

DOC NO : 320001640A



UMS3025-W

Digital Flat-Panel X-RAY Detector

User Manual for S3025-W

Samsung Electronics Co., Ltd.

This manual is provided for the installation and operation of S3025-W.

Please read this manual before the detector install and use.

© 2013 Samsung Electronics Co., Ltd. All rights reserved.



Revision History

Version	Date	Page	Revision
0.1	2014 June	-	Draft
		□	-



Table of Contents

- About this Manual..... 7
 - Symbols Used in This Manual..... 7
 - Intended for use..... 8
 - User Requirements..... 8
 - Service Center..... 8
- 1. Safety instructions..... 9
 - Safety Instructions..... 9
 - System Symbols..... 10
 - System Maintenance Checkpoints..... 12
 - General Safety..... 13
 - Electrical Safety..... 14
 - Mechanical Safety..... 15
 - Fire Safety..... 15
 - Safety from Explosion..... 15
 - EMC (Electromagnetic Compatibility)..... **Error! Bookmark not defined.**
 - Label..... 16
 - Maintenance, Cleaning and Disposal..... 16
 - Disclaimer..... 17
- 2. System Overview..... 18
 - System Overview..... 18
 - System Purposes..... 18
 - Product components..... 19
 - Examination Room Components..... 20
 - Control Room Components..... 21
- 3. System Components..... 22
 - System Components..... 22
 - Detector..... 22
 - Power Supply Box..... 27
 - Main Cable..... 28
 - Battery Recharger..... 29
 - Battery..... 32
- 4. Operating the System Hardware..... 34
 - Operating the System Hardware..... 34
 - Checking Connection..... 34
 - Operation..... 35
 - Operating description..... 36
- 5. Appendices..... 37
 - REQUIRED PUBLIC STATEMENT FOR GPL/LGPL/GPLv2/OpenSSL/CPOL LICENSED SOFTWARE USED IN THIS PRODUCT..... 38
 - GNU GENERAL PUBLIC LICENSE..... 39**
 - GNU LESSER GENERAL PUBLIC LICENSE..... 44**
 - BSD LICENSE..... 49**

Table 1 Special Symbol	11
Table 2 System Maintenance Checkpoints	12
Table 3 COMPONENTS	19
Table 4 LED STATUS	23
Table 5 POWER SUPPLY BOX DESCRIPTION	27
Table 6 BATTERY RECHARGER INDICATE LED	29
Table 7 BATTERY RESIDUAL DISPLAY	Error! Bookmark not defined.
Table 8 BATTERY INDICATE LED	Error! Bookmark not defined.
Table 9 CHECKING THE POWER STATUS OF COMPONENTS (S3025-W)	35
Table 10 POWER OFF STATUS	35
Table 11 OPERATING TIME TABLE	36

Figure 1 Examination Room Components	20
FIGURE 2 RECHARGER	21
FIGURE 3 RECHARGER ADAPTER.....	21
FIGURE 4 WIRELESS DETECTOR.....	22
FIGURE 5 INDICATE LED.....	23
FIGURE 6 DO NOT DROP.....	24
FIGURE 7 Be CAREFUL OF DETECTOR LOCATION.....	25
FIGURE 8 KEEP WEIGHT DISTRIBUTED EVENLY	25
FIGURE 9 AVOID LOCALIZED WEIGHT	25
FIGURE 10 POWER SUPPLY BOX	27
FIGURE 11 MAIN CABLE.....	28
FIGURE 12 BATTERY RECHARGER.....	29
FIGURE 13 BATTERY INSERT.....	30
FIGURE 14 BATTERY LOCK.....	30
FIGURE 15 BATTERY.....	32
Figure 16 IP SET UP.....	34
FIGURE 17 POWER APPLIED COMPONENTS (S3025-W).....	35
Figure 18: TIMING CHART.....	36






About this Manual

■ Symbols Used in This Manual

The specifications and details of this manual may be changed in order to improve the product or to enhance its performance

The following symbols are used throughout this manual to alert the user to the relevant safety instructions or to any useful information when using this system

Symbol	Name	Description
	Warning	Indicates content which, if you fail to follow the accompanying instructions, may cause death or serious personal injury.
	Caution	Indicates content which, if you fail to follow the accompanying instructions, may cause personal injury or damage to the product.
	Note	Provides users with additional information on the topic for better understanding.

Please note that our company does not take responsibility for any accidents and is not obligated to do free repair service for any damage of the equipment due to the user's negligence which results from failure to follow the contents in this manual. Make sure you are familiar with the safety precautions and usage procedures. Also note that the product features may slightly differ from the contents of this manual depending on the specifications.

■ Intended for use

S3025-W, Digital Flat Panel X-Ray Detector is indicated for digital imaging solution designed for providing general radiographic diagnosis of human anatomy targeting both adult and children. It is intended to replace film based radiographic diagnostic systems and provide more precise case diagnosis and treatment planning on a real time basis for physicians and radiologists. Not to be used for mammography and direct cardiac application.

■ User Requirements



CAUTION

- This equipment should be only operated by users who have received professional medical education and training, such as physicians, radiologists, and other medical specialists.
- Please read the user manual and the safety information carefully before using this equipment. Operating the equipment without reading the safety information may result in personal injury to the patient or to yourself.

■ Service Center

- Korea : Service Center 080-022-9797

Head Quarters

- 129 Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

1. SAFETY INSTRUCTIONS



Safety Instructions

□ In this chapter, information of safety instructions and regulations are provided. It is provided to protect users of the system from unintended safety hazard and prevent property damage,

please read thoroughly and keep instructions. If additional training is required, consult your dealer or the service center of the manufacturer.














WARNING

□ Before using this system, please read safety instructions thoroughly. The manufacturer is not responsible for any damages and accidents caused by violating such safety instructions or regulations.

■ System Symbols

Table 1 shows the symbols related to maintaining the safety of the patient and the user.

	Alternate current
	Direct current
	Protective earth (Ground)
	Off (power : disconnect from the main switch)
	On (power : connect to the main switch)
	Identifies terminals which, when connected together, bring various parts of a piece of equipment or of a system to the same potential.
	Indicates content which, if you fail to follow the accompanying instructions, may cause personal injury or damage to the product.
	Indicates that the dangerous factors can be occurred caused by High Voltage.
	Indicates that the accompanying operating instructions in the manual must be followed to operate the equipment safely.
	TYPE B Applied part
	Marks it contains radio transmitting device.








	Avoid contact with water
	No unauthorized or unlawful modification
	Waste electrical and electronic equipment (WEEE)
	Temperature limitation
	Marks fragile device that requires full attention when handling.
	Manufacturer
	EC Representative

Table 1 SPECIAL SYMBOL

■ System Maintenance Checkpoints

To ensure the system performance and usability along with safety, regular maintenance and checking the condition are required. To secure safety of both patient and operator and to ensure the performance of the system, check the system on a regular interval. For periodic inspection of the system, consult your dealer or the manufacturer's service center.

No.	Item	Category	Checkpoints	Check Interval	Remark
1	Noise / Vibration	In use	Check noise and vibration from each operating parts of the system.	1 year	
2	Power Supply box	While in use	Check the power supply box voltage while the equipment s turned off.	1 year	
3	Appearance	While in use	Run a visual inspection to check if the appearance shows any abnormalities, such as loosened bolts or had grips, transformation, etc. while the equipment is turned off.	1 year	
4	Cables	Before Using	Check cable runs for worn out cables, damage or short circuited, broken wires, etc. while the equipment is turned off.	6 months	
5	Grounding	While in use	Check the earth-grounding is intact, not broken or loosened terminal. (Grounding resistance should be below 0.1Ω.)	1 year	
6	Installation Checkpoints	When Installing	When installing, check that the equipment is leveled and firmly fixed.	1 year	

Table 2 SYSTEM MAINTENANCE CHECKPOINTS



WARNING

- When inspecting on checkpoints requiring no power, please make sure to keep the system turned off.

Classification

- The type of protection against electric shock: Class I equipment
- The degree of protection against electric shock: Type B applied part
- The degree of protection against ingress of water: Ordinary equipment
- The method(s) of sterilization or disinfection: Not applicable
- The degree of safety of application in the presence of a FLAMMABLE ANAESTHETIC MIXTURE WITH AIR or WITH OXYGEN OR NITROUS OXIDE: Not applicable
- Mode of operation: As momentary continuous operation

■ General Safety

- Before using the equipment, the user should check that:
 - All components are connected correctly.
 - All components are operational when the system is powered on.
 - Neither the patient nor the user is present in the examination room when powering the equipment on.



- If any electrical or mechanical fault occurs, stop using the system immediately.
You can identify faults from the display or warnings.



- Please consult the manufacturer before connecting a component from another system to this system. Any auxiliary device connected to the system must be IEC certified (data processing equipment: IEC60950-1, medical electrical equipment: IEC60601-1). Also, if the auxiliary device is connected to a signal I/O port, it should comply with IEC60601-1 and/or IEC60601-1-1.



Do not connect the instrument with anything other than specified. Otherwise, it may result in fire or electric shock.



- Medical equipment requires periodic maintenance and management. For more information, refer to 1. Maintenance, Cleaning and Disposal.



- If an error message appears while the system is in use, it may stop operating. When an error message appears, contact the service center



- The manufacturer will not accept liability for:
 - Fault, damage or personal injury incurred as a result of the user incorrectly performing maintenance on the system
 - Personal injury incurred due to the user's carelessness
 - Fault, damage or personal injury incurred due to use of an ancillary device which is not provided by the manufacturer.

- When Problem Occurs



Should any of the following occur, immediately turn OFF the power of each instruments, unplug the power cable from the AC outlet, and contact SAMSUNG representative or distributor.

- When there is smoke, odd smell or abnormal sound.
- When liquid has been spilled into the instrument or a metal object has entered through an opening.
- When the instrument has been dropped and it is damaged.



- This detector should be used by selected users. If not you fully aware of the factor of exposure, the manual, and the schedule of organization, This could be dangerous for the patients and users.

■ Electrical Safety



□ In compliance with IEC 60601-1, this medical equipment complies with the requirements for Safety class I, type B.



□ This system must be used in an environment complying with the requirements of the IEC.



□ Do not remove the safety cover of this system needlessly. When it is removed, the high voltage current inside the system may cause electric shock.



□ Be careful to ensure that no liquids enter the system.



□ If chemicals are spilled or evaporate, it may result in fire or electric shock through contact with electric parts inside the instruments. Also, some disinfectants are flammable. Be sure to take care when using them.



□ Be sure to turn OFF the power of each instrument before connecting or disconnecting the cables. Also, do not handle them with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury.



□ Do not cut or process the cables. Also, do not place anything heavy, including the instrument on it, step on it, pull it, bend it, or bundle it. Otherwise, the cable may be damaged, which may result in fire or electric shock.



□ Be sure to hold the plug or connector to disconnect the cable. If you pull the cable, the core wire may be damaged, resulting in fire or electric shock.



□ Do not turn ON the system power when condensation is formed on the instrument. Otherwise, it may result in fire or electric shock.



□ Do not spill liquid or chemicals onto the instrument or, in cases where the patient is injured, do not allow it to become wet with blood or other body fluids, as doing so may result in fire or electric shock. In such situation, protect the instrument with disposable covering as necessary.

For safety reasons, be sure to turn OFF the power of each instrument when the inspections indicated in this manual are going to be performed. Otherwise, it may result in electric shock.

When the instrument is going to be cleaned, be sure to turn OFF the power of each instrument, and unplug the power cable from the AC outlet. Otherwise, fire or electric shock may result.



□ Never disassemble or modify the product as it may result in fire or electric shock. Also, since the instrument incorporates parts that may cause electric shocks and other hazardous parts, touching them may cause death or serious injury

■ Mechanical Safety



□ Never remove the cover (Detector, Power Box, Recharger, Battery Pack, and Adapter) or cables unless directed to do so by a professionally trained engineer.



□ When an examination is in progress, auditory and visual communication between the patient and the system user must be possible at all times.



□ Be careful not to pinch any part of your or the patient's body or clothing while using the system.



□ Do not hit or drop the instrument. The instrument may be damaged if it receives a strong jolt, which may result in fire or electric shock if the instrument is used without it being repaired.

■ Fire Safety



□ Do not operate the system in a location where there is a danger of fire.



□ In the event of a fire, stop the entire system immediately and disconnect the power cable. Make sure to extinguish the fire with a carbon dioxide fire extinguisher.

■ Safety from Explosion



□ Do not operate the system in a location where there is a danger of explosion. This system is not designed to be used in a location where there is a danger of explosion, and does not comply with the AP/AGP standard.

■ Label



- For information on the types and attachment locations of the Detector Component labels, refer to Labels.

■ Maintenance, Cleaning and Disposal

➤ Maintenance

- Inspect the equipment periodically for patient and user safety.
- The instrument must be repaired by a qualified engineer only. If it is not repaired properly, it may cause fire, electric shock, or accident.

➤ Cleaning



- Always turn off the equipment completely before cleaning.



- Do not open the cover and insert liquids into the system.



- When cleaning the exterior of the system, use a soft cleaning cloth dampened with tepid Water and soap. Do not use detergents or chemical solutions.



- While a maintenance personnel is cleaning the room, cables connected to the equipment may be lifted or pulled.

When lifting , or pulling cables, the connection with the equipment may be disconnected causing malfunction, electric shock, or danger of fire. Also, water may be absorbed into the equipment if mopped with a damp cloth, which may cause electric shocks or fire.



- If the equipment generates abnormal noises, contact the service center immediately. The user must not arbitrarily disassemble, repair, or modify the equipment. Fire or electric shock may result.



- Always be sure to keep checking the condition of the system and the patient to ensure they are normal during the use of the instrument. If any problem is found, take appropriate measures, such as stopping the operation of the instrument, as required.

➤ Correct Disposal of This Product (Waste Electrical & Electronic Equipment)

(Applicable in countries with separate collection systems)



This marking on the product, accessories or literature indicates that the product and its electronic accessories should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

➤ Environment of Use and Storage



□ Does not use or store the instrument near any flammable chemicals such as alcohol, thinner, benzene, etc. Also, this instrument is not a category AP or APG equipment. If chemicals are spilled or evaporate, it may result in fire or electric shock through contact with electric parts inside the instruments. Also, some disinfectants are flammable. Be sure to take care when using them.



□ Do not install the instrument in a location with the conditions listed below. Otherwise, it may result in failure or malfunction, fall or cause fire or injury.

- Close to facilities where water is used.
- Where it will be exposed to direct sunlight.
- Close to air-conditioner or ventilation equipment.
- Close to heat source such as a heater.
- Prone to vibration.
- Insecure place.
- Dusty environment.
- Saline or sulfurous environment.
- High temperature or humidity.
- Freezing or condensation.

Do not place the storage case in a location with the conditions listed below.

- Where the cable of the sensor unit will be strongly pulled when the sensor unit is put into the case, otherwise, the cable may be damaged, resulting in fire or electric shock.
- Where someone might get their foot caught in the cable of the sensor unit is put in the case. Otherwise they could trip over, resulting in injury.

■ Disclaimer

- The manufacturer assumes no liability for any failure or damage which may occur by using other company's products
- The manufacturer assumes no liability for any failure or damage that may occur from installing, relocating, modifying, maintaining, or repairing the equipment by any personnel other than designated personnel by the manufacturer.
- The manufacturer assumes no liability for any accidents or damage on the equipment which may occur due to operations performed without following the relevant precautions or instructions in this manual..
- The manufacturer assumes no liability for any failure or damage due to natural disasters such as fire, earthquake, flood, and lightning.
- The manufacturer assumes no liability for erroneous diagnostic criteria or results.
- The manufacturer assumes no liability for any failure or damage which may occur due to operations performed for any purposes other than its intended use.
- This equipment should be operated under the specified conditions. The manufacturer assumes no liability for any failure or damage which may occur due to operations performed under conditions other than those specified in this manual. For more information on the operating conditions, refer to Appendices.

2. SYSTEM OVERVIEW

System Overview

System Purposes

The S3025-W is a portable digital X-ray flat panel wireless detector that can generate Images of any part of the body. This X-ray imaging system consists of a scintillator directly coupled to an a-Si TFT sensor.

S3025-W can be used for radiographic imaging of human body parts such as head, Chest, spinal, abdominal, particular, hand, foot, and other internal organs. However, do not use the system for mammography purposes.

Radiated X-rays through the body is processed to produce radiography by the detector. Converted electric signal is processed by the signal processor to amplify and digitize data And the result is transferred to the workstation.

■ Product components

Item	Part Name	Qty	Description
1	Detector	1	Front view of the device
2	Power Supply Box	1	Source of necessary electricity
3	Battery Recharger	1	To recharge an extra battery
4	Battery Gender	1	Bridge between battery & battery recharger
5	Battery Pack	2	Source for wireless connection
6	Recharger Adaptor	1	Source of the battery pack recharger
7	Main Cable	1	To connect x-ray detector with Power Supply Box

Table 3 COMPONENTS



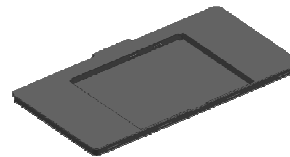
1. Detector



2. Power Supply Box

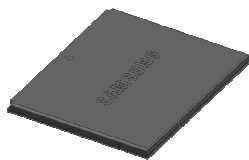


3. Battery pack Recharger



4. Battery pack Recharger

Comment [오전1]: DC 24V 삭제 사진



5. Battery pack



6. Recharger Adapter



7. Main Cable

■ Examination Room Components

The components of S3025-W can be divided into the examination room components and the control room Components in accordance with their installation locations.

The below figure 1 shows S3025-W Examination Components.



Detector

Power box

Main cable

Figure 1 EXAMINATION ROOM COMPONENTS

Comment [오전2]: DC 24V 삭제반영

All examination room components of the system should be used inside a shielded environment.

■ Control Room Components

The control room for S3025-W is configured as shown in Figure.

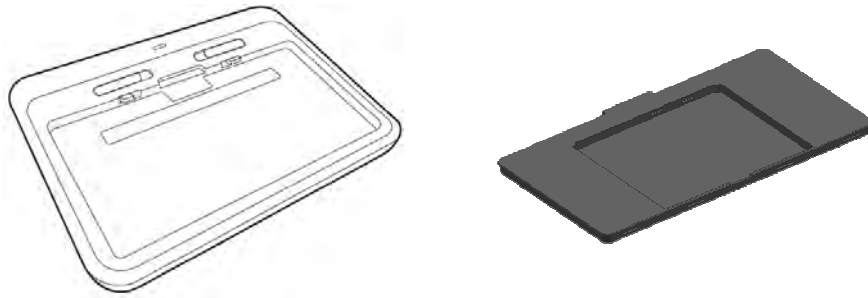


FIGURE 2 RECHARGER & GENDER



FIGURE 3 RECHARGER ADAPTER

3. SYSTEM COMPONENTS

■ System Components

■ Detector



FIGURE 4 WIRELESS DETECTOR

This Flat-Panel, wireless digital X-ray detector is designed for generating images of any part of the body. It makes high-resolution, high-sensitive digital images.

➤ Overview

The S3025-W is a portable digital x-ray flat panel detector that can generate images of any part of the body. This x-ray imaging system consists of a scintillator directly coupled to an a-Si TFT sensor. It makes high-resolution, high-sensitive digital images.

➤ Product features

- Based on a-Si TFT active matrix
- Compact (15 mm thickness) and light weight (less than 1.68 kg)
- High resolution : ~ 3.57 lp/mm
- 16-bit digital output
- Easy integration



FIGURE 5 INDICATE LED

Item	Description
Detector	① Power ON/OFF Button
	② Power Status Indicator → White colored indicator is constant when Power ON
	③ Internal Processing Status Indicator → Selected color indicator flashes during internal processing Select color : Blue, Green, Magenta, Cyan, Yellow
	④ Interface Link Indicator → Wired mode : Blinking in Blue while connecting with workstation → Wireless mode : Green colored indicator is constant
	⑤ Active Pixel Area: This is an area which converses X-ray through the patient into the image.

Table 4 LED STATUS

You cannot get the patient body image from the outside of domain.

➤ Notes for Using the Detector

- Handling

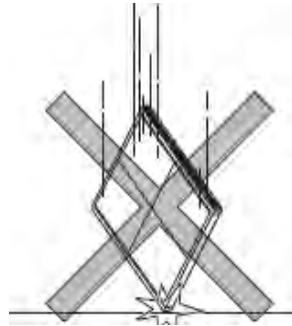


FIGURE 6 DO NOT DROP

Handle the instrument carefully, as it may be damaged if something is hit against it, dropped, or receives a strong jolt.

Embedded Mechanical shock sensor specification is 100G.

- Before Exposure

If the instrument is used with condensation formed on it, problems may occur in the quality of the instrument.

Sudden heating of the room in cold areas will cause condensation to form on the instrument. In this case, wait until condensation disappears before performing exposure.

When an air-conditioner is going to be used, be sure to raise/lower the temperature gradually so that a difference in temperature in the room and in the instrument does not occur, to prevent forming of condensation.

- During Exposure

Do not apply excessive weight to the sensor unit. Otherwise, the sensor may be damaged.

The detector and patient must be taken from a fixed state. Otherwise, the performance may be degraded.

- Limit of Load

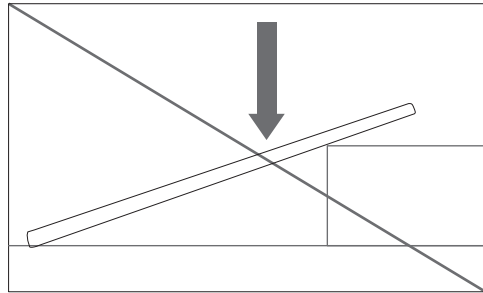


FIGURE 7 Be CAREFUL OF DETECTOR LOCATION

Be sure to use the sensor unit on a flat place so it will not bend.
Otherwise, the sensor may be damaged.

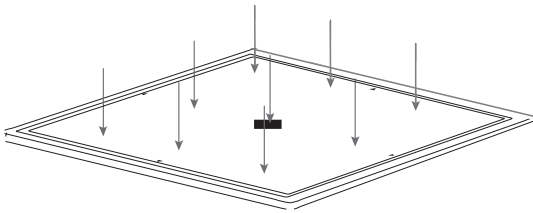


FIGURE 8 KEEP WEIGHT DISTRIBUTED EVENLY

- Uniform load

Supposing the distribution of the detection part on S3025-W, Do not load over 150Kg.

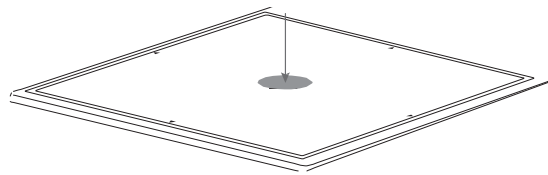


FIGURE 9 AVOID LOCALIZED WEIGHT