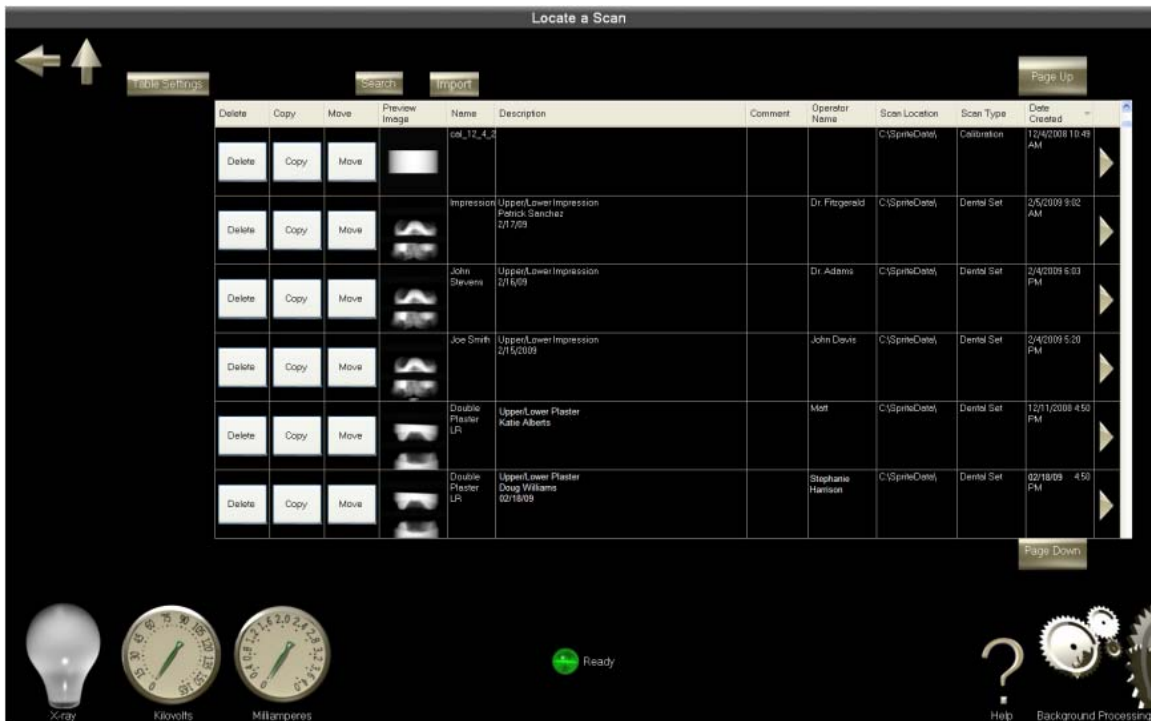
## Locate a Scan Screen

The *Locate a Scan* screen allows you to:

- search for scans by entering identifying information,
- access scan data for viewing and reconstruction,
- copy, move, and delete scans, and
- access the system calibration and validation history.

All scans are saved to an active data drive and may be accessed through this component.

This is a reproduction of the *Locate a Scan* screen. The components of this screen are described below.



## Scan Table

This table contains scan information and allows you to access a scan (and all reconstructions associated) and system calibration or validation data.

This is a reproduction of the Scan table. The components of this image are described below.

Delete	Copy	Move	Preview Image	Name	Description	Comment	Operator Name	Scan Location	Scan Type	Date Created
				cal_12_4_2				H:\SpriteData\	Calibration	12/4/2008 10:49 AM
				Aluminum Part	Part Number A104 Serial Number ZASG34235 February 21, 2009		Employee Name or Number	H:\SpriteData\	Normal Scan Very High	2/20/2009 3:19 PM
				One Touch Scan Mon, 11/17/2008	Cell Phone Interior Model 54321H			H:\SpriteData\	Normal Scan Medium	11/17/2008 4:38 PM
				One Touch Scan Fri, 12/19/2008	Maglight		Matt	H:\SpriteData\	Normal Scan High	12/19/2008 10:38 AM

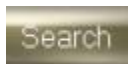


Scrolling is also available by tapping on the up or down arrow or dragging the bar in the column on the left side of the table.

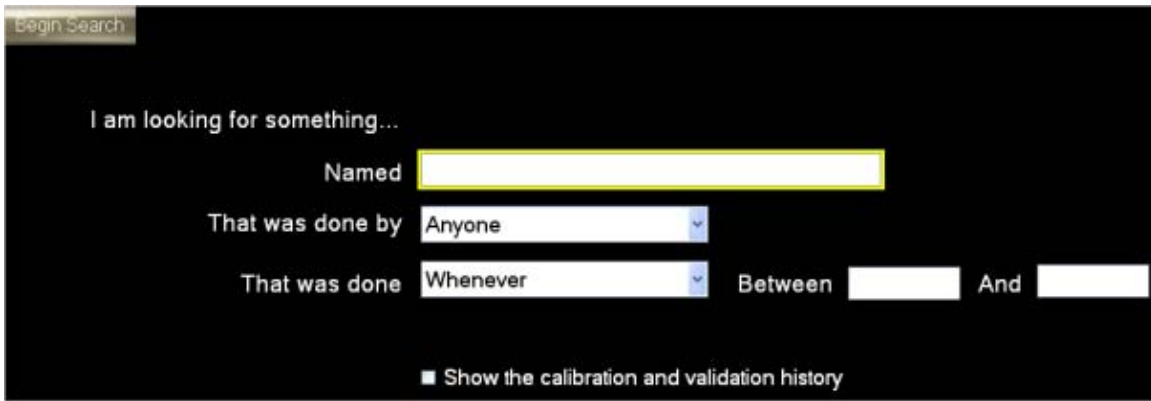


## Search Button

You may conduct an advanced search for scans (with or without reconstructions), system calibrations or validations by entering details of a scan you would like to find. Access the search window by tapping the *Search* button.



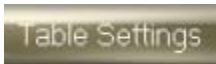
You may search by the name of the scan, the name or identification number of the person who performed the scan, and/or the date the scan was performed. If you want to search only the items in the system calibration and validation history, select the check box at the bottom. Tap *Begin Search* to run the search.



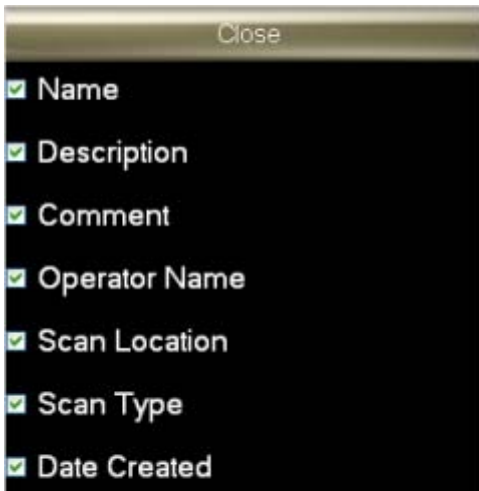
Search results are displayed in the table.

## Table Settings Button

The *Table Settings* button opens a dialog box that allows you to choose which columns are displayed in the table on the *Locate a Scan* screen.



Select the check box next to the column headings you would like to see, and then tap *Close* to enable your changes.



Column heading descriptions are as follows:

*Name* - the scan's name, as entered by the user (or as generated by the system during one touch scans)

*Description* - the scan's description, as entered by the user

*Comment* - system-generated text that displays what reconstruction action is taking place

*Operator Name* - the employee's name or number, as entered by the user

*Scan Location* - the name of the data drive on which the scan is stored

*Scan Type* - the type and quality of scan

*Date Created* - the date the scan was created



## Background Processing Screen

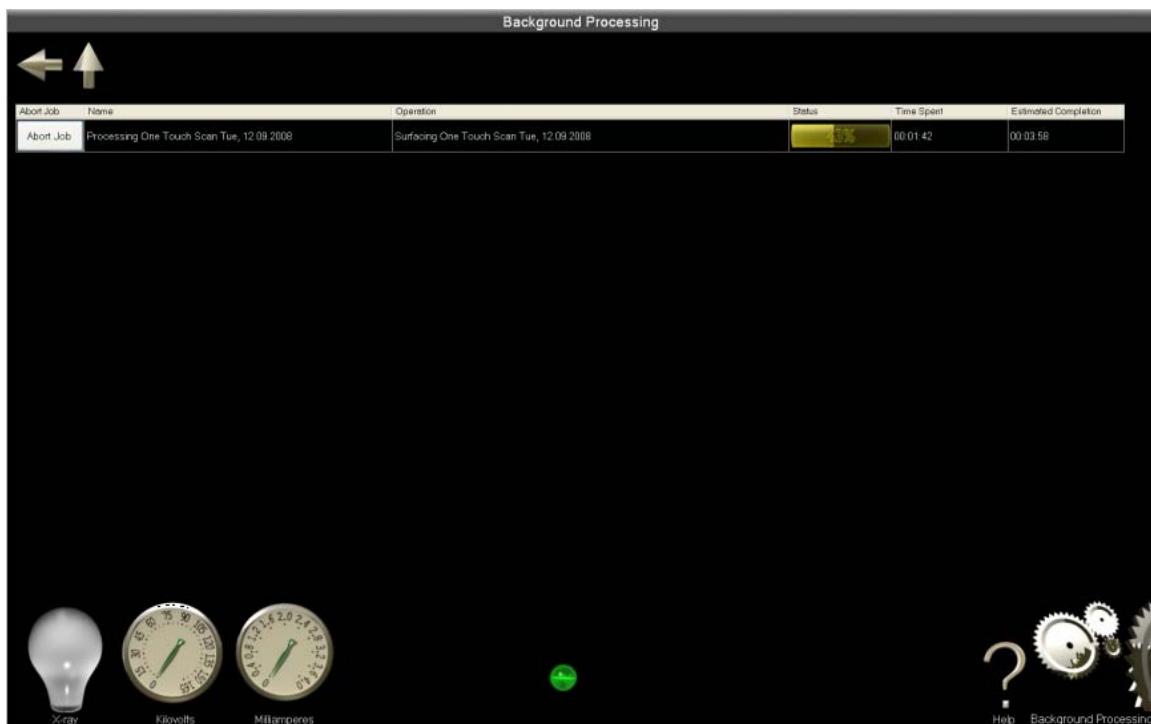
The *Background Processing* screen allows you to:

- view the status of active reconstruction jobs,
- view the list of pending reconstruction jobs, and
- abort active and pending reconstruction jobs.

The *Background Processing* component can be accessed by tapping the *Reconstruction* button on any screen.

**Note:** You may not begin a scan while a reconstruction is processing.

This is a reproduction of the *Background Processing* screen. The components of this screen are described below.



## Reconstruction Table

The reconstruction table displays information on active and pending reconstruction jobs. This information includes the job. (Each reconstruction job occupies its own row in the table.)

Abort Job	Name	Operation	Status	Time Spent	Estimated Completion
Abort Job	Preview of Aluminum Part 424mm-q1	Reconstructing Aluminum Part 424mm-q1		00:02:35	00:10:12

You may abort any reconstruction job at any time by tapping the *Abort Job* button.

## Utilities Screen

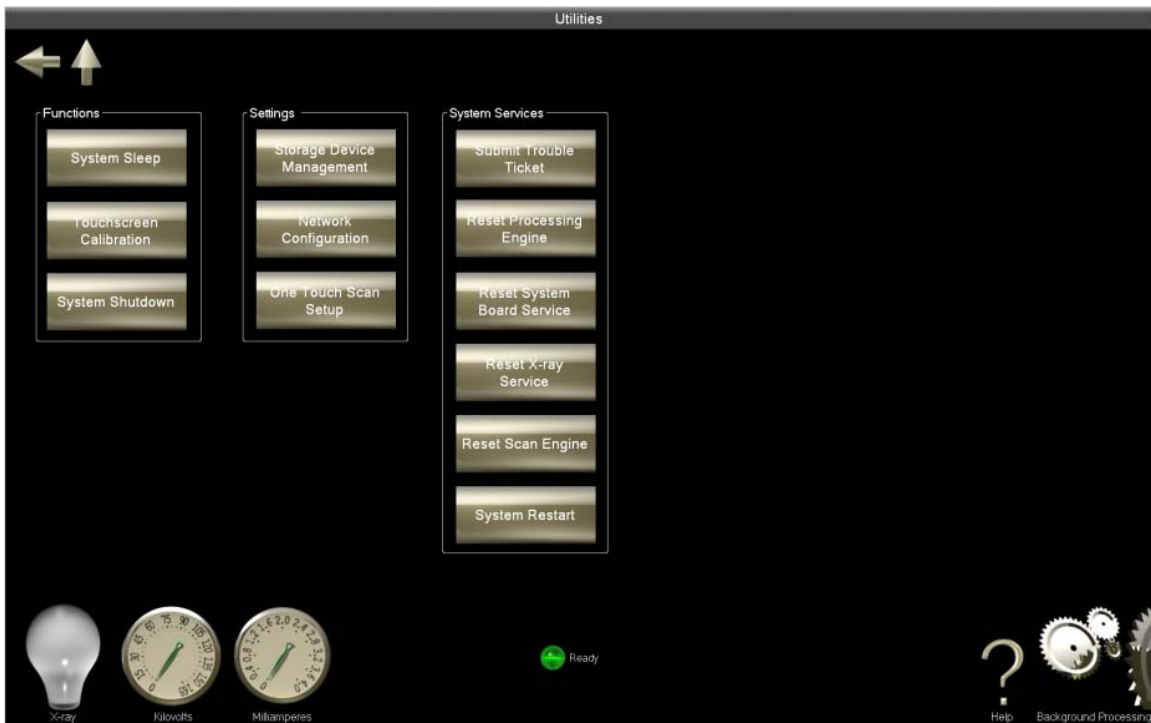
The *Utilities* screen gives you access to various system functions, settings, and system services.

Functions you may run regularly include *System Sleep*, *System Shutdown*, and *Touch screen Calibration*.

Settings you may enter or update include *Storage Device Management*, *Network Configuration*, and *One Touch Scan Setup*.

System services you may occasionally use (after speaking with *technical support*) include *Submit Trouble Ticket*, *Reset Processing Engine*, *Reset System Board Service*, *Reset X-ray Service*, *Reset Scan Engine*, and *System Restart*.

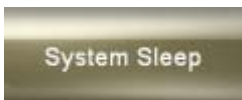
This is a reproduction of the *Utilities* page. The components of this screen are described below.



### System Sleep Button

When Sprite is not in use, you may deactivate the system. Deactivating the system, or putting it into *System Sleep*, allows you to lower power consumption without powering off the machine.

To deactivate the system, tap the *System Sleep* button.

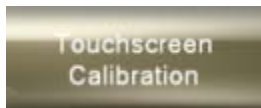


When you tap this button, the screen goes dark. The system remains deactivated until the touch screen is touched, at which time the *Utilities* screen reappears.

### Touch screen Calibration Button

Touch screen calibration ensures the touch screen is responding properly when it is tapped.

If the touch screen is not responding as you would expect it to, tap the *Touch screen Calibration* button. Calibration will begin automatically.



Follow the instructions on the touch screen to calibrate it.

First, touch the target as it moves around the screen.



Next, tap the screen and drag your finger. If the cursor follows your finger, tap the green check box. If the cursor does not follow your finger, tap the retry button, and the calibration will run again.

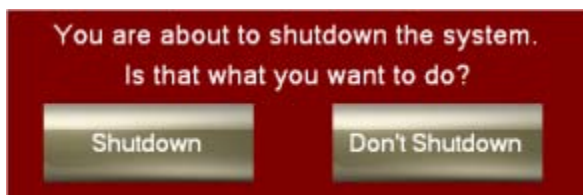


## System Shutdown Button



To power off the entire Sprite system, tap the *System Shutdown* button.

Confirm or stop the shutdown in the confirmation window.

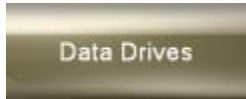


**Note:** If you shut down the system all the programs that are running will stop, and you may lose data. Further, any scheduled automatic detector calibration and conditioning will be canceled.

## Storage Device Management Button

Sprite uses only external hard drives for performing and storing scans. Your Sprite comes equipped with one external hard drive (USB 1TB external HDD). There is one USB port and auxiliary power outlet located inside the bottom cabinet. The USB port on the front of the cabinet near the top door gives you the option of transferring scan data to another drive (a USB flash drive, for instance) for use on another workstation.

To determine or change the location, or data drive, of the stored data in Sprite, you may tap the *Storage Device Management* button.



When you tap this button, the *Storage Device Management* screen appears.

## Storage Device Management Screen

The *Storage Device Management* screen allows you to add data drives to your Sprite system and determine which drive is used for data storage. You can name and rename your drives on this screen, as well.

Sprite uses only external hard drives for performing and storing scans. You will be provided with one external hard drive (USB 1TB external HDD) upon your purchase of Sprite. The USB port on the front of the cabinet gives you the option of transferring scan data to another drive (a USB flash drive, for instance) for use on another workstation.

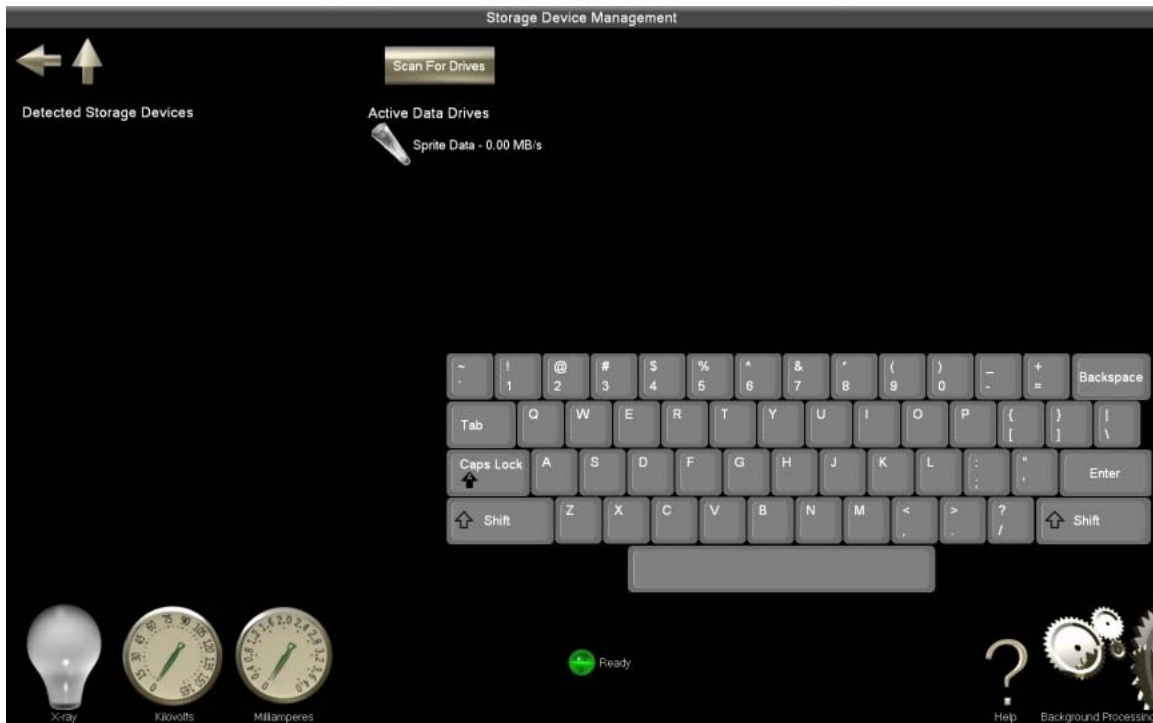
Before you can store data on a drive, you must determine whether the drive can be used for data storage. To do so, first plug the drive into a USB port. If you do not see the name of the drive appear in the list of detected storage devices tap the *Search For Drives* button, and your drive will appear in the list.

When you tap the drive name, Sprite runs a performance test to determine whether the drive can be used for data storage. If the drive passes the test, it is automatically placed in the list of data drives.

The *Storage Device Management* screen contains two lists:

- *Detected Storage Devices* – drives detected that have not been tested and approved
- *Active Data Drives* – drives tested and approved for scan data storage

This is a reproduction of the *Storage Device Management* screen. The components of this screen are described below.



## Active Data Drives

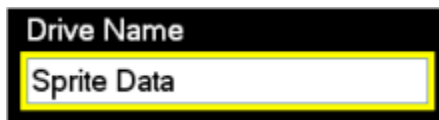
Active data drives are those assigned to store scan data. (For information on the assignment of drives, see *Detected Storage Devices*.)

You may name each assigned data drive.

To do so, tap the drive icon. The *Drive Name* box appears.



Tap inside the box, and enter the name for the data drive.



Tap the drive icon again. The new name appears.



### **Search for Drives Button**

Before you can store data on a drive, you must determine whether the drive can be used for data storage. To do so, first plug the drive into a USB port. If you do not see the name of the drive appear in the list of detected storage devices tap the *Search For Drives* button, and your drive will appear in the list.

### **Detected Storage Devices**

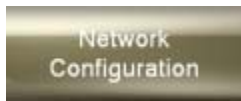
The default Sprite data drive is an external drive located in the cabinet, plugged into the internal USB port. Devices listed under *Detected Storage Devices* have been detected in a USB port but not yet tested and approved for data storage. To test and approve a drive, tap on the drive's name and you will be asked to confirm your actions.

Sprite will run a performance test on the drive. If the drive is capable of storing scan information it will appear in the *Active Data Drives*.

### **Network Configuration Button**

Sprite is capable of networking with other computers and connecting with the internet. To take advantage of this capability, you must have an available Ethernet outlet and an established local area network (LAN). The Sprite installer configures your system for networking and internet connectivity.

To access the network configuration settings, tap the *Network Configuration* button.

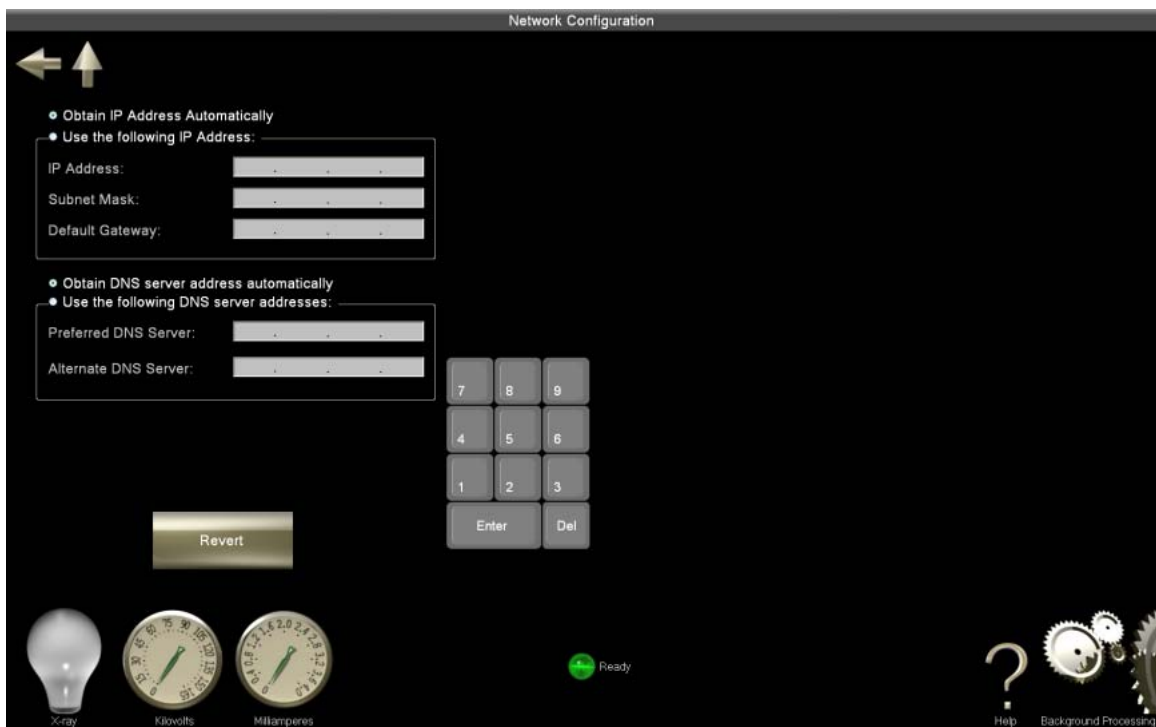


When you tap the *Network Configuration* button, the *Network Configuration* screen appears.

### **Network Configuration Screen**

This screen displays and allows you to enter or change the information about your local area network (if applicable).

This is a reproduction of the *Network Configuration* screen. The components of this screen are described below.



### Network Configuration Parameters

Sprite is capable of networking with other computers and connecting with the internet. To take advantage of this capability, you must have an available Ethernet outlet and an established local area network (LAN). The Sprite installer will configure your system for networking and internet connectivity. If Sprite is networked to the internet, you will be issued a web site to view the scans and their accompanying files online (from another workstation).

If an outlet or network becomes available after installation, you may configure your system using the following form:

If you are manually entering the information, tap on each line and enter the numbers with the key pad in the appropriate rows.

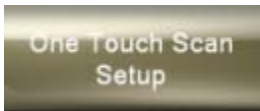
## Revert Button

To clear information entered and revert to the previous settings, tap the *Revert* button.



## One Touch Scan Setup Button

To create default scan settings, which allow you to take advantage of *One Touch Scan*, tap the *One Touch Scan Setup* button.



When you tap this button, the *One Touch Scan Setup* screen appears.

## One Touch Scan Setup Screen

Use this screen to set or modify the default parameters used in *One Touch Scan*.

This is a reproduction of the *One Touch Scan Setup* screen. The components of this screen are described below.



## Scan Parameters

Tap the tab of the appropriate stage (which correlates to level of scan).





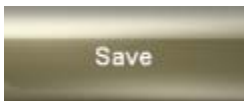
Enter the other default settings to conduct full scanning and viewing procedures. The scan energy determines the strength of the X-rays. The resolution setting determines the quality of your scans. High-resolution scans produce more data (or lines per millimeter) but require a longer processing time.

The screenshot shows a settings interface on a dark background. At the top, four metrics are listed: Scan Time: 13 seconds, Process Time: 3 minutes, Total Time: 3 minutes, and Resolution: 458 μm. Below these are three horizontal panels. The first panel, labeled 'Scan Energy', has two radio button options: '90 keV' (unselected) and '130 keV' (selected). The second panel, labeled 'Resolution', has five radio button options: 'Coarse', 'Medium', 'Fine', 'High' (selected), and 'Ultra'. The third panel, labeled 'Quality', has five radio button options: 'Quick' (selected), 'Medium', 'High', 'Very High', and 'Extreme'.

Note: You must set the default scan settings for each stage for wish you wish to perform One Touch Scans.

**Save Button**

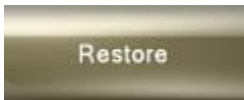
If you would like to save your preview (or scout) image, tap the save button and a copy of it will be saved on the active data drive.



Note: You may find all saved scans through the *Locate a Scan* component.

**Restore Button**

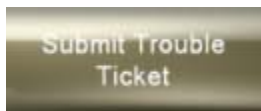
Tap the *Restore* button to reset the settings to their original state.



**Submit Trouble Ticket Button**

Trouble tickets help IMTEC technical support staff to diagnose and correct any problems you may encounter when using Sprite. These tickets contain not only your description of the problem, but also additional internally generated system/process information.

To create a trouble ticket, tap the *Submit Trouble Ticket* button.



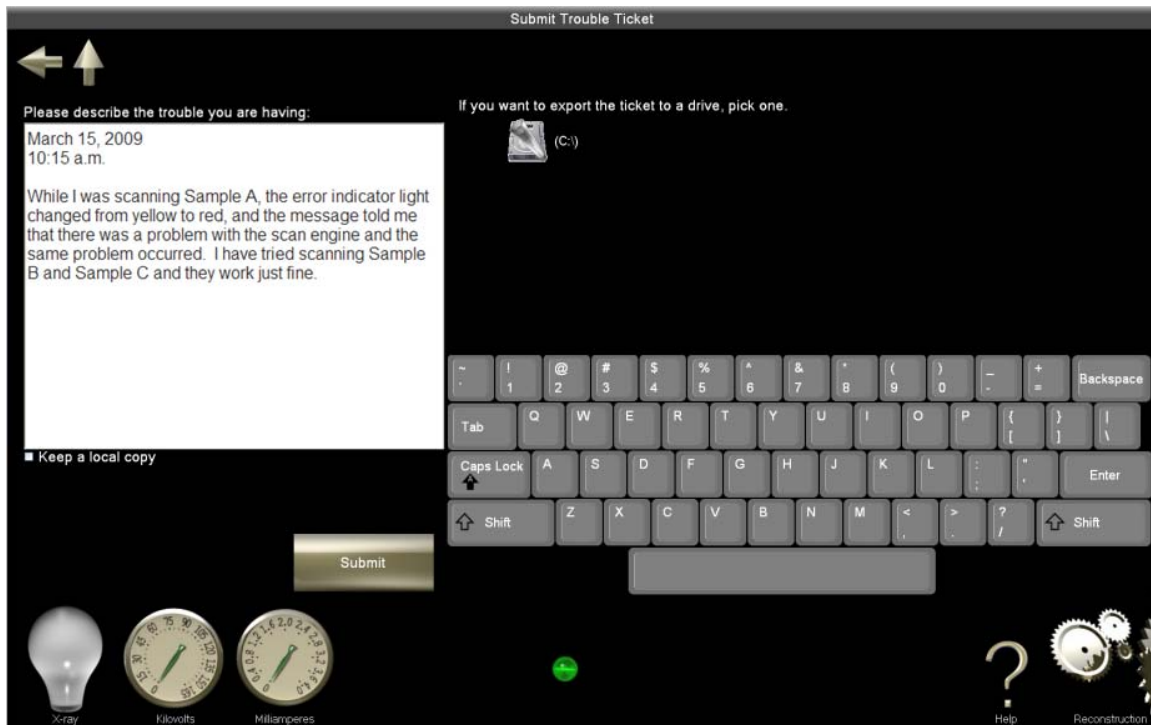
When you tap the *Submit Trouble Ticket* button, the *Submit Trouble Ticket* screen appears.

### **Submit Trouble Ticket Screen**

Trouble tickets help IMTEC *technical support* diagnose and correct any problems you may encounter when using Sprite. These tickets contain not only your description of a problem, but also additional internally generated system/process information.

This screen allows you to create and submit a trouble ticket. By default, trouble tickets are stored on the active data drive, but you have other options, as well.

This is a reproduction of the *Submit Trouble Ticket* screen. The components of this screen are described below.



### **Description of Trouble**

The trouble ticket box allows you to describe the trouble you are having. To enter information, first tap inside the box. When the keyboard becomes active, type in the trouble you are having or any question you have about the system. In your trouble ticket please state: what function you were running before the problem occurred, if it was reproducible or not and any steps that were taken to correct the problem.

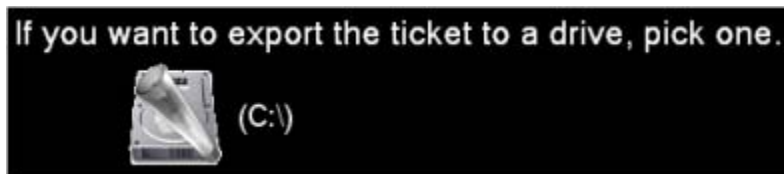
Please describe the trouble you are having:

March 15, 2009  
10:15 a.m.

While I was scanning Sample A, the error indicator light changed from yellow to red, and the message told me that there was a problem with the scan engine and the same problem occurred. I have tried scanning Sample B and Sample C and they work just fine.

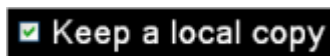
### Export Ticket

To save the ticket to another drive (to transfer it to another workstation, for example), choose the drive from the list. (Be sure you have connected the drive to one of the available USB ports.)



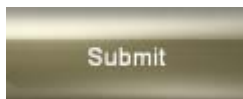
### Keep a Local Copy of Ticket

Tickets saved to the current active drive can be retrieved by a technician to assess any problems. To save the ticket to the active drive tap/select the box next to *Keep a local copy*.



### Submit Button

Tap the *Submit* button to save and/or export the trouble ticket.



## Reset Processing Engine Button

IMTEC recommends creating a trouble ticket and contacting *technical support* to efficiently resolve software and hardware problems.

This specific system repair service applies to the FlashCT data processing software system. It is available but should be used only after speaking with tech support.

## Reset System Board Service Button

IMTEC recommends creating a trouble ticket and contacting *technical support* to efficiently resolve software and hardware problems.

This specific system reset service affects the central circuit board. It is available but should be used only after speaking with tech support.

## Reset X-ray Service Button

IMTEC recommends creating a trouble ticket and contacting *technical support* to efficiently resolve software and hardware problems.

This specific system reset service affects the mechanical X-ray system. It is available but should be used only after speaking with tech support.

## Reset Scan Engine Button

IMTEC recommends creating a trouble ticket and contacting *technical support* to efficiently resolve software and hardware problems.

This specific system reset service applies to the FlashCT data acquisition software system. It is available but should be used only after speaking with tech support.

## System Restart Button

IMTEC recommends creating a trouble ticket and contacting *technical support* to efficiently resolve software and hardware problems.

This specific system reset service applies to the entire software and mechanical system. It is available but should be used only after speaking to tech support.

## System Status Screen

The *System Status* screen indicates the status of the hardware, mechanical, and software systems and alerts you to any errors.

Sprite's various colored light bulbs and gauges serve as visual indicators of the overall system status and the status of individual mechanical and software components. These indicators appear not only on the *System Status* screen, but throughout the Sprite interface.

**Note:** This screen is primarily for diagnostics performed by IMTEC technical support. If you think the system may have a problem or if you see a light that is any color besides green, you should contact technical support.

This is a reproduction of the *System Status* screen. The components of this screen are described below.



## Gauges

These gauges are related to the electrical voltage detected for the X-ray source and other mechanical components.



## Test X-ray Lamp Switch

Tap the *Test X-ray Lamp* switch to test the "X-ray On" illuminating signs on either side of the touch screen on front of the cabinet.



When the switch is "turned on" it illuminates, as do the signs on the front of the cabinet (however, this does not actually activate the X-rays).

If the "X-ray On" sign does not illuminate on the outside of the cabinet, the X-rays source cannot be turned on.

## Primary Indicators

The primary indicators are identified with the larger of the light bulbs on the *System Status* screen. Each of these indicators corresponds to a multiple-function component on the system board.

Each bulb is labeled and can be one of four colors.



Red Light – an error has occurred



Yellow Light – the system is scanning, assessing itself, or otherwise busy



Green Light – the system is ready and properly running



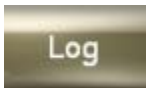
Gray Light – the system is waiting for an assessment or no data has been found

Tap the status light for a log specific to that component.

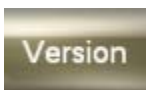
**Note:** These light bulbs indicate single points of failure on the system board and are used for diagnosis by *tech support*.

## Log and Version Buttons

Tap the *Log* button to display the software log. Only errors and warnings will be displayed.



Tap the *Version* button to display the version of software that is currently running in your Sprite machine.



**Note:** The button that has been pressed and is actively displaying its corresponding information turns red

---

## Secondary Indicators

The secondary indicators are identified with the smaller of the light bulbs on the *System Status* screen. Each of these indicators corresponds to a single-function component on the system board.

Each bulb is labeled and can be one of four colors.



Red Light – an error has occurred



Yellow Light – the system is scanning, assessing itself, or otherwise busy



Green Light – the system is ready and properly running



Gray Light – the system is waiting for an assessment or no data has been found

Tap the status light for a log specific to that component.

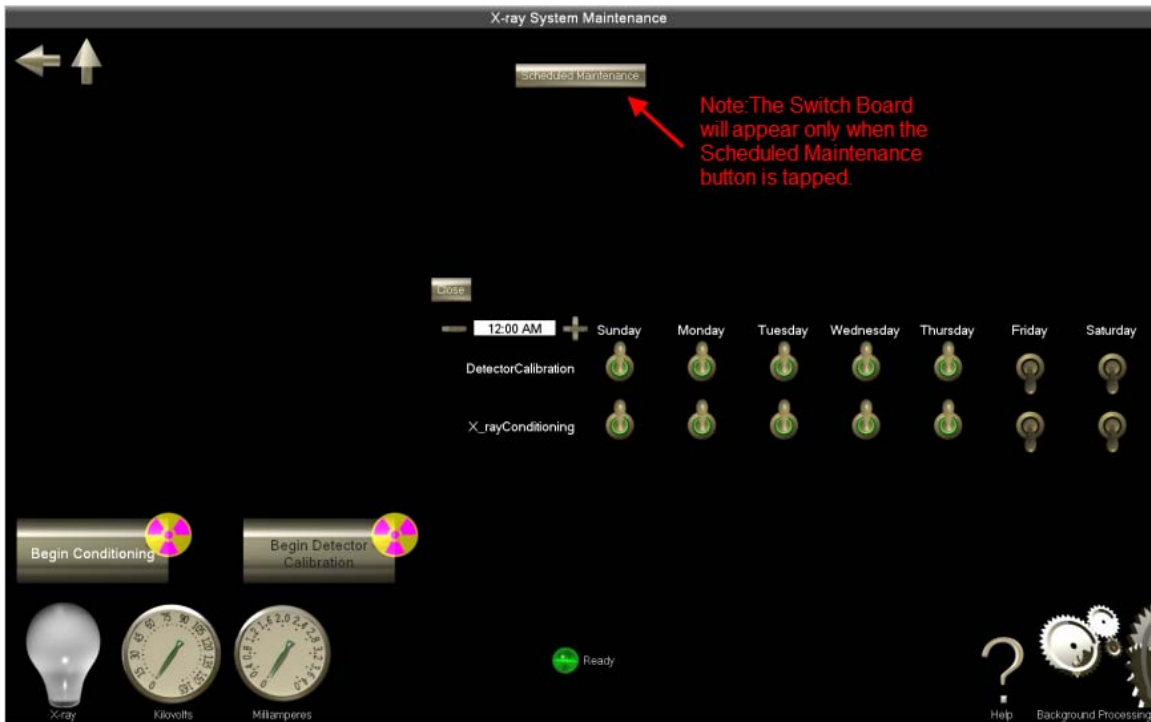
**Note:** These light bulbs indicate single points of failure on the system board and are used for diagnosis by *tech support*.

## X-ray System Maintenance Screen

This screen allows you to manually begin or schedule automatic maintenance procedures. These procedures – X-ray conditioning and detector calibration – are required for the X-ray source and detector to perform at their highest levels.

**Note:** Be sure nothing is in the cabinet prior to detector calibration. If an item is left inside the cabinet, detector calibration will not begin.

This is a reproduction of the *X-ray System Maintenance* screen. The components of this screen are described below.



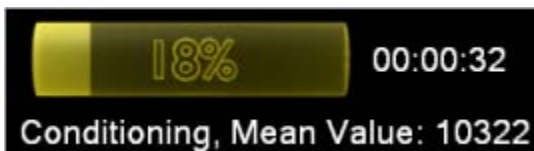
### Begin Conditioning Button

Conditioning maintains the X-ray tube and prepares it for scanning. You may not begin a scan without the X-rays being conditioned; you will be notified on the main screen if conditioning is necessary before you begin scanning. It is important to note that conditioning can be time consuming. IMTEC highly recommends setting automated conditioning to take place several hours before you intend to begin scanning.

To begin manual conditioning, tap the *X-ray System Maintenance* button on the main screen, and then tap the *Begin Conditioning* button.



As conditioning takes place a progress bar appears, the X-ray's mean value is displayed, and the indicator icons change accordingly.





When conditioning finishes you may begin detector calibration or return to the main screen.

For more information on automating conditioning, see [Scheduled Maintenance](#).

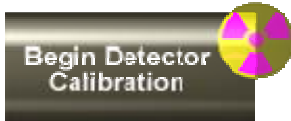
## Begin Detector Calibration Button

Detector calibration prepares the detector and is essential for accurate image acquisition.

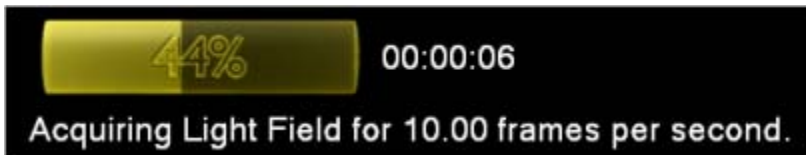
Your detector calibration schedule will depend on your usage and on the ambient temperature in the room containing your system. Extensive use and frequent or substantial ambient temperature swings dictate more frequent detector calibration. IMTEC recommends you calibrate the detector between once a day and once a week. Poor image quality, presenting with lines or rings in the images, is a sign that you should calibrate your detector.

**Note:** Be sure nothing is in the cabinet prior to detector calibration. If an item is left inside the cabinet, detector calibration will not begin.

To begin detector calibration tap the *Begin Detector Calibration* button on the *X-ray System Maintenance* screen.



As calibration takes place a progress bar and messages regarding the process appear and the indicator icons change accordingly.



When detector calibration finishes, you may begin X-ray conditioning or return to the main screen to begin a new scan.

For information on automating conditioning and detector calibration, see [Scheduled Maintenance](#).

## Scheduled Maintenance Button

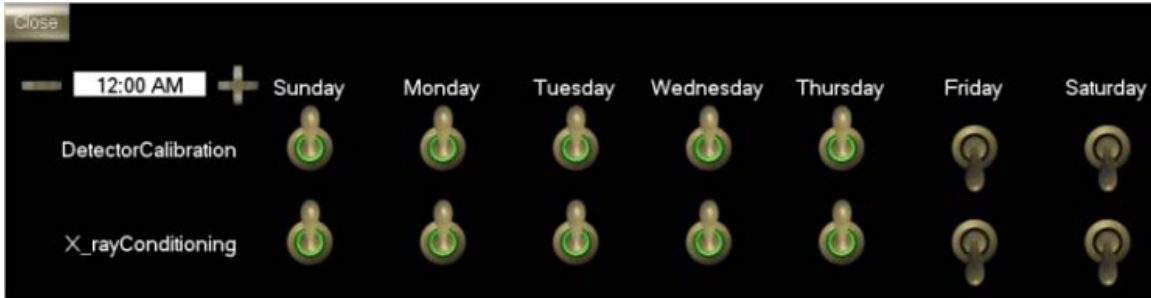
Sprite offers scheduled maintenance, specifically automatic X-ray conditioning and detector calibration. This can be especially useful if there are regular periods (e.g., several days) when the machine is idle. It is important to note that conditioning can be time consuming. IMTEC highly recommends setting automated conditioning to take place several hours before you intend to begin scanning. The following table informs you of the amount of time that conditioning and cool down require:

Time Since Last Scan	Length of Conditioning	Length of Cool Down
Less than 72 hours	Do not need to condition	N/A
72-720 hours	17 minutes	30 minutes
over 2160 hours	2.5 hours	1 hour

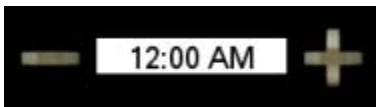
To set your machine to automatically condition the X-rays and calibrate the detector on a schedule, tap the *Scheduled Maintenance* button.

### Scheduled Tasks

The switchboard and clock appear.



You may set the time that you would like automatic conditioning and calibration to begin by tapping the plus and minus buttons next to the clock.



Choose the days you would like each procedure to run by tapping the switch for the corresponding days. The switch is on when a green circle illuminates on it.



When you are finished, you may leave the switchboard on the screen or tap the *Scheduled Maintenance* button to close it.

**Note:** When automatic conditioning and calibration begin, X-rays turn on and become active.

## Common Elements

### Abort Button

Tap the *Abort* button to stop a scan.



The button turns red, the X-rays turn off, and the scan stops.



To move away from the current screen (to begin another scan, for instance), use the navigation buttons.

### Arrow Button



To retrieve a scan or any of its reconstruction files, or calibration/validation report listed in the table, tap the arrow located in the corresponding row and the results display on the following page. If you tap the arrow on the *Locate a Scan Screen*, the *Scan Review Scan* screen appears. If you tap the arrow on the *Scan Review* screen, the *Results* screen appears.

## Image Manipulation Buttons


These tools allow you to view and manipulate preview (scout) or raw images. They include image size (i.e., the *Larger* and *Smaller* buttons), rotation, window width and level, panning and zooming.


### Rotate


Tap the play (or arrow) button to see the scanned images as the stage rotates 360° from left to right.




The position indicator moves along the slider as the rotation progresses or may be set to view the image from a certain angle within the 360° rotation.

 To increase the speed of the rotation, tap the plus sign.

 To decrease the speed of the rotation, tap the minus sign.

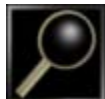
 To stop the image in a specific "position", tap the *Pause* button.

### **Level**

 To adjust the contrast or the brightness of the image (also known as the window width and window level, respectively), tap the *Level* button.


Touch the image on the screen and drag your finger left or right to adjust the contrast. Drag up or down to adjust the brightness.

### **Zoom**

 To magnify a region on the image, tap the *Zoom* button.


Touch the image on the screen and drag your finger over the region you would like to magnify. A red box appears over the area. When you take your finger off the screen the region becomes magnified.

### **Pan**

 To move the image on the screen, tap the *Pan* button.

Touch the image on the screen and drag your finger in any direction to move the image. If you have zoomed in on a region of interest, you may pan the object to see the area surrounding the region.

### **Reset Image**

 To return to the original image after using the imaging techniques, tap the *Reset Image* button.

**Note:** When level, pan, or zoom is activated, the respective button's outline turns green.

## **Navigation Buttons**

Tap these buttons to move back to previous screens.

Tap this button to move back to the previous screen.

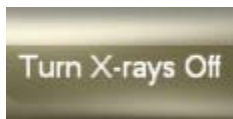


Tap this button to move back to the home screen.



## Turn X-rays Off Button

The *Turn X-rays Off* button appears when the X-ray source is active (you can tell when the X-ray source is active because the X-ray icon and the "X-ray On" sign on both sides of the touch screen is illuminated). Press and hold this button for 3–5 seconds to stop a scan. The button turns red and a countdown begins, culminating in the scan's termination.



### Notes

- You also may stop a scan by tapping the Abort button or pressing the Emergency Stop button on the machine itself.
- Reasons to turn the X-rays off include: changing samples, moving sample placement, and allowing the X-ray tube to cool down.
- The X-ray tube will eventually burn out and require replacement. Similar to light bulbs, frequent powering on and off can expedite burn out.

## Background Processing Button

The *Background Processing* button provides access to the *Background Processing* screen. This button appears on the main screen and in the bottom right corner of every screen.



If the gears of this button are moving, image processing (or reconstruction) is under way.

**Note:** You may not begin a scan while any image processing is under way.

## Scan Identification

The *Begin a New Scan*, *Scanning*, *Scan Review* and *Results* screens allow you to enter information to identify a scan. The identifying fields are *Scan Name*, *Scan Description*, and *Who Did the Scan*.

You can enter identifying information by tapping in the box associated with a field's name. The keyboard appears (if it is not already on the screen).

### Scan Name

A screenshot of a mobile application interface showing a text input field. The field is labeled "Scan Name" in white text on a black background. The input box itself is white with a yellow border.

The *Scan Name* field can be entered only on the *Begin a New Scan* screen.

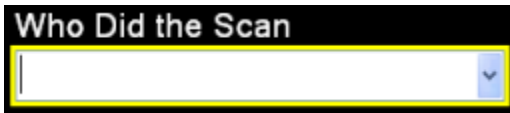
A screenshot of a mobile application title bar. The text "Scanning: One Touch Scan Thu, 02.05.2009" is displayed in white on a dark grey background.

When using the *One Touch Scan* option, the name is automatically created using "One Touch Scan" and the date of the scan.

A screenshot of a mobile application title bar. The text "Scan Review: Impression" is displayed in white on a dark grey background.

Note: Once you enter a name, it will appear on the top of the screen in the title bar and you may not change it. In this example, the name given to the scan is "Impression".

### Who Did the Scan

A screenshot of a mobile application interface showing a text input field. The field is labeled "Who Did the Scan" in white text on a black background. The input box is white with a yellow border and a small blue arrow icon on the right side.

To enter the name or identification number of the person performing the scan, tap inside the box and enter text. Tap the arrow to view and select from previously entered names.

### Scan Description

A screenshot of a mobile application interface showing a text input field. The field is labeled "Scan Description" in white text on a black background. The input box is white with a yellow border.

Tap inside the *Scan Description* box to enter or modify a scan's or reconstruction's description.

## Keyboard

Use the keyboard to enter text into *Scan Name*, *Scan Description*, and other text boxes when conducting scanning procedures. If the keyboard is not shown when you want to enter text, simply tap inside one of a text box to make it appear.



## Kilovolts Icon

This icon indicates the force of electricity being supplied to the X-ray source.



## Milliamperes Icon

This icon indicates the strength of electricity that is being supplied to the X-ray source.



## Status Light and Message

The light bulb indicates the status of the mechanical and hardware system. Combined with the text message, it alerts you the status of the machine and relays any errors. The bulb can be one of four colors.



Red Light – an error has occurred



Yellow Light – the system is scanning, assessing itself, or otherwise busy



Green Light – the system is ready and properly running



Gray Light – the system is waiting for an assessment or no data has been found

Tap the status light (or message) to access the *Hardware Status* screen.

**Note:** If any light bulbs are illuminated in any color but green or yellow, please contact technical support.

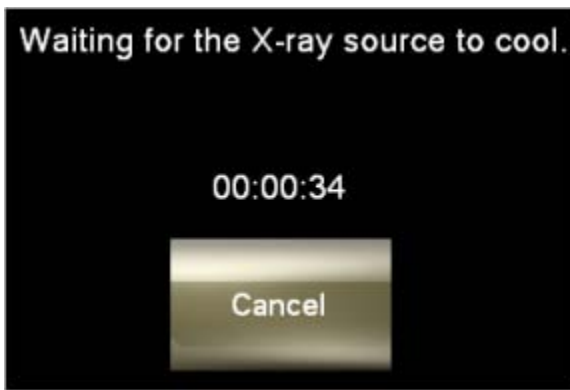
## Temperature Gauge

The temperature gauge indicates the temperature of the X-ray tube.



If the temperature of the tube exceeds the allowable limit, the light will turn red on the gauge and the X-ray is automatically shut off.

If you try to run a scan while the X-ray tube is cooling down, a message appears indicating how much time remains until the scan will begin.



The scan begins automatically when the countdown is complete. If you tap the *Cancel* button, the scan is canceled and the countdown stops. Use the navigation buttons to return to the previous or home screen.

## X-ray Icon

The X-ray icon represents the status of the X-ray source, whether it is on and emitting X-rays or not.

*This icon is white when the X-ray source is off.*



*The icon is yellow (or "illuminated") when the X-ray source is on.*





Note: You can turn off X-rays in several ways. For more information, see [Safety](#).

## Trefoil

A radiation trefoil is permanently affixed to each button that activates X-rays.





## Technical Support

If you have encountered a problem, please contact IMTEC for technical support.

Email: support@imtecimaging.com

Toll-Free  
Phone: 800-879-9799

Note: Our toll-free telephone numbers do not work from outside of the United States

Phone: 505-661-3000

Fax: 505-662-5179

International  
Phone: 001-505-661-3000

Address: IMTEC, a 3M Company  
110 Eastgate Drive  
Los Alamos, NM 87544