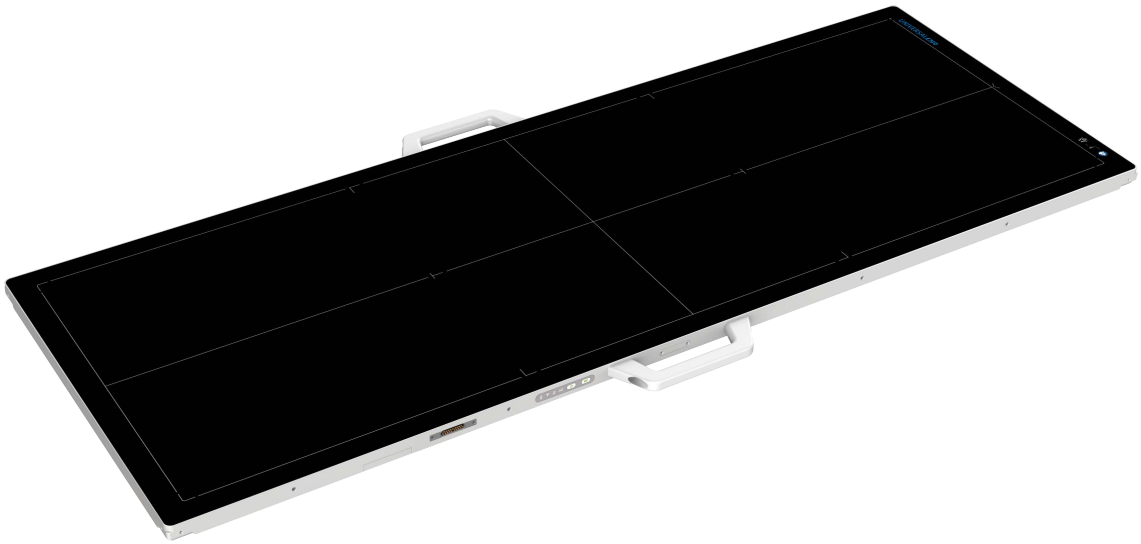
User Manual

Venu1748V

Digital Flat Panel Detector



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To Customers

Thank you for choosing the Venu1748V Digital Flat Panel Detector (hereinafter referred to as Venu1748V) as your X-ray solution.

This manual contains all the general information about the Venu1748V, intended to provide users with instructions on installation, use, and maintenance.

All information in this manual, including illustrations, is based on the equipment prototype. If your equipment does not match these contents, they will not apply to your equipment.

Information regarding the specifications, composition, and appearance of this product is subject to change without prior notice.

Store this manual safely so that you can access it in the future.

Environmental Protection

This symbol indicates that this product cannot be disposed of as domestic or commercial waste. Improper handling of this type of waste may result in a negative impact on health and the environment.

Some countries or regions, such as the European Union, have set up systems to collect and recycle electrical or electronic waste items. Please contact your local authorities for information about practices established in your region. If collection systems are not available, call our Customer Service for assistance.

For Your Safety

- To avoid personal injury or product damage, be sure to read the user manual and all accompanying information carefully and pay attention to all safety information before installing and using the detector.
- The installation, debugging, addition, modification, and maintenance of this product can only be carried out by professionals.
- Only a physician or a legally certified operator is allowed to use this product.
- The equipment must be stored and operated in a specified medical environment and maintained by professional maintenance personnel under safe and operable conditions.
- Request your sales representative or local dealer to install this product.

Disclaimer

- In no event shall we be reliable for any abnormality, equipment damage, and personal injury caused due to your failure to follow the warnings and operating instructions in this manual.
- In no event shall we be reliable for any damage, loss, or injury incurred by the purchaser or third parties due to fire, earthquake, or any accident, misuse, or abuse of this product.
- In no event shall we be reliable for any damage, loss, or injury arising from unauthorized modifications, repairs, or alterations to this product or failure to strictly comply with the operating and maintenance instructions described in the manual.
- In no event shall we be reliable for any damage or loss arising from using any options or consumable products other than those dedicated as original products.
- During X-ray imaging, collecting, processing, reading, and storing of image data, the user should comply with the law of the countries where the product is used.
- The user and operator are responsible for maintaining the privacy of image data acquired from this product.

Warning Symbols

The warning symbols that appear in this user manual are classified as follows for better comprehension of their meanings. Make sure that you fully understand them and obey the instructions they contain.

 WARNING	This indicates a potentially hazardous situation that, if ignored, may result in severe personal injury, death, or substantial property damage.
 CAUTION	This indicates a potentially hazardous situation that, if ignored, may result in minor personal injury or property damage.
 PROHIBITED	This symbol is used to indicate a prohibited operation.
 NOTE	This emphasizes or supplements important information about the main text.
 REFERENCE	This symbol means "Refer to the documentation provided on the CD" or "Consult other sections of this manual for information.”

Abbreviations

Abbreviations	Explanation
AC	Alternating Current
AP	Access Point
DC	Direct Current
EMC	Electro-Magnetic Compatibility
FPD	Flat Panel Detector
FTP	File Transfer Protocol
HVG	High Voltage Generator
IP	Internet Protocol
IT	Information Technology
LAN	Local Area Network
LED	Light Emitting Diode
PC	Personal Computer
ROI	Range of Interest
RF	Radio Frequency
SAR	Specific Absorption Rate
SDK	Software Development Kit
SID	Source Image Distance
SN	Serial Number
SSID	Service Set Identifier
TFT	Thin Film Transistor
UI	User Interface
WL	Window Level
WW	Window Width
SN	Serial Number

Contents

1 Safety Information

1.1 Safety Precautions

■ Operation and Storage Environment

WARNING

- **Do not operate or store the equipment in or around flammable or corrosive gases, gas mixtures, liquids, chemicals, or other substances.**

  Ignoring this warning may result in an explosion, fire, or electric shock, which may cause personal injury, death, or substantial product damage.

- **Do not operate the detector in a location with the following conditions. Ignoring this warning may result in equipment failure, fire, or personal injury.**

  a) Close to fluid or places where fluid is used
  b) Where it will be exposed to direct sunlight
  c) Close to the air outlet of an air-conditioner or ventilation equipment
  d) Close to a heat source such as a heater
  e) Where the power supply is unstable
  f) In a dusty environment
  g) In a saline or sulfurous environment
  h) Where temperature or humidity is high
  i) Where there is freezing or condensation
  j) In an area prone to vibration
  k) On an incline or in an unstable area

CAUTION

- **Avoid using it in an environment with electromagnetic interference. The equipment around the product must meet the requirements of EMC standards.**

  Due to interference from non-EMC-compliant equipment, resulting in abnormal performance, valuable clinical images may not be obtained after exposure is completed, resulting in reduced image quality.

- **To make it easy to disconnect the plug at any time, avoid putting any obstacles near the outlet.**

  Otherwise, it may not be possible to disconnect the plug immediately in case of an emergency.

- **Do not place any superfluous objects within the moving range of the parts of this product.**
- **Do not spill liquids or chemicals onto the equipment. Do not let the equipment come into contact with the patient's blood or other body fluids.**

  Otherwise, it may result in fire or electric shock. To avoid such contact, disposable protective covers should be used to protect the equipment.

- **All patients using active implantable medical devices should stay away from this product.**
- **Do not turn on the power switch when there is condensation on the detector or any of its components or accessories.**

■ Equipment, Interface, Power Source, and Cables


WARNING

- **Do not connect the detector to any component or accessory other than the manufacturer's specified ones. Do not use any power source other than the one provided with the equipment.**

  Ignoring this warning may result in an explosion, fire, or electric shock, which may result in personal injury, death, or substantial product damage.
- **Be sure to turn off the detector's power before connecting or disconnecting the cables or accessories.**
- **Do not touch the power supply, detector, cable, connector, or other components with wet hands.**

  Ignoring this warning may result in an explosion, fire, or electric shock, which may result in personal injury, death, or substantial product damage.
- **To avoid the risk of electric shock, this equipment must be connected to a power supply with protective earth.**
- **Use only dedicated cables for the equipment. Do not use any other cables.**
- **Do not modify the cables or subject the cable to external stress or damage. Avoid placing anything heavy, including the detector, on the cable, stepping on the cable, pulling the cable, or subjecting the cable to excessive bending or bundling.**

  Ignoring this warning may result in cable failure, which may result in personal injury, death, or product damage.


CAUTION

- **Do not place excessive heavy objects on the equipment.**

  Otherwise, the internal sensor may be damaged, and the equipment may not normally work to acquire images.
- **Do not hit or drop the equipment.**

  The equipment may be damaged if it receives a strong jolt, which may result in fire or electric shock if the equipment is used without being repaired.
- **The power cord plug must be firmly inserted into the power socket.**

  If contact failure occurs, or if metal objects come into contact with the exposed metal prongs of the plug, fire or electric shock may result.
- **Do not supply power to more than one piece of equipment using the same AC outlet.**

  Doing so may result in fire or electric shock.
- **Be sure to disconnect the power cable by holding the plug or connector, not by pulling the cable.**

  The core wire may be damaged if you pull the cable too hard, resulting in fire or electric shock.

■ Handling

- **Do not disassemble or modify the equipment and its accessories. Any modification of the equipment is not allowed, and it is forbidden for personnel not authorized by the company to modify it. If modifications have been made to the equipment, appropriate inspections and tests must be carried out to ensure continued safe use of the equipment.**

  Ignoring this warning may result in an explosion, fire, or electric shock, which may cause personal injury, death, or substantial product damage.

- **Do not handle the equipment with wet hands.**

  Otherwise, it may result in electric shock that could result in death or severe injury.

- **Make sure the equipment is used on a flat and stable surface to prevent bending and deformation of the equipment.**

  Otherwise, the internal image sensor may get damaged.

- **If the detector is placed vertically or in any tilted position, the X-ray detector must be securely placed in the Bucky tray or securely fastened to the X-ray detector enclosure or support structure.**

  Otherwise, the detector may tip over, causing injury to the patient or damage to internal equipment.

- **Keep the detector under even load (same pressure) during image acquisition.**

  Otherwise, the quality of acquired images is not guaranteed.

■ Failure Handling

- **Turn off the detector, cut off the power supply immediately from the AC outlet and contact your sales representative or local dealer if any of the following occurs:**

  When there is smoke, an odd smell, or an abnormal sound.

  When the liquid has been spilled into the equipment or a metal object has entered the equipment through an opening.

  When the equipment has been dropped and is damaged.

- **When the liquid has been spilled into or on any part of the X-ray detector or power supply, or when the X-ray detector, its component, or accessory is dropped, unplug the power supply from the AC outlet and immediately contact your sales representative or local dealer.**

  Further use under abnormal conditions may result in severe personal injury, death, or substantial product damage.

■ Maintenance, Inspection, and Cleaning


WARNING

- **Be sure to turn off the power of the detector when the inspections indicated in this manual are going to be performed. If the detector is powered by AC power supply, turn off the power switch and/or unplug the AC power cord.**

  Ignoring this warning may result in an explosion, fire, or electric shock, which may result in personal injury, death, or substantial product damage.
- **NEVER use alcohol, ether, and other flammable cleaning agents to clean the equipment for safety. NEVER use methanol, benzene, acid, alkali, or other corrosive liquids to clean the equipment.**
- **The X-ray detector must be repaired by X-ray detector manufacturer authorized personnel only.**

  Ignoring this warning may result in explosion, fire, electric shock, or unknown hazards, which may result in severe personal injury, death, or substantial product damage.


CAUTION

- **Clean the power cord plug periodically by unplugging it from the AC outlet and removing dust and dirt from the plug, its periphery, and AC outlet with a dry cloth.**

  Suppose the power cord is left plugged in for an extended period of time in a dusty, dark, and humid environment, the dust around the outlet will absorb moisture, possibly causing insulation failure and a fire.
- **Ensure that the equipment's surface & plugs are dry before turning ON the power.**

  Otherwise, it may result in fire or electric shock.
- **For safety reasons, when the equipment is not in use, the power supply should be turned off; when the product is in use, maintenance operations are not allowed.**

1.2 Notes for Using the Equipment

Pay attention to the following precautions when using the equipment. Otherwise, the equipment may not function correctly.

■ Before Exposure

- Be sure to check the equipment daily and confirm that it works properly.
- When a room is heated up suddenly in cold areas, it will cause condensation on the equipment. In this case, wait until the condensation evaporates before performing an exposure. If condensation occurs during the use of the equipment, the images captured may suffer from quality problems. When an air-conditioner is used, be sure to raise/decrease the temperature gradually to ensure that the temperature difference between room and equipment will not cause condensation.
- The detector should be warmed up for 15 minutes before exposure or the creation of a calibration template.

■ During Exposure

- Do not move the power cable and network cable during exposure. Otherwise, it may cause image noise, artifacts, or incorrect images.
- Do not use the equipment in areas with strong magnetic fields. Otherwise, it may cause image noise, artifacts, or incorrect images.
- Do not use the equipment in areas with vibration. Otherwise, it may cause image noise, artifacts or incorrect images.

■ After Exposure

Turn off the power to the detector when the flat panel detector is not used.

■ Disinfection and Cleaning

After every examination, wipe the surfaces of the detector using disinfectants such as ethanol. For details on how to sterilize, consult a specialist.

- Do not spray the detector directly with disinfectants or detergents.
- Wipe it with a cloth slightly damped with a neutral detergent. Do not use solvents such as alcohol, thinner, benzene, acid, and base. Doing so may damage the surface of the equipment.
- A waterproof non-woven cover is recommended as a barrier between the detector and the bleeding patient.

■ Replacing Cables

Power off the equipment and unplug the power cord from the power outlet before operation. Unplug the detector cable from the workstation interface. Otherwise, a fire or electric shock may result.

Eliminate static electricity before replacing cables, including operating platforms, tools, and operators.

2 Regulatory Information

2.1 Labels and Symbols

The detector and other components have labels and symbols on them. Their contents and locations are indicated below.

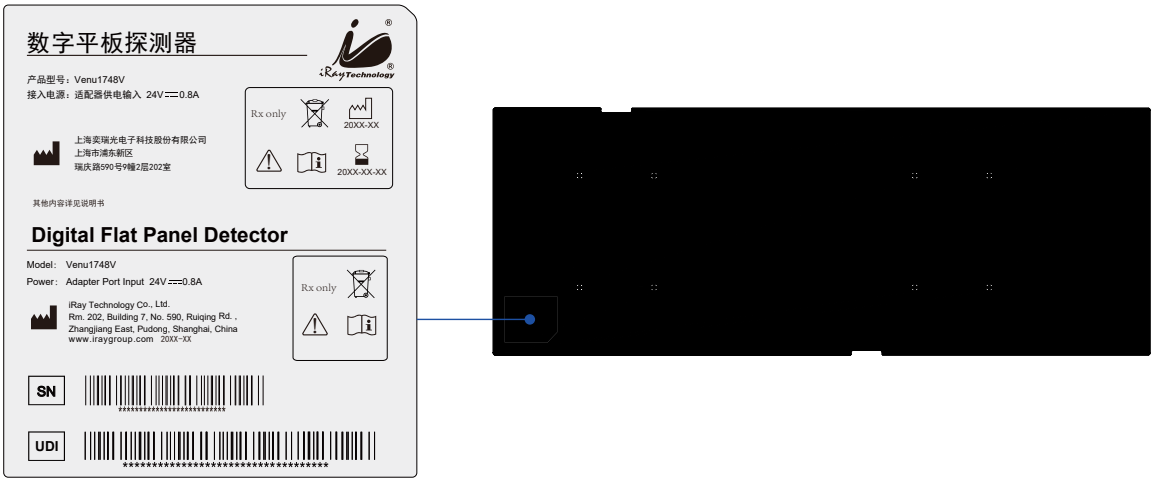
The labels in this document are only examples; please refer to the actual labels.

■ Packaging Box

The supplied outer packaging box of the detector contains the environmental requirements for detector packaging, stacking, transportation, and storage.

■ Detector

Two labels located on the detector are shown in the figure below. The labels include model, configuration, SN, and other information.



Symbol	Explanation	Location
	This symbol is used to indicate, “Keep the equipment upright.”	Packaging box
	This symbol is used to indicate “Fragile, handle with care.”	Packaging box
	This symbol indicates that the product needs to be protected from moisture.	Packaging box
	This symbol indicates the maximum number of stacks.	Packaging box
	This symbol indicates the temperature range to which the product can be safely exposed.	Packaging box
	This symbol indicates the humidity range to which the product can be safely exposed.	Packaging box
	This symbol is used to indicate “Keep away from direct sunlight.”	Packaging box
SN	This symbol is used to identify the manufacture series number, which is made of 19 digits as shown below: $A_1A_2A_3A_4$ B_1B_2 C_1C_2 L $M_1M_2D_1D_2Y_1Y_2$ $X_1X_2X_3X_4$ Production Series No. Production Date Production Site Production Version No. Derivative Type Production Type	On the detector label
	This symbol indicates the name and address of the manufacturer.	On the detector label
UDI	This symbol indicates the Unique Device Identifier.	On the detector label

Symbol	Explanation	Location
	Caution: Please refer to the instructions in the user manual.	On the detector label
	This symbol represents a reference to the user manual for general information.	On the detector label
	This symbol indicates that the product must be sent to the appropriate facility for recycling when the end-user intends to discard the product.	On the detector label
 20XX-XX	This symbol indicates the manufacture date.	On the detector label
 20XX-XX-XX	This symbol is used to indicate the expiration date.	On the detector label
	This symbol indicates that the product is a medical device.	On the detector label
Rx only	The device is for prescription use only.	On the detector label
	This symbol indicates that “please handle with care.”	On the front side of detector
	This symbol indicates the operating temperature range.	On the front side of detector
	This symbol represents a safety symbol that indicates “a reference to the user manual.”	On the front side of detector

2.2 Safety Standards for Medical Equipment

2.2.1 Medical Equipment Classification

Item	Classification
Type of protection against Electrical shock	Class I, using medically approved adaptor supply
Degree of protection against electrical shock	Without applied parts
Degree of protection against ingress of water	IPX0
Mode of operation	Continuous operation

Item	Classification
Flammable anesthetics	Not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide Not suitable for use in the oxygen-rich environment
Power supply	Powered by power adaptor
Signal transmission	Wired transmission

2.2.2 Safety Standards Reference

The safety standards listed below apply to the product and its accessories.

- Venu1748V conforms to this EN 60601-1-2:2015/IEC 60601-1-2:2014 standard on both immunity and emissions.
- Use only computers and image display monitors complying with IEC 60601-1 or IEC 60950-1.

Standard	Description
MDD (93/42/EEC)	Medical Device Directive
Directive 2011/65/EU	Restriction of the use of certain hazardous substances (RoHS)
EN ISO 13485:2016	Medical devices– Quality management systems– Requirements for regulatory purposes
EN ISO 14971:2019	Medical device – Application of risk management to medical devices
IEC 60601 1: 2005 + CORR. 1 (2006) + CORR. 2 (2007) + AM1 (2012)	Medical electrical equipment –Part 1: General requirements for basic safety and essential performance
EN 60601-1:2006+A11:2011+A1:2013+A12:2014	Medical electrical equipment –Part 1: General requirements for basic safety and essential performance
ANSI/AAMI ES60601-1:2005/(R)2012+A1:2012+C1:2009/(R)2012+A2:2010/(R)2012	Medical electrical equipment –Part 1: General requirements for basic safety and essential performance
CAN/CSA-C22.2 No.60601-1:14	Medical electrical equipment –Part 1: General requirements for basic safety and essential performance
IEC 60601-2-54:2009+A1:2015+A2:2018	Medical electrical equipment –Part 2-54: Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy
CAN/CSA-C22.2 NO. 60601-2-54:11	Medical electrical equipment –Part 2-54: Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy
IEC 60601-1-6:2010+A1:2013	Medical electrical equipment Part 1-6: General requirements for basic safety and essential performance — Collateral standard: Usability

Standard	Description
CAN/CSA-C22.2 NO. 60601-1-6: 11+A1:2015	Medical electrical equipment Part 1-6: General requirements for basic safety and essential performance — Collateral standard: Usability
EN 60601-1-6:2010+A1:2015	Medical electrical equipment Part 1-6: General requirements for basic safety and essential performance — Collateral standard: Usability
IEC 60601-1-2:2014/EN 60601-1 -2:2015	Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance– Collateral standard: Electromagnetic disturbances– Requirements and tests
IEC62133-2:2017/EN 62133-2:20 17/UL 62133-2:2020/CSA C22.2 No. 62133-2-20	Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications
EN 62220-1:2004	Medical electrical equipment – Characteristics of digital X-ray imaging devices–Part 1: Determination of the detective quantum efficiency
EN 62366:2008	Medical devices – Application of usability engineering to medical devices
ISO 15223-1:2016	Medical devices-symbols to be used with medical device labels, labeling and information to be supplied–Part1:General requirements

2.3 Guidance and Manufacturer’s Declaration for EMC

2.3.1 Important Information Regarding Electromagnetic Compatibility (EMC)

Venu1748V needs special precautions regarding EMC and needs to be installed only by our company or an authorization engineer and put into service according to the EMC information provided in the user manual.

- This equipment may be susceptible to electromagnetic interference from portable and mobile RF communications such as mobile (cellular) telephones. Electromagnetic interference may result in incorrect system operation and create a potentially unsafe situation.
- The use of accessories and cables other than those specified by our company, with the exception of accessories and cables sold by our company of Venu1748V as replacement parts for internal components, may result in increased emissions or decreased immunity of the detector.
- Venu1748V should not be used adjacent to or stacked with other equipment. In case adjacent or stacked use is necessary, the detector should be observed to verify normal operation in the configuration in which it will be used.

2.3.2 EMI Compliance Table

■ **Electromagnetic Emissions**

Emission Test	Compliance	Electromagnetic Environment-Guide
Conducted and radiated RF emissions CISPR 11	Group 1 Class B	Professional healthcare facility environment
Harmonic distortion IEC 61000-3-2	Class A	
Voltage fluctuations/flicker IEC 61000-3-3	Complies	

2.3.3 EMS Compliance Table

■ **Enclosure Port**

Phenomenon	Basic EMC Standard	Immunity Test Levels
		Professional Healthcare Facility Environment
Electrostatic Discharge	IEC 61000-4-2	±8kV contact ±2kV, ±4kV, ±8kV, ±15kV air
Radiated RF EM field	IEC 61000-4-3	3V/m 80MHz-2.7GHz 80% AM at 1kHz
Rated power frequency magnetic fields	IEC 61000-4-8	30A/m 50Hz or 60Hz

■ **Input A.C. Power Port**

Phenomenon	Basic EMC Standard	Immunity Test Levels
		Professional Healthcare Facility Environment
Electrical fast transients/burst	IEC 61000-4-4	±2kV 100kHz repetition frequency
Surges Line-to-line	IEC 61000-4-5	±0.5kV, ±1kV
Surges Line-to-ground	IEC 61000-4-5	±0.5kV, ±1kV, ±2kV
Conducted disturbances induced by RF fields	IEC 61000-4-6	3V 0.15MHz - 80MHz 6V in ISM bands between 0.15MHz and 80MHz 80% AM at 1kHz
Voltage dips	IEC 61000-4-11	0% U_T; 0.5 cycle At 0º, 45º, 90º, 135º, 180º, 225º, 270º and 315º

Phenomenon	Basic EMC Standard	Immunity Test Levels
		Professional Healthcare Facility Environment
		0% U_T; 1 cycle 70% U_T; 25/30 cycles Single phase: at 0º
Voltage interruptions	IEC 61000-4-11	0% U_T; 250/300 cycles

■ **Cable Information Provided Against EMC**

Cable	Recommended Length	Shield/Unshielded	Qty.	Cable Classification
AC power cable	1.8m	Unshielded	1	AC power
DC power cable	3m	Unshielded	1	DC power

2.4 Environmental Directive

Europe WEEE directive

ROHS (2011/65/EU)

PFOS legislation (No.757/2010)

REACH legislation (No.1907/2006)

Cadmium legislation (Controlled substance: Annex XVII)

REACH legislation (No.1907/2006) (SVHC: Annex XVII)

New batteries directive (2006/66/EC)

EU Packaging Directive (94/62/EC)

2.5 IT Network

■ **PEMS Network Requirements**

List of the hazardous situations resulting from a failure of the IT-network

No.	Hazard
1	The operating system is not compatibility
2	Change or update the software failed;

No.	Hazard
3	The compatibility of the interface
4	The data transfer protocol error
5	The inconsistent of interface or format leads to data distortion
6	The data output failed

3 Product Introduction

3.1 Overview

Venu1748V is a 17”×48” digital flat panel detector based on amorphous silicon thin film transistor technology. Using CsI as the scintillator, it contains a 3064×8696 active pixel matrix with a pixel size of 139 μm, providing high-quality radiographic images.

■ Intended Use

Venu1748V, as the primary imaging equipment component in the digital radiography (DR) system, is supplied to the manufacturers of the medical diagnostic X-ray imaging systems, and is used in conjunction with the medical diagnostic X-ray imaging system. It is used for imaging of the measured object, and the imaging data is output to the processing device after the image is acquired.

This equipment can be installed on a rack with good insulation performance, and can be in contact with the patient. Our company will provide technical support for system integration and equipment software.

This product is intended to provide a general radiographic diagnosis of human anatomy and digital X-ray imaging technology to diagnose disease, injury, or any health problem. It is suitable for shooting images of all common anatomical parts that require X-ray examination, supporting the imaging of large objects, including long bones, and complete spine detection.

This equipment is not suitable for mammography, dental photography, neonatal, and dynamic imaging photography. It is forbidden to use this equipment for pregnant women. Attention should be paid to X-ray protection of non-examined parts during X-ray inspection. There are no contraindications.

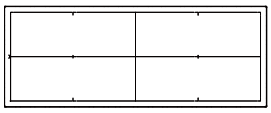
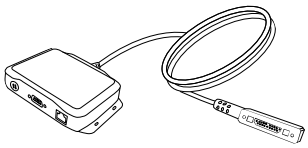
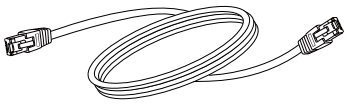
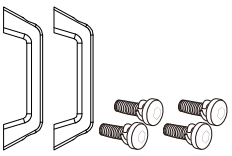
According to its intended use and results of risk management, essential performance is identified and described as the following:

- To acquire dark field images, the Venu1748V image acquisition function will not be affected.
- To transmit images, Venu1748V image transmission function will not be affected.

■ Key Features

- 17”×48” static wired flat panel detector
- CsI scintillator
- 139μm pixel size, 16-bit ADC HD image details
- Supporting two trigger modes of Software/AED
- Supporting imaging of large objects
- Equipped with detachable handles

3.2 Standard Product Accessories

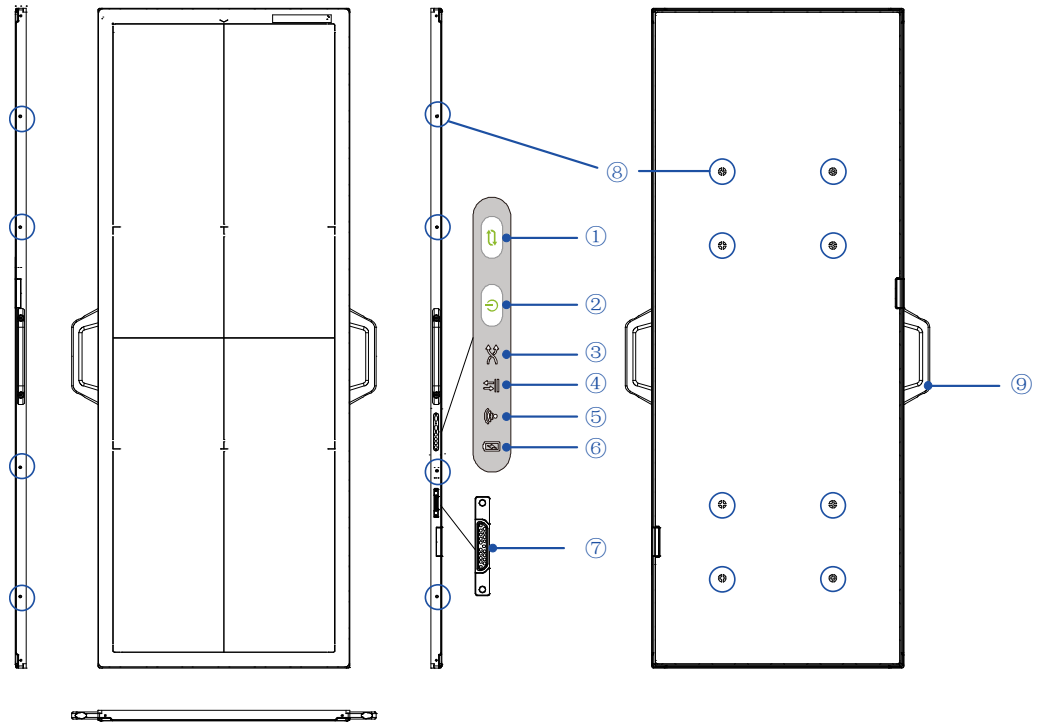
Detector (Venu1748V)	Power Adapter	Control Box
		
US AC Power Cable (1.8m)	**Ethernet Cable (5m)**	**Handles+Scresw (2pcs)**
		

CD		Documents	
	Gain calibration template Defect calibration template SDK EN/CN User Manual		OQC Test Report Packing List Product QC


CAUTION

- The specific configuration of Venu1748V will be adjusted according to the actual needs of customers.
- To ensure that the detector can be safely connected to the system, please carefully check the above components to ensure that the components are complete and confirmed by our engineers. If anything is missing or damaged, please contact your local dealer.
- We do not assume any risk responsibility for abnormal situations such as detector damage caused by the use of components not verified by our engineers.

3.3 Product Description



No.	Figure	Item	Description
①		Switch button	Reserved
②		Power button	Used to power off the detector
③		Mode indicator	Used to indicate the mode of detector
④		Status indicator	Used to indicate the status of detector
⑤		Link indicator	Used to indicate the link status of detector
⑥		Power indicator	Used to indicate whether the detector is powered ON or OFF
⑦		Composite interface	Power & network composite interface
⑧	/	Mounting hole	8 on the bottom and 8 on the side (M5 depth 0.8mmm) for fixing the detector
⑨	/	Handle	Please install the handle according to the position shown in the figure

3.3.1 Buttons

Function	FPD Status			Remarks
Power ON	Power OFF	Short-hold for 4s	No action	FPD starts by default after powering on and turning on the control box switch Short hold for 4s to restart the FPD after it is turned OFF by pressing the power button
Forced restart		Long-hold for 7s	No action	Long hold the power button for more than 7s, release it when the power indicator is ON
Forced restart	Power ON	Long-hold for 7s	No action	Long hold the power button for more than 7 seconds, release it when the power indicator is OFF and ON again
Enter/exit sleep mode		Double-click	No action	Release the power button after two short presses (interval < 1s) to enter or exit the sleep mode
Power OFF		Short-hold for 4s	No action	Hold for 4s and release the power button when the power indicator is OFF
Restore default configuration		Double-click Short-hold for 4s	Long-hold for 7s	Press and hold the mode button for 7s Triple click power button Short hold power button for 4s

3.3.2 LED Indicators

LED	Status	Color	FPD Status
Mode	Green blinking		Restore default configuration
	OFF		Shut down Wired connection is built
Status	OFF		Shut down Exposure prohibited
	Green ON		Exposure enabled
	Green blinking		Image transmission Initialize
	Orange ON		Error

LED	Status	Color	FPD Status
Link	OFF		Shut down Wired connection broken and wireless connection not ready
	Green ON		Wired connection is built
	Green blinking		Initialize
Power	OFF		FPD power OFF
	Green ON		DC input, FPD power OFF
	Green blinking		During ON&OFF

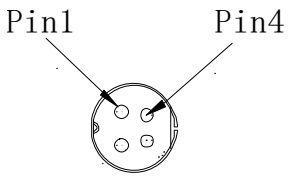
NOTE

If the indicator light is abnormal, please stop using the flat panel detector and perform troubleshooting.

Contact the our customer service department for professional customer support if the fault still cannot be eliminated.

3.3.3 DC Power Interface

The detector supports the input of external DC stabilized power supply, and the interface is defined as follows:



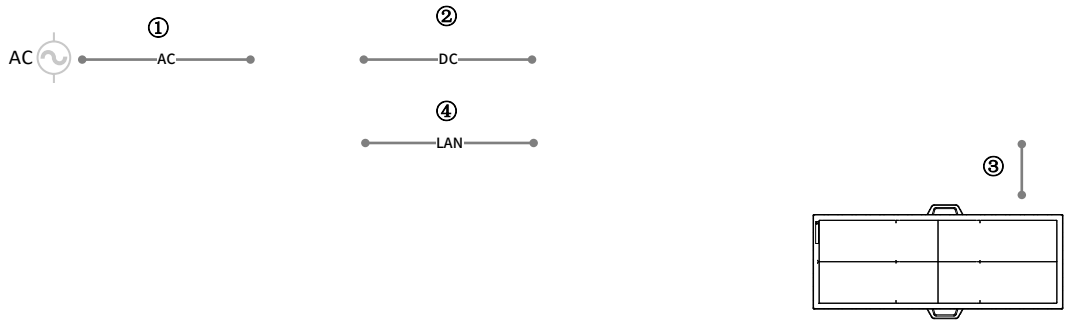
No.	Definition	Rated Current	Voltage Input Range
PIN 1	Negative phase terminal of DC power supply	Typ. 1.5A	0~0.5V
PIN 2	Positive phase terminal of DC power supply	Typ. 1.5A	23~25V
PIN 3	Positive phase terminal of DC power supply	Typ. 1.5A	23~25V
PIN4	Negative phase terminal of DC power supply	Typ. 1.5A	0~0.5V

WARNING

To meet the safety and functional requirements of the detector, the detector must be powered by the power adapter supplied with the detector.

3.3.4 Interface Connection Diagram

The connection diagram of the equipment is shown below:



① Connect one end of the power adapter to an AC power cable, and connect the AC power cable to a power socket with grounding protection.

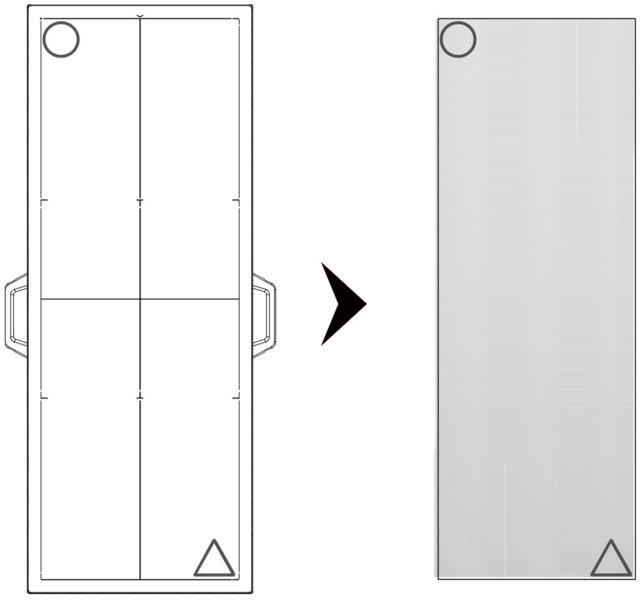
② Connect the other end of the adapter to the DC power cord, and insert the connector of the DC power cord into the DC power interface of the control box.

③ Insert the connector of the control box into the composite interface of the detector.

④ Insert one end of the Ethernet cable into the LAN interface of the control box, and insert the other into the LAN interface on the PC side.

3.3.5 Imaging Direction

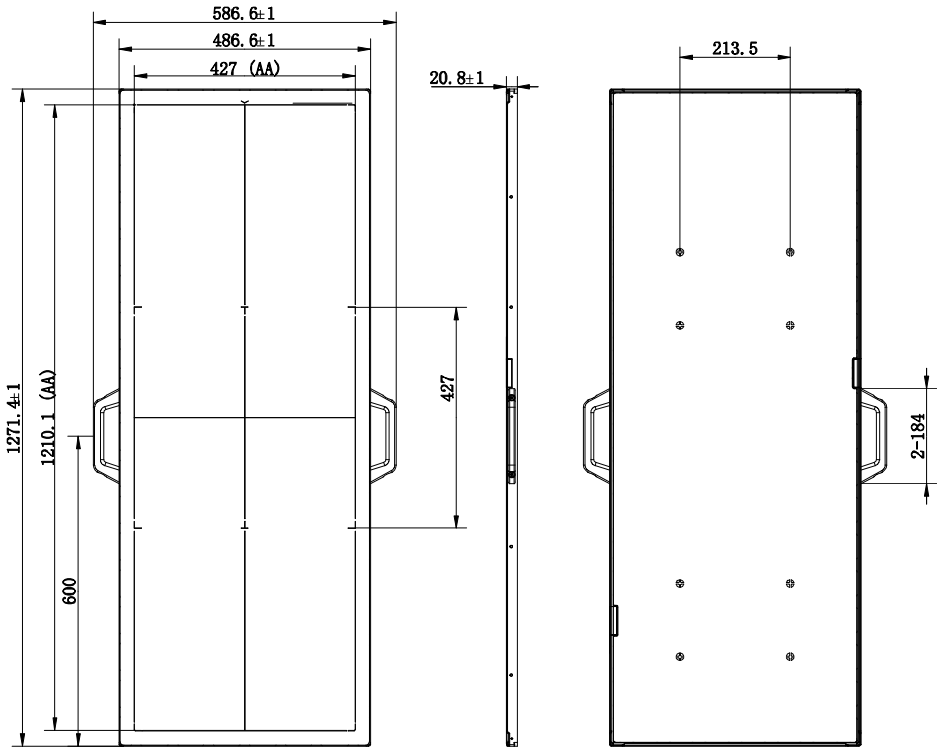
Please note that the image direction corresponds to the actual position of the detector (○ is the zero position) as shown in the figure below.



4 Technical Specifications

4.1 Detector

■ **Drawing**



■ **Specifications**

Item	Specification
Model	Venu1748V
Scintillator	CsI
Sensor technology	a-Si TFT
Pixel pitch	139μm
Effective array	3064×8696
Effective area (H×V)	425.8mm×1208.7mm
AD conversion	16 bit
Trigger mode	Software/AED
Data interface	Wired transmission

Item	Specification
Dimensions	1271.4mm (L)×586.6mm (W)×20.8mm (H)
Weight	16kg

■ **Environmental Requirement**

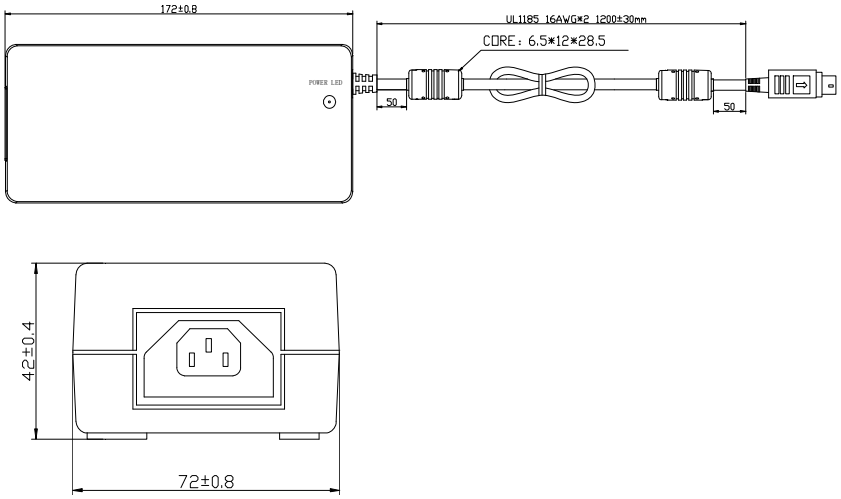
Please confirm that the environment meets the basic requirements of Venu1748V to ensure that the detector can be stored or operated in a reliable environment.

Item	Operation	Storage&Transport
Temperature	5~35℃	-20~55℃
Temperature variation	＜0.5℃/min	＜1℃/min
Humidity	10%~90%RH	5%~95%RH
Air pressure	700~1060hPa	700~1060hPa

Do not operate the machine at an altitude of more than 3000 meters.

4.2 Power Adapter

■ **Drawing**



■ **Specifications**

Item	Specification
Model	LXCP120-0240500
Input	100~240V AC input
Output	24V single output mode, 120W
Dimensions	172mm (L)×72mm (W)×42mm(H)
Weight	0.65kg

4.3 Workstation

■ **Specifications**

Item	Requirement
Operating system	Windows 7 64bit
CPU	Intel Core i5 3.6G
Storage	8G DDR3
Hard disk	640G
Network card	Intel Pro EXP9301CT PRO

- In order to avoid unnecessary troubles in the integration process of the detector, please select the workstation configuration certified by our company for system construction
- Please close the firewall and anti-virus software to avoid problems such as detector connection failure or abnormal image acquisition.

5 Guide to iDetector

Venu1748V provides you with an SDK to integrate the detector into your DR system, as well as an iDetector application that can run on the end-user workstation of the Windows operating system for detector calibration, detector configuration, image acquisition, image preprocessing, and image browsing. You can use iDetector to control the detector without a DR system.

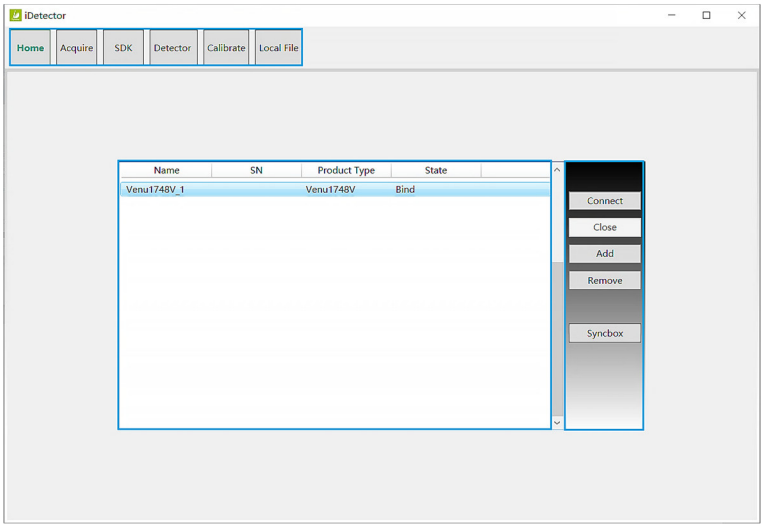
5.1 Software Installation

If iDetector does not work properly, please install VC redistribute package, NET Framework.

- Install Microsoft .NET Framework 4.5 first, which needs to be downloaded from the Microsoft website.
- AnIntstall VC distribution package vcredist_x86_2013 (or vcredist_x64_vs2013).

5.2 User Interface

5.2.1 Home Page



Item		Functional Description
Tabs	Home	Used to connect FPD and check the connection status
	Acquire	Used to acquire images, select calibration modes, save and process images
	SDK	Config.ini parameter settings and log level settings

Item		Functional Description
	Detector	Used to configure parameters and acquisition modes
	Calibrate	Used to generate and manage calibration files
	Local File	Used to open, view local images, and process images
Infor-mation bar	Name	Detector name
	SN	Detector serial number
	Product Type	Detector type
	State	Detector connection status (bind, unknown, ready, etc.)
Buttons	Connect	Click this button to connect the selected detector
	Close	Click this button to disconnect the selected detector
	Add	Add a working directory
	Remove	Delete a working directory
	Syncbox	Open the Syncbox configuration window (device optional)

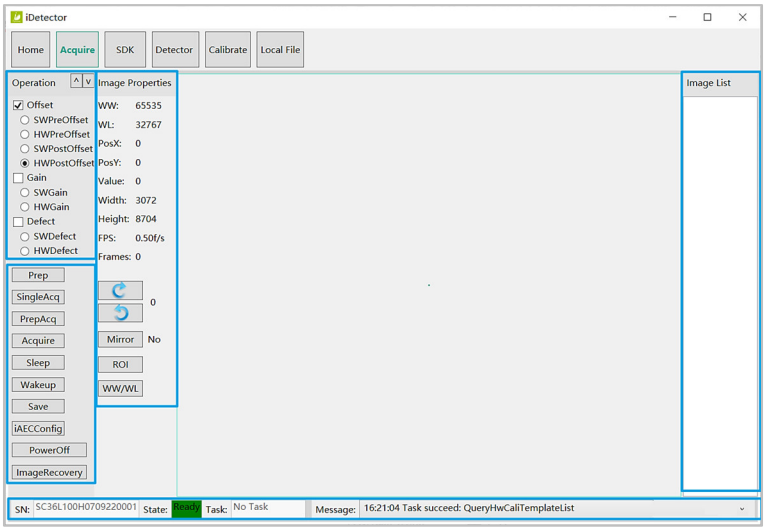
NOTE

Except for the Home page and the Local File page, which can be viewed in offline mode, the other four pages can only be viewed when the detector is connected.

5.2.2 Acquire Page

On the Home page, select the corresponding detector model, and click the [Connect] button. When the network connection is normal, the detector will respond to the connection command sent by iDetector. After completing the self-check, iDetector will automatically jump to the Acquire page.

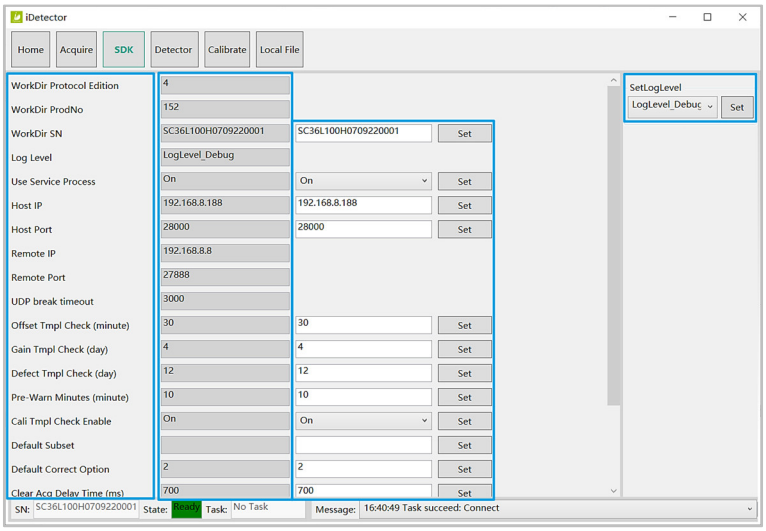
On the Acquire page, you can perform operations including image acquisition, calibration method selection, image storage, and image processing. The Acquire page is shown below:



Item			Functional Description
Template selection	Offset	SWPreOffset	Undefined
		HWPreOffset	Undefined
		SWPostOffset	The workstation performs PostOffset calibration
		HWPostOffset	The detector performs PostOffset calibration
	Gain	SWGain	The workstation performs Gain calibration
		HWGain	The detector performs Gain calibration
	Defect	SWDefect	The workstation performs Defect calibration
		HWDefect	The detector performs Defect calibration
Instruction interaction	Prep		Preparation for exposure acquisition
	SingleAcq		Single-frame acquisition
	PrepAcq		Manually clear and acquire image
	Acquire		Start exposure acquisition
	Sleep		Sleep mode
	Wakeup		Wake up the detector
	Save		Save the current acquired images in .raw, or .tiff format
	PowerOff		Power off the detector
Image Information	WW		Window width
	WL		Window level
	PosX		X coordinate of the current cursor location
	PosY		Y coordinate of the current cursor location
	Value		Gray value of the current cursor location
	Width		Image width
	Height		Image height
	FPS		Undefined
	Frames		Undefined
			Rotate the image clockwise, 90 degrees every time
			Rotate the image anticlockwise, 90 degrees every time
	Mirror		Enable or disable the mirror function of images
	ROI		ROI tool, which can be used to view the image of the AVG, SV, SNR, and other parameters
	WW/WL		Automatically adjust window width and window level according to the area selected by the right-click box
Image browsing	Image List		Displays the latest acquired image thumbnail, double click to view the images
Status bar	SN		SN number of the currently-connected detector
	State		Detector state, e.g. busy, ready
	Task		The task being executed
	Message		Feedback to the action result of the detector, such as succeed, failed

5.2.3 SDK Page

Click [SDK] to enter the SDK page, which contains all the parameter information related to the SDK. You can modify some of the modifiable configuration items according to the actual situation. The SDK page is shown below:

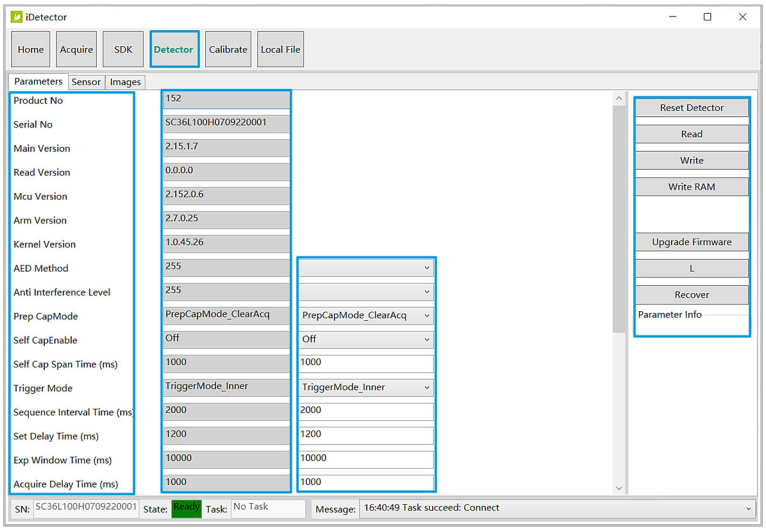


5.2.4 Detector Page

On the Detector page, you can view the configuration information of the currently connected Detector, including the SN number, version, and IP address.

■ Parameters

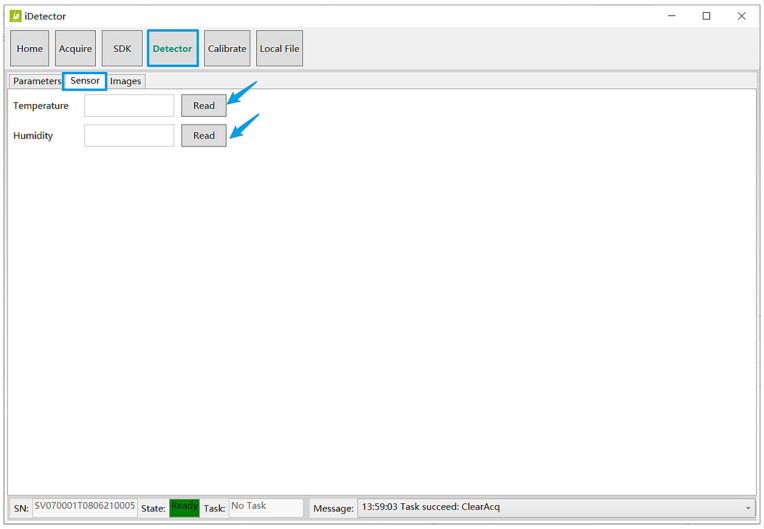
When entering the Detector page, the Parameters page is entered by default. The Parameters page is mainly divided into four areas: parameter items, readable parameters, writable parameters, and operation buttons.



Item		Description	Modifiable
Parameters (Part of them listed)	Product No	Product type number	Negative
	Serial No	Detector serial number	Negative
	Trigger Mode	X-ray synchronization modes (Soft & Inner)	Positive
	Set Delay Time (ms)	Window time between clear and acquisitions	Positive
	Acquire Delay Time (ms)	Undefined	Positive
	IntergrateTime (us)	Undefined	Positive
	Tube Ready Time	Undefined	Positive
Readable parameters	Parameter values Read by clicking the [Read] button are displayed in this area		/
Writable parameters	Enter the value of the corresponding parameter in this area, and click [Write] to make the setting take effect		/
Buttons	Reset Detector	Reset the detector	/
	Read	Read detector ROM parameters	/
	Write	Write detector ROM parameters	/
	Write RAW	Write detector RAM parameters	/
	Upgrade Firmware	Firmware upgrade	/
	L	Upload log	/
Status bar	Feedback the state of the detector and the information of read and write parameters, etc.		/

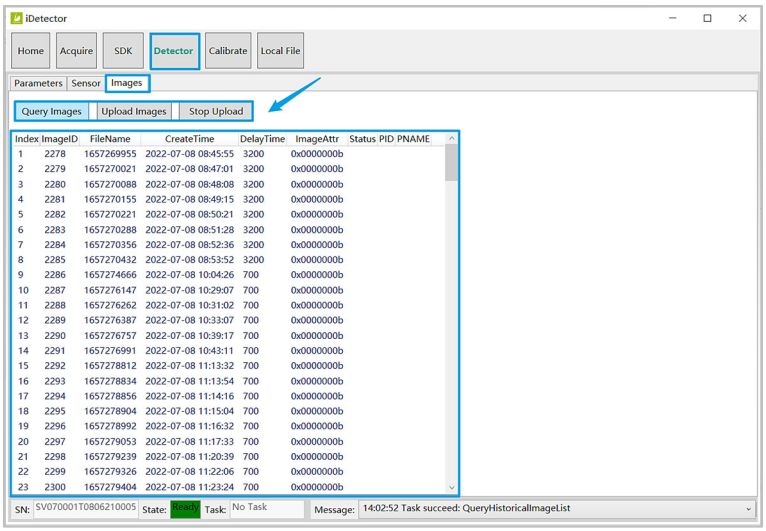
■ Sensor

On the Sensor page, you can query the temperature and humidity of the detector.



Item	Description
Temperature	Read the temperature inside the detector
Humidity	Read the humidity inside the detector

■ Images



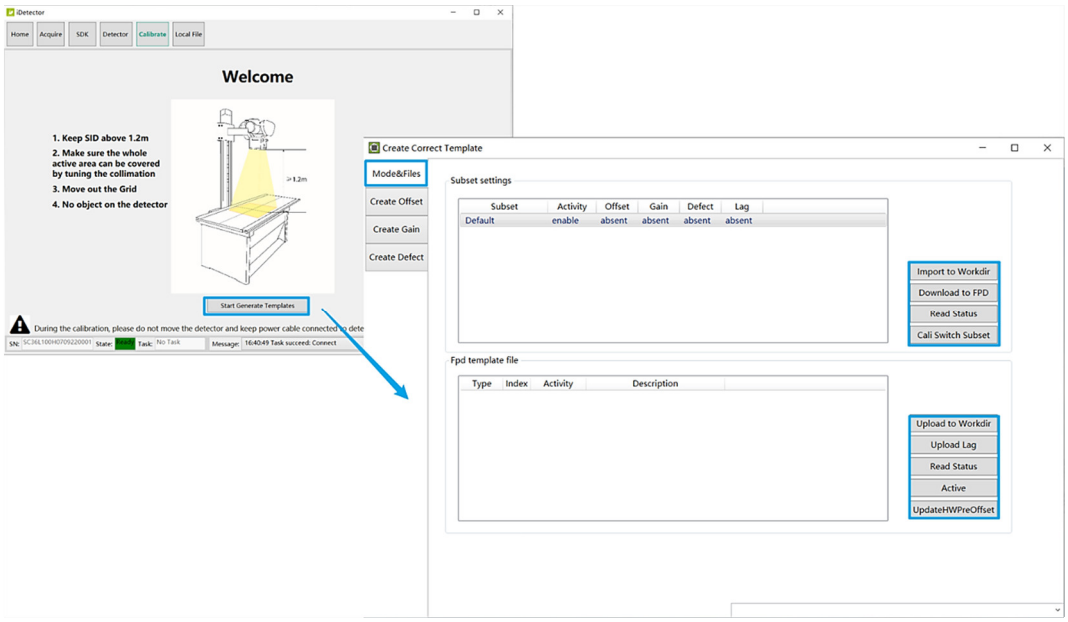
Item		Functional Description
Buttons	Query Images	Query the list of detector internal images
	Upload Images	Upload specific images inside the detector
	Stop Upload	Stop uploading
Information bar	Index	Image number, a total of 200 numbers (when the image exceeds 200, the image number 200 is always the latest image)
	FileName	Image name, which is generated based on the date when the image was created, and the date is converted into seconds
	CreateTime	Image creation time
	DelayTime	Window time when acquiring images
	ImageAttr	Image type, image before correction, or image after correction

NOTE

After selecting "HW-Postoffset" for correction, the image is normally saved inside the detector, without correction or loading "SW-Postoffset", the saved images are all non-corrected images.

5.2.5 Calibrate Page

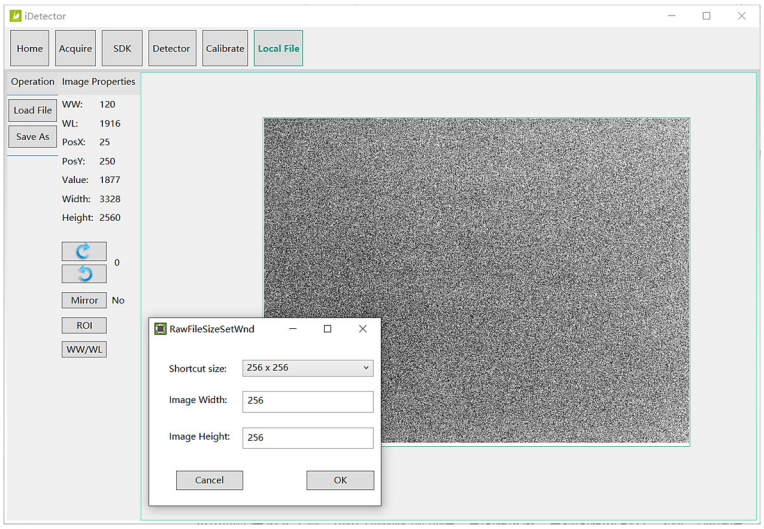
Click [Start Generate Template] on the Calibrate page to enter the template creation page (as shown in the figure below), in which you can select detector modes, and generate and manage calibration templates.



Subpage	Description		
Welcome page	Welcome page, showing precautions and schematics. Click [Start Generate Templates] to pop up the **Create Correct Template** page		
Mode&Files	Subset settings Workstation template state	Import to Workdir	Copy the selected template to the current workstation calibration directory
		Download to FPD	Download the selected template to the detector
		Read Status	Refresh the status of top left list
	Fpd template file FPD template state	Upload to Workdir	Upload the selected template to the specified workstation calibration directory
		Read Status	Refresh the status of bottom left list
		Active	Activate the selected template
		UpdateHWPreOffset	Force the FPD to update the Offset template
Create Offset	Create Offset calibration template		
Create Gain	Create Gain calibration template		
Create Defect	Create Defect calibration template		

5.2.6 Local File Page

You can open locally saved images supporting three file formats: .raw, .tiff, and .dft, and search for local images on this page. Click [Load File] to pop up the file open wizard, select the file to be opened and click to open. When selecting a file in .raw or .dft format, click to open and the dialog box shown below will pop up, enter the correct opening size, and click [OK]] to open the image.

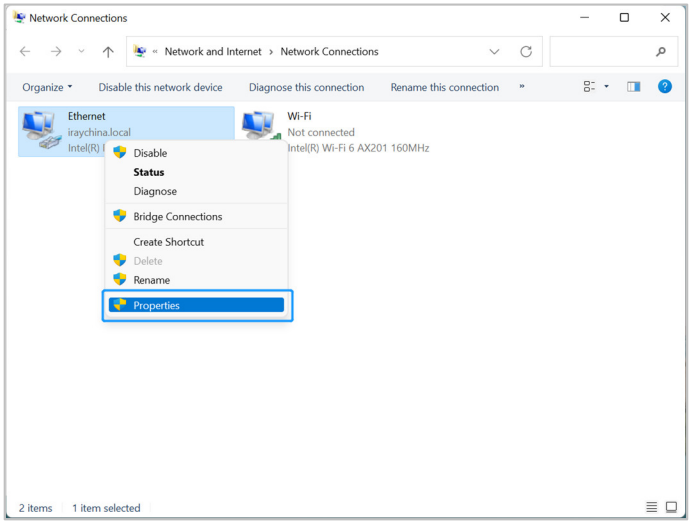


5.3 Software Operation

5.3.1 Configuring IP Address

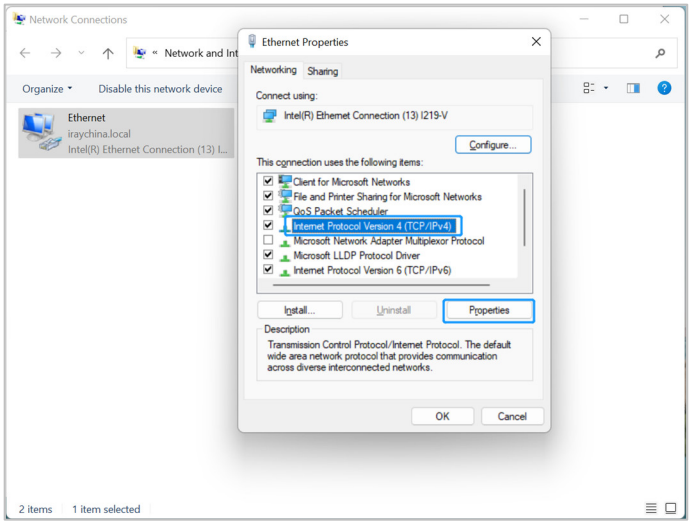
Configuring the IP Address

① Open the Network Connections window, right click [Ethernet], and click [Properties]

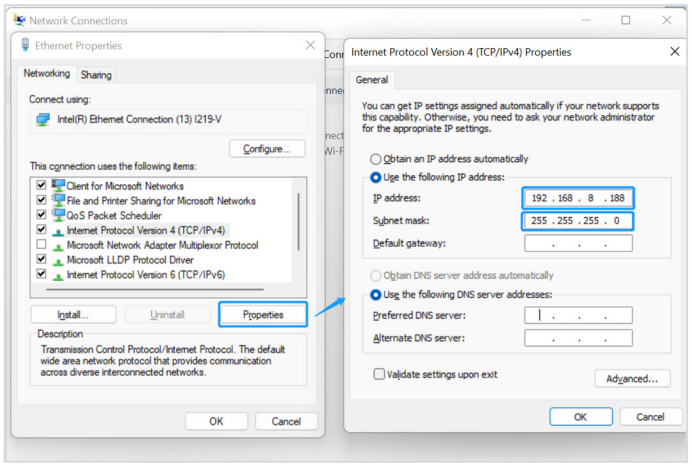


Configuring the IP Address

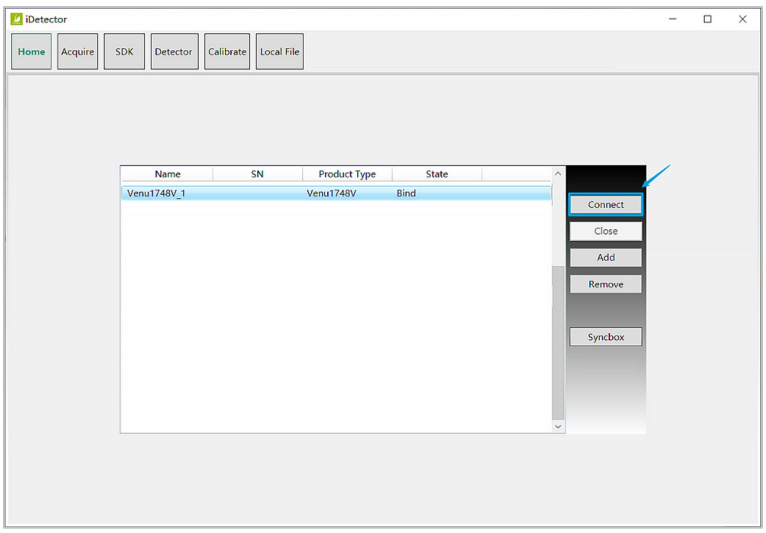
② Click [Internet Protocol Version 4 (TCP/IPv4)]



③ Tick [Use the following IP address], enter IP address: 192.168.8.188; Subnet mask: 255.255.255.0



5.3.2 Establishing a Connection



Double-click to open iDetector, select the corresponding product type, and click [Connect] to build the connection.

CAUTION

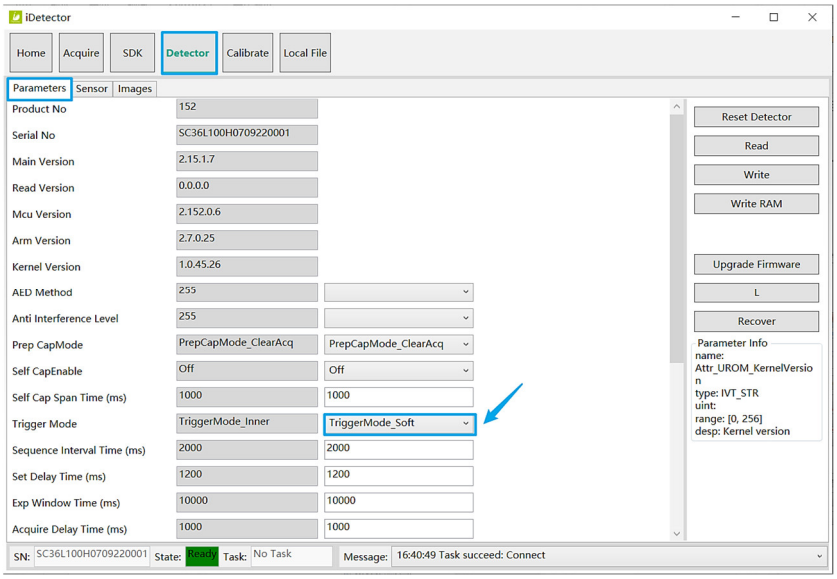
- After replacing the connection network card, the user needs to use the corresponding IP address to reconnect.
- The operation of Multi-Share is based on IP address identification. After the iDetector establishes a connection with the detector, the detector does not allow other iDetectors to connect. Suppose it lasts for 5 minutes and there is no communication between the iDetector and the detector. In that case, the detector will automatically release the current possession and allow other iDetectors to connect to the detector.

5.3.3 Configurable Parameters

Parameter	Description	Range
Trigger Mode	Trigger mode, including TriggerMode_Soft and TriggerMode_Inner	/
Set Delay Time	Exposure window	/
Acquire Delay Time	Undefined	/
IntergrateTime (us)	Undefined	/
Tube Ready Time	Undefined	/

5.3.4 Selecting a Trigger Mode

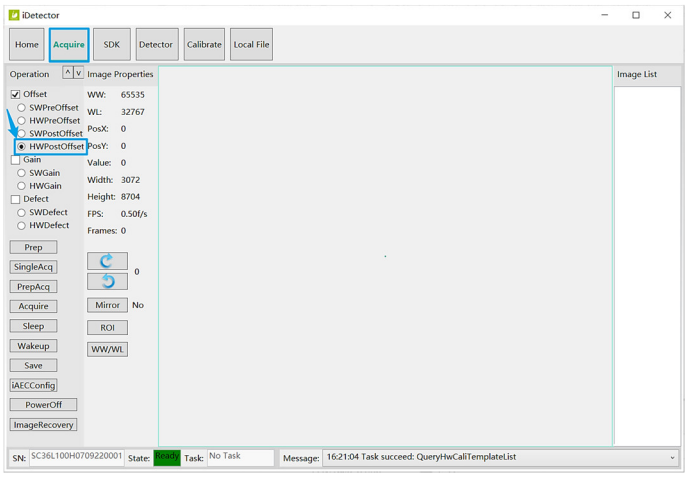
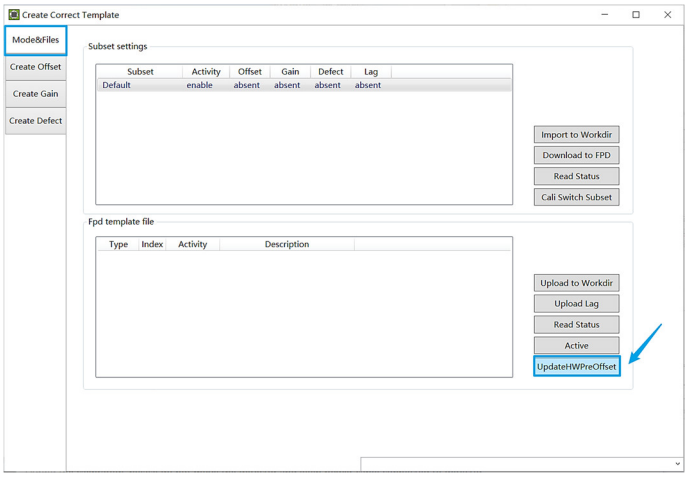
Enter the Detector page, select [**Parameters**] tab, find the "TriggerMode" parameter and set it to "triggermode-soft" or "triggermode-inner", as shown below:



5.3.5 Creating Calibration Templates

After the first installation is completed, the DR system is readjusted, or the hardware parameters are significantly changed, it is recommended that you recreate the calibration template. In addition, we recommend you update the calibration template every six months.

■ Generating a Pre-Offset Template

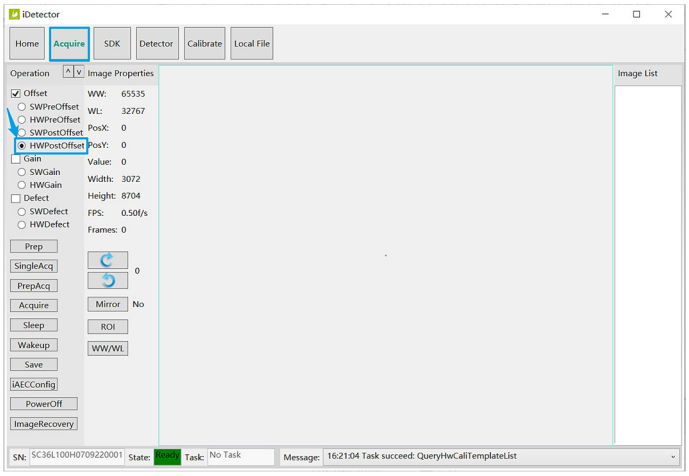
Generating a Pre-Offset Template	
① Go to the Acquire page and select [HWPostOffset].	
② Enter the Calibrate page and click [Start Generate Templates], click [UpdateHWPreOffset] under the Mode&Files Tab and wait until the template is recreated	

■ Generating a Gain Template

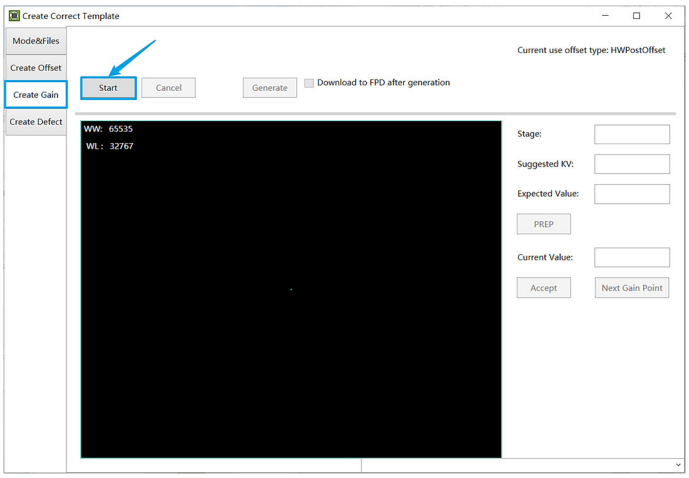
Before starting the creation of the Gain calibration template, make sure that the detector is placed in the center of the field of view of the radiation source, the distance between the tube and the detector surface (SID) is 2.3m, and the ray source field of view completely covers the detector.

Generating a Gain Template

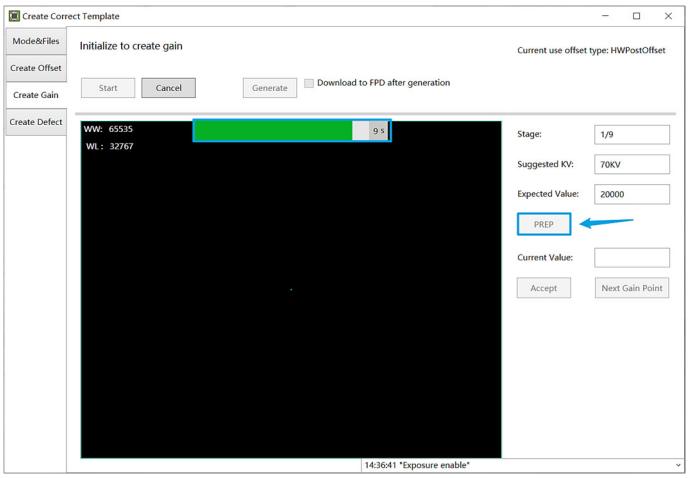
① The Gain calibration template needs to generate 9 X-ray images in total. Enter the Acquire page, select [HWPostoffset]



② Enter the Create Correct Template page, click the Create Gain tab, and click [Start]

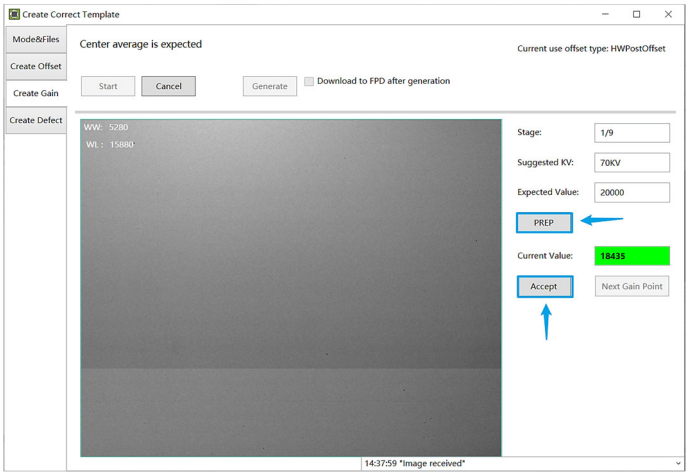


③ Set the X-ray dose to meet the expected value, click [PREP], wait for the exposure progress bar to appear, and complete the exposure before the progress bar closes



Generating a Gain Template

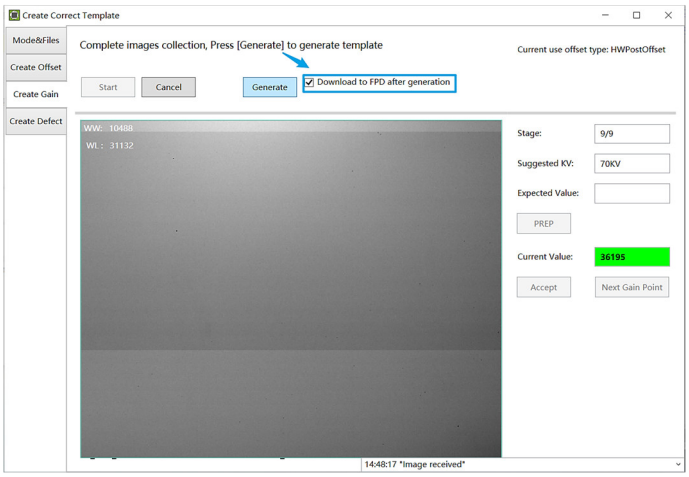
④ Different colors will be displayed in the Current Value box: yellow means that the image does not meet the requirements, but the template can still be generated; red means that the image does not meet the requirements, the template cannot be generated, and the dose must be modified and re-shot; green means that the image meets the requirements, Click [Accept], click [PREP] to start the next exposure



⑤ Repeat step ③ to Step ④ to obtain the remaining 8 images. Suggested kV and Expected Value are shown in the table on the right

Stage	Suggested kV	Expected Value
1~3	70 kV	20000
4~6	70 kV	30000
7~9	70 kV	40000

⑥ After acquiring 9 X-ray images, click [Generate], and wait until "Tasksucceed: FinishGenerationProcess" appears. If HWGain calibration mode is used, check [Down to FPD after generation], if SWGain is used, you do not need to check it



NOTE

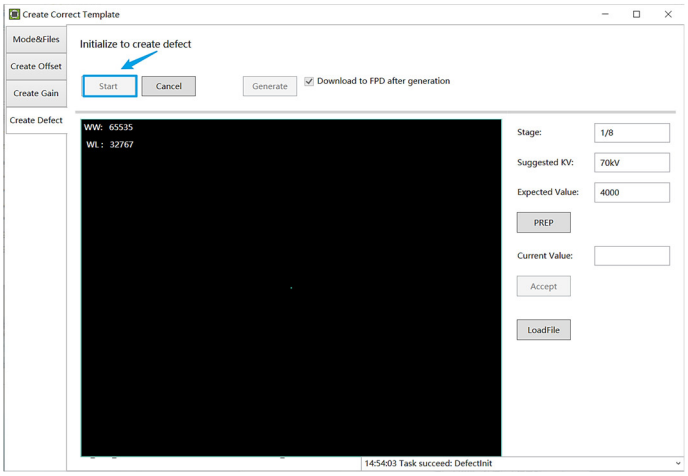
Make sure your X-ray dose is correct, iDetector will remind you to adjust the dose if it is out of range, and then you need to adjust the dose and shoot again.

■ Generating a Defect Template

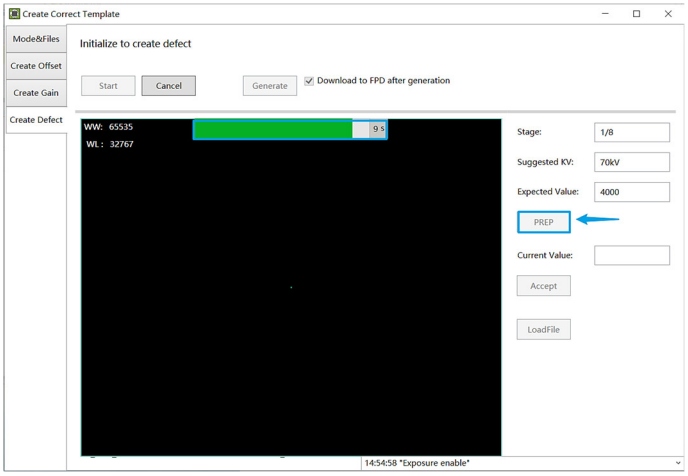
Before starting the creation of the Defect calibration template, make sure that the detector is placed in the center of the field of view of the radiation source, the distance between the tube and the detector surface (SID) is 2.3m, and the ray source field of view completely covers the detector.

Generating a Defect Template

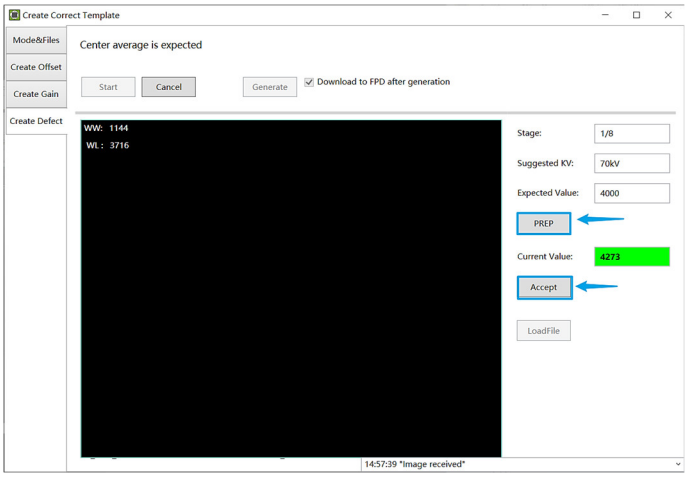
① The Defect calibration template needs to generate 8 X-ray images in total. Click the [Create Defect] tab and click [Start]



② Set the X-ray dose to meet the expected value, click [PREP], wait for the exposure progress bar to appear, and complete the exposure before the progress bar closes



③ Different colors will be displayed in the Current Value box: yellow means that the image does not meet the requirements, but the template can still be generated; red means that the image does not meet the requirements, the template cannot be generated, and the dose must be modified and reshot; green means that the image meets the requirements, Click [Accept], click [PREP] to start the next exposure

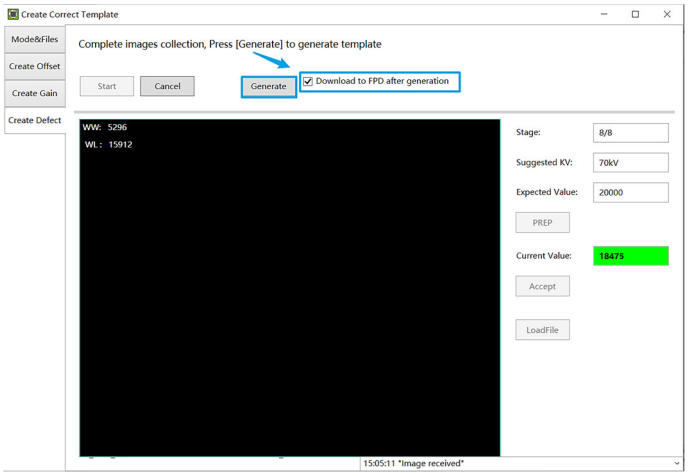


④ Repeat step ② to Step ③ to obtain the remaining 7 images. Suggested kV and Expected Value are shown in the table on the right

Stage	Suggested kV	Expected Value
1	70kV	4000
2	40kV	4000
3	120kV	16000
4~8	70kV	20000

Generating a Defect Template

⑤ After acquiring 8 X-ray images, click [Generate], and wait until "Tasksucceed: Finish-GenerationProcess" appears. If HWGain calibration mode is used, check [Down to FPD after generation], if SWGain is used, you do not need to check it



NOTE

Make sure your X-ray dose is correct, iDetector will remind you to adjust the dose if it is out of range, and then you need to adjust the dose and shoot again.

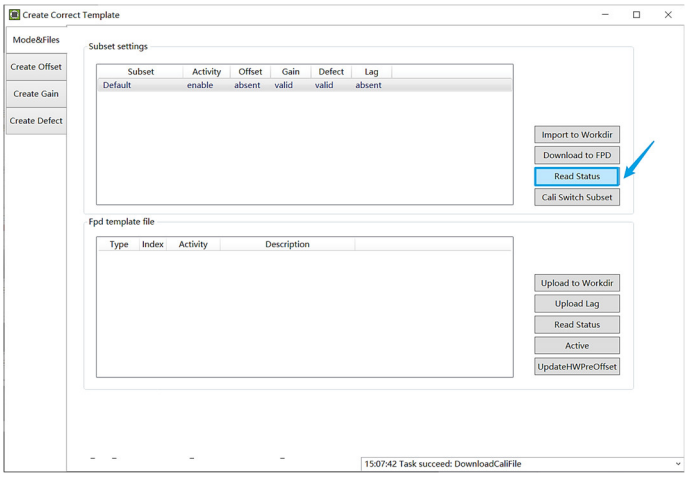
5.3.6 Managing Calibration Templates

■ Synchronizing Calibration Templates

Calibration templates can be stored inside the detector. Click [DownLoadFile] to download the workstation templates to the detector, and click [UpLoadFile] to upload the detector templates to the workstation.

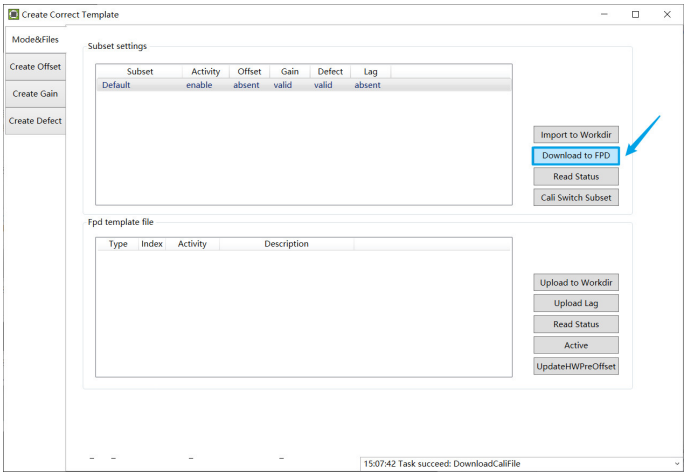
Downloading a Template of the Workstation to the Detector

① After generating Offset, Gain, and Defect templates, click [Read Status] button under the Mode&Files tab

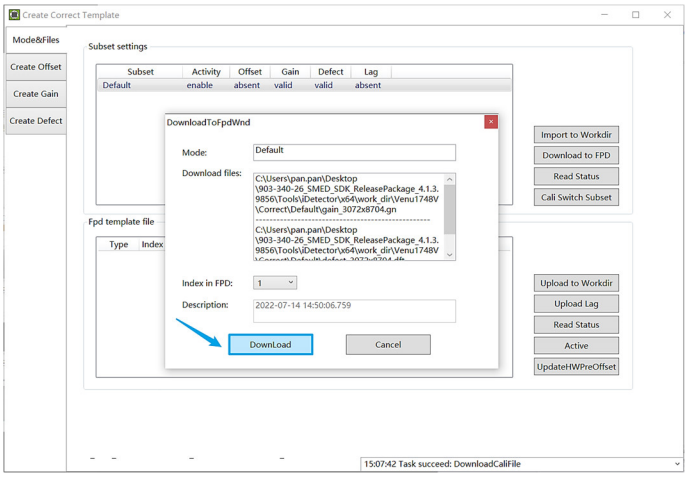


Downloading a Template of the Workstation to the Detector

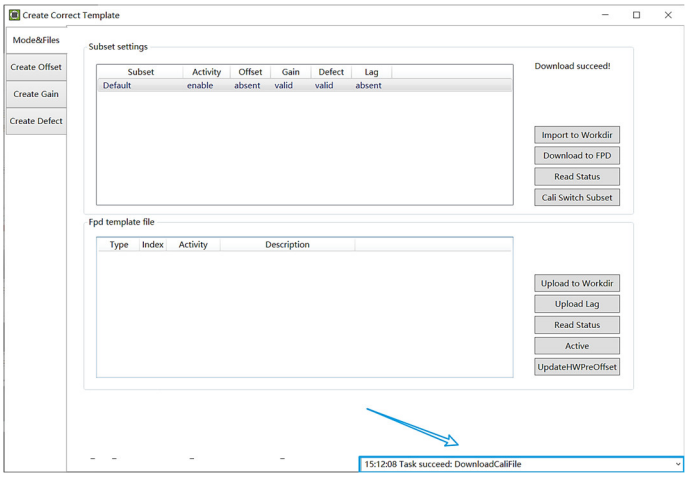
② Select the calibration template to be downloaded and click [Download to FPD]



③ Check whether the information is correct, if incorrect, you are allowed to modify the template index and click【Download】

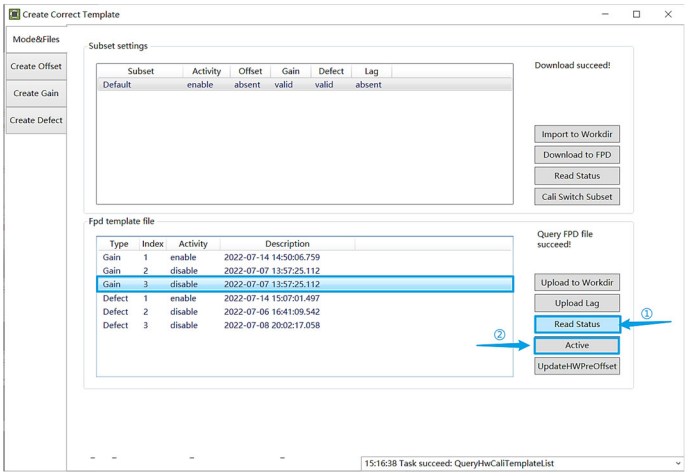


④ Wait until "Tasksucceed: Download CaliFile" appears in the status bar

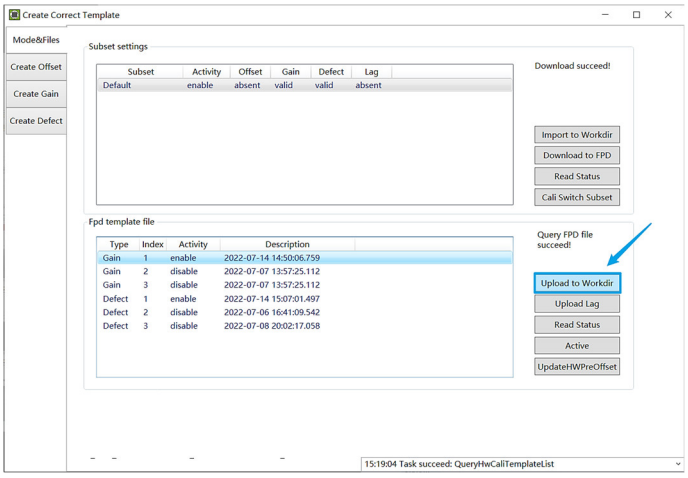


Uploading a Template Inside the Detector to the Workstation

① Click the Mode&Files tab, select the [Read Status] button under Fpd template file, and select the calibration template to be uploaded

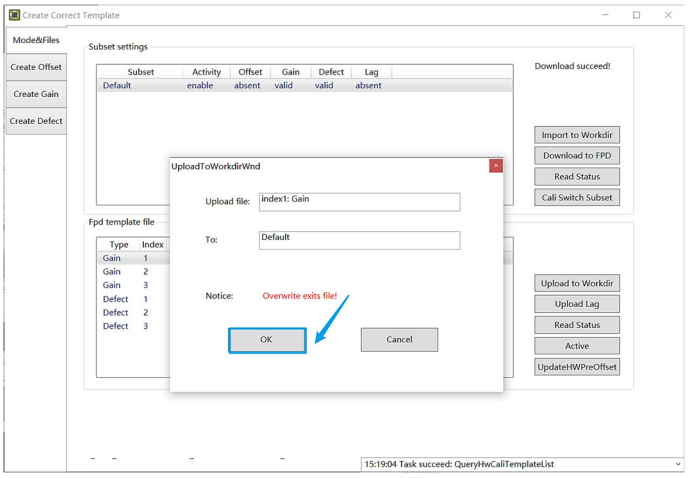


② Select the directory "Subset settings" to which the template needs to be uploaded and click [Upload to Workdir]



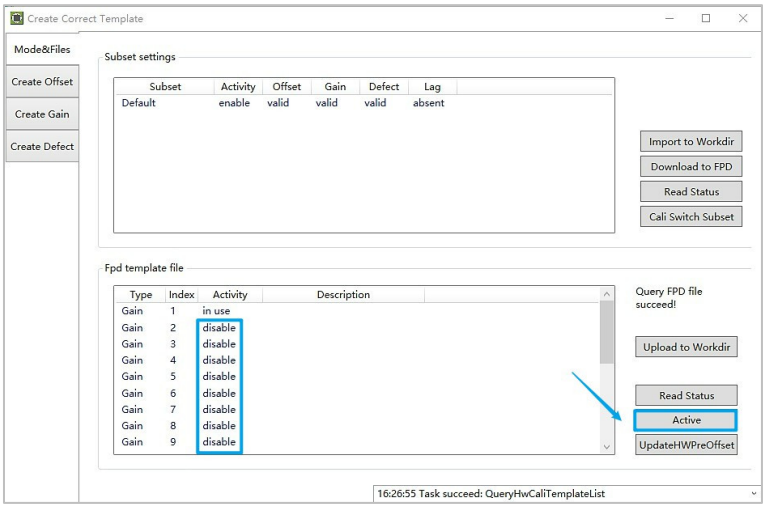
③ The UploadToWorkdirWnd dialog box will pop up on the page. If the information is correct, click [OK] and wait until the prompt message “Upload FPD file succeed!” appears

④ Check if the template has been uploaded to: work_dir\Venu 1748V_192.168.100.8\Correct\Default



■ Activating Calibration Templates

Click [**Read Status**] to get the template. If the Activity displays disable, select the corresponding item and click [**Active**] to activate the template.



■ Loading Calibration Modes

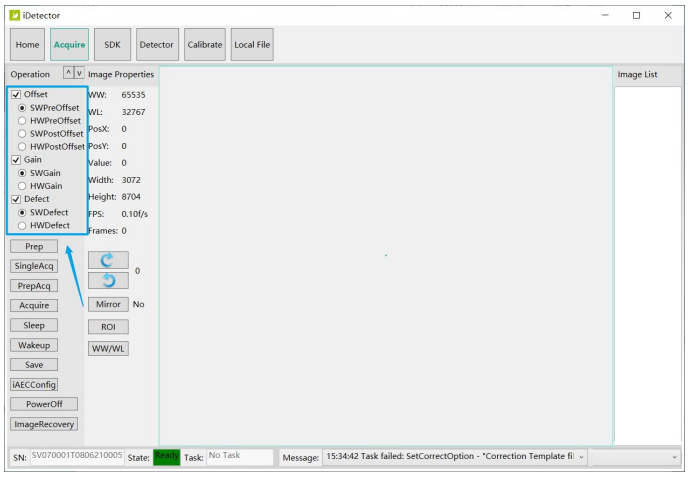
Two calibration modes are available:

- In software calibration mode, the workstation completes all calibration processes;
- In hardware calibration mode, the detector completes all calibration processes.

Loading Calibration Modes

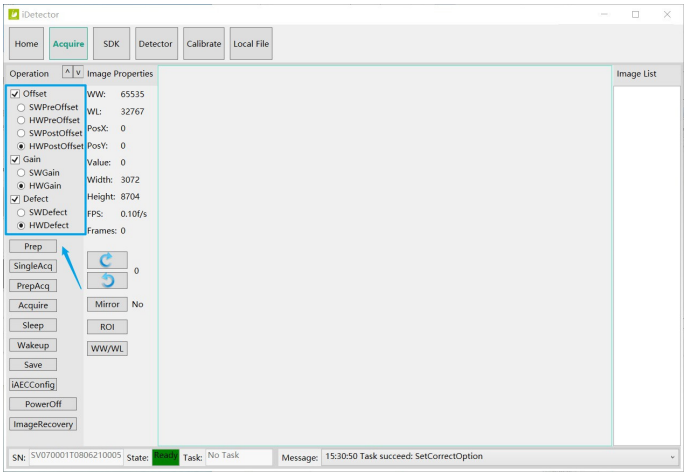
① Make sure that there are related calibration template files in the path: …work_dir\Venu1748V\Correct\Default

② On the Acquire page, set the soft calibration mode, set the Offset mode to "SWPost Offset", the Gain mode to "SWGain", and the Defect mode to "SWDefect"



Loading Calibration Modes

③ Set hard calibration mode: set Offset mode to "HWPost Offset", Gain mode to "HWGain", and Defect mode to "HWDefect"

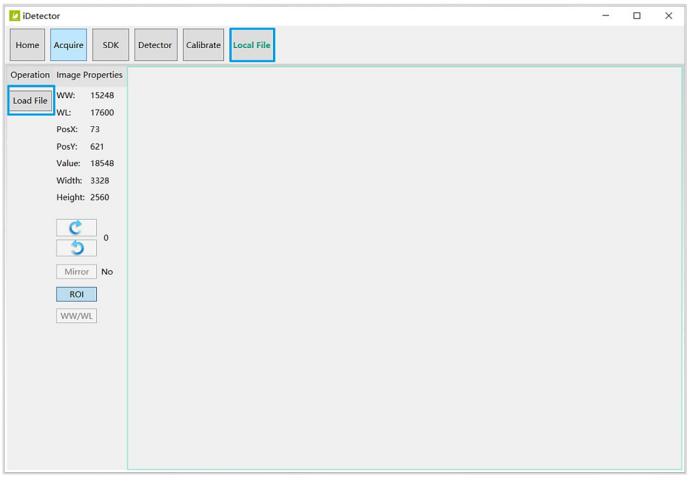


5.3.7 Checking and Modifying Defect Calibration Templates

iDetector allows you to view defect calibration templates. When the detector's defect calibration templates are updated, you can also add and delete defect points or lines through iDetector.

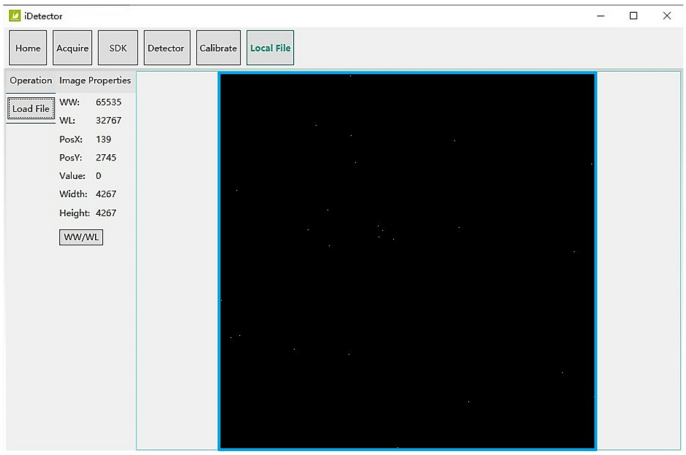
Checking and Modifying Defect Calibration Templates

① Click the [**Load File**] button on the Local File page, select the Defect template file (.dft) under the corresponding path, and click [**Open**]

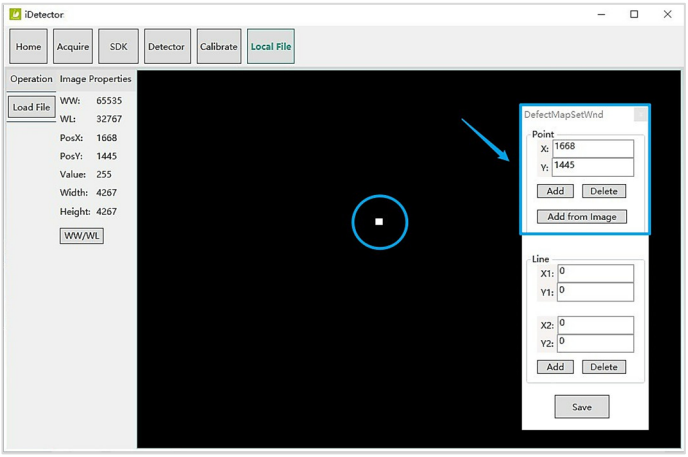


Checking and Modifying Defect Calibration Templates

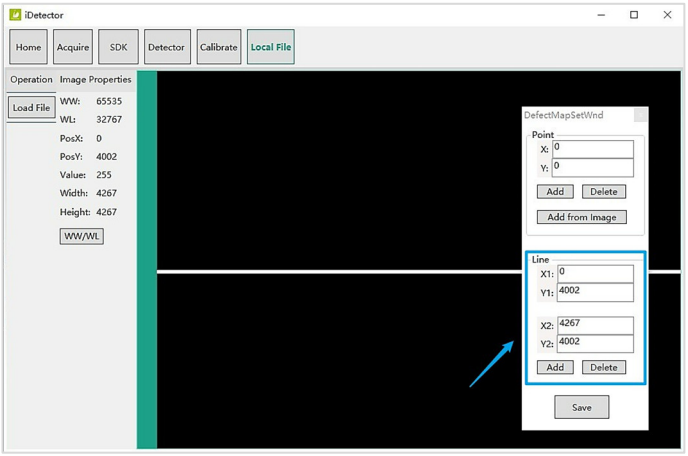
② The Defect calibration template is displayed in the image view area



③ After the Defect template file is opened, the defect map setting window will pop up, zoom the defect template, find the corresponding defect point, and fill the coordinate position into the defect map setting window. Click [Delete] to delete the defect point. If you need to add a defect point, fill in the coordinates to be added in the window, click [Add], you can add a defect point, and click [Save] to save the modified Defect template



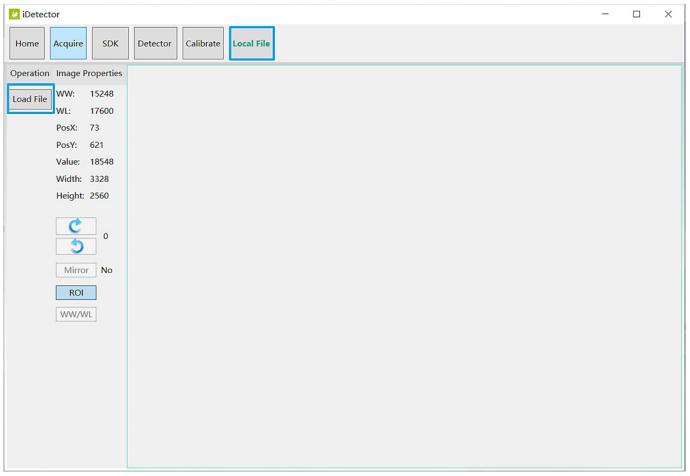
④ In the DefectMapSetWind, fill in the start and end coordinates of the defect line, click [Add] or [Delete] to add or delete the defect line information and click [Save] to save the modified Defect template



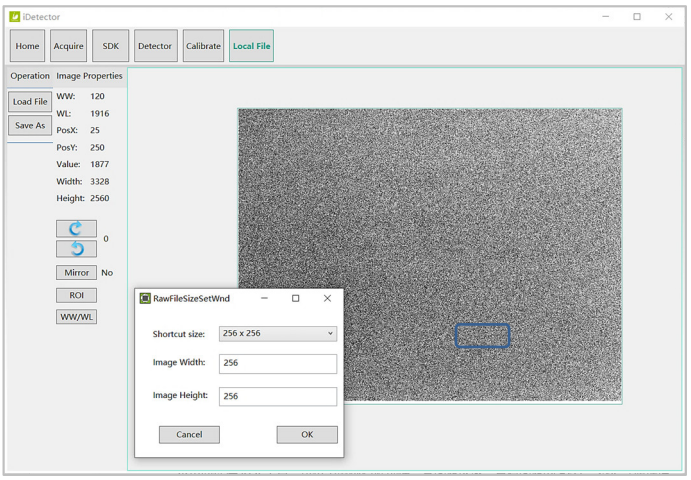
5.3.8 Viewing and Uploading Images

Local Image Viewing

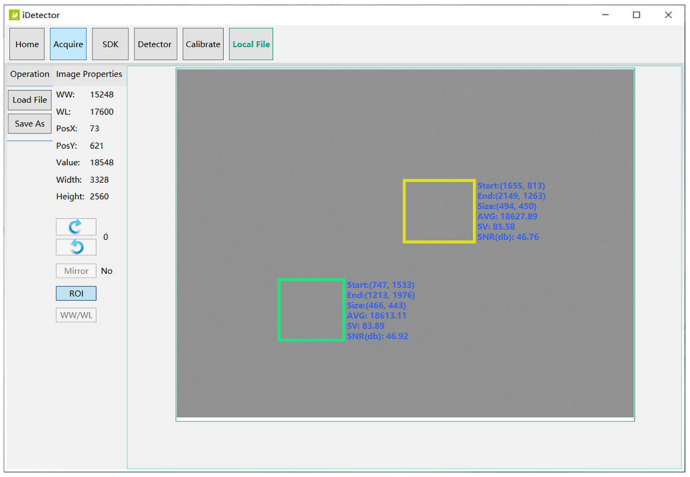
① Click the [Load File] button on the Local File page to open .dicom, .raw, or .tif file



② Select the image stored in the workstation and click [open] to open the image

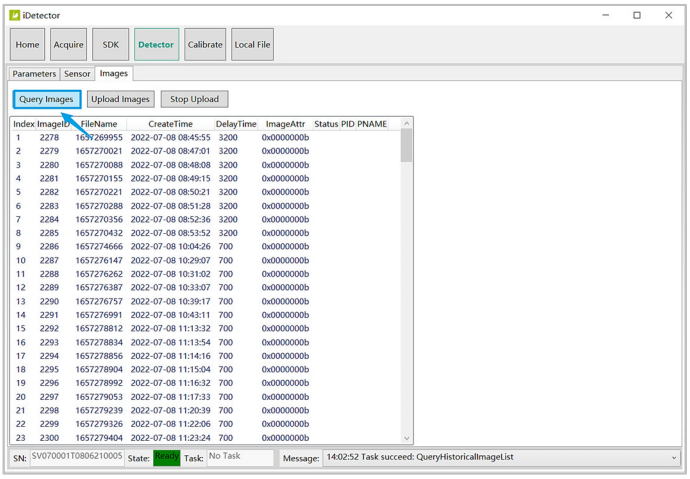


③ This page provides an ROI tool, you can right-click to select an image area, and view the AVG, SNR, and other attribute values of the image.



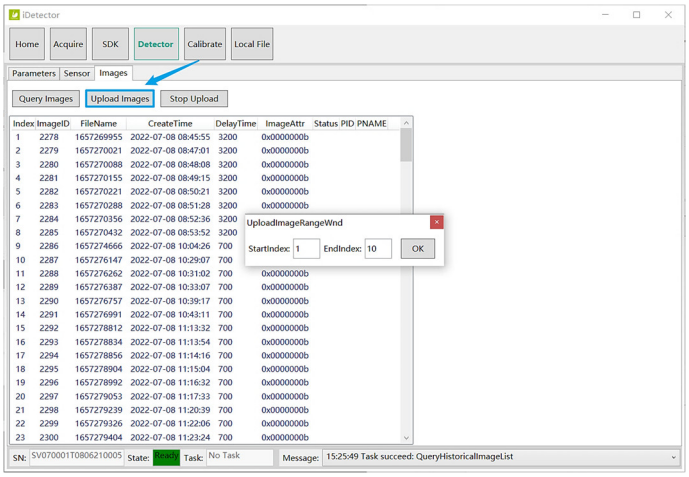
Uploading the Internal Image Stored in Detector

① Click the Images tab on the Detector page and click the [Query Images] button. The stored images inside the detector will be listed in the information list



② Click [Upload Images], select the StartIndex and the EndIndex of the images you intend to upload, click [OK], and wait until the status is displayed as "Success," indicating that the upload is successful. During the upload process, you can click [Stop Upload] to terminate the uploading process

③ The uploaded images are saved in the Upload folder under the corresponding detector working directory

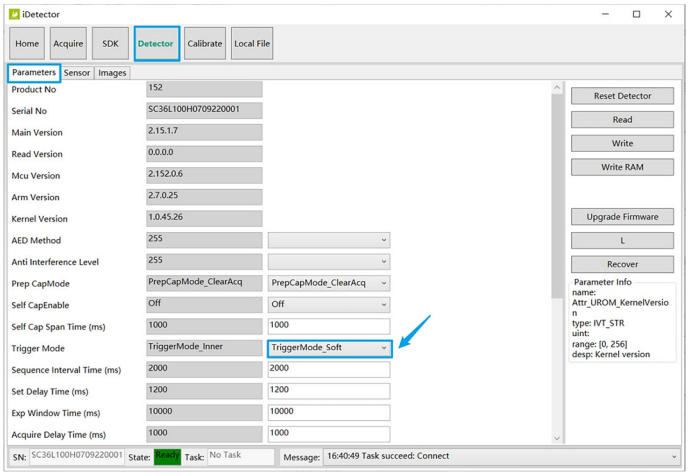


5.3.9 Upgrading Firmware

The detector supports firmware upgrade via iDetector or Web, please follow the steps below to upgrade the firmware:

Upgrading Firmware via Web

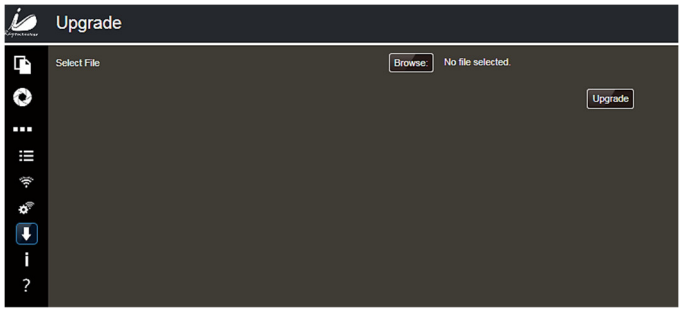
① Enter the Detector page, click the [Parameters] tab, modify the exposure mode to "TriggerMode_Soft," and then click [Write]



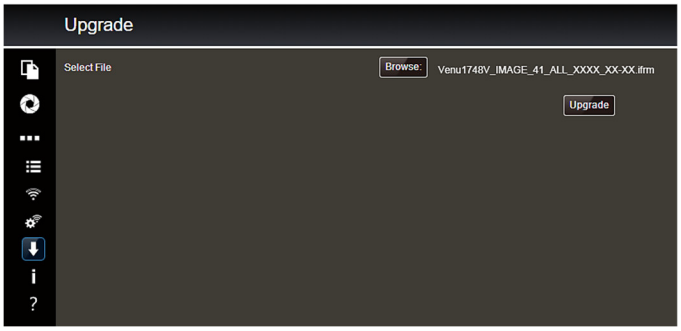
Upgrading Firmware via Web

② Open the browser, type "192. 168.8.8" in the search bar, and press Enter key on the keyboard. Type “admin” in the User Name box; type “iRay” in the Password box, and click [login]

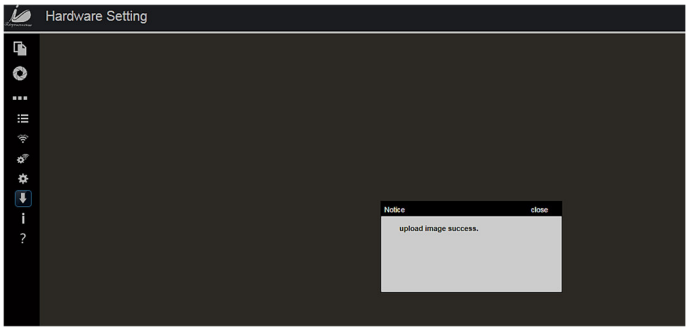
③ Click [Browse]



④ Select Venu1748V_IMAGE_ 41_ALL_XXXX_XX_XX.ifrm" and click [Open]. The selected file name will be displayed on the page. Click [Upgrade]



⑤ click [close] after the uploading is completed

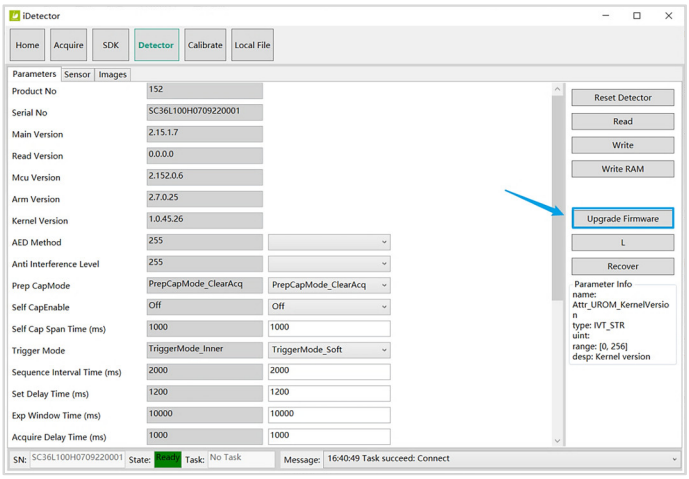


Upgrading Firmware via Web

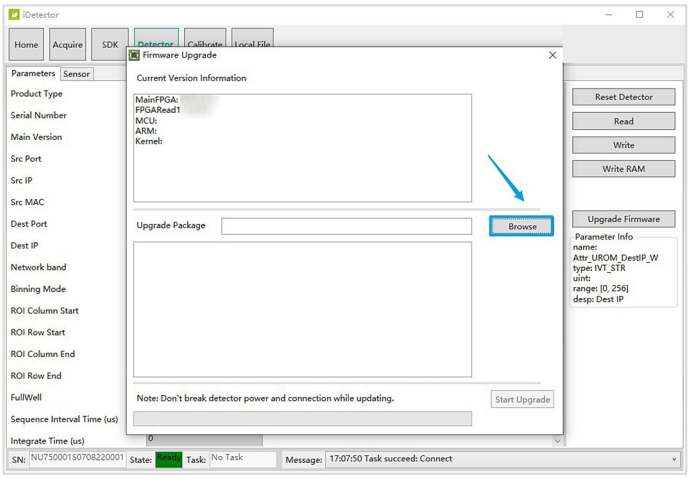
⑥ A progress bar will be displayed on the page. The notice shown on the right will be displayed if the upgrade is successful. Otherwise, it means that the upgrade failed. Please re-start the detector when the upgrade is succeeded

Upgrading Firmware via Web

① Click the Parameters tab in the Detector page, click the [Upgrade Firmware] button to enter the Firmware Upgrade page



② The Current Version Information area on the left displays the current firmware version. Click [Browse] to select the .ifirm firmware file to be upgraded. After selecting the file, the new firmware version will be displayed in the information box below. After checking the information, click [Start Upgrade] to start the upgrade, and the detector will automatically restart after the upgrade is completed



CAUTION

Select the "ALL-Image" file and make sure that the upgrade file has been selected. If the upgrade file is not selected, or the selection is wrong and upgraded, the detector may be abnormal.

5.3.10 Shortcuts

iDetector supports the following shortcuts:

- Double-click the left button, and the image will be displayed in the middle area of the screen at its maximum size.
- Hold down the left button and drag to display the image being dragged.
- F3 button is used to quickly adjust window width and window level.

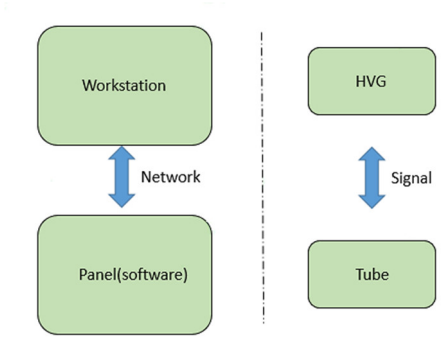
6 Workflow

Venu1748V is mainly used to acquire X-ray images. The acquisition of the detector should be synchronized with the X-ray generator. Venu1748V supports two trigger modes: Software mode and AED mode.

6.1 Software Mode

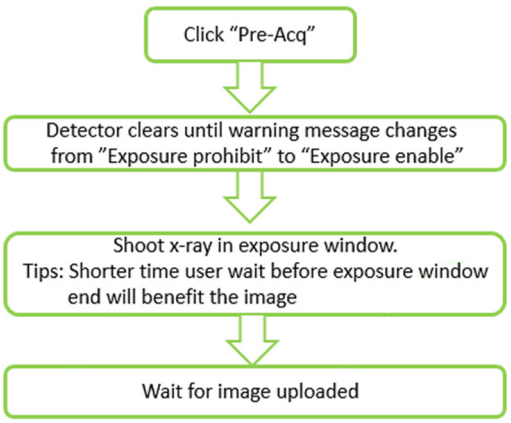
6.1.1 Block Diagram

The software mode is a basic way to acquire X-ray images. The block diagram is shown as follows. When configuring Software mode, you need to select "software" under Trigger mode.

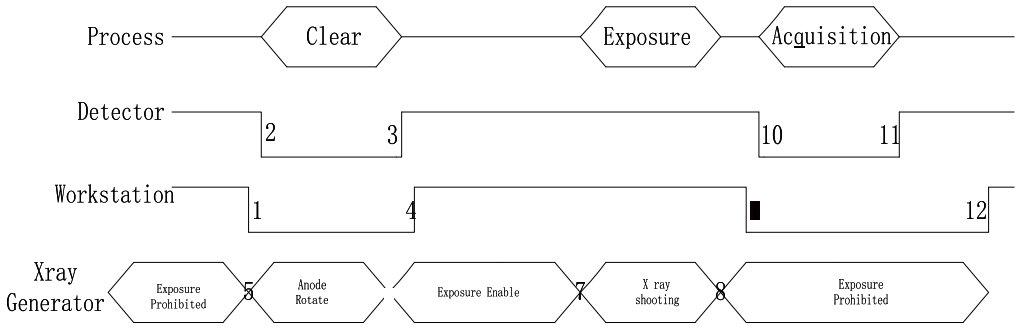


Workstation refers to a PC with iDetector or SDK software installed. In Software mode, iDetector or SDK does not control the X-ray generator, and the user decides when to take X-rays.

6.1.2 Work Process



6.1.3 Timing



① When the workstation receives a user "pre-acq" request, it will send a "clear" command to the detector.

② After the detector receives the "clear" command from the workstation, it starts to empty the interior. At this time, the detector will notify the workstation of "exposure prohibited".

③ After the detector completes the "clear" action, it will send the message "Exposure Enable" to the workstation.

④ After the workstation obtains the "exposure enable" information from the detector, it will display the relevant information in the iDetector information bar and notify the user that the detector is ready to receive X-rays.

⑤ The user triggers the X-ray generator to start initialization and makes anode rotation to prepare for X-ray shooting

⑥ The X-ray generator completes radiation preparation and reminds the user that it is ready to receive X-ray trigger radiation.

⑦ The user starts to trigger X-rays, and the X-ray generator starts to emit rays.

⑧ The workstation is ready to receive image data.

⑨ The detector starts image acquisition

⑩ The detector completes image acquisition and prepares to send data to the workstation

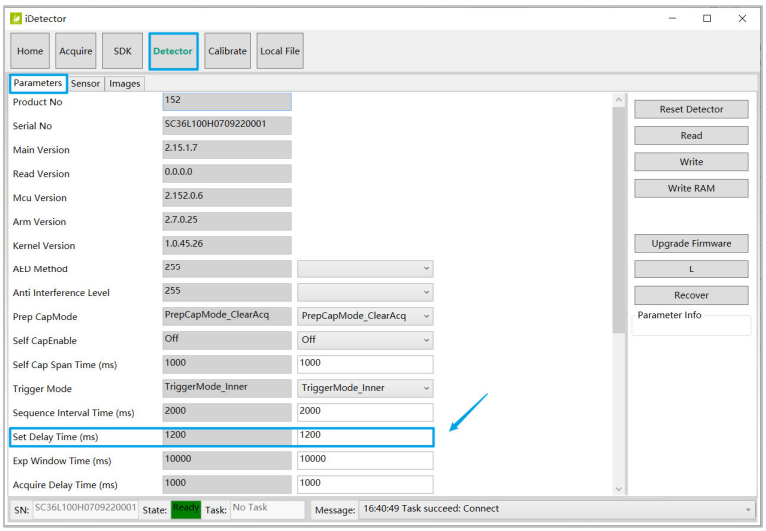
⑪ The workstation obtains all image data from the detector.

NOTE

- The preview image received by the workstation may have irregular stripes and cannot be used as a final diagnosis.
- The detector will acquire a dark field image again as offset calibration. If you choose hardware calibration, the detector will upload the calibration image after calibration and display it on the workstation screen. If you chooses software calibration, the workstation will perform a calibration and display images.

6.1.4 Exposure Window

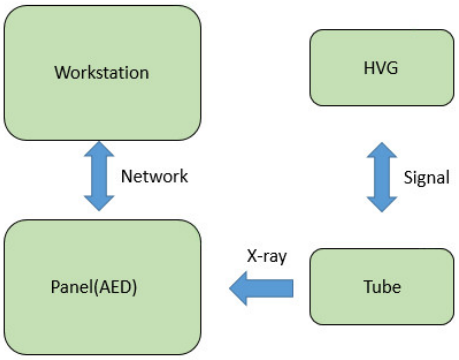
The exposure window time can be configured under the Parameters Tab and can be set to 0.7s, 1.2s, 2.2s, 3.2s.



6.2 AED Mode

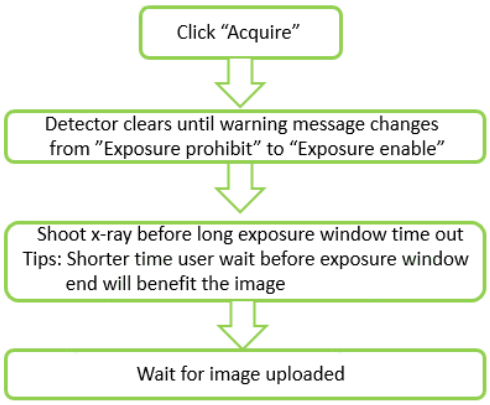
6.2.1 Block Diagram

The block diagram is as follows, to configure the AED mode, you need to select Inner in Trigger mode.

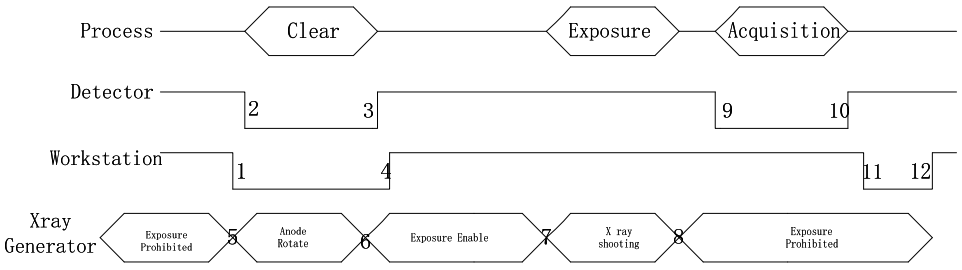


In Inner mode, iDetector or SDK does not control the X-ray generator in Inner mode, the user decides the time to take X-ray.

6.2.2 Work Process



6.2.3 Timing



① When the workstation receives a user "Acquire" request, it will send a "clear" command to the detector.

② After the detector receives the "clear" command from the workstation, it starts to empty the interior. At this time, the detector will notify the workstation of "exposure prohibited".

③ After the detector completes the "clear" action, it will send the message "Exposure Enable" to the workstation.

④ After the workstation obtains the "exposure enable" information from the detector, it will display the relevant information in the iDetector information bar and notify the user that the detector is ready to receive X-rays.

⑤ The user triggers the X-ray generator to start initialization and makes anode rotation to prepare for X-ray shooting.

⑥ The X-ray generator completes radiation preparation and reminds the user that it is ready to receive X-ray trigger radiation.

⑦ The user starts to trigger X-rays, and the X-ray generator starts to emit rays.

⑧ The workstation is ready to receive image data.

⑨ The detector starts image acquisition.

⑩ The detector completes image acquisition and prepares to send data to the workstation

⑪ The workstation obtains all image data from the detector.

NOTE

- The preview image received by the workstation may have irregular stripes and cannot be used as a final diagnosis.
- The detector will acquire a dark field image again as offset calibration. If you choose hardware calibration, the detector will upload the calibration image after calibration and display it on the workstation screen. If you chooses software calibration, the workstation will perform a calibration and display images.
- The detector allows you to cancel the exposure window outside the exposure window.

7 Service Information

7.1 Service Life

The manufacture date of the product can be found on the attached label on the back side of the detector, and the exact date of manufacture of the detector can be found according to the serial number.

The estimated product lifetime is up to 7 years under appropriate regular inspection and maintenance.


NOTE

- The product life is decided by that of the detector.
- For other replaceable parts, their service life will not affect the life cycle of the whole product.
- Main parts (parts required to maintain the function of the product) of this product will be stocked for 5 years after discontinuance of production for repairing.

7.2 Regular Inspection and Maintenance

To ensure the safety of users, operators and other third parties, and to maintain good performance and reliability of the equipment, please ensure that regular inspections are carried out at least once a year.

If necessary, clean the equipment, adjust parameters, replace consumables and check the basic performance of the equipment according to the safety requirements described in this manual.

7.2.1 Daily Inspection

The following checks should be performed before and after use of this product.

Item	Operation
Detector	Make sure there are no loose screws or cracks in the detector Make sure there is no dust and impurities attached to the connection pins Make sure there are no cracks or short circuits at the connection pins
Cables	Ensure that the cable is not damaged and the cable shell is not torn Verify that the power cord is reliably connected to the power socket of the detector

7.2.2 Monthly and Yearly Inspection

Item	Frequency	Operation
Resolution	Monthly/yearly	Check detector resolution by resolution graphic or using phantom
Linear	Monthly/yearly	Evaluate by examining the gray value of images
Calibration	Monthly/yearly	Check when the X-ray generator, tube, collimator or exposure environment changes

Contact qualified service engineers for the maintenance and overhaul involving the disassembly of the equipment enclosure. Please contact our Service Department or your product distributors.