USER & SERVICE MANUAL

DIGITAL FLAT PANEL X-RAY DETECTOR

Edge Air 1417 / 1417WCC

OSKO

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Preface

Please note that this information is for proper use and safety of the equipment. The following symbols may indicate a hazardous situation in which, if not heeded, may result in serious injury or even death to the user or others, or damage to the equipment.

	Used to emphasize essential information. Be sure to read this information to avoid incorrect operation.
WARNING	Indicates warning and safety instructions. If not adhered to, it could result in death or serious injury to the user or others.
CAUTION	Indicates a hazardous situation which, if not heeded, may result in minor or moderate injury to the user or others, or damage to the equipment.

For users in the United States:

- United State federal law restricts this equipment to be used by or on the order of a physician.
- Since the X-ray exposure condition can be changed depending on the age, gender and bone density of the patient, in case of Pediatric, X-ray exposure condition can be changed by expert's judge. For further information, please refer to FDA Pediatric X-ray Imaging web page.

  http://www.fda.gov/radiation-emittingproducts/radiationemittingproductsandprocedures/medicalimaging/ucm298899.htm

For users in other countries:

- This equipment is to be used by or on the order of a licensed person under the related laws for each country.
- Need a user language other then English, please contact the seller or the following contact information.

Intended use:

Digital Flat Panel X-Ray Detector is indicated for digital imaging solution designed for general radiographic system for human anatomy. It is intended to replace film or screen based radiographic systems in all general purpose diagnostic procedures. Not to be used for mammography.

EC REP

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1. Safety Information

1.1 Safety Standard

1.1.1 Medical Device Classification

Item	Description
Classification by protection type against Electric Shock	Class I or Internally Powered Equipment
Classification according to the degree of protection against ingress of water	IPX66
Mode of operation	Continuous electromagnetic
Environment of Use	This equipment is not suitable for use in the presence of flammable anesthetic or oxygen.

- IP66 does not mean completely waterproof, so use with caution. If the connector is contaminated with liquids or foreign substances, clean and dry it sufficiently before use. If you operate the equipment outside of recommended operating conditions, the equipment may be damaged. This damage is not covered by warranty.

1.1.2 Regulations

1. Safety and Electromagnetic Compatibility Information

Item	Description
IEC/EN/UL 60601-1	Medical electrical equipment Part 1: General requirements for safety
IEC/EN 60601-1-2	Medical electrical equipment Part 2: Electromagnetic compatibility-requirements and tests

This equipment has been tested and found to comply with the limits for medical devices in IEC 60601-1-2. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.

FCC Interference Statement

This equipment has been tested and generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures: Reorient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment into an outlet on a circuit different from which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.

2. Radio Frequency compliance

FCC (For USA)

- **FCC ID: 2ALPQRYRWM001A**

  - 5.15- 5.25 GHz band is restricted to indoor operations only.
  - Host device of the approved module shall be marked with the following item:
  - Compliance with FCC requirement 15.407(c)

  Data transmission is always initiated by software, which is the passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated byte MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinues transmission in case of either absence of information to transmit or operational failure.

- **FCC Compliance Statement**

  This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- **FCC CAUTION**

  Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

  When installing it in a mobile equipment

  This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65. This equipment has very low levels of RF energy that it deemed to comply without maximum permissive exposure evaluation (MPE). But it is desirable that it should be installed and operated keeping the radiator at least 20cm or more away from person's body (excluding extremities: hands, wrists, feet and ankles).

  When you use the detector with wire mode, the wireless function is automatically off.

  - 5150-5250 MHz band is restricted to indoor operations only.

IC Notice (For CANADA)

- **IC: 22586-RWM001A**

  This Class A digital apparatus complies with Canadian ICES-003

  Host device of the approved module shall be marked with the following item: Contains Transmitter Module Radio Certification No: 10742B - RWM001A

  This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le present appareilest conforme aux CNR d'Industrie Canada applicables aux appareilsradioexempts de licence.L'exploitationestautorisee aux deux conditions suivantes : (1) l'appareil ne doitpasproduire de brouillage, et (2) l'utilisateur de l'appareildoit accepter tout brouillageradioelectriquesubi, meme si le brouillageest susceptible d'encompromettre le fonctionnement.

RED Notice (European Union)

The product compliance to the Directive 2014/53/EU as Radio Equipment.

- 5150-5250 MHz band is restricted to indoor operations only.

3. Electro-Magnetic Compatibility Information

- Do not use mobile phones in the vicinity of this device. Use of mobile phones near this device can cause errors in operation due to electromagnetic wave interference, so such devices should be turned off in the vicinity of this device.

- The use of accessories and cables other than those sold by OSKO Inc. as internal components, may result in increased emissions or decreased electromagnetic immunity of this device.

- Do not use this device adjacent to or stacked with other devices. If adjacent or stacked use is necessary, confirm normal operation in the configuration in which this device will be used.

- Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Edge Air 1417 / 1417WCC, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

- NOTE: The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

- Cable

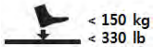
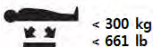
Item	Length	Unit
Link cable (Shielded)	7	m
LAN cable (Shielded)	10	m
Power cord (3-Wire No Shielding)	1.8	m
USB cable (A to B type)	1.8	m
Trigger cable (Rayence I/F Cable)	10	m
Micro USB cable (A to Micro B type)	1	m

Immunity Test	Basic EMC standard or test method	Operating mode	Test leve/requirement
Mains terminal disturbance voltage	EN 55011 CISPR 11	Wired mode	Group1, Class A
Radiated disturbance	EN 55011 CISPR 11	Wired & Wireless mode	Group1, Class A

Immunity Test	Basic EMC standard or test method	Operating mode	Test leve/requirement
Harmonic Current Emission	EN 61000-3-2	Wired mode	Class A
Voltage change, Voltage fluctuations and Flicker Emission	EN 61000-3-3 IEC 61000-3-3	Wired mode	Pst: 1 Plt: 0.65 Tmax:0.5 dmax: 4% dc: 3.3%
Electrostatic Discharge Immunity	EN 61000-4-2 IEC 61000-4-2	Wired & Wireless mode	± 8 kV/Contact ± 2, ± 4, ± 8, ± 15 kV/Air
Radiated RF Electromagnetic Field Immunity	EN 61000-4-3 IEC 61000-4-3	Wired & Wireless mode	3 V/m 80 MHz-2.7 GHz 80% AM at 1 kHz
Immunity to Proximity Fields from RF wireless Communications Equipment	EN 61000-4-3 IEC 61000-4-3	Wired & Wireless mode	Table 9 in IEC 60601-1-2: 2014
Electrical Fast Transient/Burst Immunity	EN 61000-4-4 IEC 61000-4-4	Wired mode	AC Mains of power supply ± 2 kV, 100 kHz repetition frequency
			Link/LAN cable ± 1 kV, 100 kHz repetition frequency
Surge Immunity	EN 61000-4-5 IEC 61000-4-5	Wired mode	Line to Line ± 0.5 kV, ± 1 kV Line to Ground ± 0.5 kV, ± 1 kV, ± 2 kV
Immunity to Conducted Disturbances Induced by RF fields	EN 61000-4-6 IEC 61000-4-6	Wired mode	3 V 0.15-80 MHz 6 V in ISM bands Between 0.15 MHz and 80 MHz 80% AM at 1 kHz
Power Frequency Magnetic Field Immunity	EN 61000-4-8 IEC 61000-4-8	Wired & Wireless mode	30 A/m 50 Hz & 60 Hz
Voltage dips	EN 61000-4-11 IEC 61000-4-11	Wired & Wireless mode	0 % U_T: 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°
			0 % U_T; 1 cycle and 70 % U_T; 25/30 cycles Single phase: at 0º

Immunity Test	Basic EMC standard or test method	Operating mode	Test leve/requirement
Voltage interruptions	EN 61000-4-11 IEC 61000-4-11	Wired & Wireless mode	0 % U_T; 250/300 cycle

1.2 Symbols

Symbols	Descriptions
	Refer to instruction manual/ booklet
	Consult instructions for use
	Alternate current
	Protective earth (Ground)
	Off (power : disconnect from the main switch)
	On (power : connect from the main switch)
	On / Off (button type)
WARNING	Warning
CAUTION	Caution
	To indicate a reference to the X-ray tube, for example to identify the surface of a component such as a focused anti-scatter grid, that has to be oriented towards the X-ray tube.
	This is a Type B applied part according to UL 60601-1 and IEC 60601-1.
	Handle with care
	Non-ionizing radiation
	Partial Pressure Limitation
	Overall Pressure Limitation

Symbols	Descriptions
	Read carefully
	Manufacturer
	Date of manufacture
SN	Serial number
	WEEE : Waste Electrical and Electronic Equipment
EC REP	Authorized representative in the European community.
	Batteries Marking (Battery Directive 2006/66/EC)
CE1639	CE symbol grants the equipment compliance to the European Directive for Medical Devices 93/42/EEC as a class Ⅱa device and 1999/5/EC. Authorized by **Notified Body SGS (code no.:1639) of Belgium**
C US XXXXXX	Recognized Component Mark for Canada and the United States
	For Korea Symbol for safety
	Keep dry
	Fragile, handle with care
	This side up
4	4 layer stacking
	Temperature limit

1.3 Warning

WARNING

Environment of Use and Storage

- Follow the specified process of operational instructions written in this manual for the safety of the users and patients.
- Do not use or store the detector near any flammable chemicals such as thinner, benzene, etc. Also, this detector 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 detector. Also, some disinfectants are flammable. Be sure to take care when using them.

WARNING

Connection

- Do not connect the detector with anything other than specified. Otherwise, it may result in fire or electric shock.
- To avoid the risk of electric shock, this detector must only be connected to supply mains with protective earth.
- Do not touch SIP/SOP and the patient simultaneously. There is a risk of electric shock from current leakage.
- Additional equipment connected to medical electrical equipment must comply with the respective IEC or ISO standards (e.g. IEC 60950 for data processing equipment). Furthermore all configurations shall comply with the requirements for medical electrical systems (see IEC 60601-1-1 or clause 16 of the 3 Ed. of IEC 60601-1, respectively). Anybody connecting additional equipment to medical electrical equipment configures a medical system and is therefore responsible that the system complies with the requirements for medical electrical systems. Attention is drawn to the fact that local laws take priority over the above-mentioned requirements. If in doubt, contact OSKO Inc. Customer Service team or authorized agent.
- Equipment connected to the detector and in the patient environment must be powered from a medically-isolated power source or must be a medically-isolated device. Equipment powered from a non-isolated source can result in chassis leakage currents exceeding safe levels. Chassis leakage current created by an accessory or device connected to a non-isolated outlet may add to the chassis leakage current of the detector.

WARNING

Handling

- Always be sure to keep checking the condition of the system and the patient to ensure they are normal during the use of the detector. If any problem is found, take appropriate measures, such as stopping the operation of the detector, as required.
- Never disassemble or modify the detector as it may result in fire or electric shock.

  Also, since the detector incorporates parts that may cause electric shocks and other hazardous parts, touching them may cause death or serious injury.
- Do not hit or drop the detector. The detector may be damaged if it receives a strong jolt, which may result in fire or electric shock if the detector is used without being repaired.

WARNING

When Problem Occurs

Should any of the following occur, immediately turn OFF the power of each detector, unplug the power supply cord from the AC outlet, and contact OSKO Inc. Customer Service team or authorized agent.

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

WARNING	**Maintenance and Inspection** ▪ For safety reasons, be sure to turn off the power of the detector when the following inspections are going to be performed. Otherwise, it may result in electric shock. ▪ When the detector is going to be cleaned, be sure to turn off the power of each detector, and unplug the power cable from the AC outlet. ▪ Do not use any type of solvent, such as benzene. Otherwise, fire or electric shock may result. ▪ Wear waterproof gloves to protect your hands from direct contact with IPA (Isopropyl-alcohol) or any other liquid. ▪ Maintenance of the detector should be done by an authorized service provider. If problem still cannot be corrected, it may result in fire or electric shock.

WARNING	**Wireless Connection** ▪ SSID & PSK value should match to Router's setting. If these values are not matched with Detector and Router, the connection is not allowed for security. ▪ Avoid using co-channel or adjacent-channel with other wireless devices for high-quality wireless performance. ▪ Transmitting omnidirectional radio wave and sending same information to different place at once is against the law. ▪ Any service related to the human life safety cannot be supported since this wireless detector has potential electric wave interference. ▪ This wireless detector has potential electric wave interference during use.

1.4 Caution

CAUTION

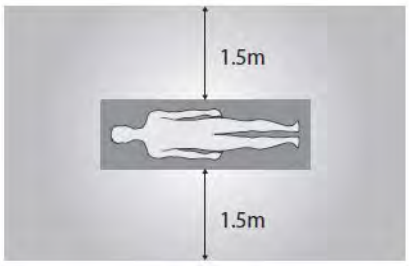
Environment of Use and Storage

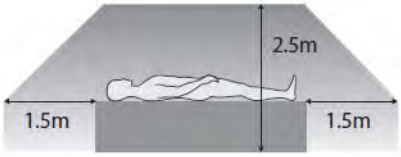
Do not install the detector in a location with the conditions listed below. Otherwise, it may result in failure or malfunction, cause fire or injury.

- Do not position the equipment so that it is difficult to disconnect the power cord.
- 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.

This device is used for a professional health care enviromnment and do not place the storage case in a location with the conditions listed below.

- Where the cable of the detector unit will be strongly pulled when the detector 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 detector.
- Non-medical equipment such as the battery charger, access point cannot be used in patient's vicinity.





CAUTION

Handling

- Applied part: CFRP (Carbon Fiber Reinforced Plastic) Applied part having contact with the patient for a time "t": 1 min ≤ t < 10 min
- If contact over 24 hours on CFRP (Carbon Fiber Reinforced Plastic) of detector, it could be cause skin irritation.
- In order to prevent infection, please wipe the CFRP (Carbon Fiber Reinforced Plastic) with a soft cloth moistened with IPA (Isopropyl-alcohol) liquid. Wear waterproof gloves to protect your hands from direct contact with IPA or any other liquid.
- For safety reasons, be sure to turn off the power of each equipment when detector is not used.
- This detector is contraindicated for pregnant woman.

CAUTION

Location of Cables

- Make sure all cables are located so that they cannot be stepped on, tripped over, or otherwise subjected to damage or stress.

CAUTION

Maintenance and Inspection

- For safety reasons, be sure to inspect the detector before using it. In addition, carryout a regular inspection at least once a year.
- If the detector is defective, do not disassemble the detector randomly. Maintenance of the detector should be done by an authorized service provider. Please contact OSKO Inc. Customer Service team or authorized agent.
- Be sure to check the user's manual for replaceable components.

CAUTION

Modifications

- Any changes or modifications in construction of this detector which are not expressly approved by the party responsible for compliance could void the user's authority to operate the detector.

CAUTION

Battery

- Do not let the detector or battery come in contact with liquids. Liquids can get into the detector's circuits, leading to corrosion. Even when the detector appears to be dry and appears to operate normally, the circuitry could slowly corrode and pose a safety hazard. If the battery gets wet, have them checked by authorized agent or contact OSKO Inc. Customer Service team, even if they appear to be working properly.
- Do not place your battery near a heat source. Excessive heating can damage the detector or the battery and could cause the detector or the battery to explode.
- Do not dry a wet or damp battery with an appliance or heat source such as a microwave oven, hair dryer, iron, or radiator.
- Do not dispose of the detector or the battery in a fire. The detector or the battery may explode when overheated.
- Use only OSKO Inc.-approved batteries and recharge your battery (Model name: RB37WHA) only with OSKO Inc.-approved chargers (Model name: RC120WA) which are specifically designed for your detector.
- Use of a non-OSKO Inc.-approved battery or charger may present a risk of fire, explosion, leakage, or other hazard. OSKO Inc.'s warranty does not cover damage to the detector caused by non-OSKO Inc.-approved batteries and/or chargers.
- Misuse or use of incompatible batteries and charging detectors could result in damage to the detector and a possible risk of fire, explosion, or leakage, leading to serious injuries, damages to your detector, or other serious hazard.
- Check the battery status frequently to avoid battery empty. When the low battery LED of detector is turned on, change the battery or charge the battery using cable.

CAUTION

Recommendations to equipment manufacturers and battery assemblers

- The following represents a typical, but non-exhaustive, list of good advice to be provided by the manufacturer of secondary cells and batteries to equipment manufacturers and battery assemblers.
- Do not dismantle, open or shred cells. Batteries should be dismantled only by trained personnel. Multi cell battery cases should be designed so that they can be opened only with the aid of a tool.
- Do not short-circuit a cell or battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by conductive materials.
- Do not remove a cell or battery from its original packaging until required for use.
- Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.

- Do not subject cells or batteries to mechanical shock.
- In the event of a cell leaking, do not allow the liquid to come into contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- Equipment should be designed to prohibit the incorrect insertion of cells or batteries and should have clear polarity marks. Always observe the polarity marks on the cell, battery and equipment and ensure correct use.
- Do not mix cells of different manufacture, capacity, size or type within a battery.
- Seek medical advice immediately if a cell or battery has been swallowed.
- Consult the cell/battery manufacturer on the maximum number of cells, which may be assembled in a battery and on the safest way in which cells may be connected.
- A dedicated charger should be provided for each equipment. Complete charging instructions should be provided for all secondary cells and batteries offered for sale.
- Keep cells and batteries clean and dry.
- Wipe the cell or battery terminals with a clean dry cloth if they become dirty.
- Secondary cells and batteries need to be charged before use. Always refer to the cell or battery manufacturer's instructions and use the correct charging procedure.
- Do not maintain secondary cells and batteries on charge when not in use.
- After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.
- Secondary cells and batteries give their best performance when they are operated at normal room temperature.
- Retain the original cell and battery literature for future reference.
- When disposing of secondary cells or batteries, keep cells or batteries of different electrochemical systems separate from each other.
- Contact the OSKO Inc. Customer Service team to destroy a battery.

CAUTION

Recommendations to the end-users

- The following represents a typical, but not exhaustive list of good advice to be provided by the equipment manufacturer to the end-user.
- Do not dismantle, open or shred secondary cells or batteries.
- Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.
- Do not short-circuit a cell or a battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.
- Do not remove a cell or battery from its original packaging until required for use.
- Do not subject cells or batteries to mechanical shock.
- In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- Do not use any charger other than that specifically provided for use with the equipment.
- Observe the plus (+) and minus (–) marks on the cell, battery and equipment and ensure correct use.
- Do not use any cell or battery which is not designed for use with the equipment.
- Do not mix cells of different manufacture, capacity, size or type within a device.
- Keep cells and batteries out of the reach of children.
- Seek medical advice immediately if a cell or a battery has been swallowed.

	▪ Always purchase the correct cell or battery for the equipment. ▪ Keep cells and batteries clean and dry. ▪ Wipe the cell or battery terminals with a clean dry cloth if they become dirty. ▪ Secondary cells and batteries need to be charged before use. Always use the correct charger and refer to the manufacturer's instructions or equipment manual for proper charging instructions. ▪ Do not leave a battery on prolonged charge when not in use. ▪ After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance. ▪ Secondary cells and batteries give their best performance when they are operated at normal room temperature (20 °C ± 5 °C). ▪ Retain the original product literature for future reference. ▪ Use only the cell or battery in the application for which it was intended. ▪ When possible, remove the battery from the equipment when not in use. ▪ Dispose of properly. ▪ Contact the OSKO Inc. Customer Service team to destroy a battery.

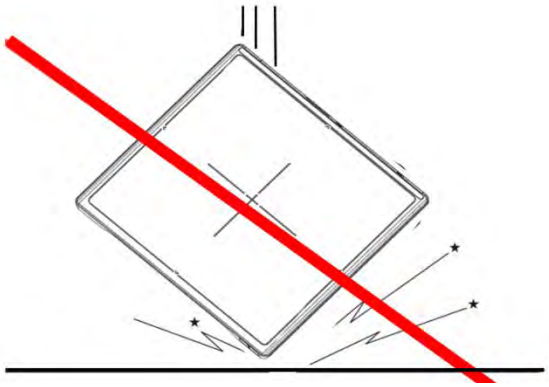
1.5 Safety Information

Preparation

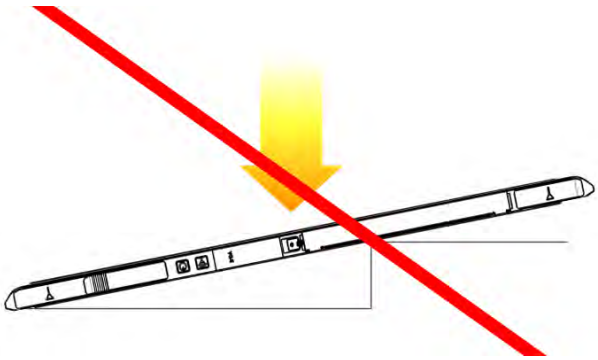
- Be sure to connect the cables to the proper connectors. Otherwise, the detector may malfunction or may be damaged.
- The power supply provided by OSKO Inc. is designed for the detector from OSKO Inc.. Please contact OSKO Inc., if any other type of power supply is needed to be used.
- Be sure to fully charge the battery before use. Charge the battery on the day of examination or on the previous day.
- Battery slowly discharges even when not in use. The battery may have expired if it discharges immediately after being fully charged. You can purchase an optional battery to replace an exhausted one.
- The battery charger provided by OSKO Inc. is designed for the dedicated battery.
- When the detector will not be used for some time, remove the battery.
- (When purchasing additional battery) Lithium ion batteries State of Charge of the battery must not exceed 30% as per the Safe Transport of Dangerous Goods by Air. Charge the battery before use.

Handling

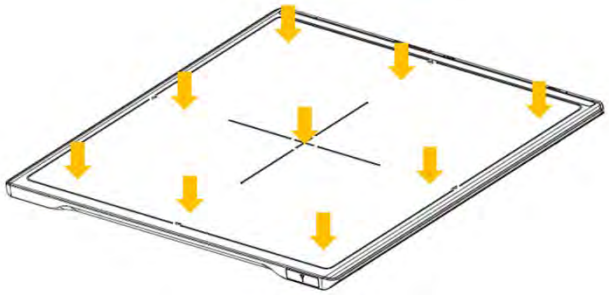
- Handle the detector carefully, as it may become damaged if it is hit, dropped, or receives a strong jolt.



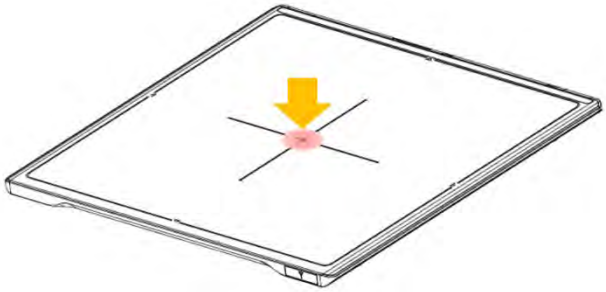
- Be sure to use the detector on a flat place so it will not bend. Otherwise, the detector may be damaged.



- Be sure to check the detector daily and confirm that it works properly. Sudden heating of the room in cold areas will cause condensation to form on the detector. In this case, wait until condensation disappears before performing exposure. If the detector is used with condensation formed on it, problems may occur in the quality of the detector. 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 detector does not occur, to prevent forming of condensation. Follow the recommended proper Room temp.
- Do not use the detector near devices generating a strong magnetic field. Doing so may produce image noise or artifacts.
- Keep the connectors free from being in contact with the patient.
- Connectors are intended to be connected to an external device and must follow IEC standards.
- Do not apply excessive weight to the detector. Otherwise, the detector may be damaged.



Overall Pressure: 300kg (661lb) over the whole area of detector window.



Partial Pressure: 150kg (330lb) on an area 40 mm in diameter.

Disinfection and Cleaning

- Do not spray disinfectants or detergents on the detector.
- When cleaning the detector, be sure to turn off the power, and unplug the power cable from the AC outlet.
- Do not use any flammable chemicals such as thinner, benzene for cleaning. Otherwise, fire or electric shock may result.
- Wear waterproof gloves to protect your hands from direct contact with disinfectants or detergents.

1.6 Label and Location of Attachment

Refer to the back of the device for details.

1.7 Summary of usability specifications

Medical purposes

- Provision and reading of disease and injury diagnostic images

Patient groups

- No patient population exists who uses or is in contact with the device.
- Patient population for the X-ray images read is not specified.

Parts of body or organizations to which the device is mounted or that interact with the device

- Detector contacts the body surface of a patient and an operator.

Significant physical and performance characteristics

- Refer to 2.4 Part Specifications in this manual

Operating principles

- Flat panel detector is a system that can acquire, save, process and transfer digital images of an area of interest taken with X-ray. X-ray beam entering the X-ray imaging sensor is converted into visible light by scintillation layer of the sensor. The amorphous silicon (a-Si) and Photo Diode on TFT Array of the sensor further converts visible light into electric signal. Electric signals are amplified and converted to digital signals to form image data. Obtained image data is transferred to the computer via Ethernet or Wi-Fi interface and visually displayed on the monitor screen.

Intended user profile

- No special training is required to use this device. The intended users of this device are as follows.

A professional in good health with specialist knowledge/ qualifications who has fully understood the content of this document. (Such as a doctor or radiological technologist)

2. Product Introduction and Specification

2.1 Product Features

The Edge Air 1417 / 1417WCC are a wireless digital flat panel detector that has been designed for a faster, more streamlined approach to digital radiography systems.

The Edge Air 1417 / 1417WCC detectors utilize a combination of propriety TFT glass and high quality scintillators, which along with a pixel pitch of 140 microns and assures delivery of sharp, high quality images.

The Edge Air 1417 / 1417WCC detectors contain built-in Access Point (AP) enabling images to be directly sent to a Wi-Fi connected computer within seconds. Built-in image memory storage permits taking images where a computer connection is not available and also prevents lost images should there be an interruption of power. Whether an image was taken with the detector in the portrait or landscape position, the auto image rotation function allows images to be displayed in the correct orientation.

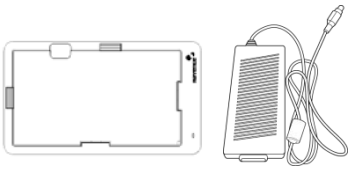
These features, coupled with an auto-trigger signal sensing technology that allows the detectors to be used without generator integration, makes the Edge Air 1417 / 1417WCC the ideal flat panel detector solution for both fixed and portable applications.

2.2 Product Components

2.2.1 Basic Components

Detector 1EA

Battery 1EA



Mobile Battery charger 1EA &
Mobile Battery charger adaptor 1EA

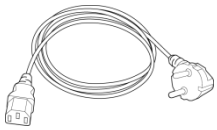
AC power cord 1EA
(110V or 220V)

Installation CD 1EA
Manual File 1EA

Manual 1EA

2.2.2 Optional Components

Power supply1EA



AC power cord 2EA
(110V or 220V 1.8m)

Link Cable
(7m)

Additional battery

Trigger Cable 1EA

USB Cable 1EA for
AGI Box

LAN cable 1EA
(CAT 6, 10m)
(straight-through)

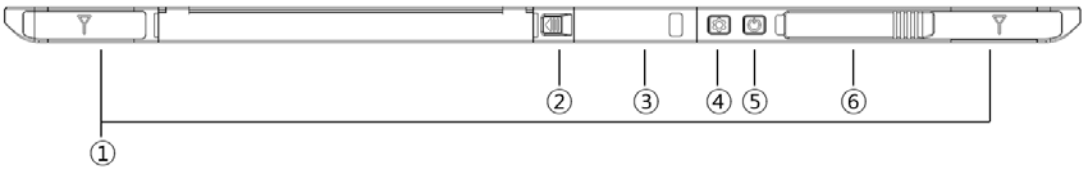
AGI Box 1EA

Dual Battery Charger
1EA

Dual Battery Charger
adapter 1EA

2.3 Part Names and Functions

2.3.1 Detector



1. Wireless Antenna
2. Battery Unlock button

   This is an unlock button to remove battery
3. OLED window
4. Mode select button & LED indicator

Mode Change
Press the 1 second

Indication the status of detector

Name of LED	Status of LED	Status of product
Mode	Orange on	Station mode(wireless)
	Green on	AP mode(wireless)
	Off	Wired mode
	Blinking Orange and Green alternatively	Sleep mode

5. Power button & LED indicator

Power On / Off
Press over than 3 seconds

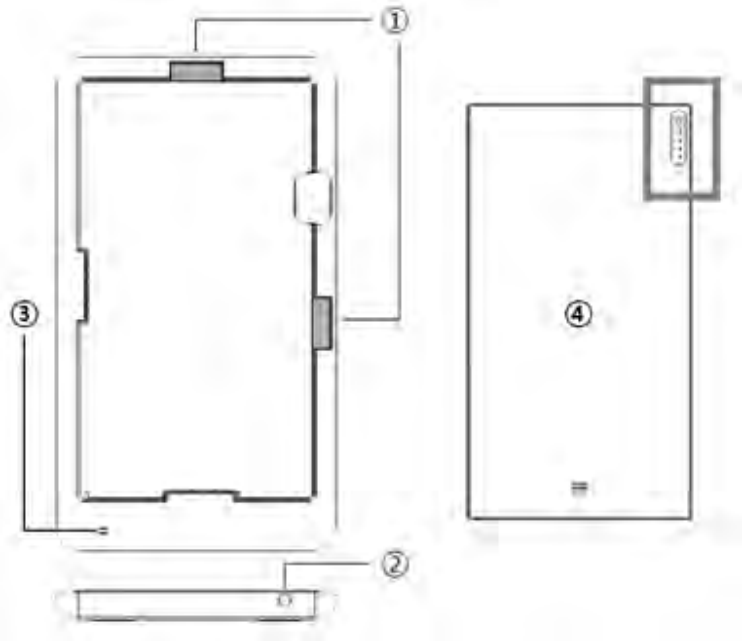
Indicating the status of detector

Name of LED	Status of LED	Status of product
Power	Green	Power on
	Blinking green	Power booting
	Red	Low battery (Battery remain 0~7%)
	Orange	Low battery (Battery remain 7~15%)

6. Link cable connector

   Use for data transfer and charging battery while wired mode is in use (Connect between detector and power supply.)

2.3.2 Battery & Mobile charger



1. Battery unlock level

This is an unlock-level to remove battery

2. Power connector

Connects to the mobile charger adapter

3. LED Indicator

Display battery charging status.

LED Color	Battery Status
Green	Fully charged
Orange	Charging
Red	Error

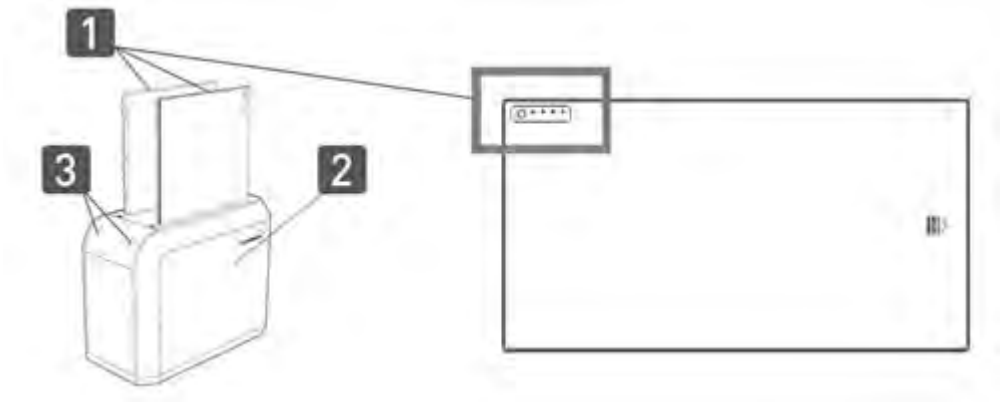
4. Battery : Rechargeable Lithium Ion battery(Charging Time-3 hrs)

- In the diagram above, the box shows where the remaining battery percentage is displayed.

Battery Remain Indicator	Battery Level
● ◯ ◯ ◯ ◯	75~100 %
● ◯ ◯ ◯ ○	50~75 %
● ◯ ◯ ○ ○	25~50 %
● ◯ ○ ○ ○	0~25 %

- Battery warranty period: 6 months
- If detector is not used for long period time (More than 15 days), battery should be removed from detector. Otherwise, it will be discharged.

2.3.3 Stand Battery & Charger (Optional)



1. Battery : Rechargeable Lithium Ion battery(Charging Time-3 hrs)

- In the diagram above, the box shows where the remaining battery percentage is displayed.

Battery Remain Indicator	Battery Level
	75~100 %
	50~75 %
	25~50 %
	0~25 %

- Battery warranty period: 6 months

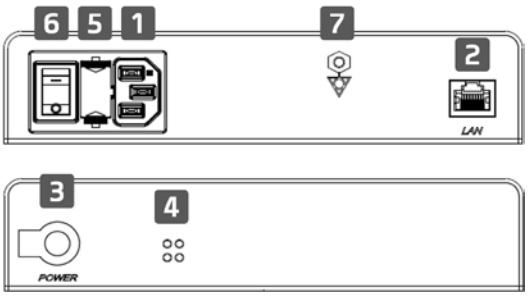
2. Battery Charger : Two port cradle type

3. LED Indicator

Display battery charging status.

LED Color	Battery Status
Green	Fully charged
Orange	Charging
Red	Error

2.3.4 Power Supply (Optional)



1. Power Plug Connector

   Connects to the AC power cord

2. LAN Connector

   Ethernet port for transmitting an image/command between the detector and PC

3. Link Connector

   Used for charging the battery while the detector is in use (Connect the detector and power supply)

4. LED Indicator

   Display status of the power supply.

Color	Status	Power Status
Green	On	Power on

5. Fuse

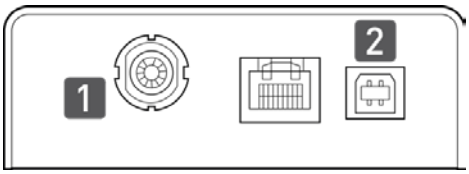
   T3.15 AL 250V

6. Switch

   Power On/Off switch

7. Frame ground

2.3.5 AGI Box (Optional)



1. Trigger Connector

   This is a connector to synchronize the detector and generator. Connect the AGI to the generator by using a P-interface cable or trigger cable.

2. USB Connector

   This is a connector for communication between the AGI and PC. Connect the AGI to the PC by using a USB cable.

2.4 Part Specifications

2.4.1 Detector

Parameter	Spec.		Unit
Sensor Type	Amorphous Silicon with TFT (Single panel)		-
Scintillator Type	CsI:TI		-
Total Pixel Matrix	2500 X 3052		Pixels
Total Pixel Area	350.0 X 427.3		mm
Pixel Pitch	140		µm
Effective Pixel Matrix	2440 X 2992		Pixels
A/D Conversion	14 / 16		bits
Data Transfer	1Gbps Ethernet 802.11 a/g/n/ac Wireless LAN, Wireless LAN up to 867Mbps		-
Preview time	≤2 (2x2 binning)		sec
Energy range	40 ~ 150		kVp
Limiting Resolution	Min.2.5/ Max. 3.57		lp/mm
MTF (@1lp/mm)	Min. 50		%
DQE (@0.1lp/mm)	Min. 70		%
Dimension	384 X 460 X 15		mm
Weight	3 (incl. battery)		kg
Sensor Protection Material	Carbon fiber plate		-
Trigger mode	Manual Mode Auto Trigger Mode (Auto Exposure Detection)		-
Power consumption	Typ. 30.6 (Charging & Operating only) Typ. 8.6 (Operating only) Typ. 22 (Charging only)		W
Wireless specifications	Standard	802.11 a/g/n/ac compliance Without DFS (5.25GH to 5.35GHz and 5.47 to 5.725) Band	
	Peak Rate	1300Mbps	
	Frequency	2.4 GHz / 5 GHz	
	Bandwidth	20MHz / 40MHz / 80MHz	
	MIMO	3 X 3	

- Maximum wireless signal rate derived from IEEE standard specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate.
- Recommended Maximum operable distance : 10m (From the Access Point)
- Wireless Module and Wireless Antenna

- Wireless antennas: The module adopts the latest 802.11ac Dual-Band technology (2.4 GHz and 5 GHz). The transmitter of the module is powered by host equipment (Detector). The antennas are 3 printed-dipole antennas.

- Wireless module: The Rayence RWM001A 802.11 a/b/g/n/ac half mini PCI-e module is implemented. It supports 3T3R (3 transmit 3 receive) MIMO technology, which delivers throughput up to 1300Mbps. Edge Air 1417 / 1417WCC in the RF module does not use DFS band.

2.4.2 Battery [Model name: RB37WHA]

Parameter	Spec.	Unit
Size	236.2 x 127.8 x 6	mm
Weight	0.3	Kg
Input	12.6	VDC
Output	11.1	VDC
Cycle life	Max. 500	cycles
Operation temp. range	5~35	℃
Charging time	Typ. 3	hours
Capacity	Typ. 3400	mAh
Operating time	Typ. 4	hours

2.4.3 Mobile charger [Model name: RMC001A]

Parameter	Spec.	Unit
Dimension	280 X 160 X 17	mm
Weight	0.3	Kg
Input	18	VDC
Output	12.6	VDC

2.4.4 Mobile charger Adaptor [Model name: AFM60US18]

Parameter	Spec.	Unit
Dimension	125 X 62 X 34	mm
Weight	0.4	Kg
Input	80-264VAC, 47~63Hz, 1.5A	-
Output	18VDC, Max 3.34A	-

2.4.5 Dual Battery Charger (Optional) [Model name: RC120WA]

Parameter	Spec.	Unit
Size	200 x 100 x 150	mm
Weight	0.9	Kg
Input	20	VDC
Output	12.6	VDC

2.4.6 Dual Battery Charger Adapter (Optional) [Model name: PMP120-13-3]

Parameter	Spec.	Unit
Size	160 x 76 x 43.7	mm
Weight	0.8	Kg
Input	100-240VAC, 47~63Hz, 1.4~0.6A	-
Output	20VDC, Max 6.0A	-

2.4.7 Power Supply (Optional) [Model name: RP003A]

Parameter	Spec.	Unit
Dimension	188 X 92 X 41.5	mm
Weight	0.5	Kg
Rated power supply(Input)	100-240VAC (50/60Hz)	-
Rated power supply(Output)	Typ. 24VDC (Max 1.7A)	-

2.4.8 AGI Box (Optional)

Parameter	Spec.	Unit
Dimension	92.5 X 119 X 33.5	mm
Weight	0.3	Kg

2.4.9 Cable (Optional)

Parameter	Length	Unit	Qty.
Link cable (Optional)	7	m	1
LAN cable (Optional) (CAT 6(straight-through), Optional)	10	m	1
Power cord (110V or 220V)	1.8	m	3
USB cable (Optional)	1.8	m	1
Trigger cable (Optional)	10	m	1
Micro USB cable (Optional)	1	m	1

2.5 Environmental Requirements

2.5.1 PC Requirement

Item	Detail
CPU	At least Intel Pentium IV HT with 2.8GHz, Intel Core Duo / Core 2 or comparable AMD Dual Core processor
RAM	At least 4GB of RAM requirement (4GB for 32 BITS OS and 8GB for64 BITS OS recommended)
Capacity of Disk Drive	At least 500GB for application and archiving. Recommended 500GBfor applications and secondary drive of 1TB for image archiving.
Network Card	▪ Dual 10/100/1000 network card system required. One for network (Internet) and one for the DR Panel communication ▪ 802.11 a/g/n/ac Wireless LAN card required (Optional)
Monitor Resolution	At least 1,366 x 768. Recommend1,920 x 1,080 resolution
Operating System(OS)	Microsoft□ Windows10 32BIT/64BIT
ETC	No antivirus except for Microsoft® Security Essentials.

2.5.2 Environmental Requirement

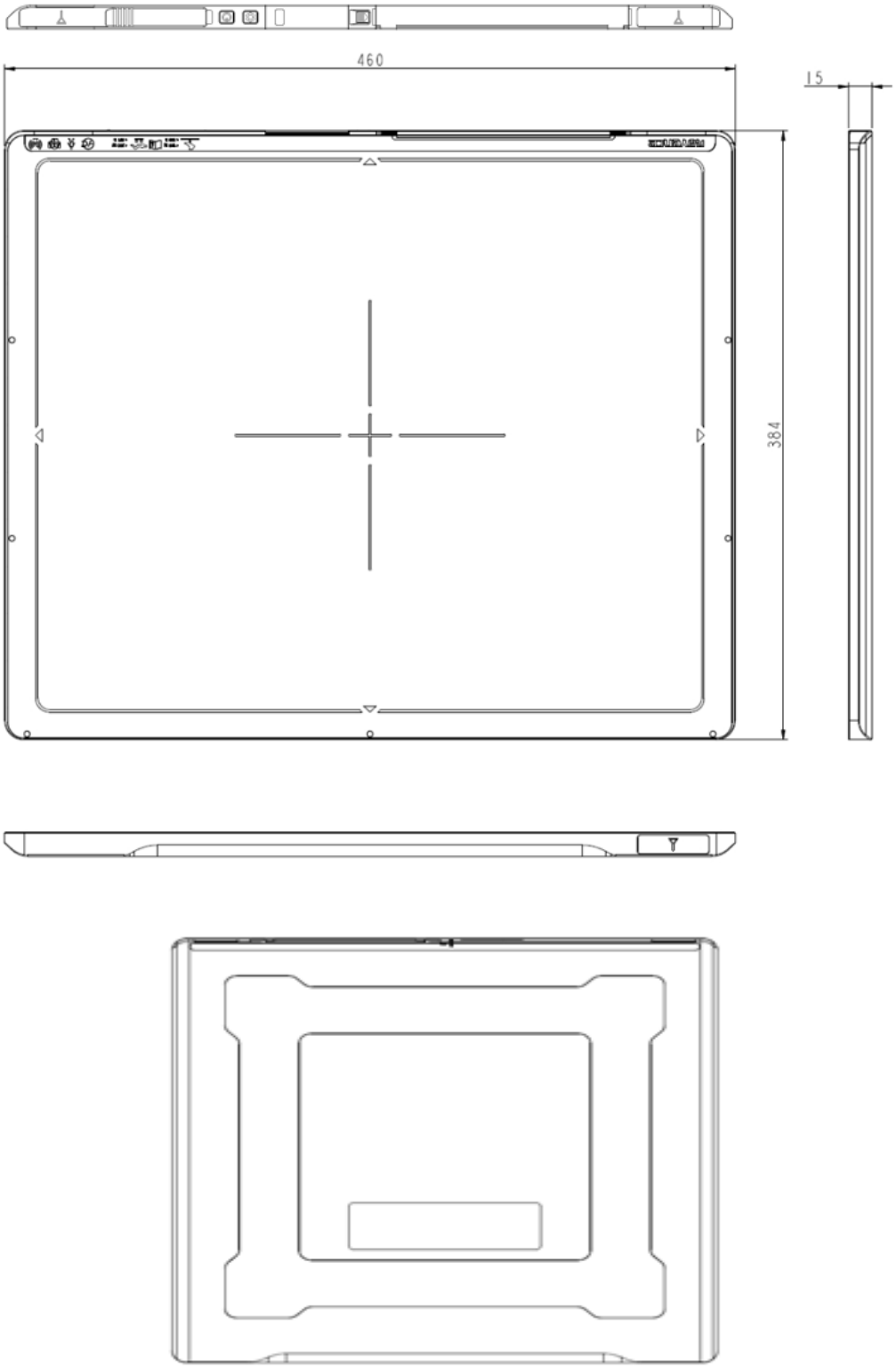
Environment	Min.	Max.	Unit	Note
Temperature(Storage)	-10	50	℃	
Temperature(Operation)	5	35	℃	
Humidity(Storage)	10	80	% H.R.	
Humidity(Operation)	30	75	% H.R.	
Pressure(Operation)	70	106	kPa	

2.5.3 Grid Recommended

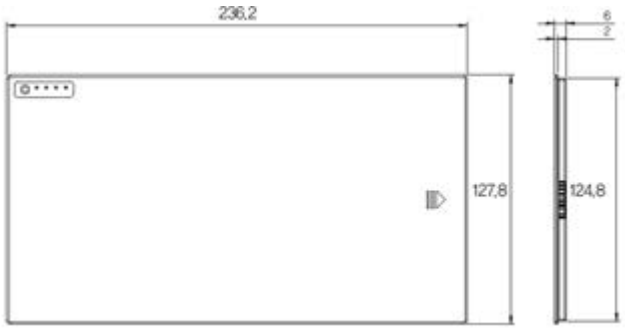
▪Item	Description
SID	100~180 cm (40~72 inch)
Ratio	8:1/10:1/12:1
Frequency	103, 215, 230 Line/inch

2.6 Dimensions (Unit: mm)

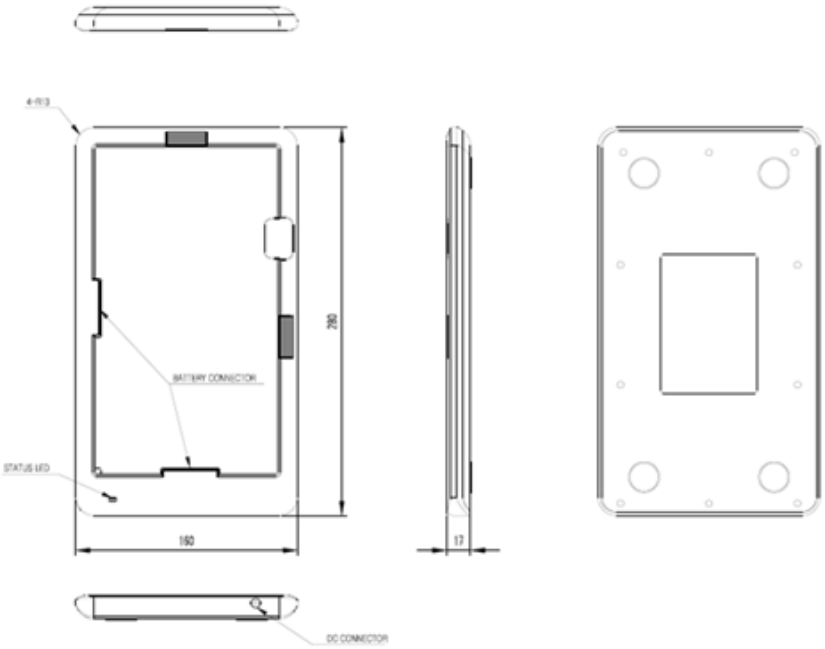
2.6.1 Detector



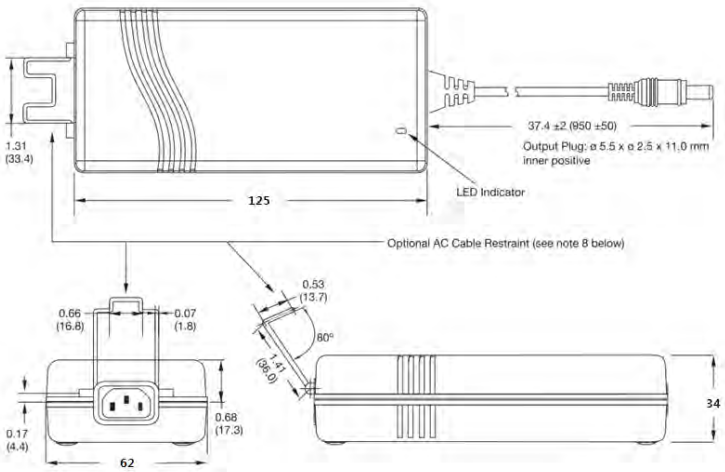
2.6.2 Battery



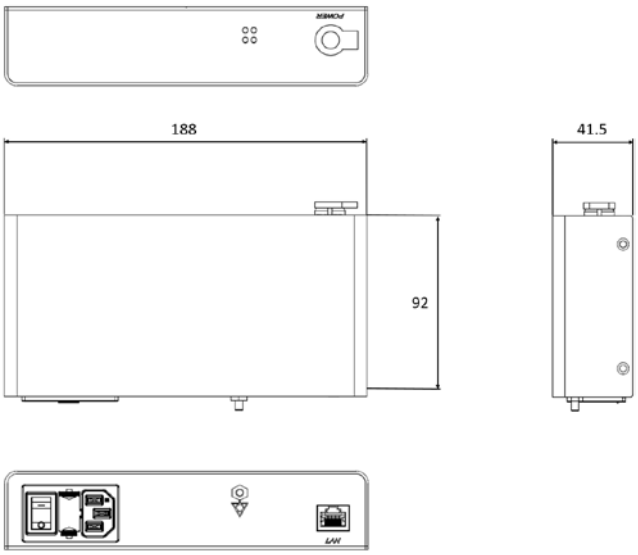
2.6.3 Mobile charger



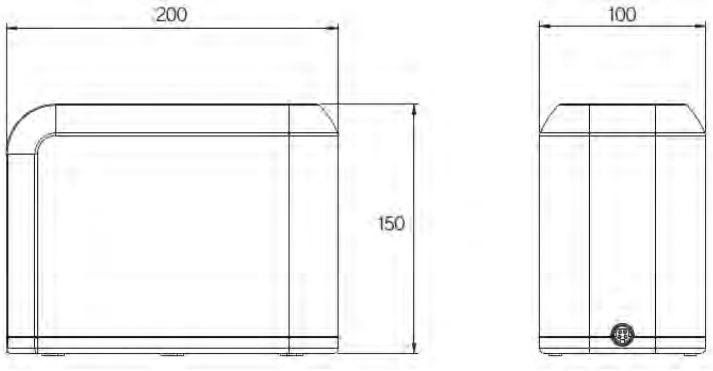
2.6.4 Mobile charger adapter



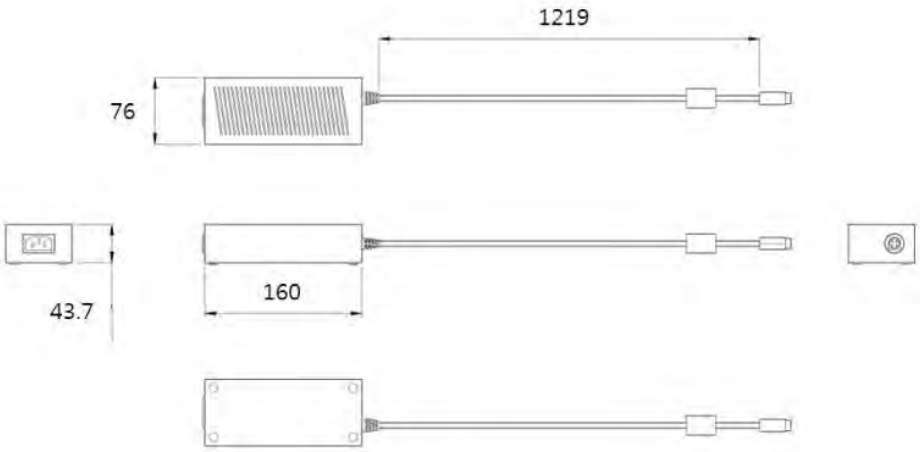
2.6.5 Power Supply (Optional)



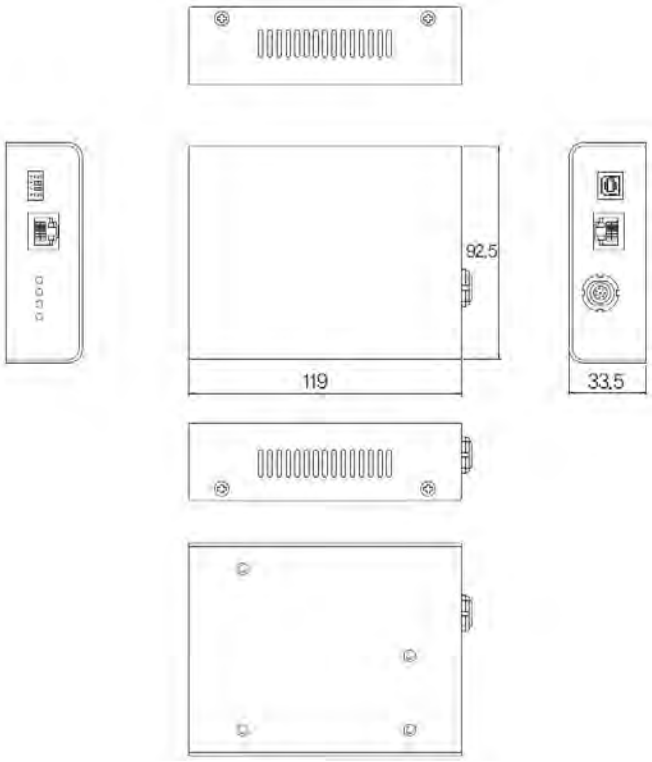
2.6.6 Dual Battery Charger (Optional)



2.6.7 Dual Battery Charger Adapter (Optional)



2.6.8 AGI Box (Optional)

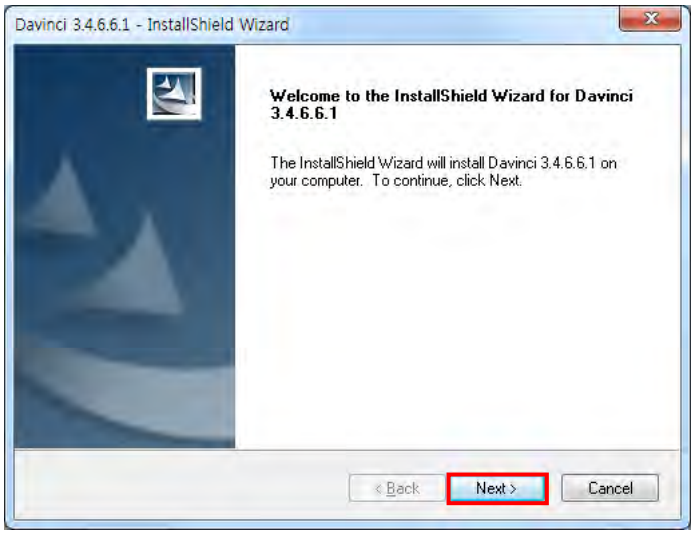


3. Installation and Calibration

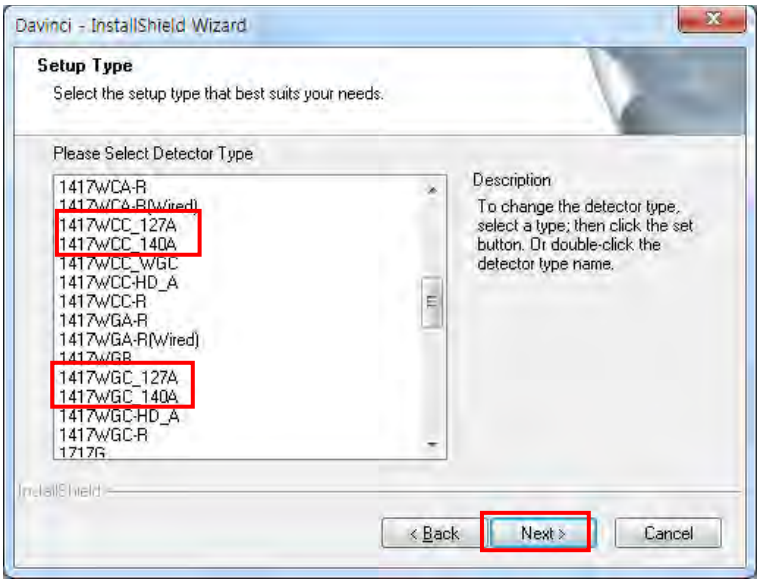
3.1 Installation

3.1.1 Software Installation

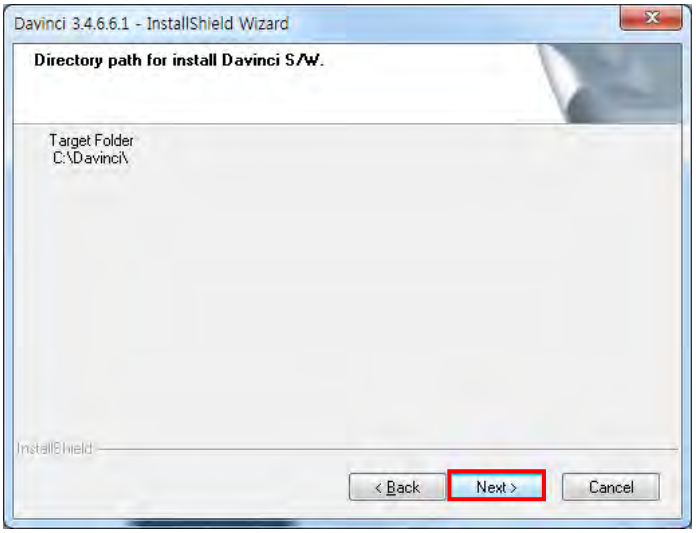
1. Insert the CD that comes with the Detector.
2. Install "setup.exe" from "\Release Davinci_version" and click "Next".



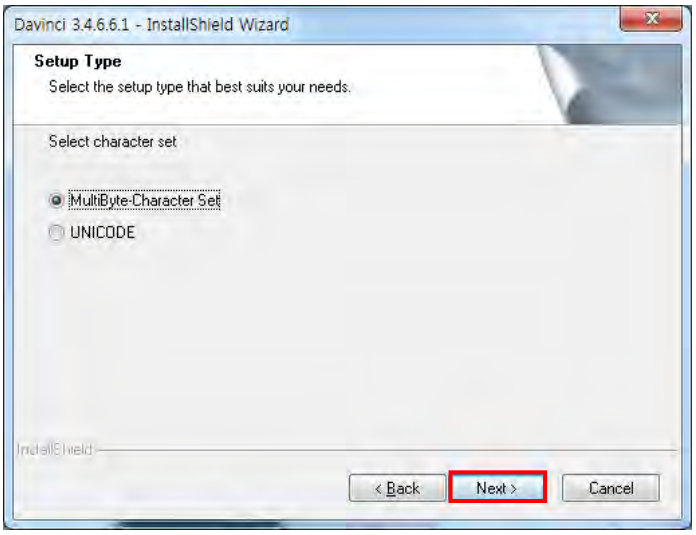
3. Choose the model from the Detector Type list and click "Next".



4. Click “Next”.

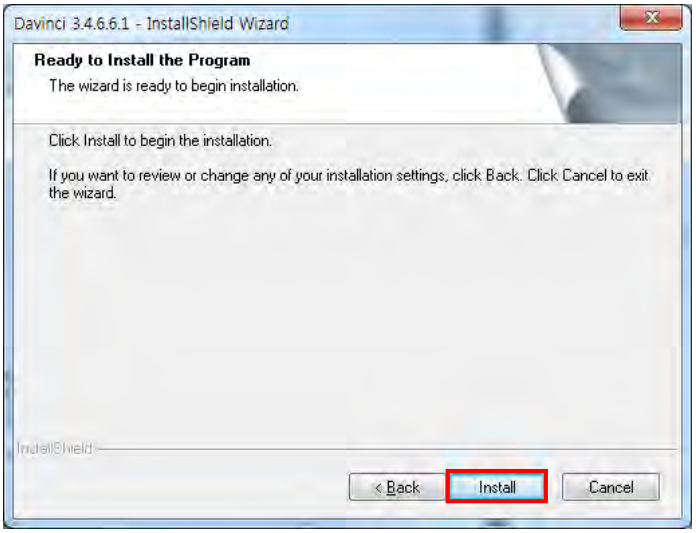


5. Select “MultiByte-Character Set” and click “Next”.

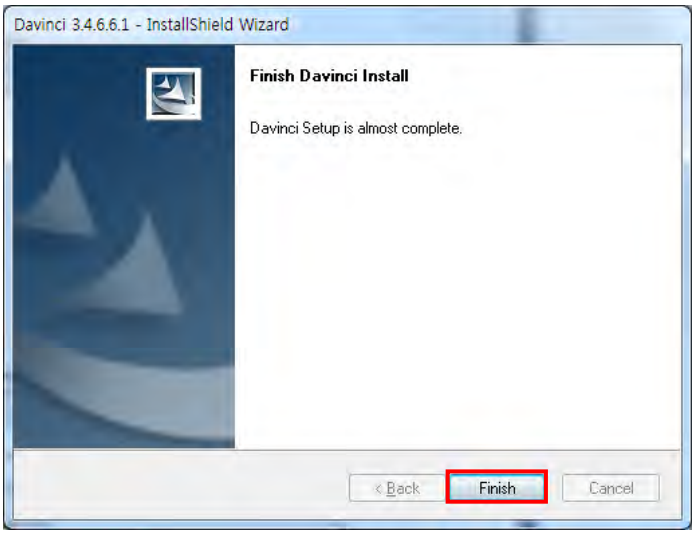


- Choose UNICODE if console SW is supporting UNICODE.
- If Multibyte - Character set or UNICODE is not installed correctly, images will not be properly acquired.

6. Click “Install”.



7. Click “Finish”.



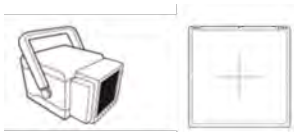
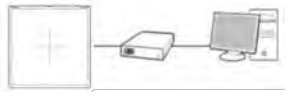
3.1.2 Install battery

Attach the battery (RB37WHA) to the detector as below.

- Battery removal

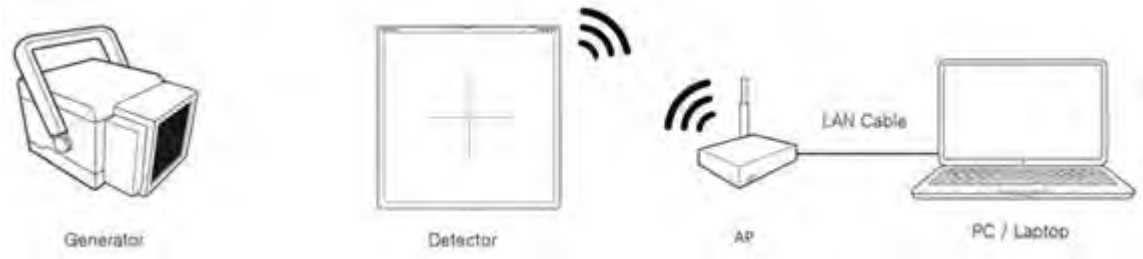
  Push the battery unlock button.

3.1.3 Mode Selection

Mode	Description
<Auto Trigger> 	Automatically detects X-ray radiation without integration of the generator and detector.
<Manual Trigger>	Detects X-ray radiation by sending and receiving sync signals through the integration between generator and detector.
<Station Mode>	Communicates with the wireless AP, and the wireless AP communicates with the PC through the LAN cable. (Wireless AP can select RAP001A provided by OSKO Inc. as option.)
<AP Mode>	Detector communicates with the PC without the wireless AP. (PC must maintain wireless network card.)
<Wired Mode> 	Communicates with the power supply, and the power supply communicates with the PC through the LAN cable.

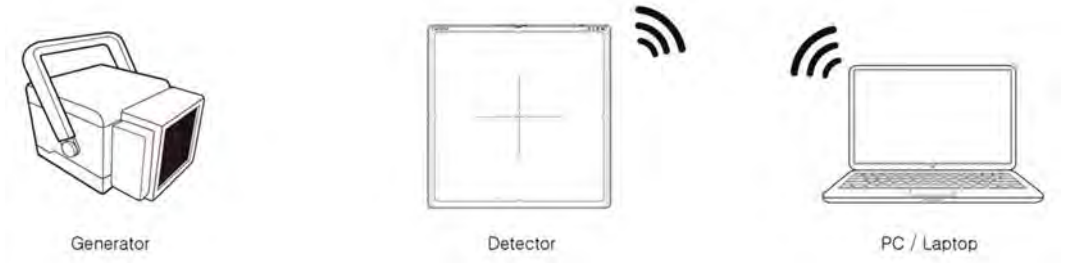
Auto Trigger & Station Mode

Follow instructions from **3.1.4** Product Set Up 1. Auto Trigger & Station Mode.



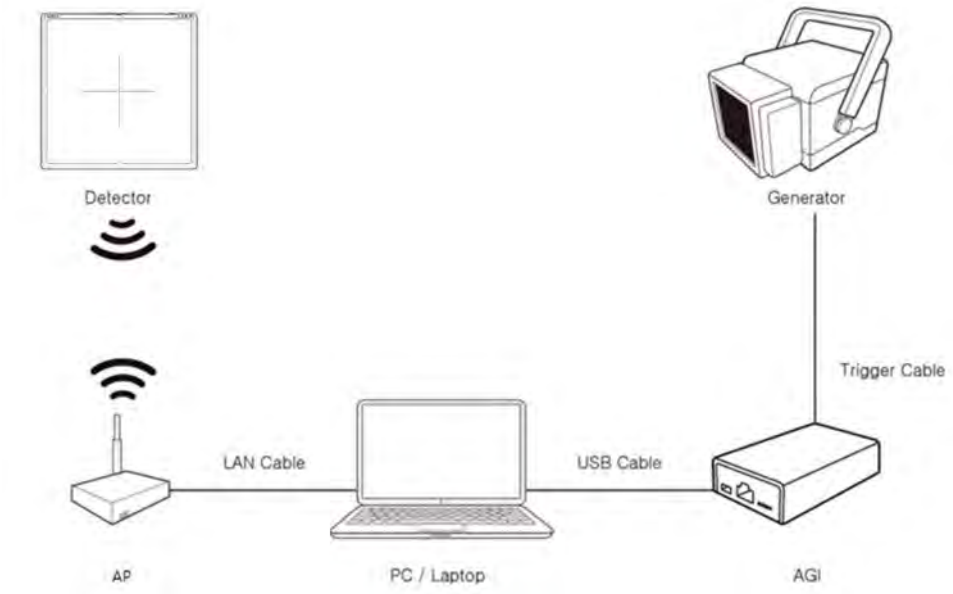
Auto Trigger & AP Mode

Follow instructions from **3.1.4**Product Set Up 2. Auto Trigger & AP Mode.



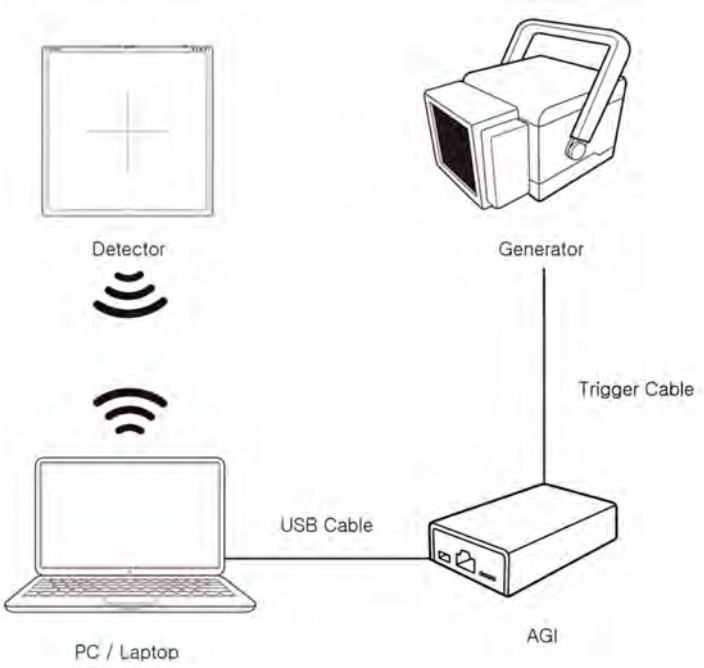
Manual Trigger & Station mode

Follow instructions from **3.1.4** Product Set Up 3. Manual Trigger & Station Mode.



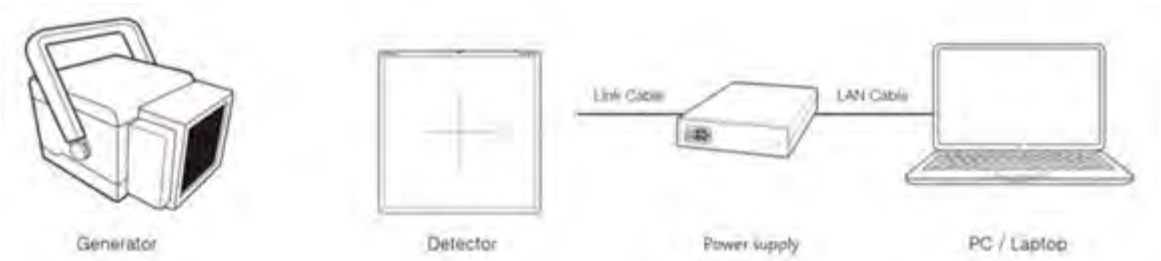
Manual Trigger & AP mode

Follow instructions from **3.1.4** Product Set Up 4. Manual Trigger & AP Mode.



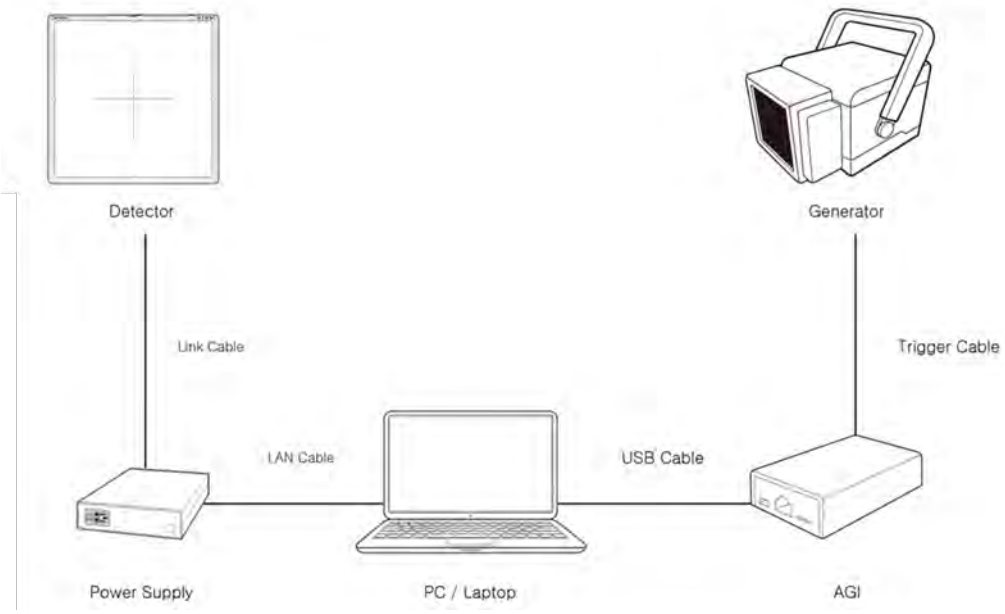
Auto Trigger & Wired Mode

Follow instructions from **3.1.4** Product Set Up 5. Auto Trigger & Wired Mode.



Manual Trigger & Wired Mode

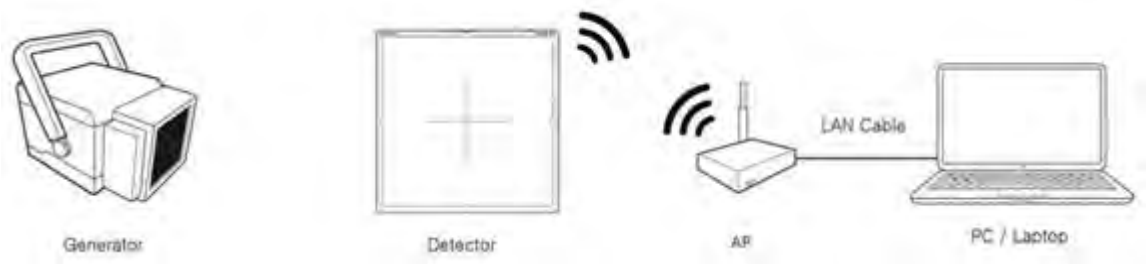
Follow instructions from **3.1.4** Product Set Up 6. Manual Trigger & Wired Mode.



3.1.4 Product Set Up

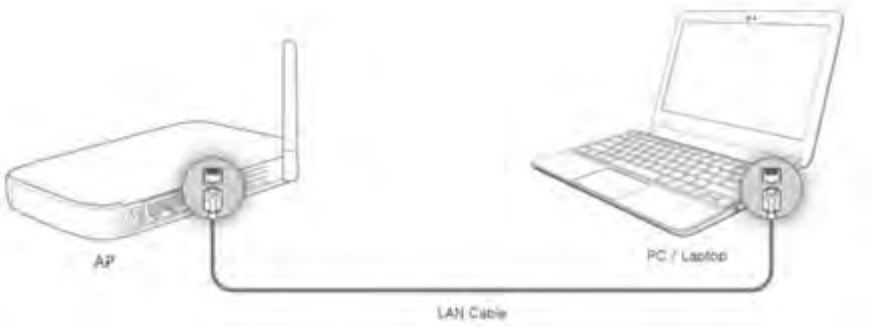
1. Auto Trigger & Station Mode

Product Set up



Connect the cable

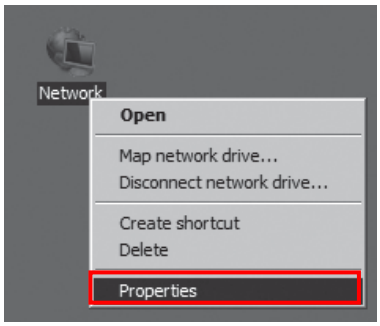
1. Connect the wireless AP and PC with the LAN cable.

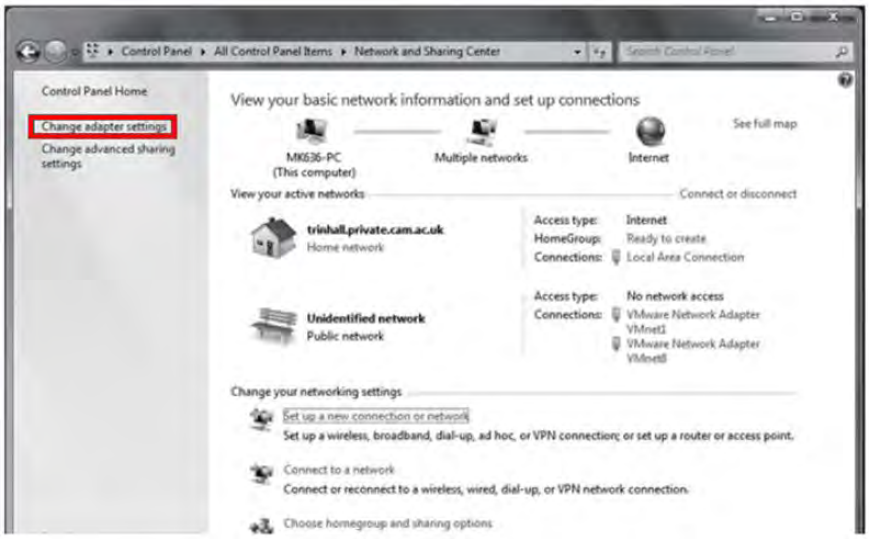


PC Set up

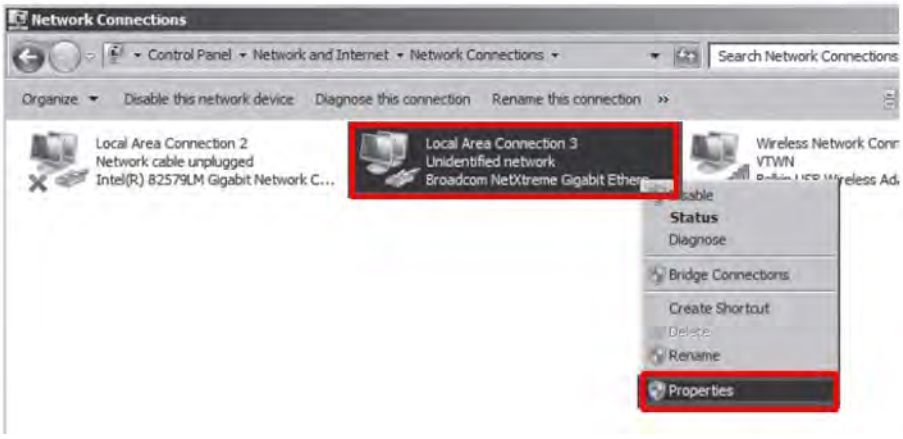
1. Set up the Network as below.

   - Desktop > Network Icon > Right click > Properties > Change Adaptor Settings
   - Control Panel > Network and Sharing Center > Change Adaptor Settings



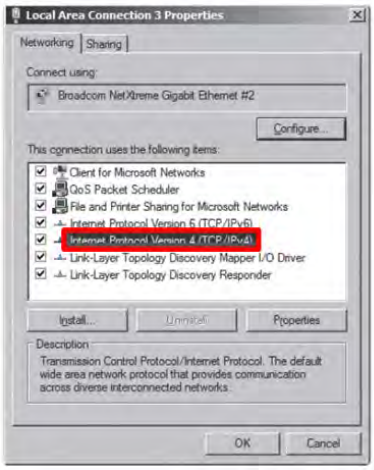


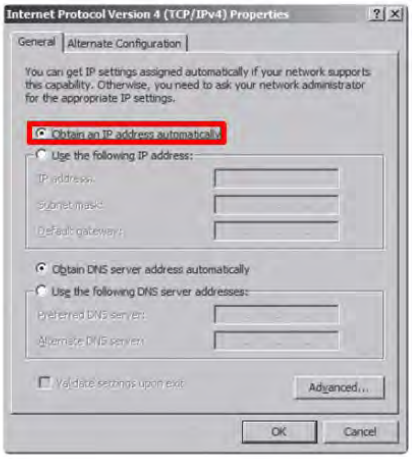
2. To use station mode, right click "Local Area Connection" and click Properties.



3. Double click “Internet Protocol Version 4 (TCP/IPv4)”.

4. Select “Obtain an IP address automatically” and click "OK".





Wireless AP (Access Point) Set up

- Please use certified wireless AP and follow each manufacture’s setup manual.

1. Set up wireless AP as below.

- SSID: Griffon
- Internal network
  - IP address: 2.2.2.1
  - Subnet mask: 255.255.255.0
  - Dynamic IP allocation range: 2.2.2.2 ~ 2.2.2.254
- Pre-Shared Key(PSK): project302
  - Authentication methods: WPAPSK or WPA2PSK
  - Password methods: TKIP/AES
- Channel (Frequency)

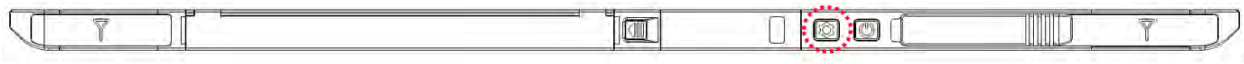
  Avoid the crowded channel option.

- Recommend to use “Auto-Channel selection” function if external AP has the feature.

2. **Part.2 Service Manual Supplement 1.** Refer to Wireless AP Set Up Instruction

Set up SW

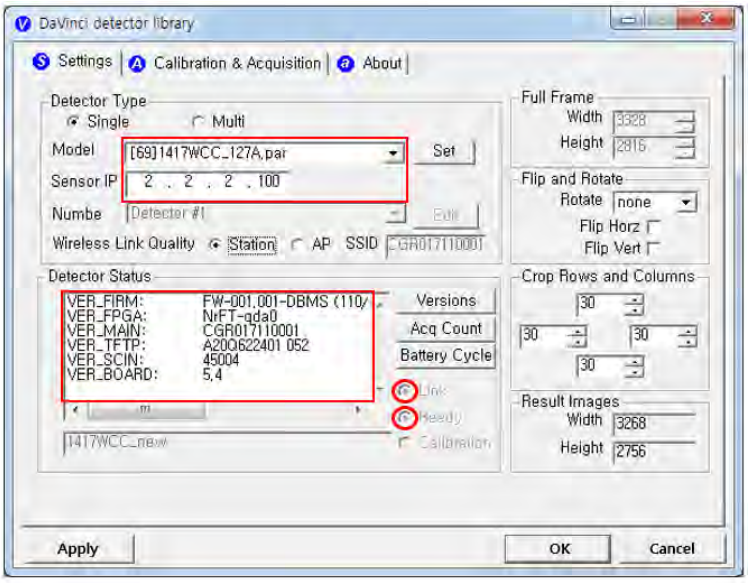
1. Turn on the detector
2. Choose Station Mode by pressing and holding the mode select button.



LED	LED Color	Mode
MODE select button	Orange	Station Mode(Wireless)
	Green	AP Mode(Wireless)
	None	Wired Mode
	Blinking Orange and Green alternatively	Sleep Mode

3. Open "_vadav.lnk" from "C:\davinci".

   Once the program is opened and the detector is connected, the LINK LED light from the detector will blink and the Detector Status will display information of the detector as below.



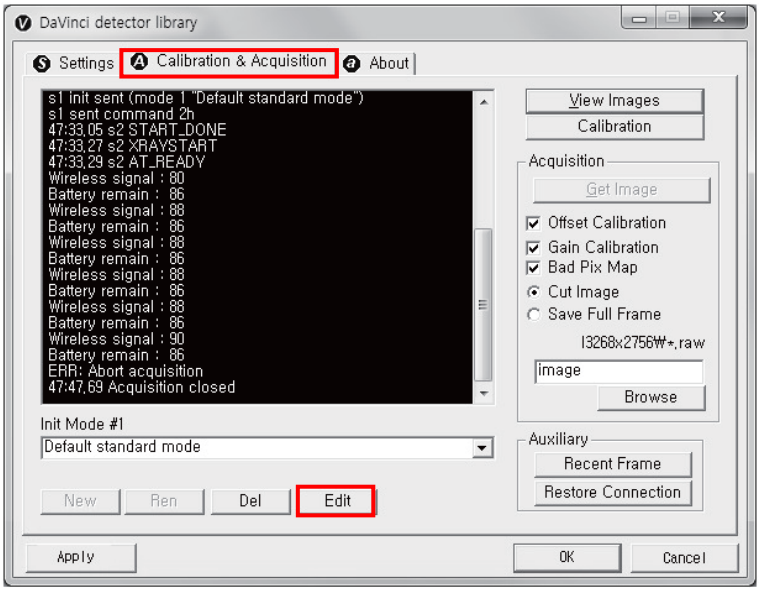
- Once the correct Sensor IP is put into the Davinci, it will automatically pull the parameter of the connected detector.

Model type	Parameter Selected
Edge Air 1417_140A	[75] Edge Air 1417_140A.par

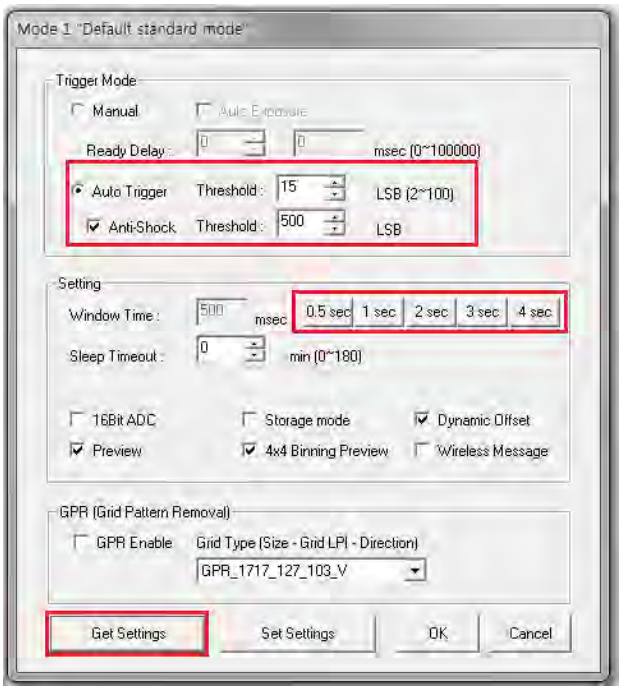
- Default IP address for wireless connection is 2.2.2.100 and for wired connection is 2.2.2.101. If the IP address needs to be changed, please refer to 2.1 Detector IP Address Set Up in Part.2 Service Manual.

If the detector does not communicate with the PC, please check the connection of the cable, PC set up and power of the detector.

4. After checking connectivity, click the “Calibration & Acquisition” tab and click "Edit".



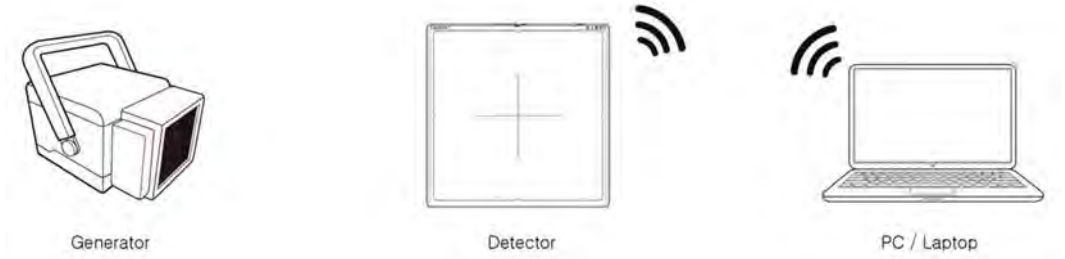
5. Another window will now be opened as shown below. Select "Auto Trigger" from "Trigger Mode". If the "Window time" needs to be changed, type the value at "Window Time" from "Setting". (For change parameter settings, must click “Get Settings” button)



- In Auto trigger mode, be sure to set the "Window time" longer than an exposure time. If the "Window time" is shorter than the exposure time, images will not be properly acquired.

2. Auto Trigger & AP Mode

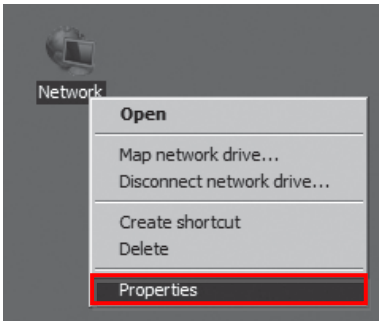
Product Set Up

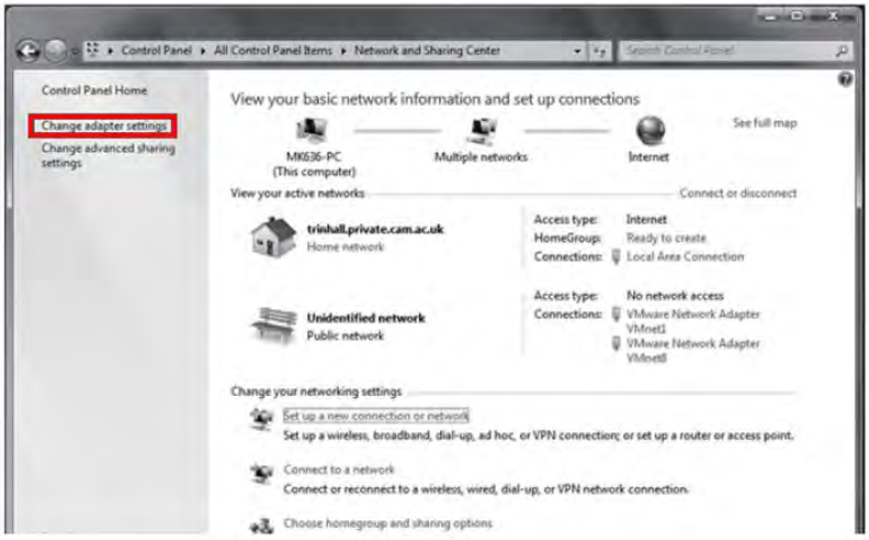


PC Set up

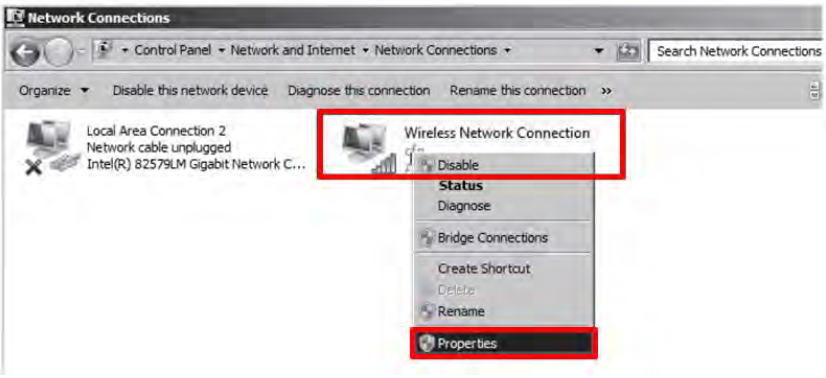
1. Set up the Network as below.

- Desktop > Network Icon > Right click > Properties > Change Adaptor Settings
- Control Panel > Network and Sharing Center > Change Adaptor Settings



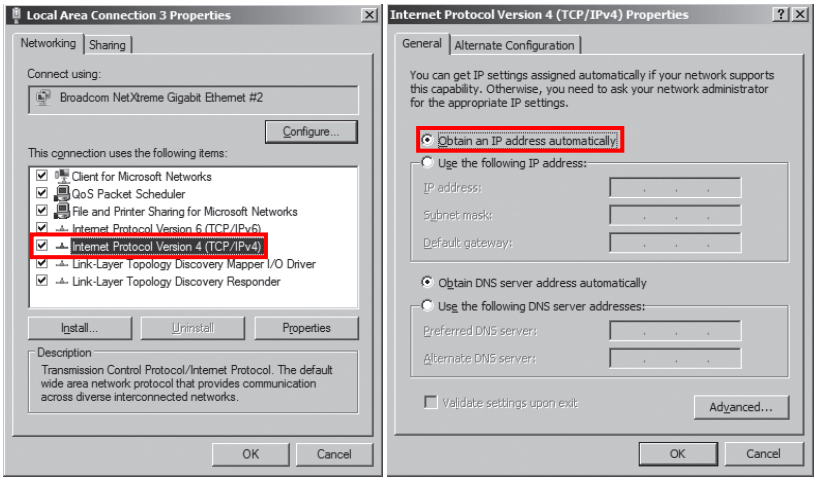


2. To use AP mode, right click "Wireless Network Connection" and click Properties.



3. Double click “Internet Protocol Version 4 (TCP/IPv4)”.

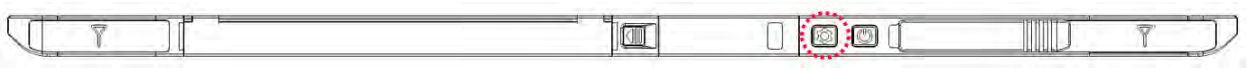
4. Select “Obtain an IP address automatically” and click "OK".



- In automatically IP address, If Detector cannot connets to PC, select “Use the following IP address” and type "2.2.2.50" at the "IP address" and type "255.255.255.0" at the "Subnet mask".
- It is recommended to use the IP of the product independently of each other as it can cause PC disconnect when two or more products use the same IP.

Set up SW

1. Connect the Detector and turn on the power.
2. Choose AP Mode by pressing and holding the mode select button.

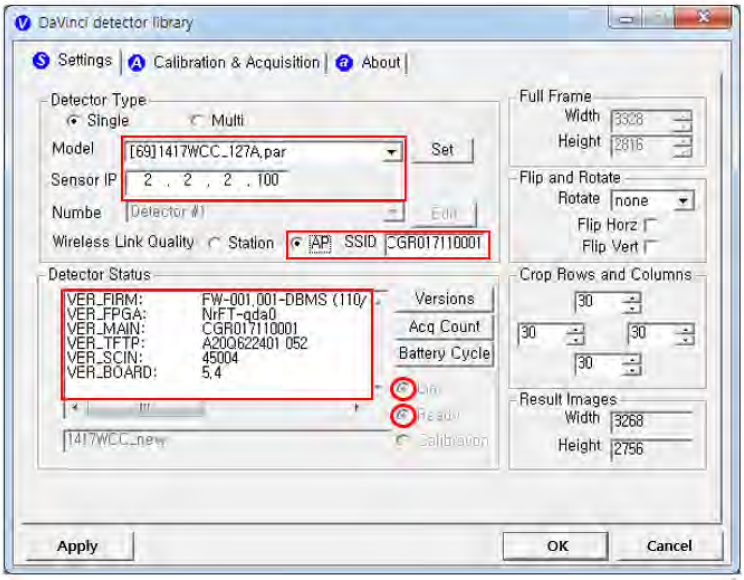


LED	LED Color	Mode
MODE	Orange	Station Mode(Wireless)
	Green	AP Mode(Wireless)
	None	Wired Mode
	Blinking Orange and Green alternatively	Sleep Mode

3. Choose the SSID (detector's SN) from Wireless Network Connection list. (PW: project302)

4. Open "_vadav.lnk" from "C:\davinci".

Once the program is opened and the detector is connected, the LINK LED light will blink and the Detector Status will display detector information as below.



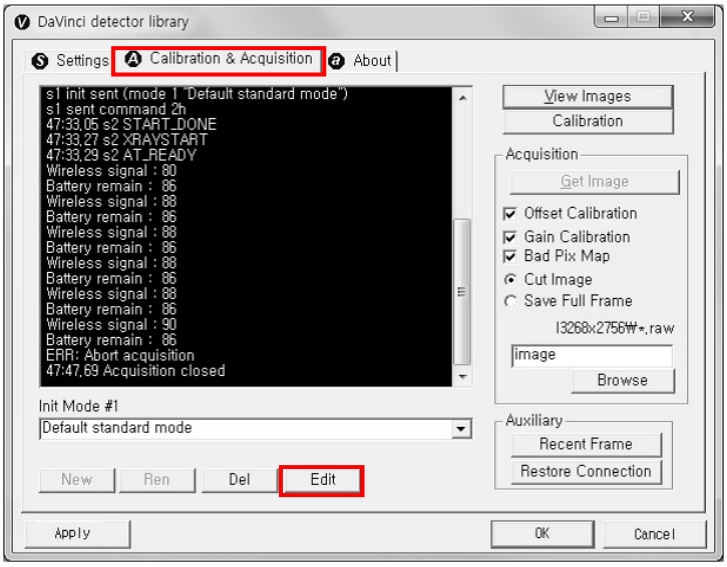
- Once the correct Sensor IP is put into the Davinci, it will automatically pull the parameter of the connected detector.

Model type	Parameter Selected
Edge Air 1417_140A	[75] Edge Air 1417_140A.par

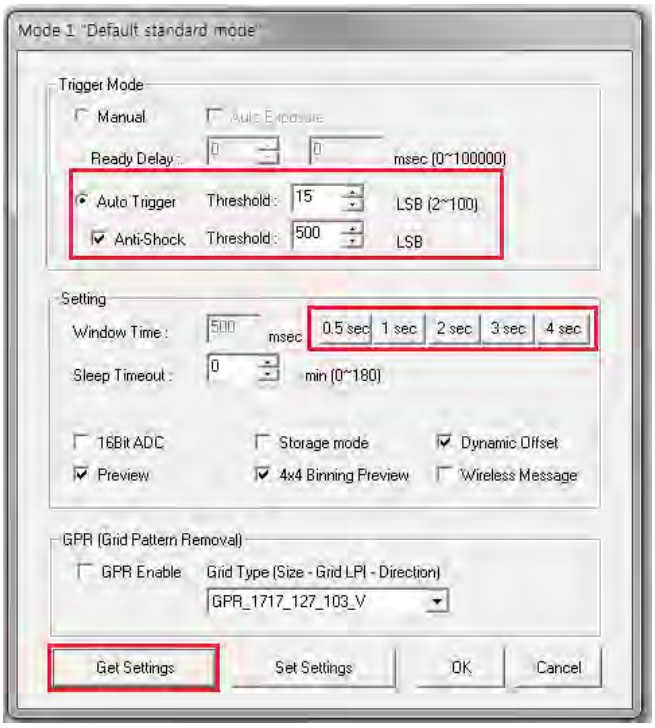
- Default IP address for wireless connection is 2.2.2.100 and for wired connection is 2.2.2.101. If the IP address needs to be changed, please refer to 2.1 Detector IP Address Set Up in Part.2 Service Manual.
- In the AP mode, select "AP" from "Wireless Link Quality" and type the detector's serial number at the "SSID".

If the detector does not communicate with the PC, please check the connection of the cable, PC set up and power of the detector.

5. After checking connection, click the “Calibration & Acquisition” tab and click "Edit".



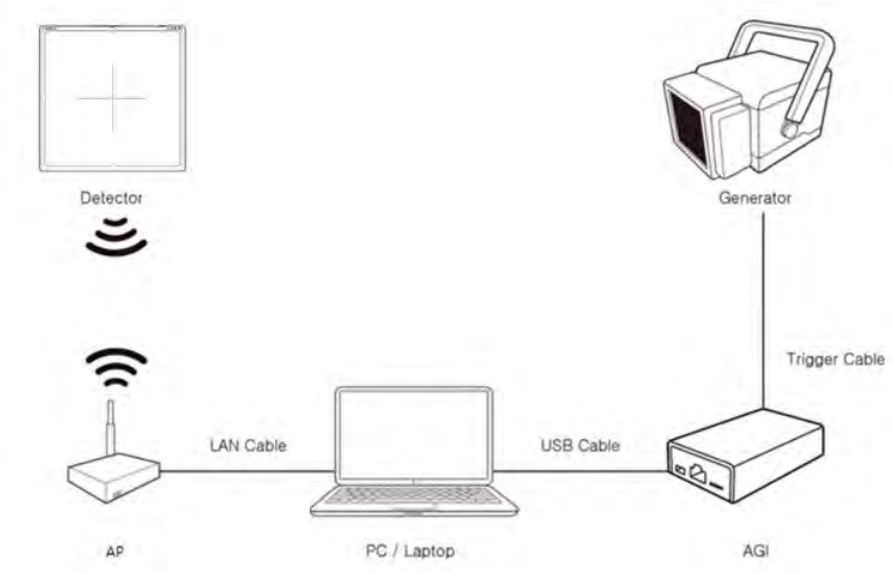
6. Another window will open as below once the “Edit” button is pressed. Select "Auto Trigger" from "Trigger Mode". If "Window time" needs to be changed, type the value at "Window Time “from "Setting". (For change parameter settings, must click “Get Settings” button)



- In Auto trigger mode, be sure to set the "Window time" longer than an exposure time. If the "Window time" is shorter than the exposure time, images will not be properly acquired.

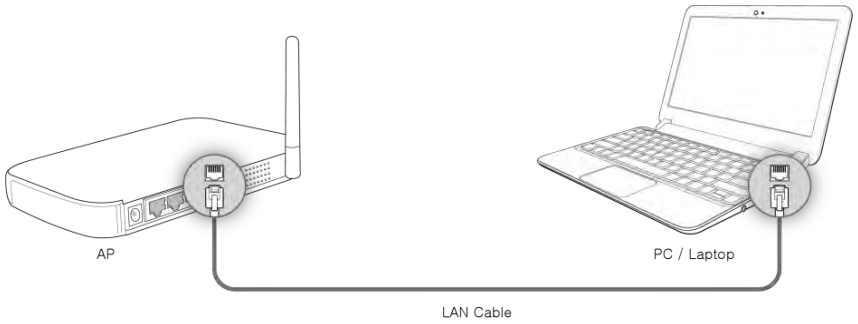
3. Manual Trigger & Station Mode

Product Set up (with AGI)

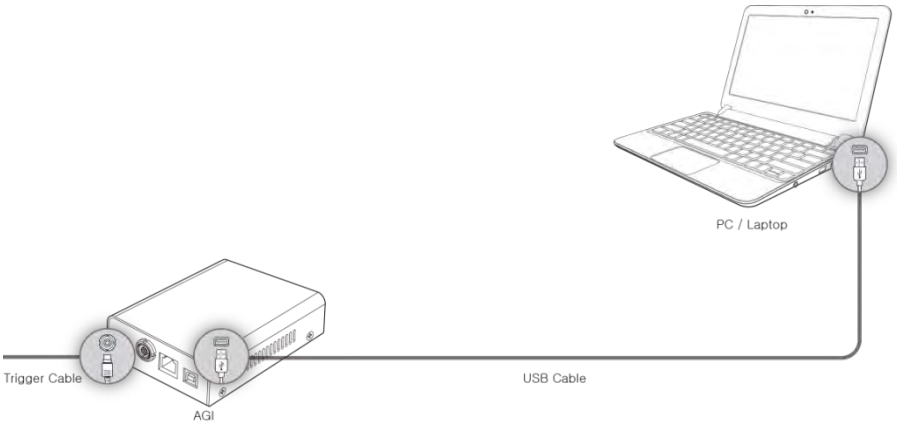


Connect the cable (with AGI box and AP)

1. Connect the wireless AP and PC with the LAN cable.

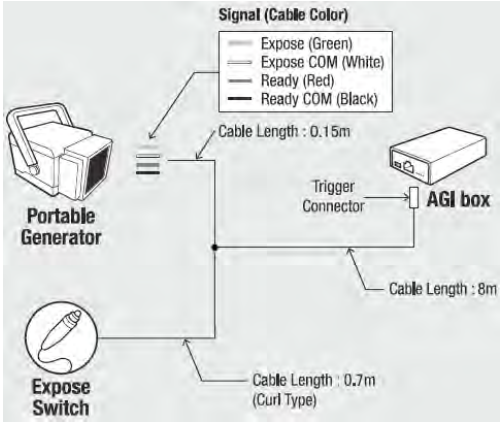


2. Connect the AGI box and PC with the USB cable.

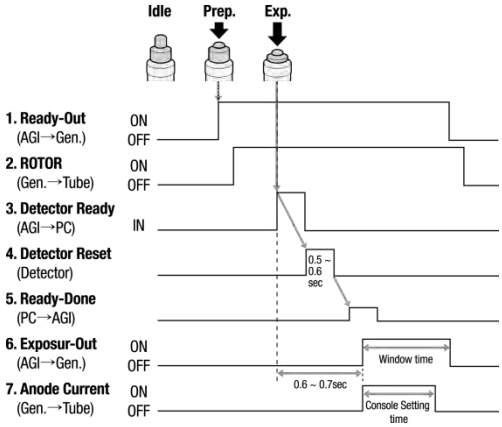


3. Connect the AGI box and generator with the P-interface or trigger cable.

Instruction of P-interface cable Integration

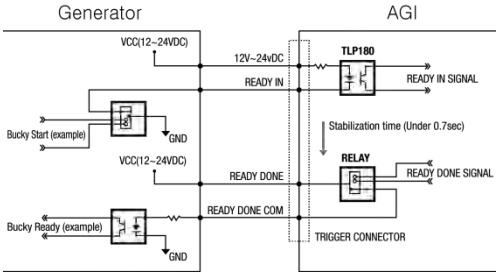


<Assembly Diagram>

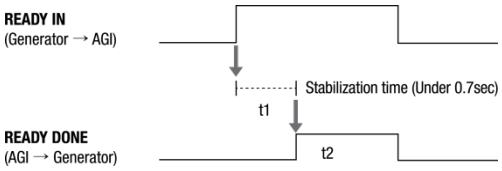


<Timing Chart>

Instruction of Trigger Cable Integration



<Assembly Diagram>

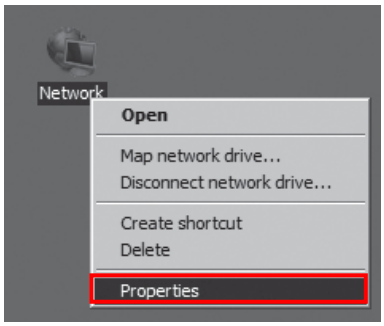


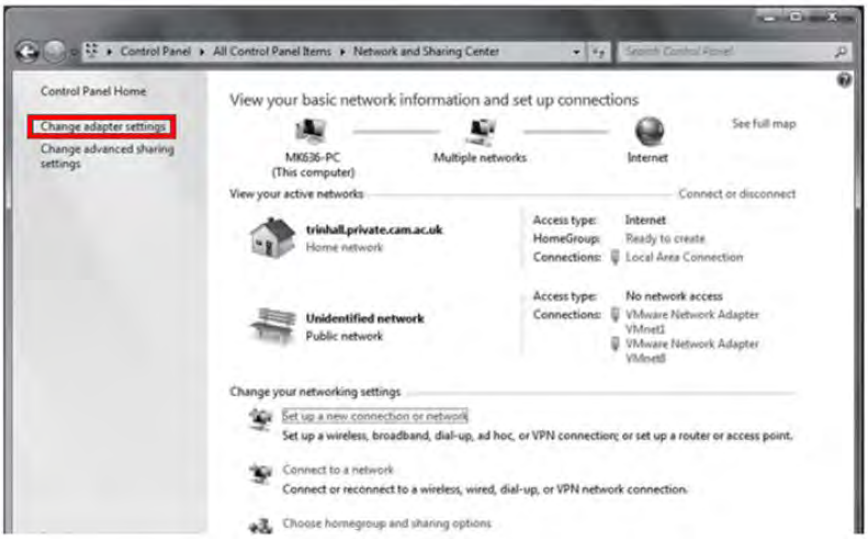
<Timing Chart>

PC Set up

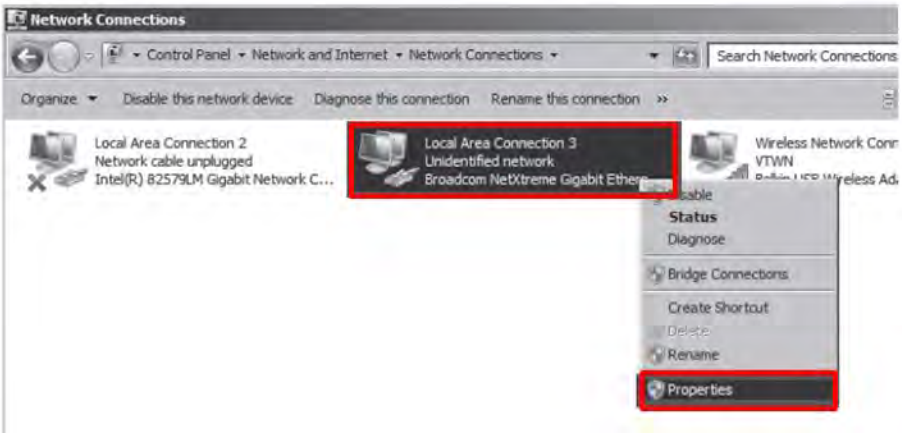
1. Set up the Network as below.

- Desktop > Network Icon > Right click > Properties > Change Adaptor Settings
- Control Panel > Network and Sharing Center > Change Adaptor Settings



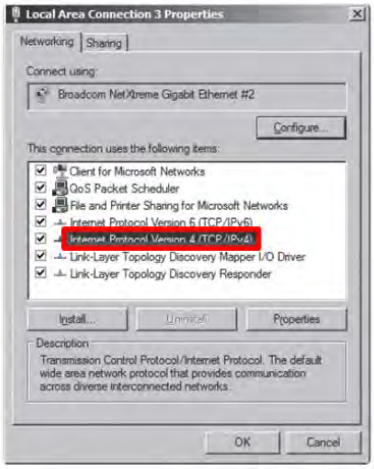


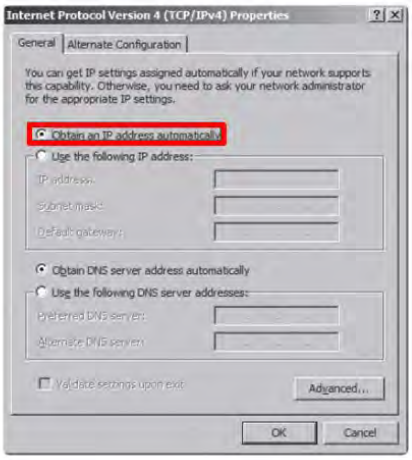
2. To use station mode, right click "Local Area Connection" and click Properties.



3. Double click “Internet Protocol Version 4 (TCP/IPv4)”.

4. Select “Obtain an IP address automatically” and click "OK".





Wireless AP (Access Point) Set up

- Please use certified wireless AP and follow each manufacture's setup manual.

1. Set up wireless AP as below.
   - SSID: Griffon
   - Internal network
     - IP address: 2.2.2.1
     - Subnet mask: 255.255.255.0
     - Dynamic IP allocation range: 2.2.2.2 ~ 2.2.2.254
   - Pre-Shared Key(PSK): project302
     - Authentication methods: WPAPSK or WPA2PSK
     - Password methods: TKIP/AES
   - Channel (Frequency)

     Avoid the Crowded channel option.

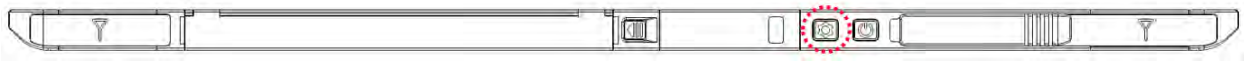
     - Recommend to use "Auto-Channel selection" function if external AP has the feature.

2. **Part.2 Service Manual Supplement 1.** Refer to Wireless AP Set Up Instruction

Set up SW

1. Connect the Detector and turn on the power.

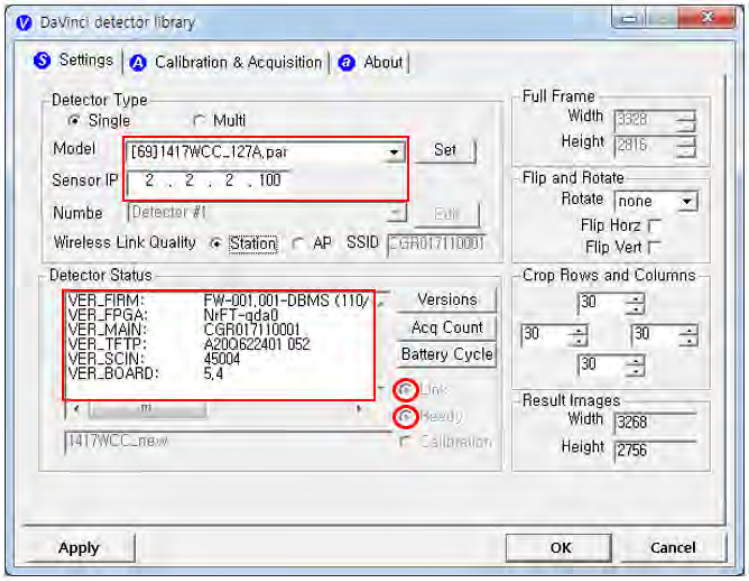
2. Choose Station Mode by pressing and holding the mode select button.



LED	LED Color	Mode
MODE select button	Orange	Station Mode(Wireless)
	Green	AP Mode(Wireless)
	None	Wired Mode
	Blinking Orange and Green alternatively	Sleep Mode

3. Open "_vadav.lnk" from "C:\davinci".

   Once the program is opened and the detector is connected, the LINK LED light will blink and the Detector Status will display detector information as below.



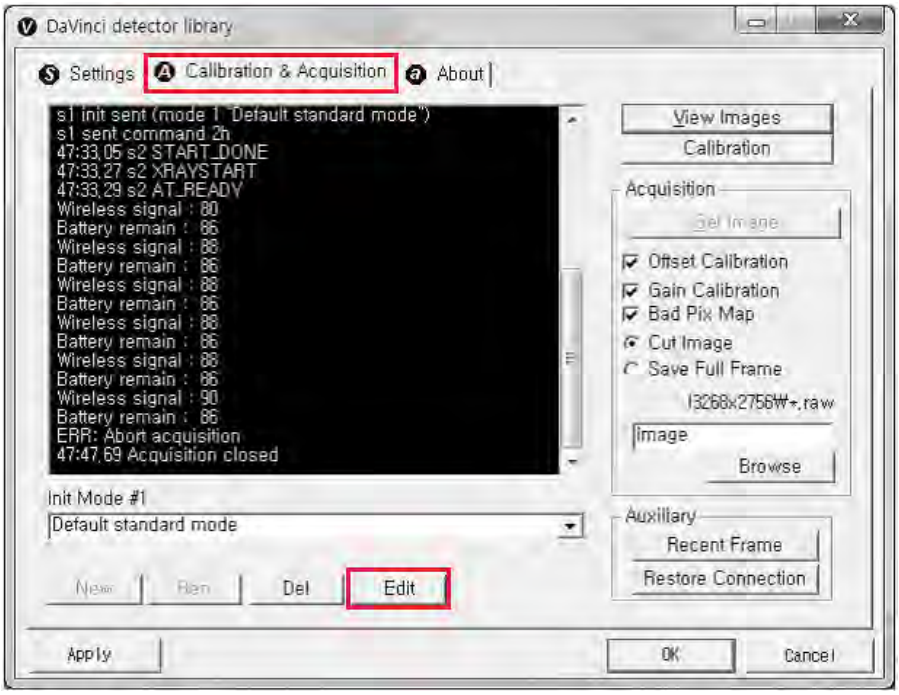
- Once the correct Sensor IP is put into the Davinci, it will automatically pull the parameter of the connected detector.

Model type	Parameter Selected
Edge Air 1417140A	[75] Edge Air 1417_140A.par

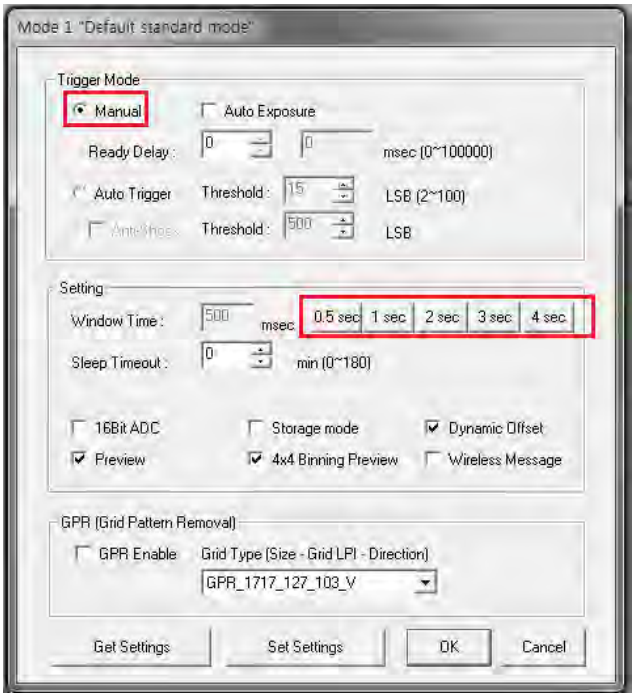
- Default IP address for wireless connection is 2.2.2.100 and for wired connection is 2.2.2.101. If the IP address needs to be changed, please refer to 2.1 Detector IP Address Set Up in Part.2 Service Manual.

If the detector does not communicate with the PC, please check the connection of the cable, PC set up and power of the detector.

4. After checking connectivity, click the “Calibration & Acquisition” tab and click "Edit".

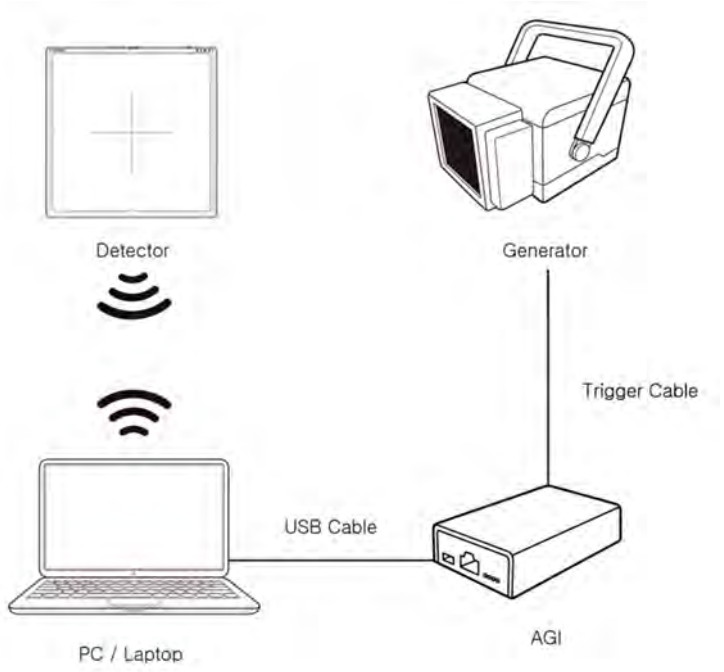


5. Another window will be opened as below once the “Edit” button is pressed. Select "Manual" from "Trigger Mode". If "Window time" needs to be changed, type the value at "Window Time" from "Setting".



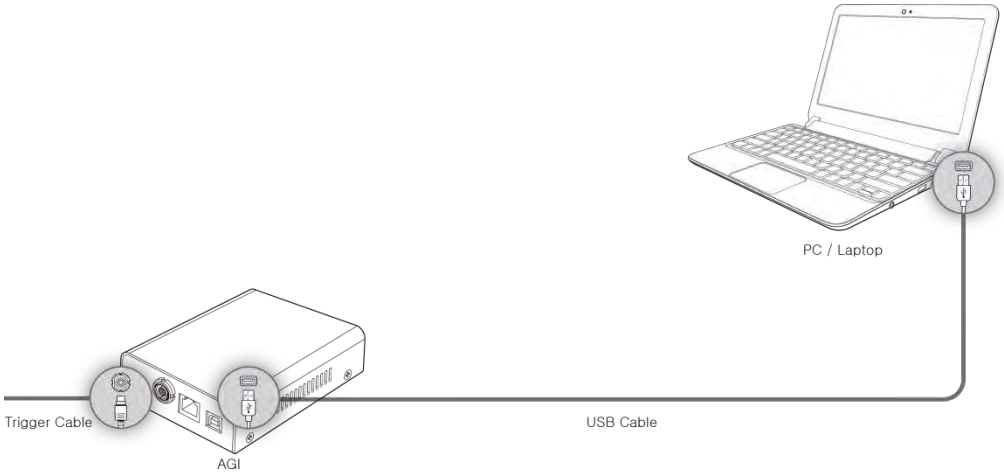
4. Manual Trigger & AP Mode

Product Set Up (with AGI)



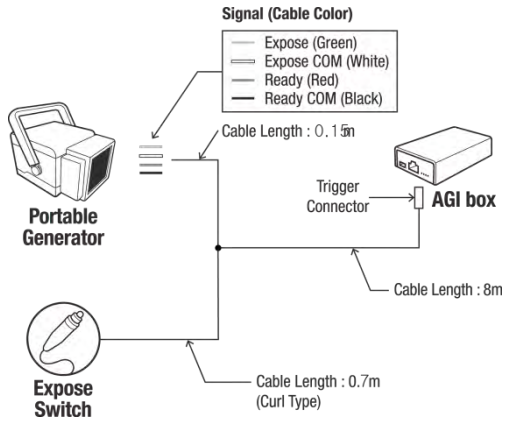
Connect the cable (with AGI)

1. Connect the AGI box and PC with the USB cable.

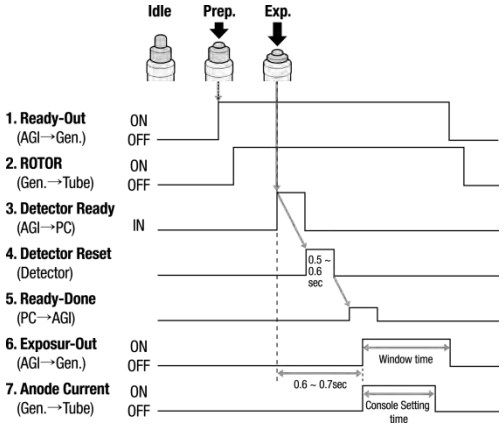


2. Connect the AGI box and generator with the P-interface or trigger cable.

Instruction of P-interface cable Integration

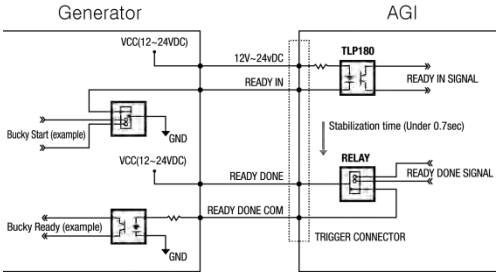


<Assembly Diagram>

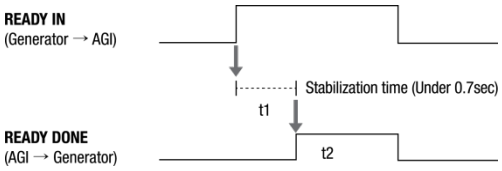


<Timing Chart>

Instruction of Trigger cable Integration



<Assembly Diagram>

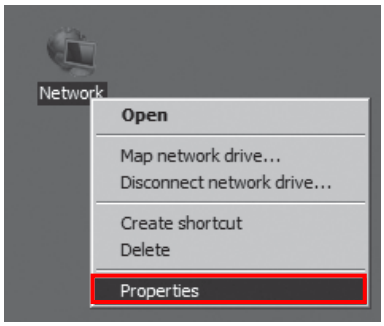


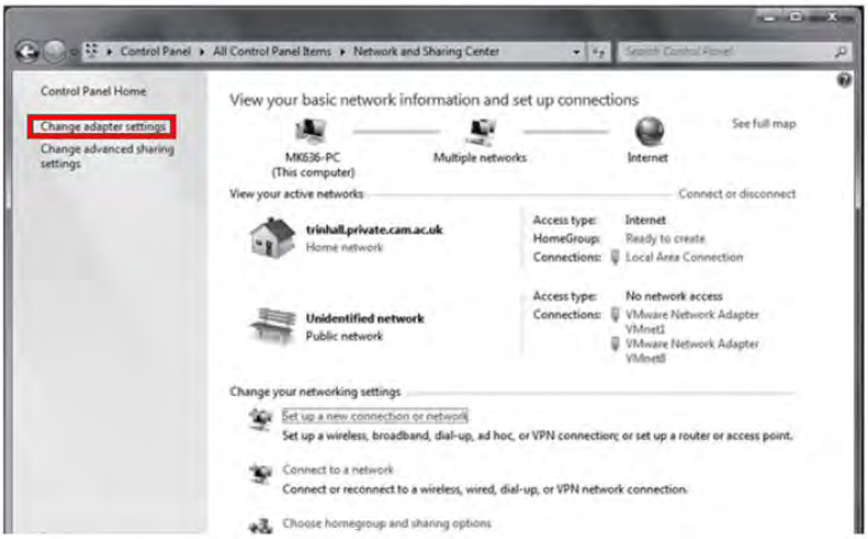
<Timing Chart>

PC Set up

1. Set up the Network as below.

- Desktop > Network Icon > Right click > Properties > Change Adaptor Settings
- Control Panel > Network and Sharing Center > Change Adaptor Settings

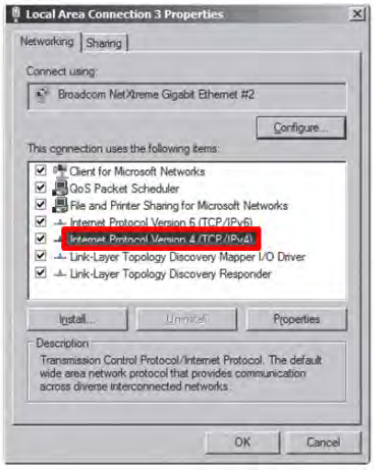


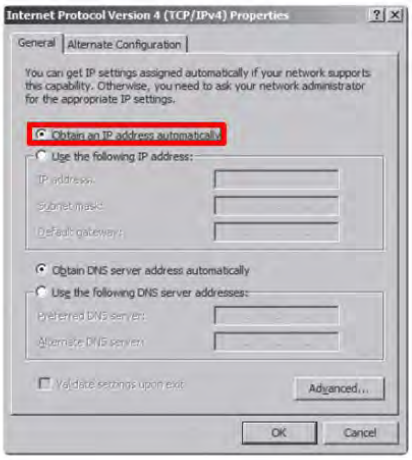


2. To use AP mode, right click "Wireless Network Connection" and click Properties.

3. Double click “Internet Protocol Version 4 (TCP/IPv4)”.

4. Select “Obtain an IP address automatically” and click "OK".



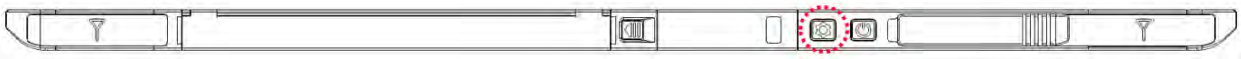


- In automatically IP address, If Detector cannot connets to PC, select “Use the following IP address” and type "2.2.2.50" at the "IP address" and type "255.255.255.0" at the "Subnet mask".
- It is recommended to use the IP of the product independently of each other as it can cause PC disconnect when two or more products use the same IP.

Set up SW

1. Turn on the detector.

2. Choose AP Mode by pressing and holding the mode select button.

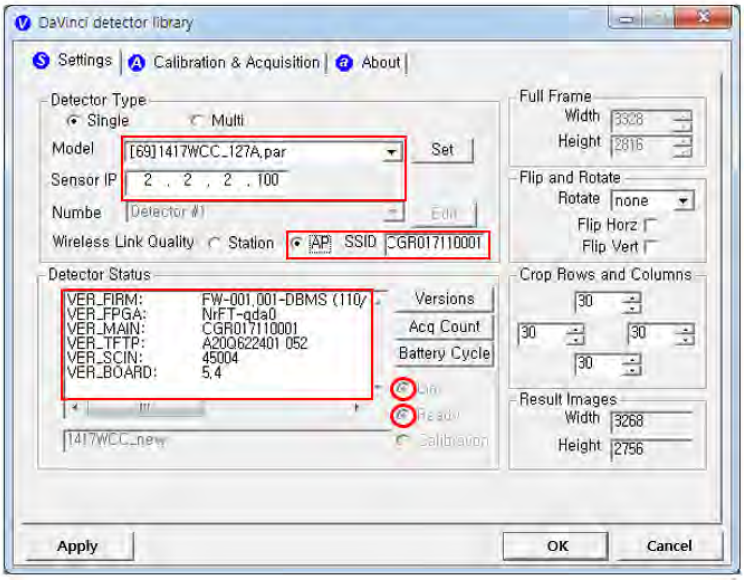


LED	LED Color	Mode
MODE	Orange	Station Mode(Wireless)
	Green	AP Mode(Wireless)
	None	Wired Mode
	Blinking Orange and Green alternatively	Sleep Mode

3. Choose the SSID (detector's SN) from Wireless Network Connection list. (PW: project302)

4. Open "_vadav.lnk" from "C:\davinci".

Once the program is opened and the detector is connected, the LINK LED light from the detector will blink and the Detector Status will display panel information as below.



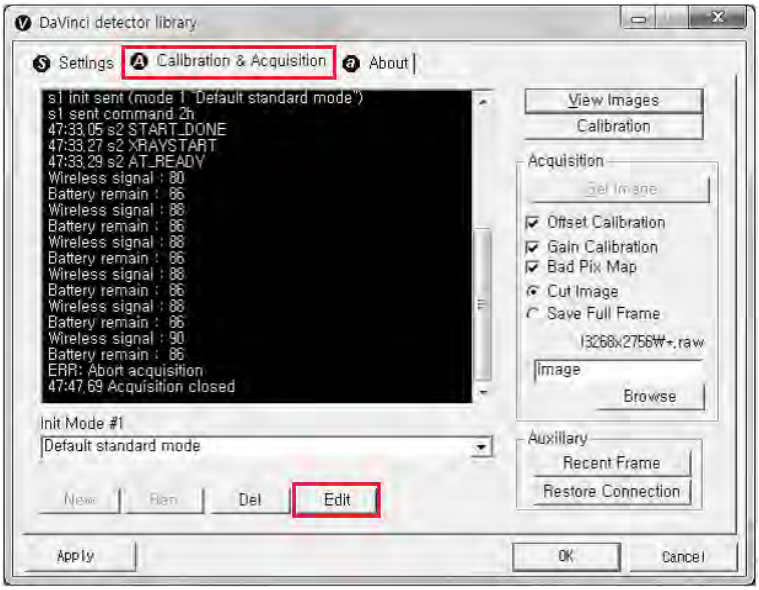
- Once the correct Sensor IP is put into the Davinci, it will automatically pull the parameter of the connected detector.

Model type	Parameter Selected
Edge Air 1417_140A	[75] Edge Air 1417_140A.par

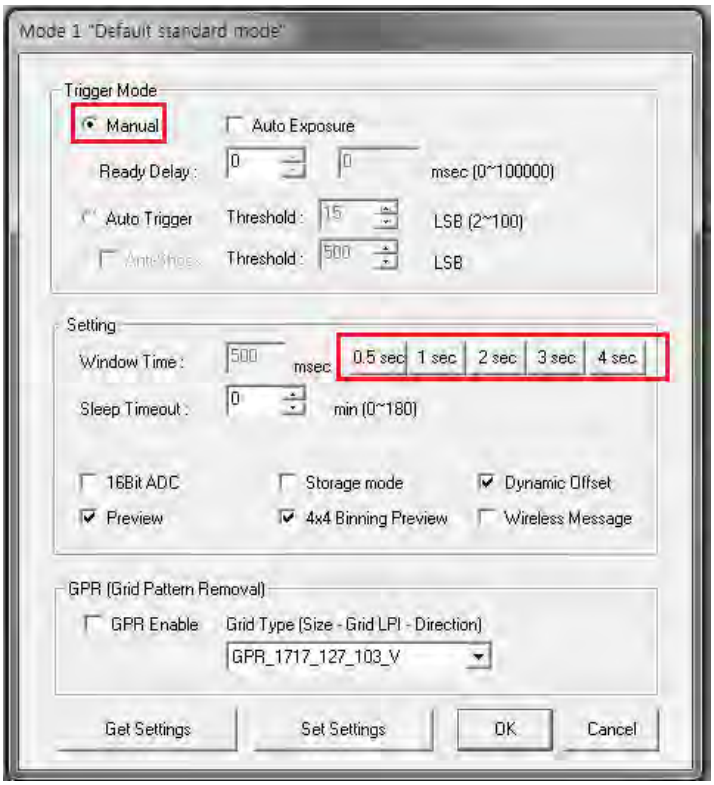
- Default IP address for wireless connection is 2.2.2.100 and for wired connection is 2.2.2.101. If the IP address needs to be changed, please refer to 2.1 Detector IP Address Set Up in Part.2 Service Manual.
- In the AP mode, select "AP" from "Wireless Link Quality" and type the detector's serial number at the "SSID".

If the detector does not communicate with PC, please check the connection of the cable, PC setup and power of detector.

5. After checking connectivity, click the “Calibration & Acquisition” tab and click "Edit".

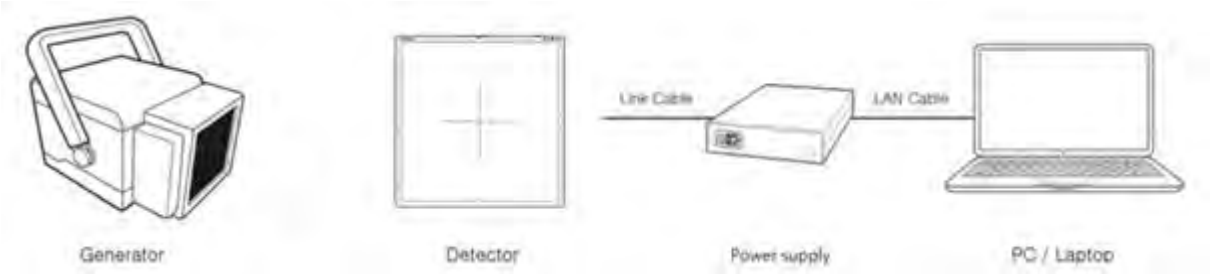


6. Another window will be opened as below once the “Edit” button is pressed. Select "Manual" from "Trigger Mode". If the "Window time" needs to be changed, type the value at "Window Time" from "Setting".



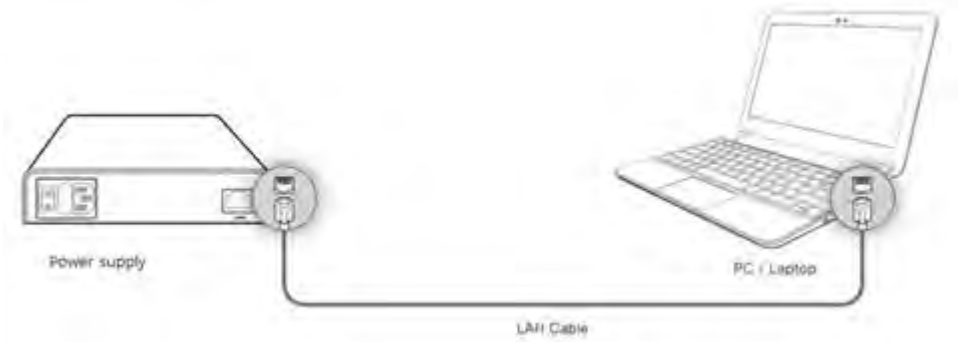
5. Auto Trigger & Wired Mode

Product Set Up

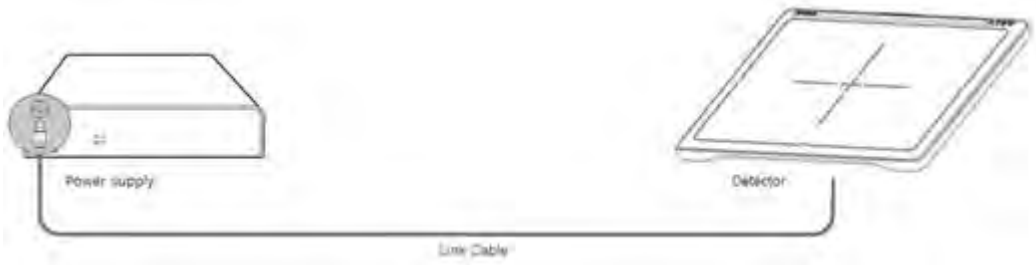


Connect the cable

1. Connect the power supply and PC with the LAN cable.



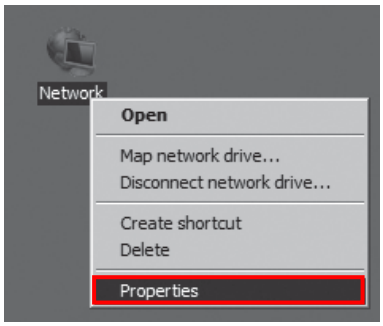
2. Connect the power supply and Detector with the Link cable.

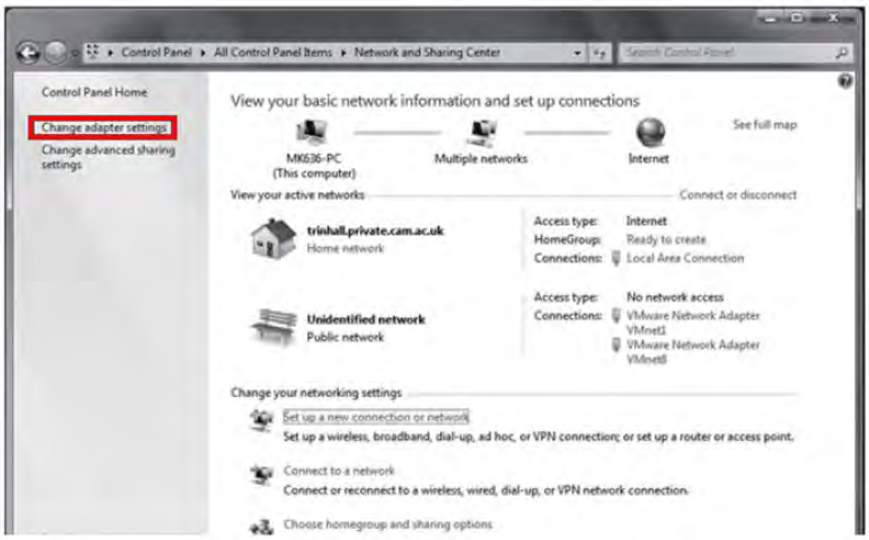


PC Set up

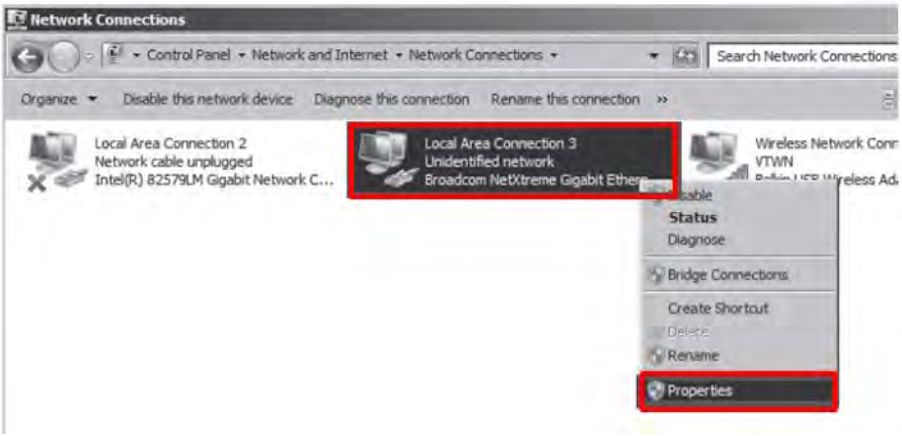
1. Set up the Network as below.

   - Desktop > Network Icon > Right click > Properties > Change Adaptor Settings
   - Control Panel > Network and Sharing Center > Change Adaptor Settings



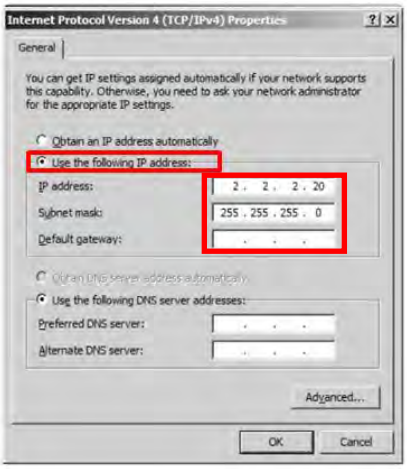


2. To use Wired mode, right click "Local Area Connection" and click Properties.



3. Double click “Internet Protocol Version 4 (TCP/IPv4)”.

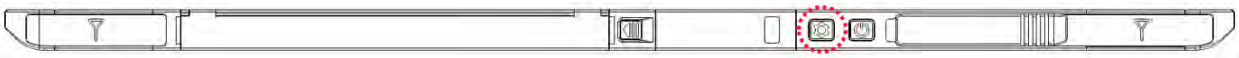
4. Select “Use the following IP address” and type "2.2.2.20" at the "IP address" and type "255.255.255.0" at the "Subnet mask".



Set up SW

1. Turn on the power supply

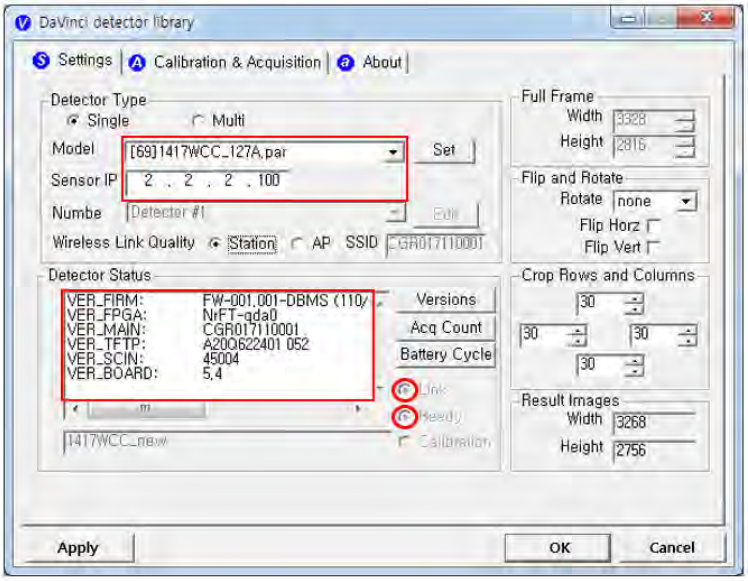
2. Connect the Detector to the power supply using the Link cable (Wired mode will be selected automatically)



LED	LED Color	Mode
MODE	Orange	Station Mode(Wireless)
	Green	AP Mode(Wireless)
	None	Wired Mode
	Blinking Orange and Green alternatively	Sleep Mode

3. Open "_vadav.lnk" from "C:\davinci".

Once the program is opened and the detector is connected, the LINK LED light will blink and the Detector Status will display detector information as below.



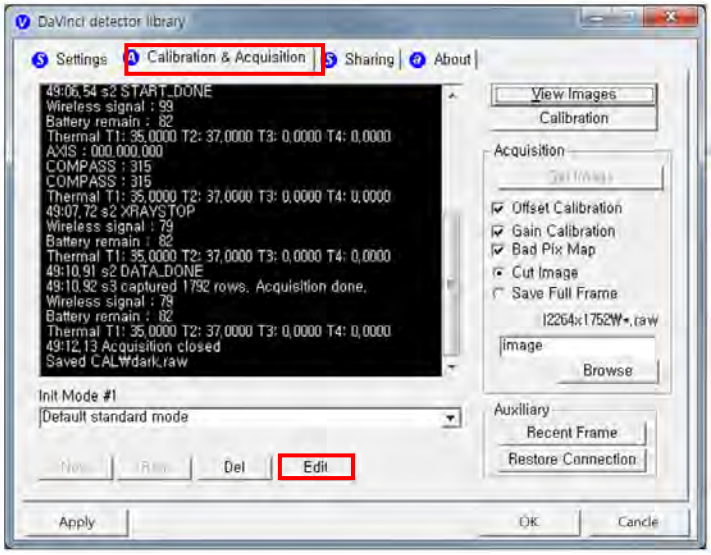
- Once the correct Sensor IP is put into the Davinci, it will automatically pull the parameter of the connected detector.

Model type	Parameter Selected
Edge Air 1417_140A	[75] Edge Air 1417_140A.par

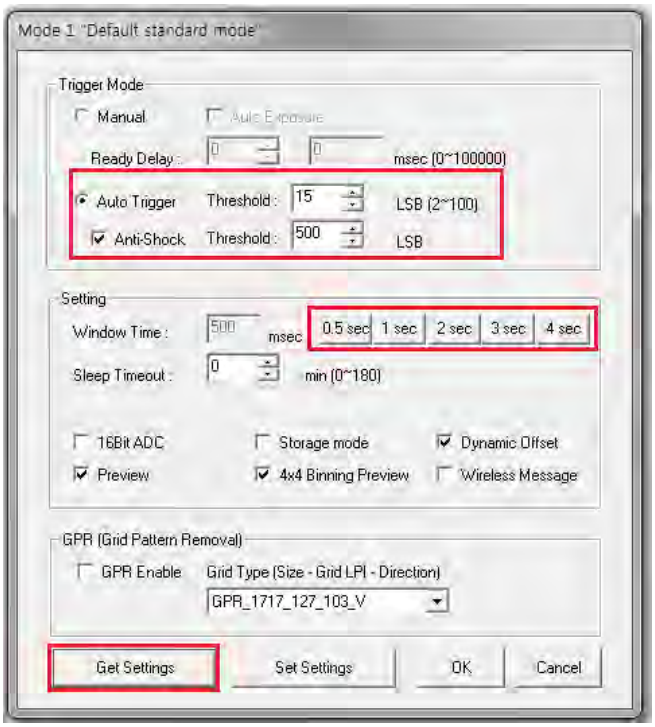
- Default IP address for wireless connection is 2.2.2.100 and for wired connection is 2.2.2.101. If the IP address needs to be changed, please refer to 2.1 Detector IP Address Set Up in Part.2 Service Manual.

If the detector does not communicate with the PC, please check the connection of the cable, PC set up and power of the detector.

4. After checking connectivity, click the “Calibration & Acquisition” tab and click "Edit".



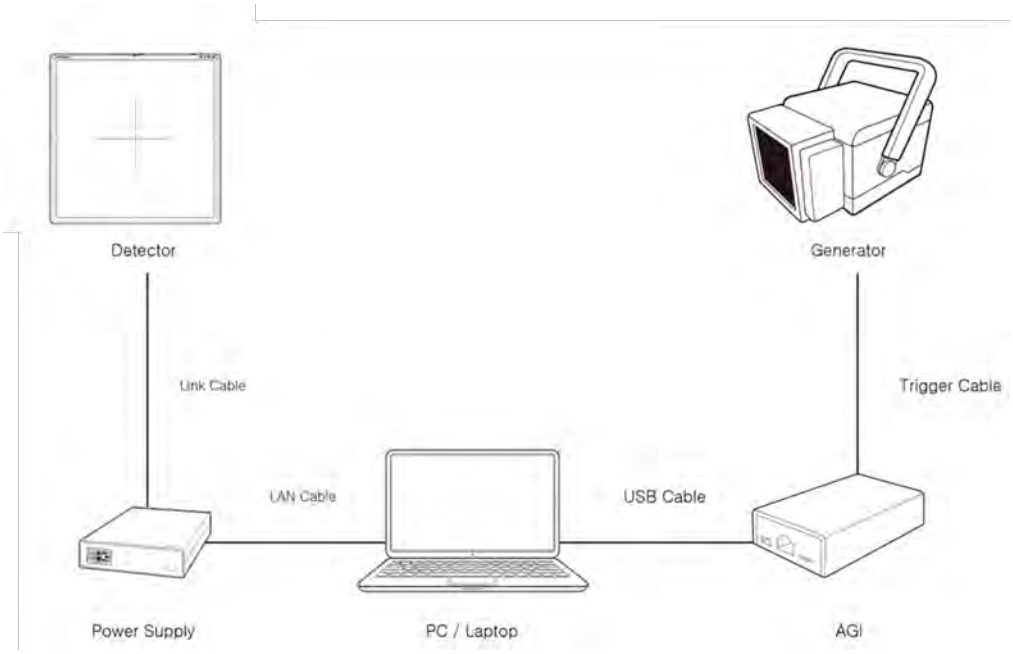
5. Another window will be opened as below once the “Edit” button is pressed. Select "Auto Trigger" from "Trigger Mode". If "Window time" needs to be changed, type the value at "Window Time" from "Setting". (For change parameter settings, must click “Get Settings” button)



- In Auto trigger mode, be sure to set the "Window time" longer than an exposure time. If the "Window time" is shorter than the exposure time, images will not be properly acquired.

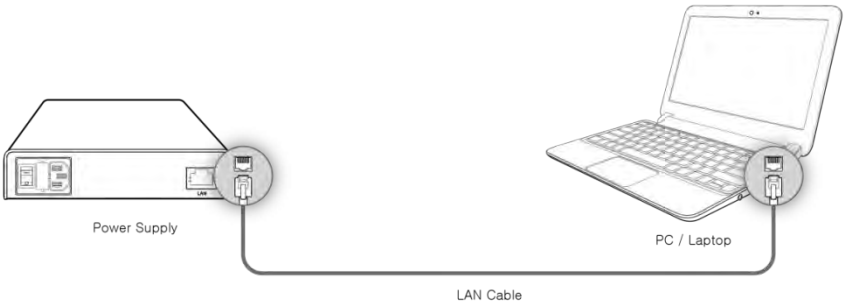
6. Manual Trigger & Wired Mode

Product Set up (with Power supply and AGI)

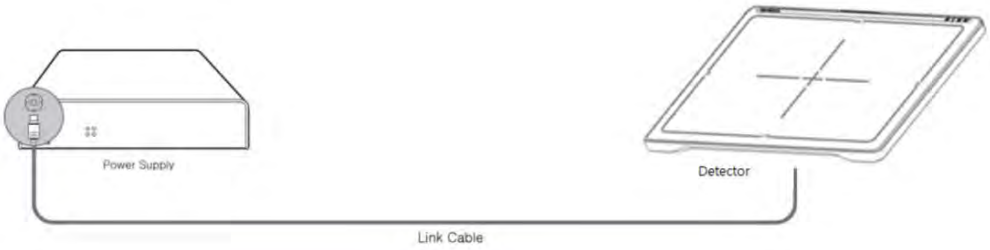


Connect the cable (with Power supply and AGI)

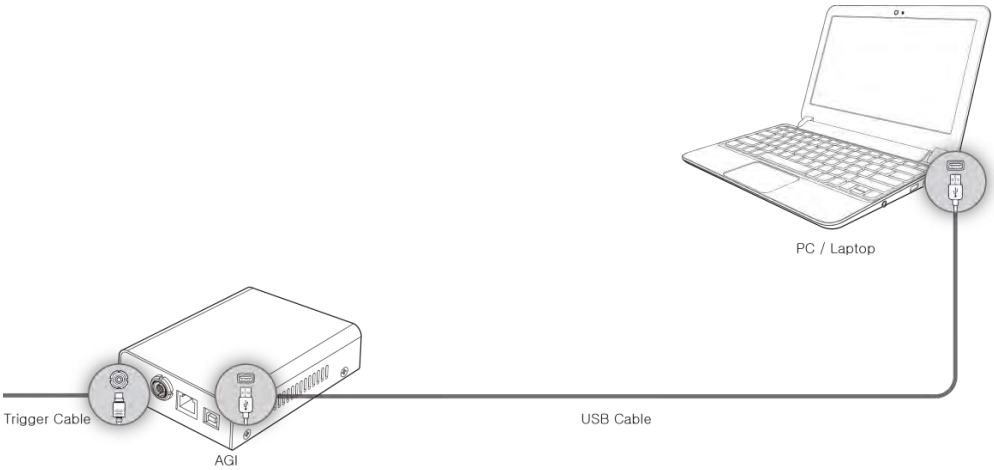
1. Connect the power supply and PC with the LAN cable.



2. Connect the power supply and Detector with the Link cable.

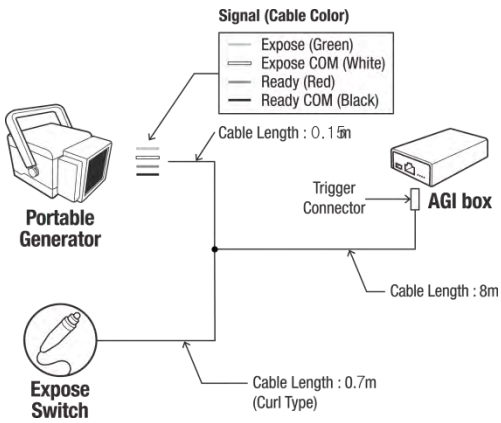


3. Connect the AGI box and PC with the USB cable.

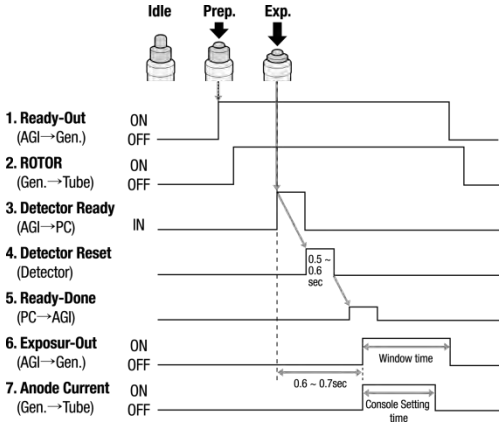


4. Connect the AGI box and generator with the P-interface or trigger cable.

Instruction of P-interface cable Integration

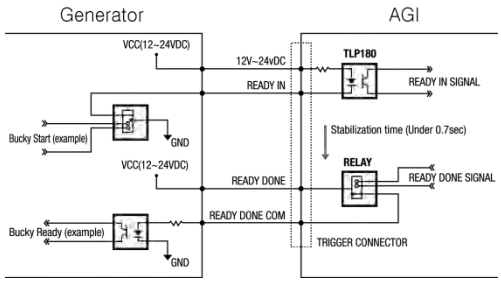


<Assembly Diagram>

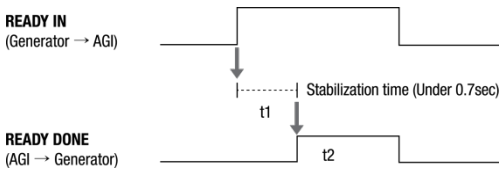


<Timing Chart>

Instruction of Trigger cable Integration



<Assembly Diagram>

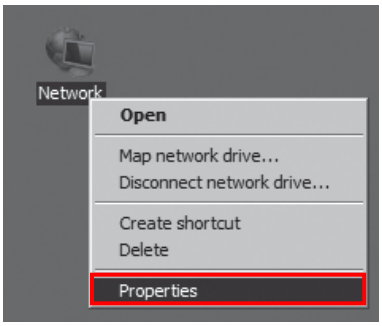


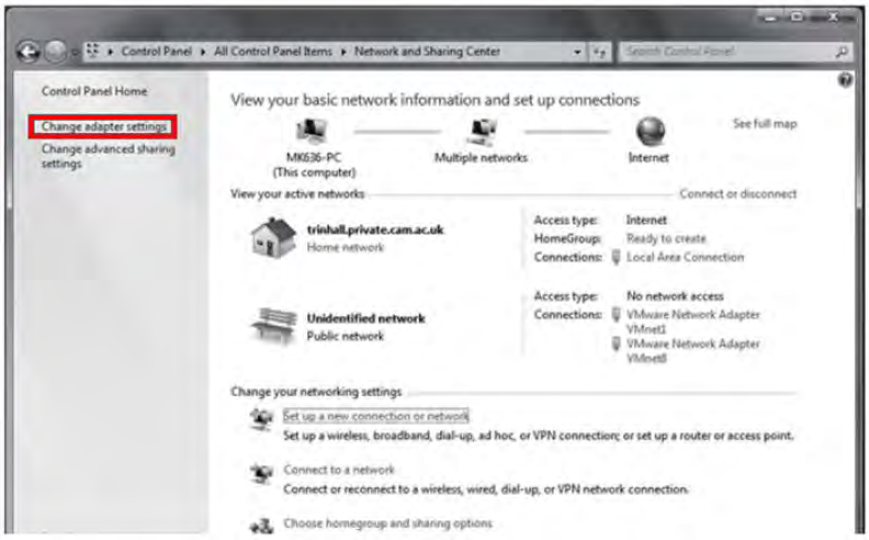
<Timing Chart>

PC Set up

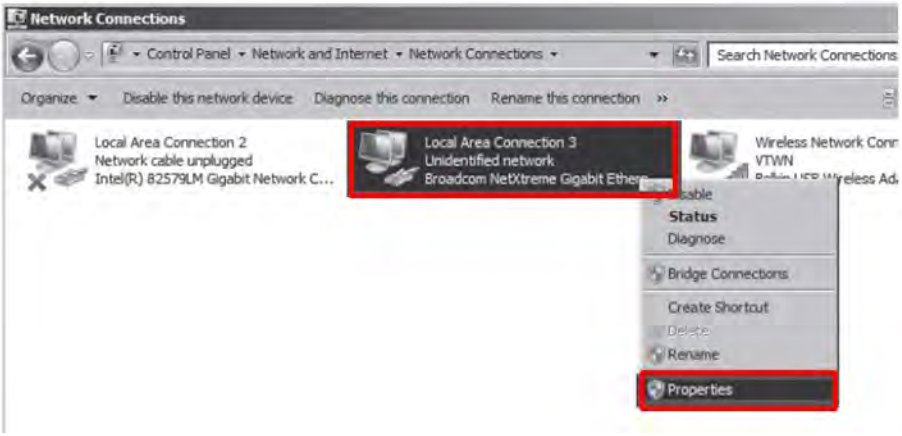
1. Set up the Network as below.

- Desktop > Network Icon > Right click > Properties > Change Adaptor Settings
- Control Panel > Network and Sharing Center > Change Adaptor Settings Set up SW



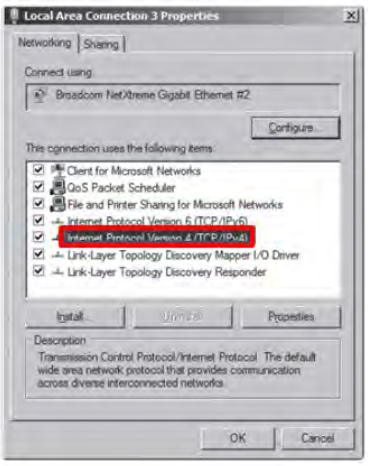


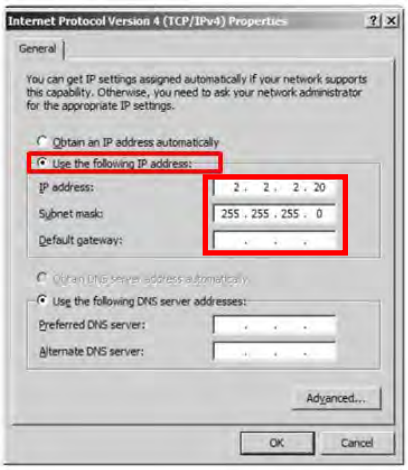
2. To use Wired mode, right click "Local Area Connection" and click Properties.



3. Double click “Internet Protocol Version 4 (TCP/IPv4)”.

4. Select “Use the following IP address” and type "2.2.2.20" at the "IP address" and type "255.255.255.0" at the "Subnet mask".

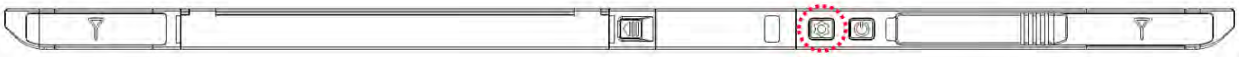




Set up SW

1. Turn on the power supply

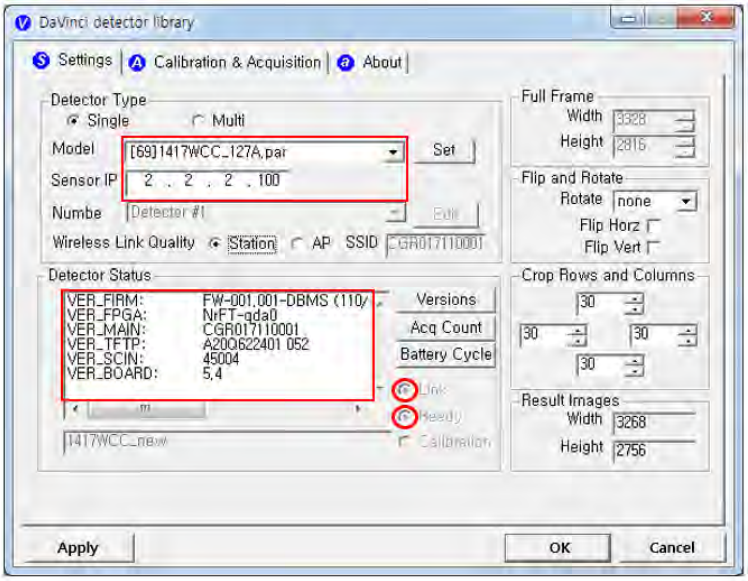
2. Connect the Detector to the power supply or RAP001A using the Link cable (Wired mode will be selected automatically)



LED	LED Color	Mode
MODE	Orange	Station Mode(Wireless)
	Green	AP Mode(Wireless)
	None	Wired Mode
	Blinking Orange and Green alternatively	Sleep Mode

3. Open "_vadav.lnk" from "C:\davinci".

Once the program is opened and the detector is connected, the LINK LED light will blink and the Detector Status will display detector information as below.



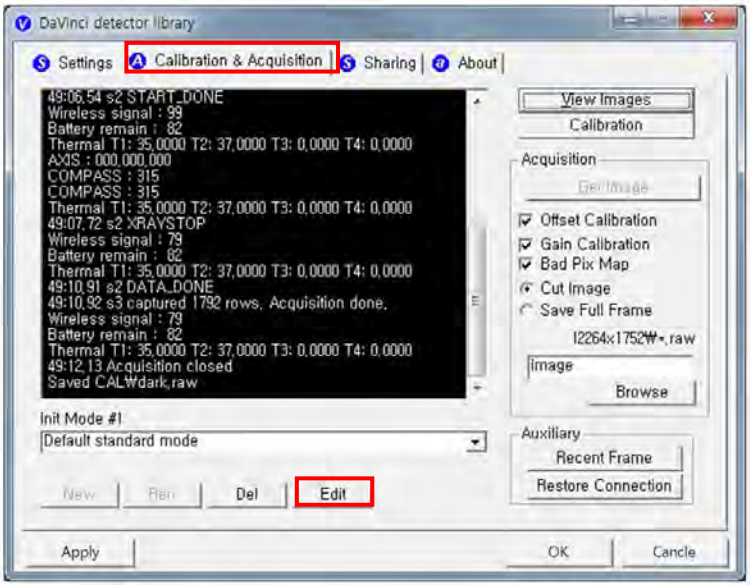
- Once the correct Sensor IP is put into the Davinci, it will automatically pull the parameter of the connected detector.

Model type	Parameter Selected
Edge Air 1417_140A	[75] Edge Air 1417_140A.par

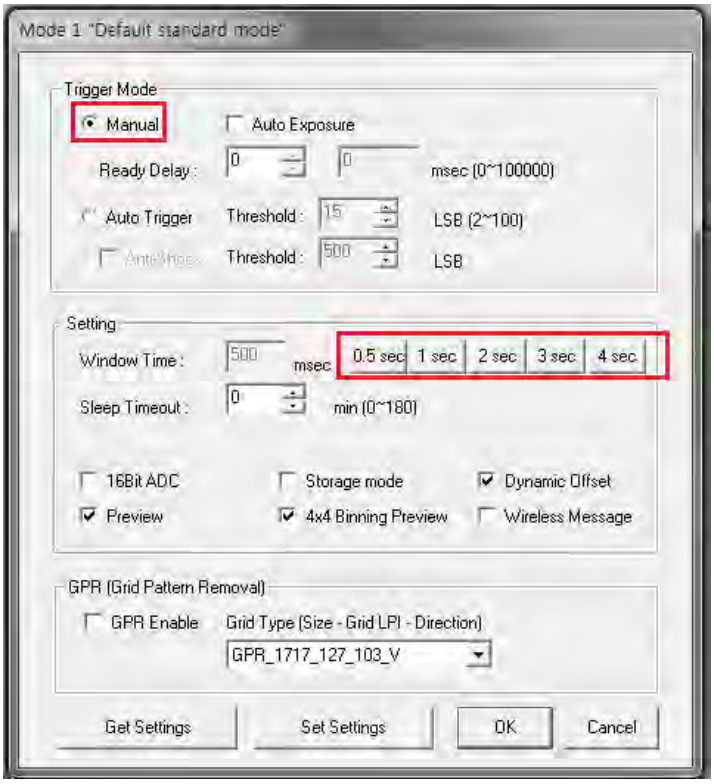
- Default IP address for wireless connection is 2.2.2.100 and for wired connection is 2.2.2.101. If the IP address needs to be changed, please refer to 2.1 Detector IP Address Set Up in Part.2 Service Manual.

If the detector does not communicate with the PC, please check the connection of the cable, PC set up and power of the detector.

4. After checking connectivity, click the “Calibration & Acquisition” tab and click "Edit".



5. Another window will be opened as below once the “Edit” button is pressed. Select "Manual" from "Trigger Mode". If "Window time" needs to be changed, type the value at "Window Time" from "Setting". (For change parameter settings, must click “Get Settings” button)



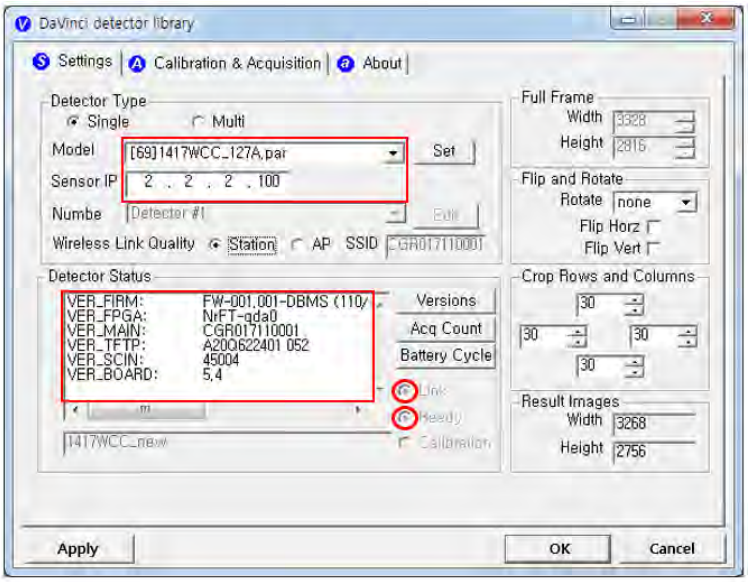
3.2 Calibration

In order to properly acquire images, calibration must be performed. Without calibration, optimum images cannot be acquired.

- OSKO Inc. recommends to warm up the detector for 5 minutes after turning on the power.
- Calibration should be performed at regular intervals, typically once every six (6) months, or whenever the central beam of the X-ray source has been moved relative to the Detector.

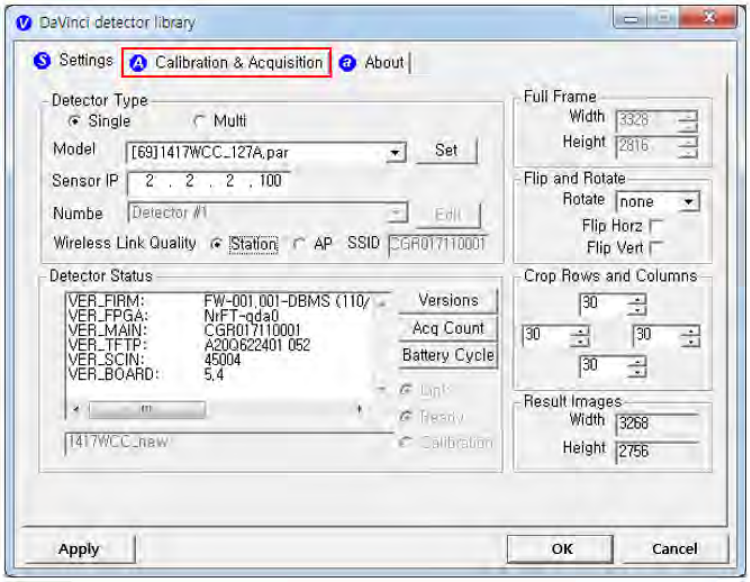
3.2.1 Auto Calibration Mode

1. Connect the detector and turn the power on.
2. Open "_vadav.lnk" from "C:\davinci".
3. Once the detector is connected, information of the detector is displayed in Detector Status and Link & Ready are checked as below.

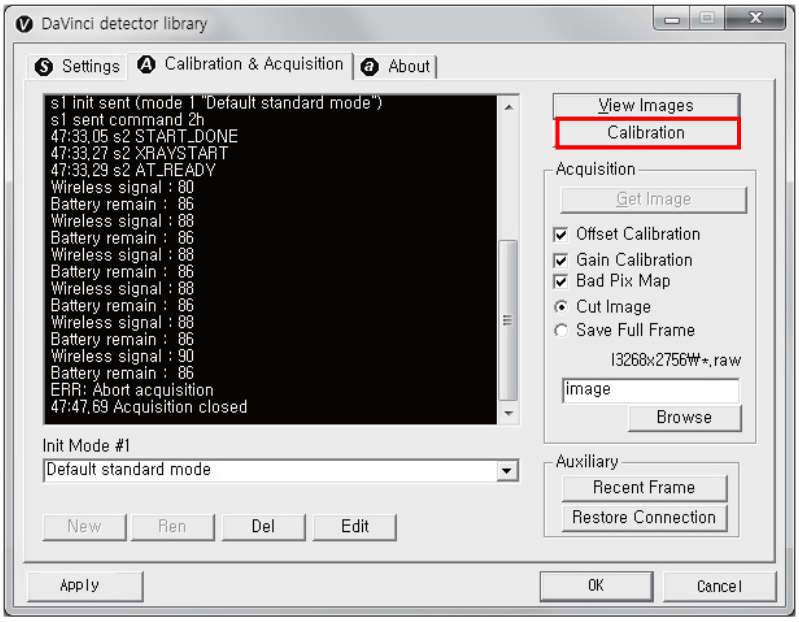


- If "Detector Status" does not show anything, please refer to **3.1Installation** in Part.1 User & Installation Manual to connect the detector properly.

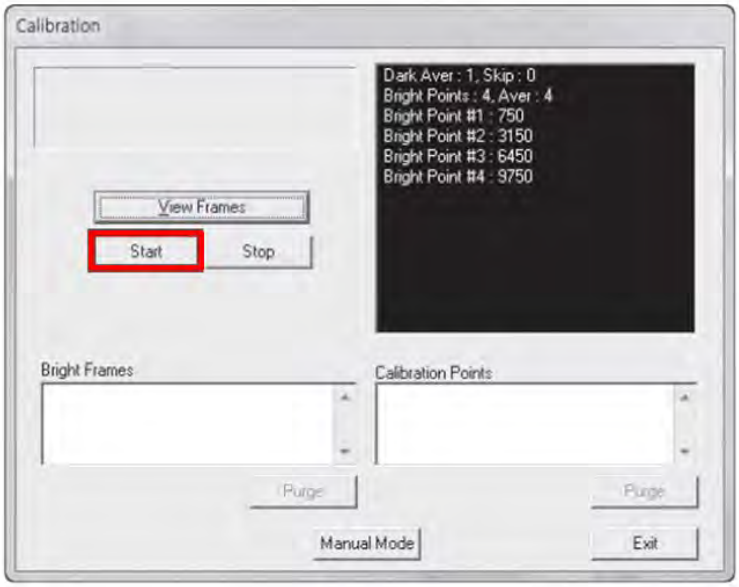
4. After checking connection, click “Calibration & Acquisition” tab.



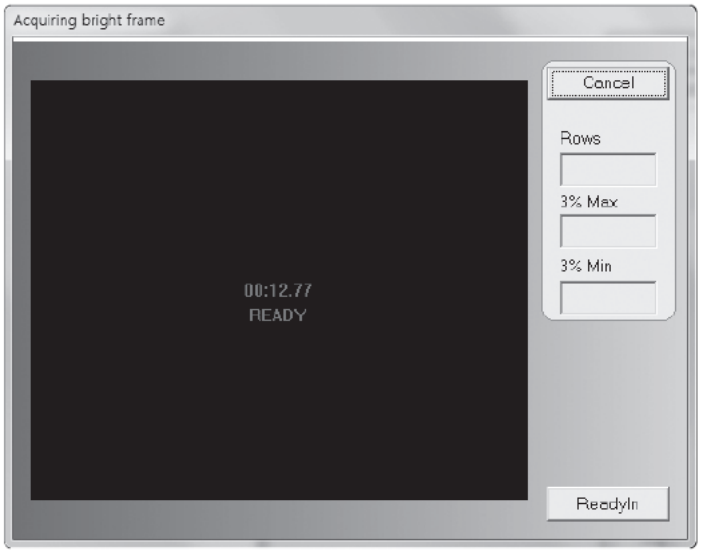
5. Click “Calibration”.



6. Once "Start" is pressed, the program automatically gets a Dark frame and the acquired Dark frame is stored in “C:\davinci\cal”. A Calibration Point file will be created automatically.

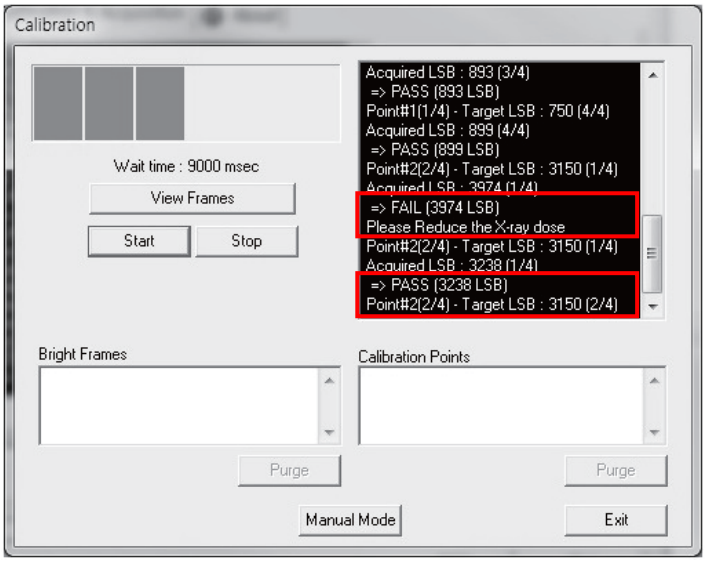


7. After acquiring the Dark frame, shoot an X-ray when the “Acquiring bright frame” window popup.



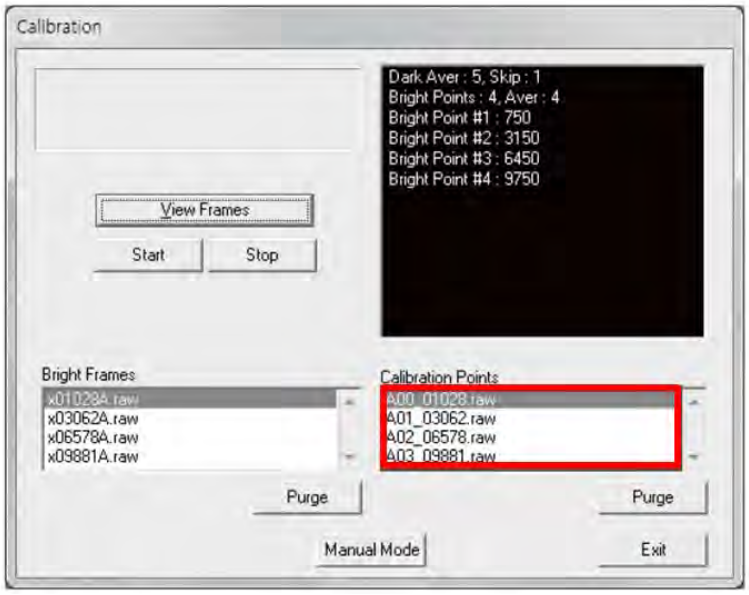
- Depending on the dark level of the product, 1~2 additional calibration points may be created.

8. “Acquiring bright frame” is closed after radiation is detected, and the program will show if the detected radiation is within acceptable range.

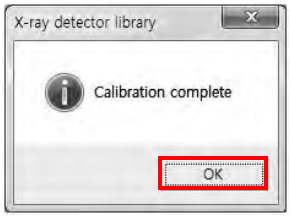


When PASS is displayed	When FAIL is displayed
Shoot X-ray with same technique when “Acquiring bright frame” is popped up.	Adjust technique to get acceptable value and shoot again.

9. For each Calibration point, four images must successfully be acquired. After successfully doing so for every point, the Calibration process is complete.

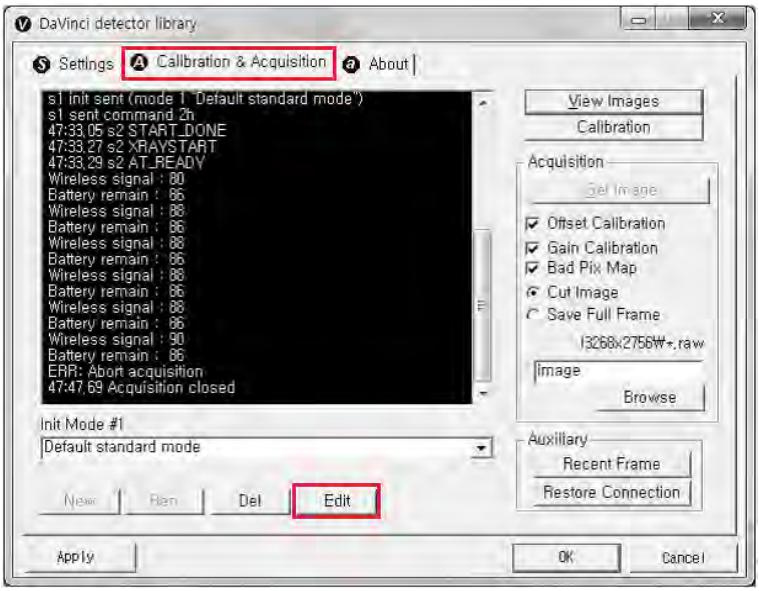


10. Click "OK" to move to the next step.

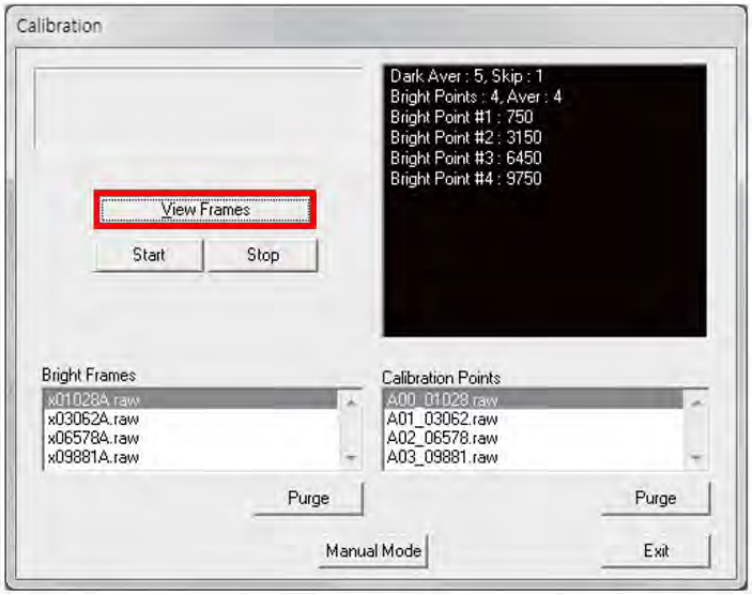


3.2.2 Manual Bad Pixel Map Set Up

1. Click “Calibration”.



2. Click "View Frames".



3. Set Manual bad pixel map (BPMM) as below.

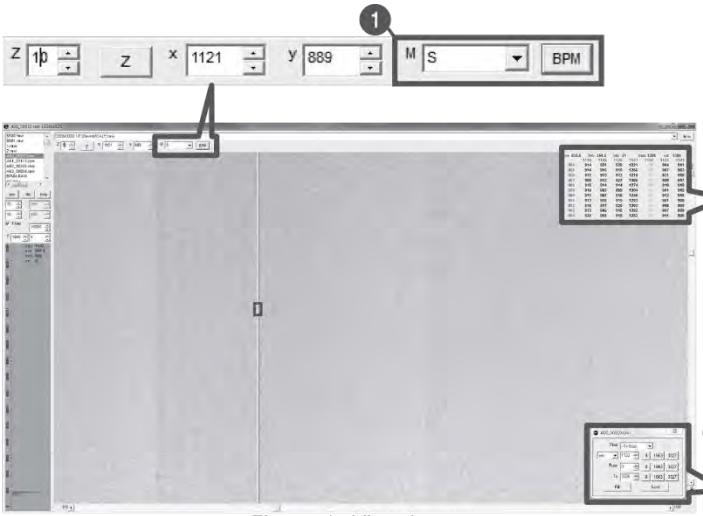


Figure 1. View Image

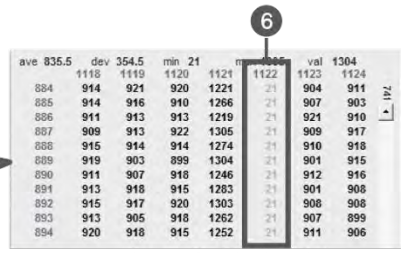


Figure 2. Pixel Point

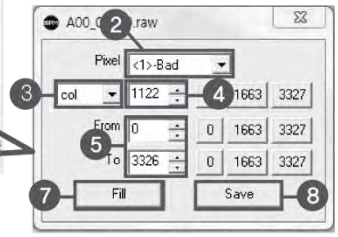


Figure 3. BPMM Control Tab

No.	Overview
1	At Figure 1, choose S from the list of M (❶) and click "BPM". Check if BPMM window is popped up as Figure 3.
2	Choose "Bad" from Pixel list (Figure 3 - ❷).
3	Choose either “row” or “col” from Figure 3 - ❸.
4	Put the coordinate of pixel to set bad pixel at Figure 3 - ❹.
5	If bad pixel is a line, put the range as below at Figure 3 – ❺. | | From | To | | Row | 0 | 2449 | | Col | 0 | 3051 | If bad pixel is not a line but some pixels, put the rest coordinate at Figure 3 - ❺.
6	After completing step 5, check if bad pixel has been changed to green as Figure 2 - ❻.
7	Click “Fill” at Figure 3 - ❼.
8	Click "Save" at Figure 3 - ❽.

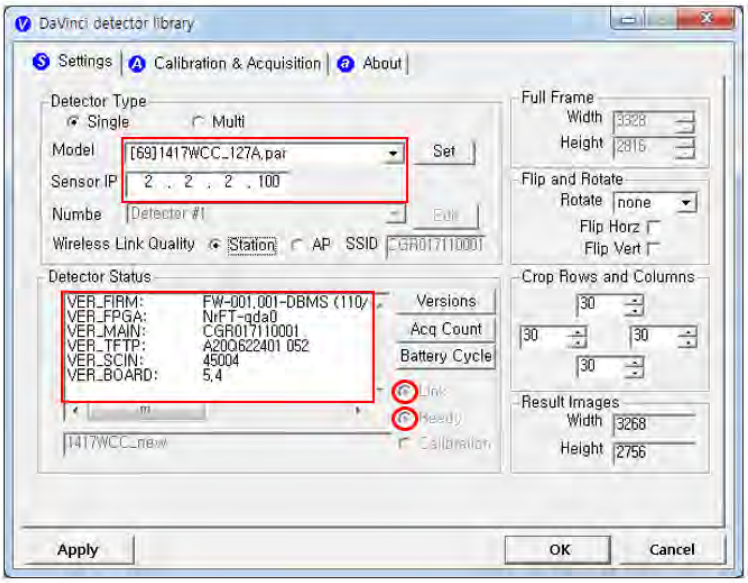
4. Once setting BPMM is done, “BPMM.raw” file will be saved at C:\Davinci\CAL.

4. Usage

4.1 Set Up

4.1.1 Product Connectivity

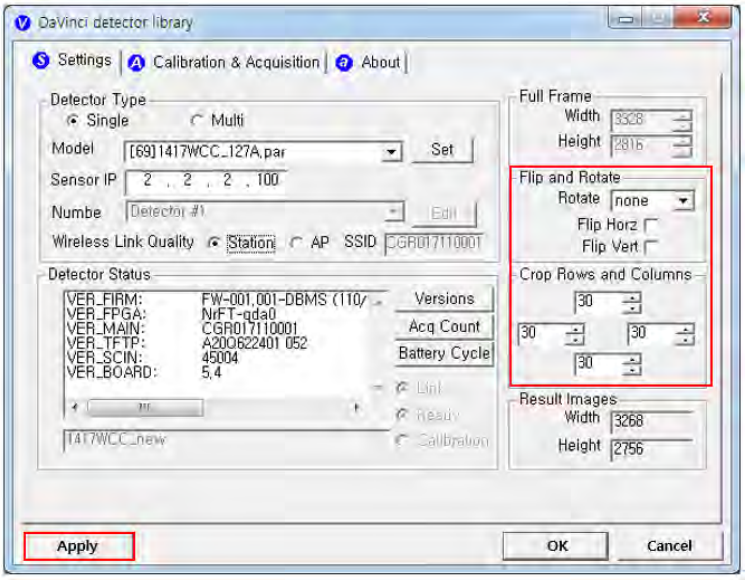
1. Connect the detector and turn on the power.
2. Open “_vadav.lnk” from “C:\davinci”.
3. Once the detector is connected, detector information is displayed in Detector Status and Link &Ready are checked as below.



- If "Detector Status" does not show anything, please refer to **3.1 Installation** in Part.1 User & Installation Manual to connect the detector properly.

4.1.2 Image Set Up

1. In order to rotate or flip an image, use the option of "Flip and Rotate" as shown below.
2. In order to change the size of an image, use "Crop Rows and Columns" as below.
3. Click "Apply" to save.



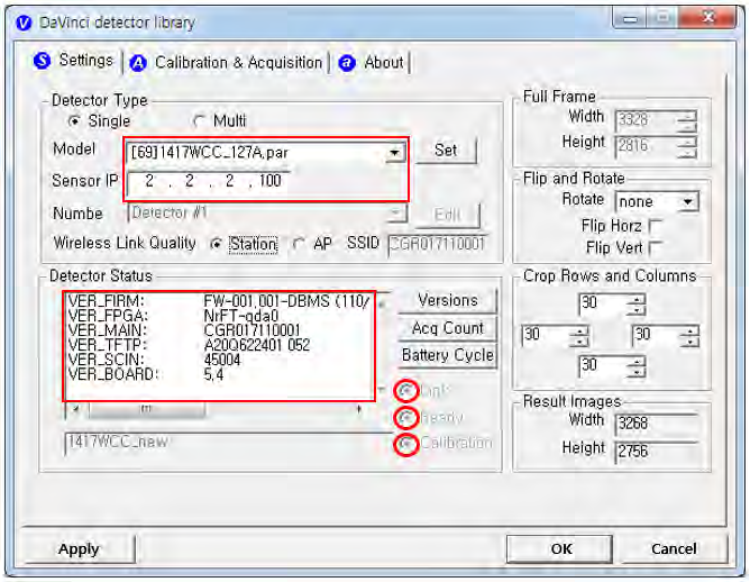
4.1.3 Multi Detector Set Up

Refer to 3 **Multi Detector Set Up** in Part.2 Service Manual for Multi-Detector Setting.

4.2 Image Acquisition

4.2.1 Product Connection

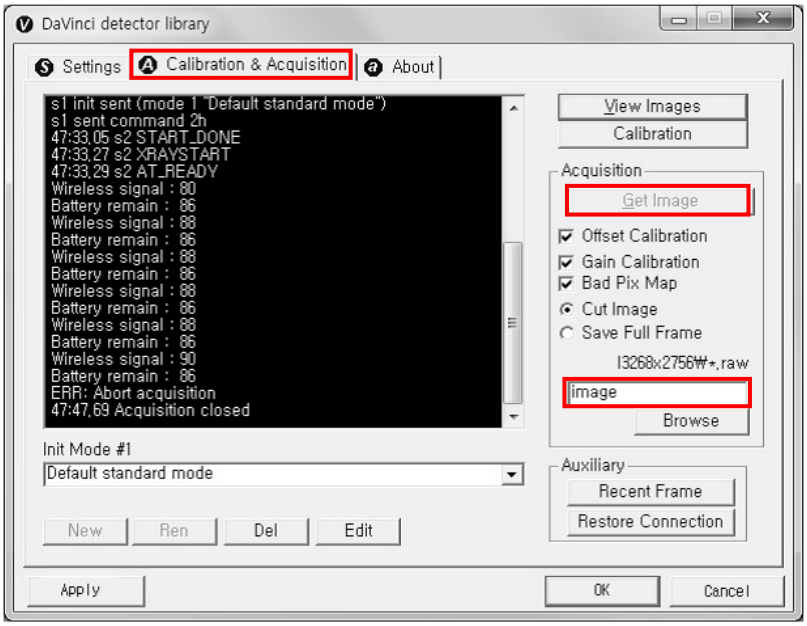
1. Connect the detector and turn on the power.
2. Open "_vadav.lnk" from "C:\davinci".
3. Once the detector is connected, information of the detector is displayed in Detector Status and Link & Ready & Calibration is checked as below.



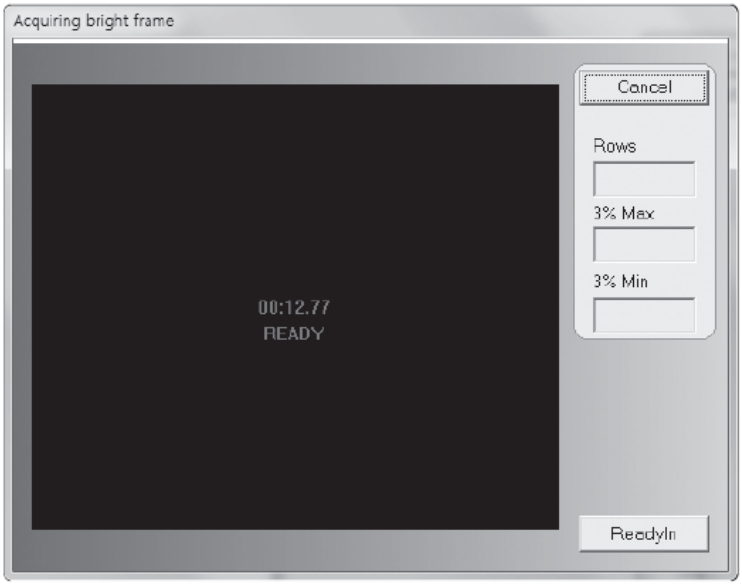
- If "Detector Status" does not show anything, please refer to **3.1Installation** in Part.1 User & Installation Manual to connect the detector properly.
- If Calibration is not checked along with black dots checking off "Link" and "Ready" as above, please refer to **3.2Calibration** in Part.1 User & Installation Manual and perform calibration again.

4.2.2 Image Acquisition

1. Click the "Calibration & Acquisition" tab and type the name of the image inside the box below. After naming the image, click "Get Image".



2. Shoot an X-ray once the "Acquiring bright frame" window pops up.

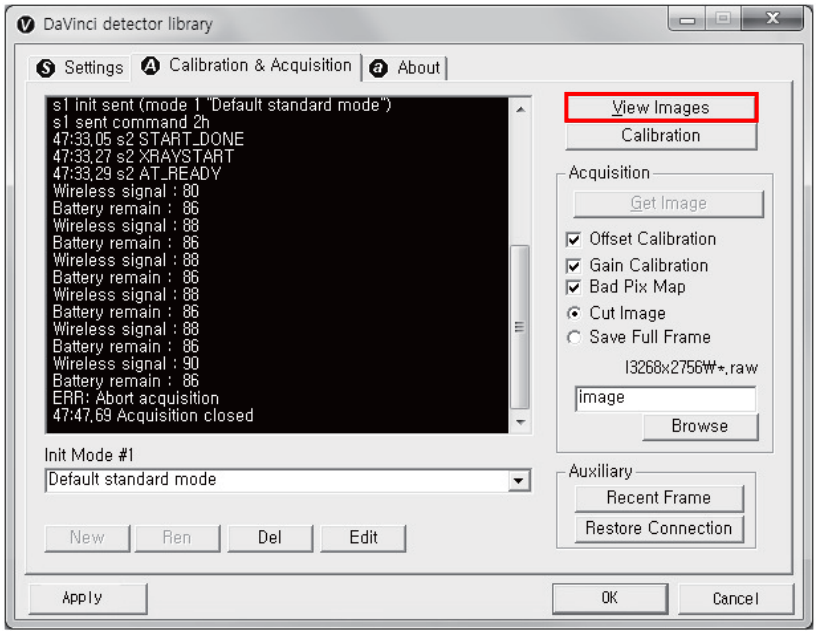


3. An acquired image will be stored in "C:\davinci\I.2440x2992" and the name of the file will be "(typed name from Step 1).raw".

4. The format of the stored file is 16 bit little-endian order.

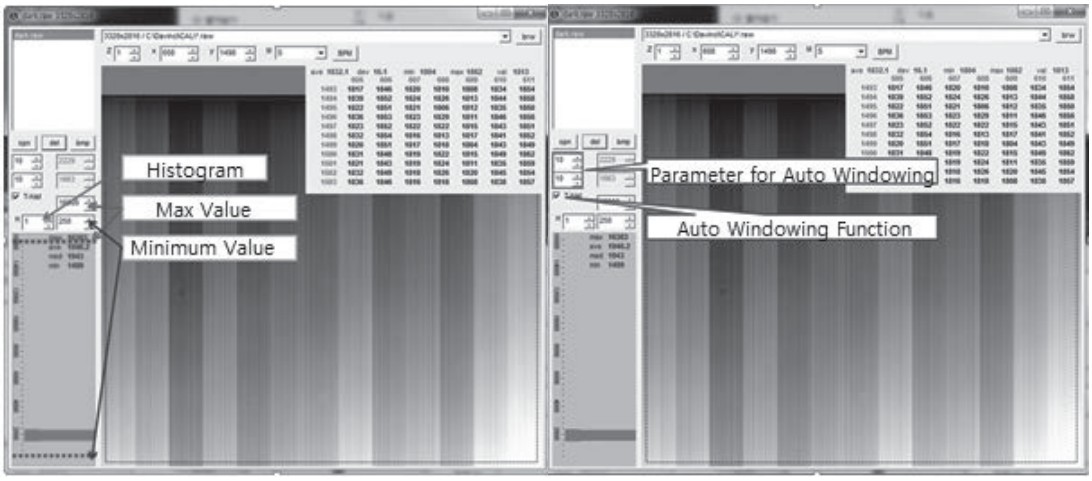
4.3 View Images

1. Click “View Images”



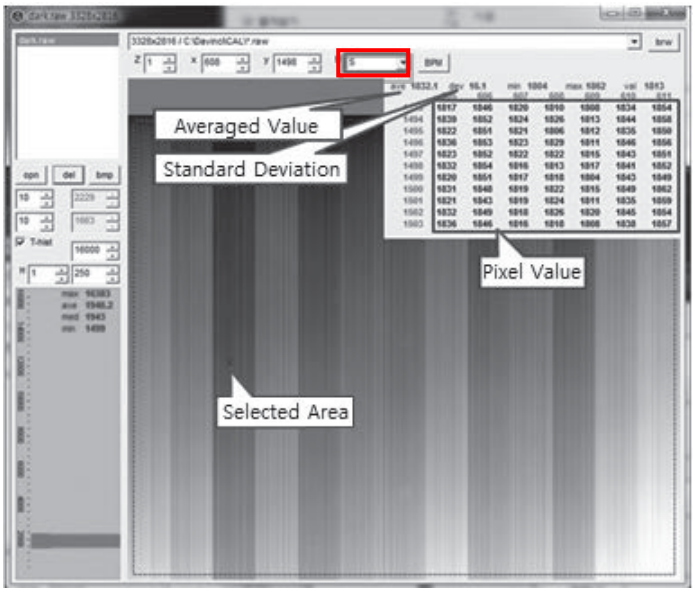
2. Another window will be popped up as below.

Histogram Set Up



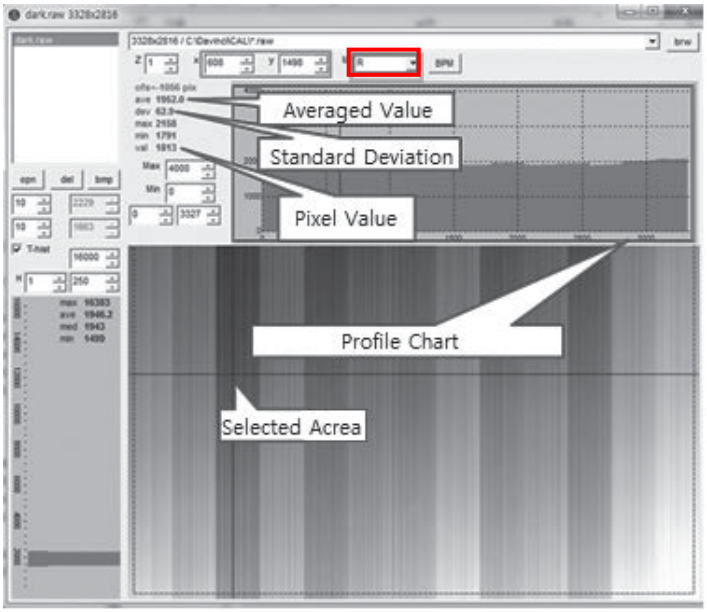
Pixel value at certain level

Choose "S" from marked box.



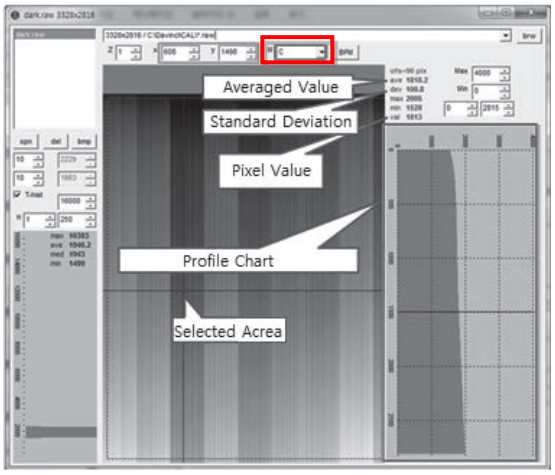
Profile for horizontal line

Choose "R" from marked box.



Profile for vertical line

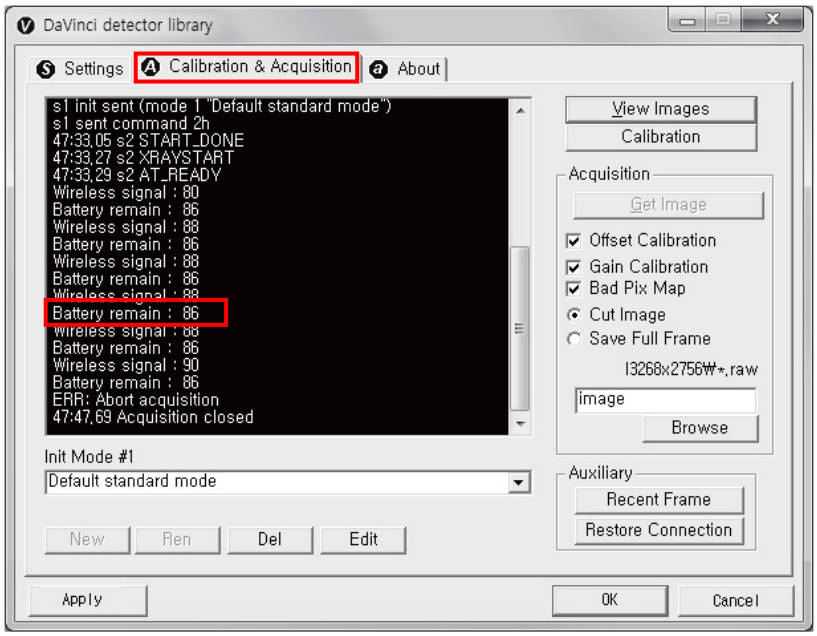
Choose "C" from the marked box.



4.4 Additional Function

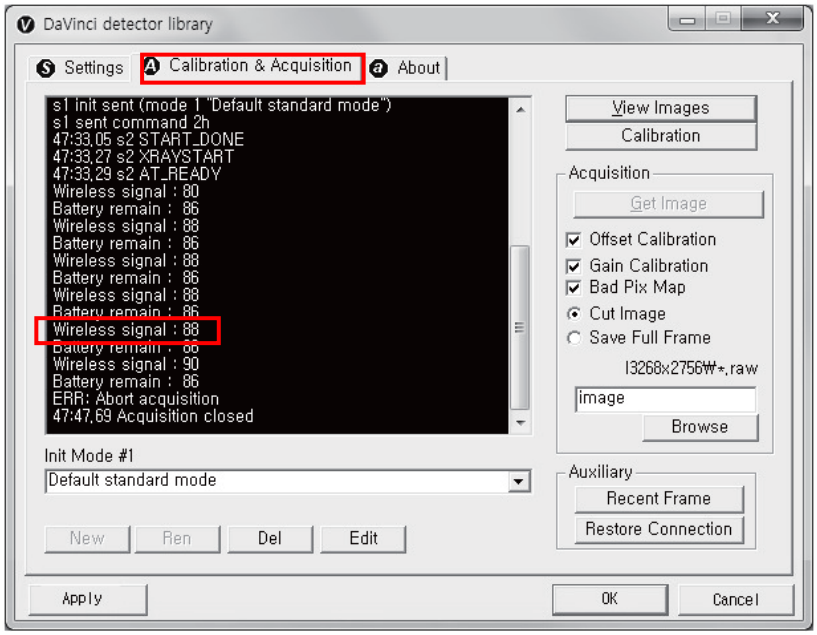
4.4.1 Battery Remain

Once you click "Get Image" under the "Calibration & Acquisition" tab, the Status window will show how much battery remains.

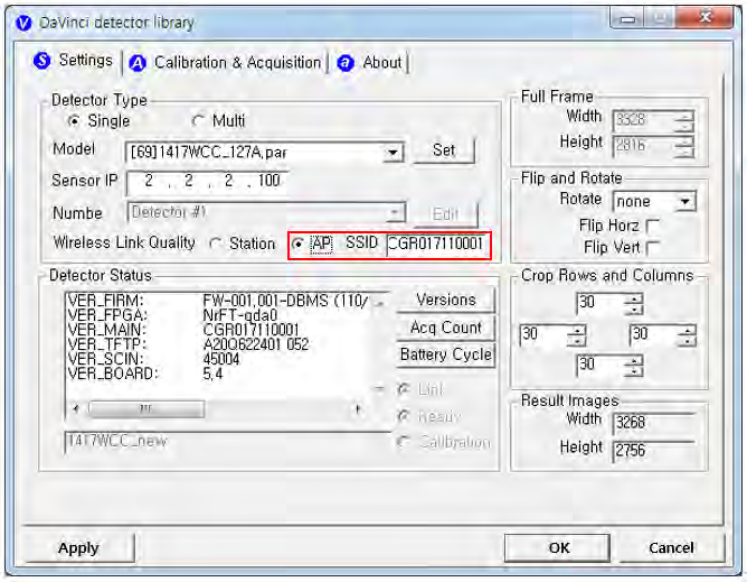


4.4.2 Wireless signal Strength

Once you click "Get Image" under the "Calibration & Acquisition" tab, the Status window will show the strength of the wireless signal.

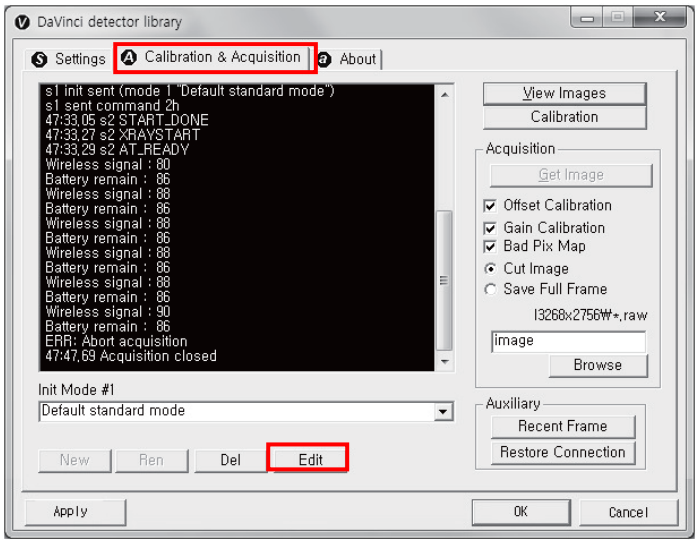


Before you check the wireless signal in the AP mode, the detector's serial number should be entered at the "SSID".

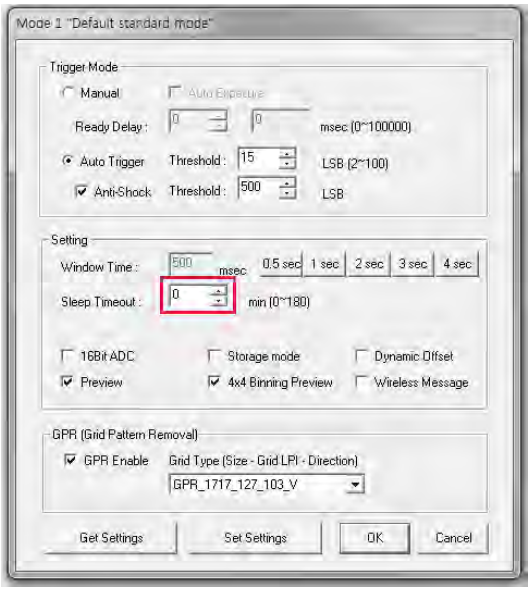


4.4.3 Sleep Mode

1. Click “Edit” under the Calibration & Acquisition tab.



2. Under the “Sleep Timeout” setting, enter a designated time for the detector to go into Sleep Mode. (For change parameter settings, must click “Get Settings” button)



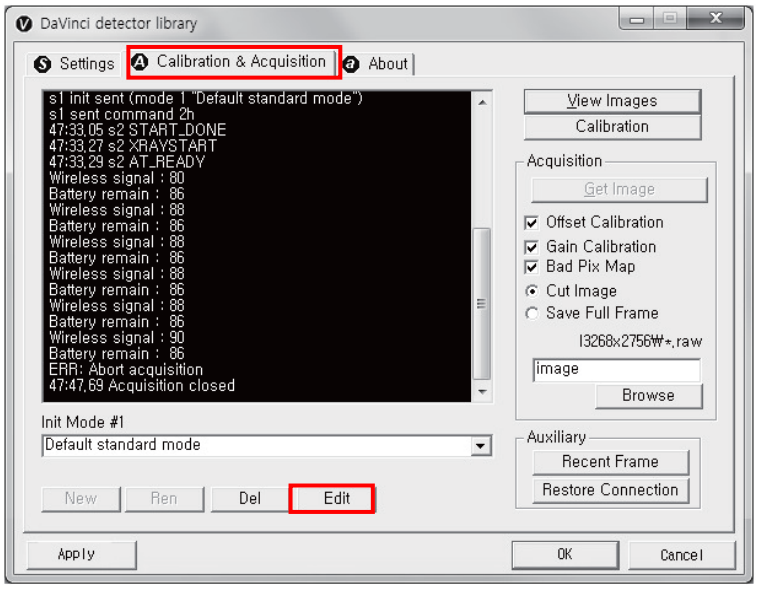
- Sleep Mode does not apply when set to zero.
- Power consumption is reduced by 40% when Sleep Mode is used.

3. To turn off Sleep Mode, attempt to acquire an image or press the power button on the detector just once.

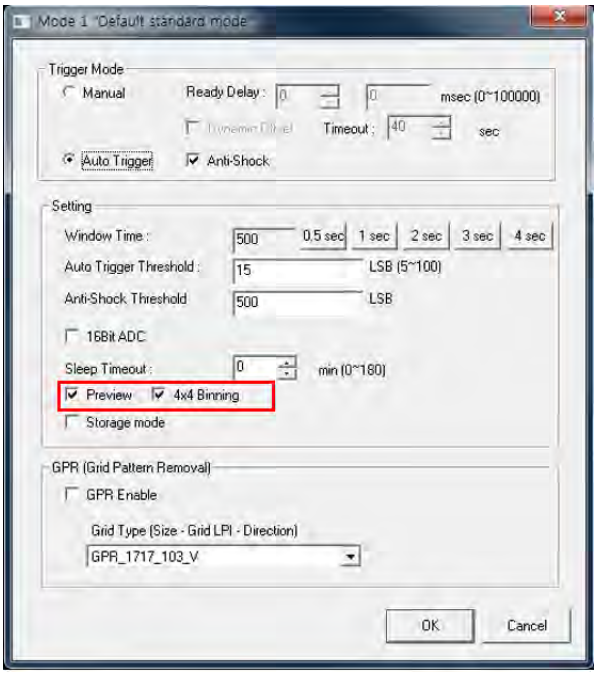
- A normal image can be acquired after 10 seconds Sleep Mode has been turned off.

4.4.4 Preview

1. Click “Edit” under the Calibration & Acquisition tab.



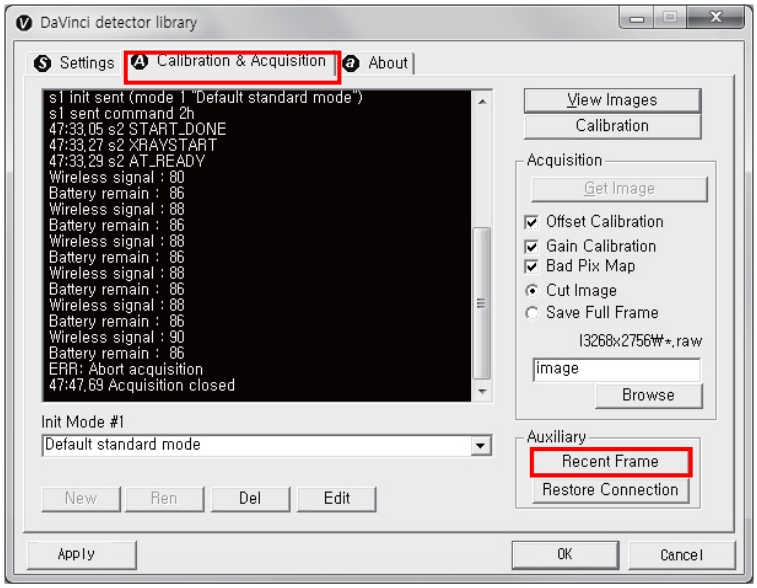
2. After checking the Preview and 4x4 Binning, a 4x4 binned image appears which allows for a quicker image preview. (For change parameter settings, must click “Get Settings” button)



- By unchecking 4x4 Binning, a normal image preview appears.
- By unchecking Preview, a full frame image appears.

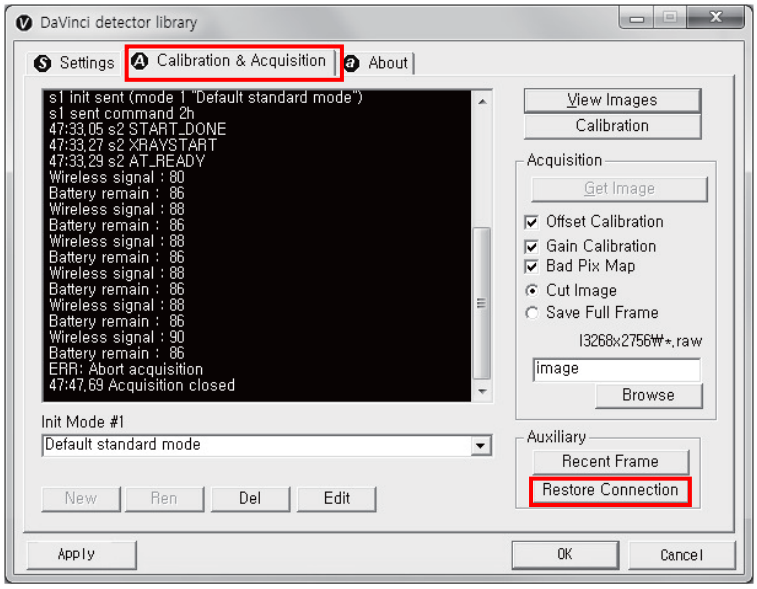
4.4.5 Recent Frame

The last acquired image can be opened by clicking "Recent Frame" under the "Calibration & Acquisition" tab.



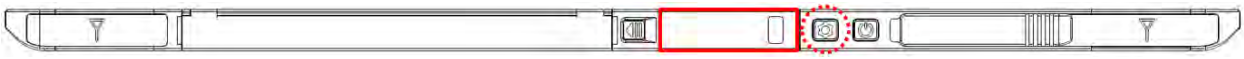
4.4.6 Restore Connection

When the connection between the detector and PC is lost, the connection can be made again by clicking "Restore Connection" under the "Calibration & Acquisition" tab.

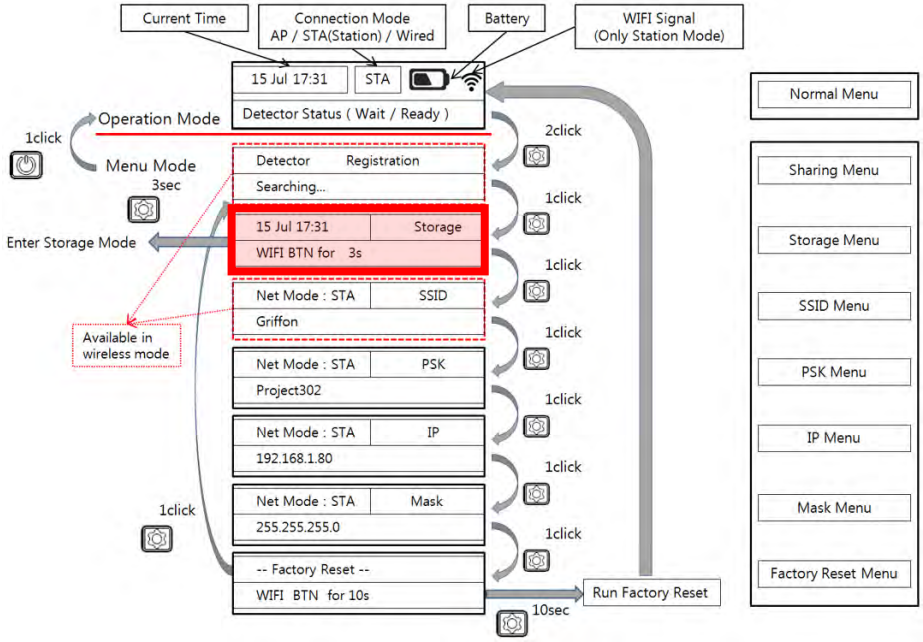


4.4.7 Image Storage function

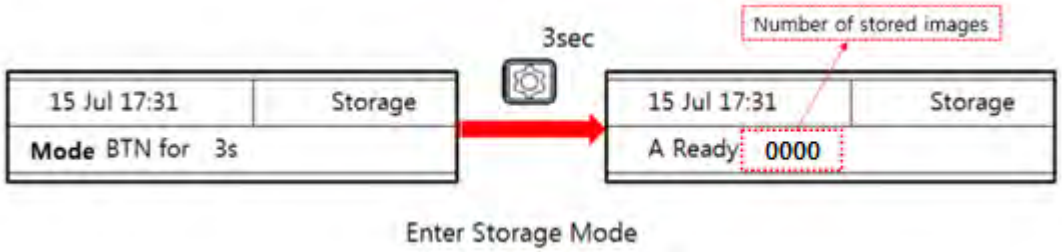
1. Press the "Mode select button" twice (within 2 seconds) and click one more time to go to "storage mode".



- Mode status can be checked by the OLED window of Detector



2. Press the mode select button for 3 seconds to check the status of storaged images.

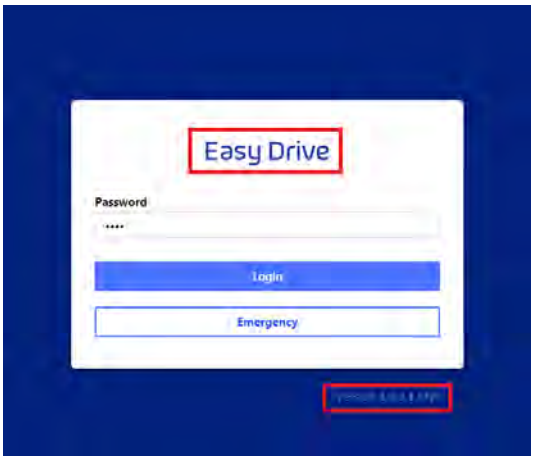


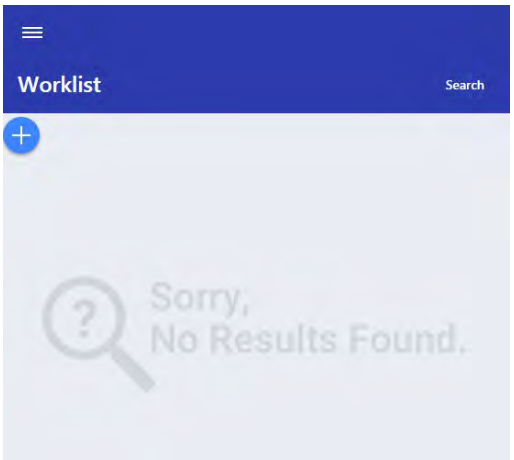
- When Storage mode is used if the connection between the detector and PC, the image is stored the memory in the Detector internal
- When Mobile device connects to Detector, can check correctly Image by Storage Viewer Web Server
- For Storage Viewer, must running DBMS and Web Server environment
- For running Storage Viewer environment, OLED is displayed “Check DB Server”
- Stored Image can be opened and deleted by referring SDK

A. Mobile Device can connect to Detector's AP Mode

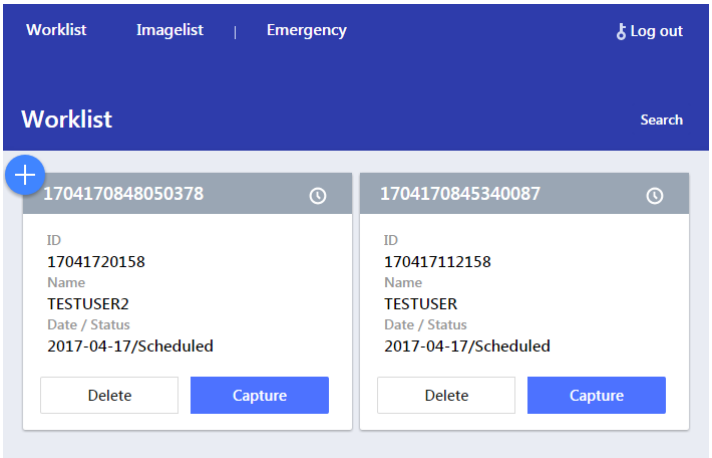
B. Connect to "http://192.168.1.80:3000". Sign in with password '1234'

C. Ater enter to worklist menus, click '+' icon and create worklist info.

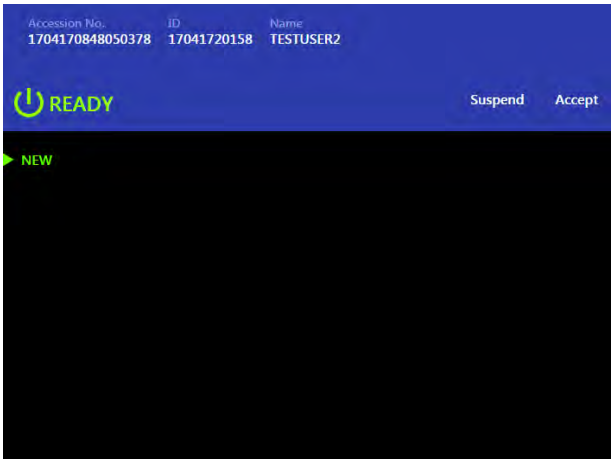




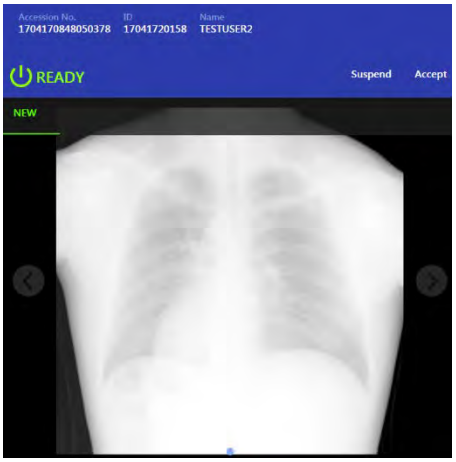
D. Can see all worklist for will acquire image. Click 'Capture' button.



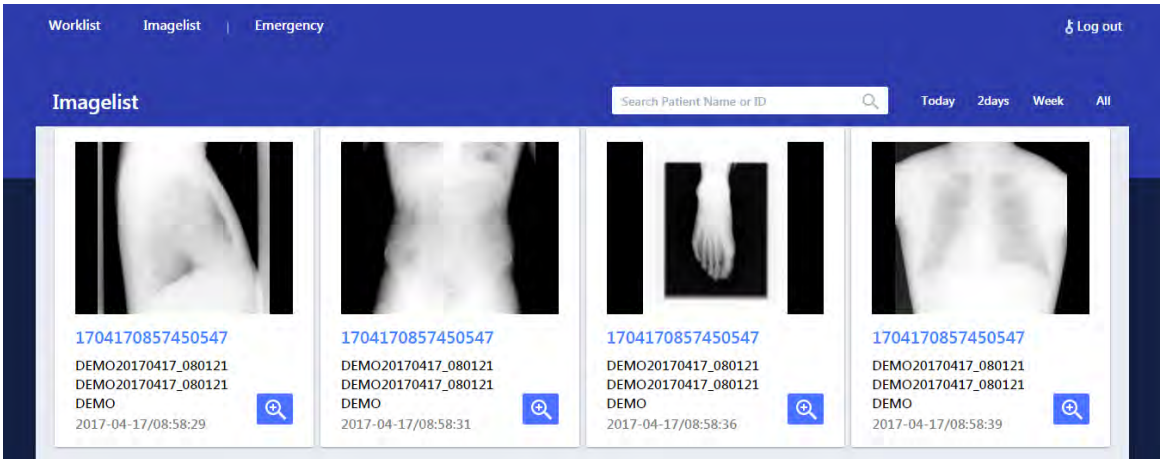
E. In detector ready status, can take X-ray image.



F. Shot X-ray → Show image and can check correct → Select Accept/Suspend button



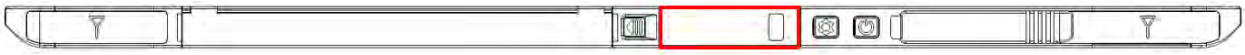
G. Show all acquisition image list on Storage Mode



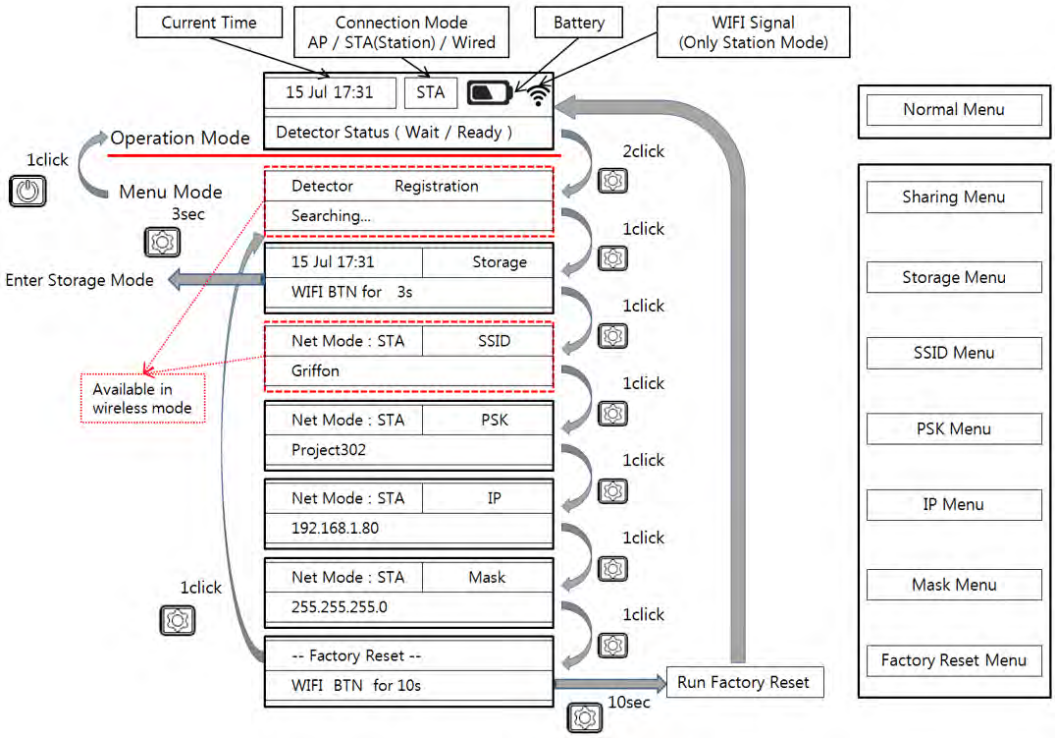
- When worklist menu is empty, detector will be created woklist menu and matching
- Some guide image is created by web server demo mode

4.4.8 OLED function

1. OLED is operating when detector is turned on.



2. Use the Mode select button and Power button can be used OLED function as follows.



		1 click	Press the mode select button
		2 click	Press the mode select button twice (within 2 seconds)
		10 sec	Press the mode select button for 10 seconds
		1 click	Press the power button
	Normal menu		- Will Show the (Time / Battery remain / Wireless signal) of detector
	Storage menu		- Operation the “storage function”
	SSID menu		- Will Show the SSID information of detector
	PSK menu		- Will Show the PSK information of detector
	IP Menu		- Will Show the IP information of detector
	Mask menu		- Will Show the Mask information of detector
	Factory reset menu		- Factory reset menu

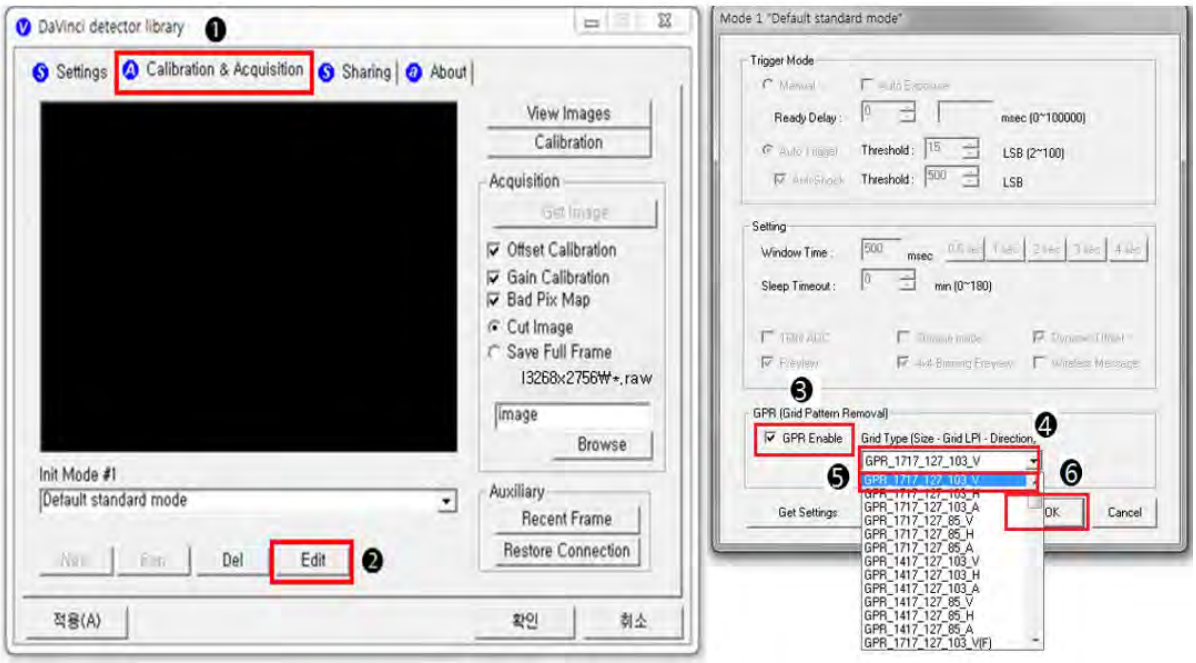
4.4.9 GPR function

1. GPR(Grid Pattern Removal) is an option to remove grid line artifacts when using an analog grid

   - Applicable grid : 103/line/inch, 85Line/inch

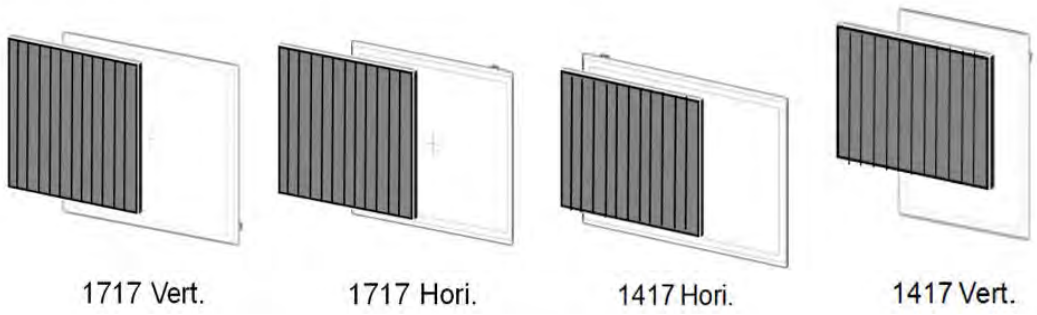
2. Setting GPR

   - Set vadav as below



No.	Overview
❶	Click “Calibration & Acquisition” tab
❷	Click “Edit” button
❸	Check “GPR Enable” check box when using an analog grid
❹	Click “Grid Type” combobox
❺	Select a GPR parameter
❻	Click “OK” button

- GPR Parameter
  - ✓ Select a parameter in consideration of the used grid specification & detector model.



- 1417 model(Edge Air 1417 / 1417WCC) use to Automatic parameter recommended
- 1717 model(Edge Air) use to Vertical Parameter recommended.

5. Maintenance

5.1 Cleaning

1. Clean the detector with IPA (Isopropyl-alcohol) when it is contaminated.
2. Before cleaning the detector, turn off the power and separate the battery.
3. Wear waterproof gloves to protect your hands from direct contact with IPA or any other liquid.
4. Do not pour or spray IPA directly on the detector. Use fabric or soft cloth moistened with IPA to clean.
5. Avoid getting IPA or any other liquid into the detector.
6. After cleaning, wait until the IPA is dried completely.

5.2 Inspection

7. In order to ensure that the detector is used safely and normally, please be sure to inspect the product regularly before use. If any problem occurs, please contact OSKO Inc. Customer Serviceteam.
8. Please perform inspections based on the check list below.

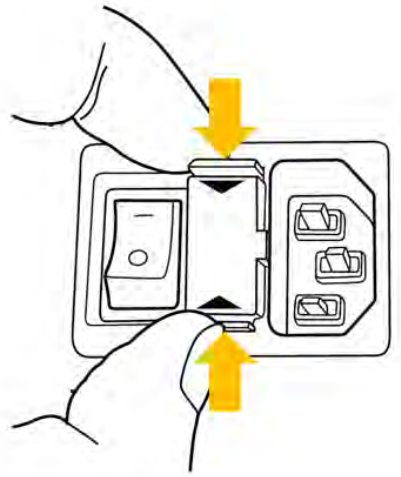
Inspection List	User	Vendor	Cycle
Check if cables are not damaged	o		Daily
Check if plugs and connectors are not loose or damaged	o		Daily
Check if cover or part is not damaged	o		Daily
Check the LED indicator	o		Daily
Re-Calibration		o	Half Year
Check the performance of the product by doing test shots with Phantom or resolution chart		o	Yearly

5.3 Replaceable Parts and Instruction of Replacement

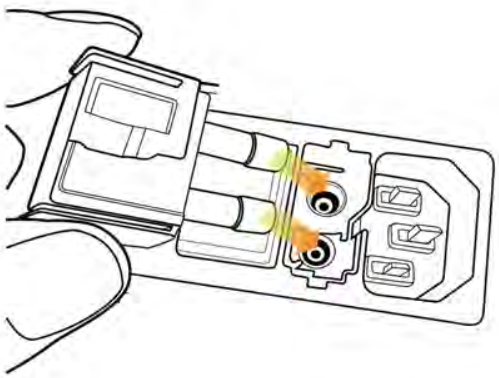
5.3.1 Fuse: T3.15 AL 250V

Replacing the Fuse

1. Press the fuse as below and pull the fuse box.



2. Pull the fuse and replace with another fuse.



5.3.2 Power cord: H05VV-F 0.75SQ * 3C

5.3.3 Ethernet Cable: UTP 4PR 24AWG (CAT.7)

5.4 Disposal or Recycling

Follow local governing ordinances and recycling plans regarding the disposal or recycling of device components.

Disposal of old Electrical & Electronic Equipment

(Application in the European Union and other European countries with separate collection system.) This symbol indicates that this product shall not be treated as household waste. Instead, it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling this product, please refer to local governing ordinances and recycling plans.

6. Warranty

6.1 Warranty

If Buyer promptly notifies OSKO Inc. or Seller regarding any parts that fail to perform as specified under normal usage during the Warranty Period and OSKO Inc. determines that such failure resulted from a defect in materials or workmanship during the Warranty Period, then OSKO Inc., at its option, shall repair, rebuild or adjust the affected parts.

OSKO Inc. shall have no obligation for any defects to the extent that such defect arises out of (i)normal and fair wear and tear or Product which has been modified without OSKO Inc.'s approval, (ii) Product which has not been installed in strict conformity to the OSKO Inc.'s directions or which have been subjected to electrical or other abuse, or damaged by improper handling, storage or use by Buyer or a third party, (iii) use of Product in combination with devices or products not purchased from OSKO Inc.; (iv) use or application of Product in a field or in an environment for which such Product was not designed or contemplated; (v) use of any parts or material not provided by OSKO Inc. for warranty service; or (vi) the third party's maintenance not certified by OSKO Inc.; or (vii) force majeure such as natural disaster.

The remedies contained in this warranty are Buyer's exclusive remedies. OSKO Inc. shall not, in any event or under any circumstances, be responsible for damages or other sums in excess of the total purchase price actually paid by Buyer to Seller i.e., OSKO Inc. or OSKO Inc.'s authorized agent. Without limiting the generality of the foregoing under no circumstance shall OSKO Inc. be responsible or liable in any regard with respect to damages from loss of use, loss of time, loss of data, inconvenience, commercial loss, lost profits or savings, or other incidental, special or consequential damages claimed by Buyer to arise out of the use or inability to use the Product, even if Buyer has been advised of the possibility of such damages.

In the event that the product is returned to OSKO Inc. after the warranty has expired, OSKO Inc. reserves the right to invoice a reasonable fee for the repair services provided to Buyer.

OSKO Inc. shall make the sole final determination about whether the fail to perform occurred in normal usage (under warranty) or not (excluded from warranty). If the authorized agent or the Buyer doesn't accept the result of OSKO Inc.'s investigation, the burden of proof is on them.

Warranty Procedure

If Buyer needs to make a claim based on this Warranty, Buyer should advise Seller in writing immediately at the following address:

OSKO Inc.

- 8085 NW 90th Street, Miami, Florida, 33166 U.S.A.
- Tel: +1-305-599-7161
- E-Mail: service@oskomedical.com
- www.OSKOMEDICAL.com

PART II. Service Manual

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2. FPD Manager Instruction (IP, SSID Set Up / Firmware, FPGA Update).....107

3. Multi Detector Set Up.....115

4. Troubleshooting.....119

1. Overview

This service manual gives additional instructions for setting up the detector.

2. FPD Manager Instruction (IP, SSID Set Up / Firmware, FPGA Update)

2.1 Detector IP Address Set Up

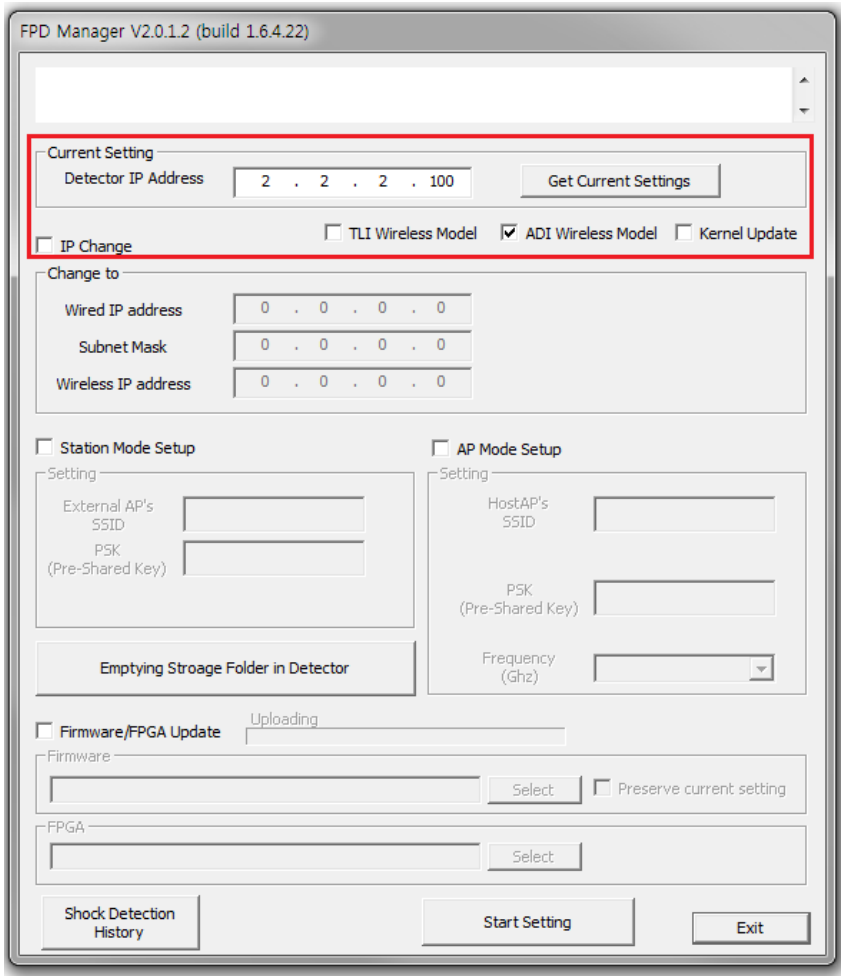
1. Turn on the power of detector and connect with PC. (IP address: 2.2.2.100)

   [Connect as wired mode (IP address: 2.2.2.101) with Link cable or wireless mode (IP address: 2.2.2.100).]

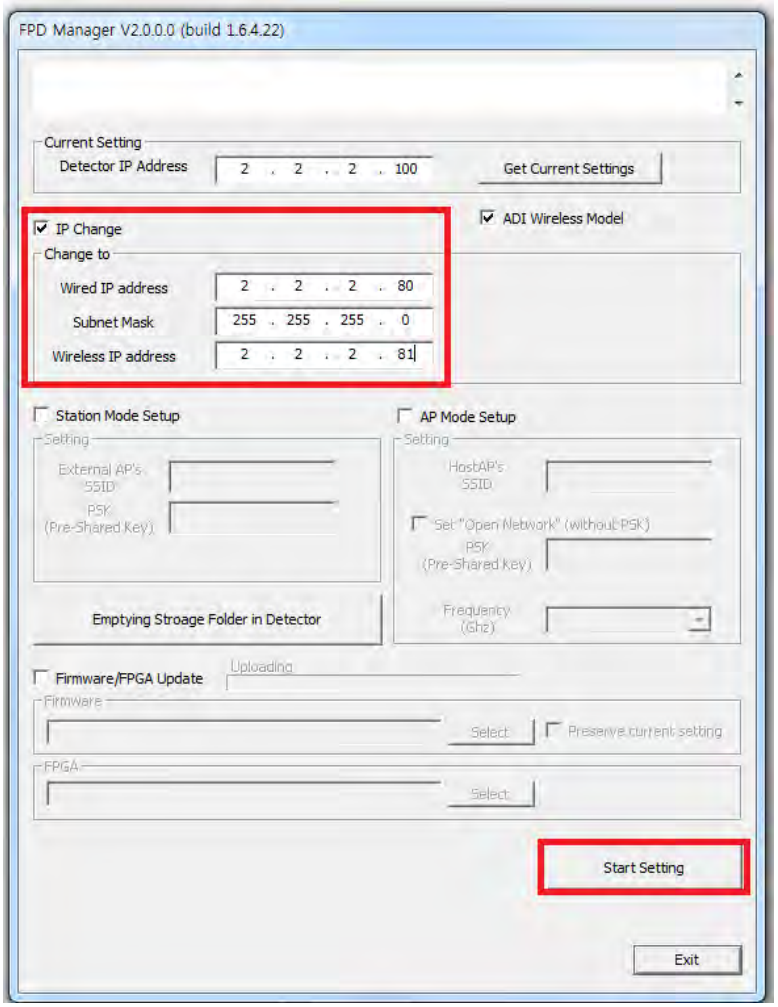
2. After the power of detector is on, open "FPD_Manager.exe".

3. Type detector's current IP address at "Detector IP Address" from "Current Setting" as below.

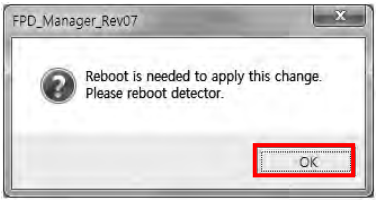
- Detector's Ethernet Controller is operated with Second IP address, 192.168.124.80.



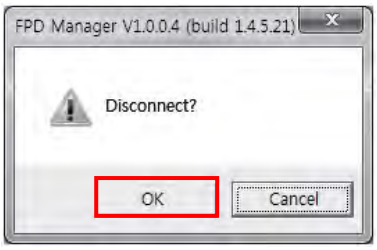
4. Select "IP change" and type the IP address. Click "Start Setting".



5. Click "OK" once the message below pops up.



6. Click "OK" again once the message below pops up.



7. Turn off the power of the detector and after 5 seconds, turn the power back on.

2.2 SSID, PSK (Pre-Shared Key) Set Up

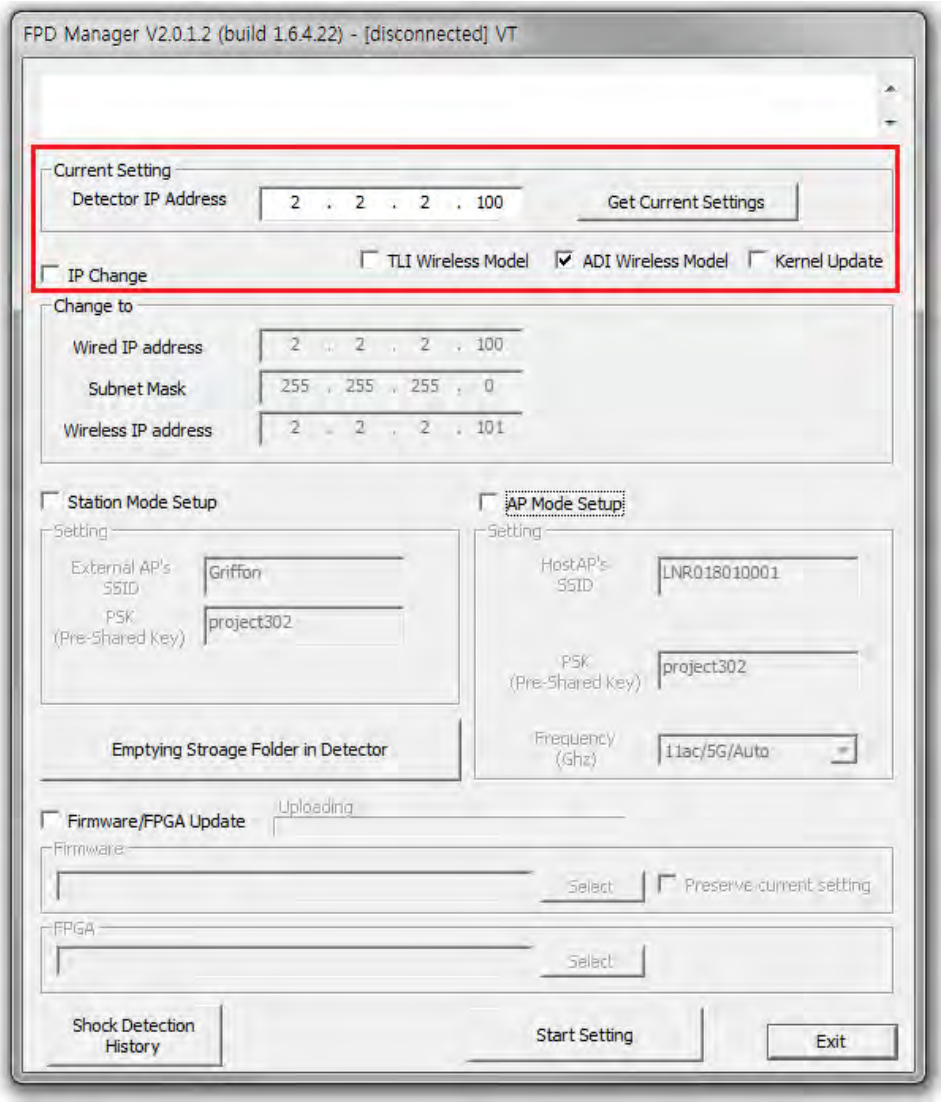
1. Turn on the power of the detector and connect it to the PC. (IP address: 2.2.2.100)

   [Connect as wired mode (IP address: 2.2.2.101) with Link cable or wireless mode (IP address: 2.2.2.100).]

2. After the power of detector is on, open "FPD_Manager.exe".

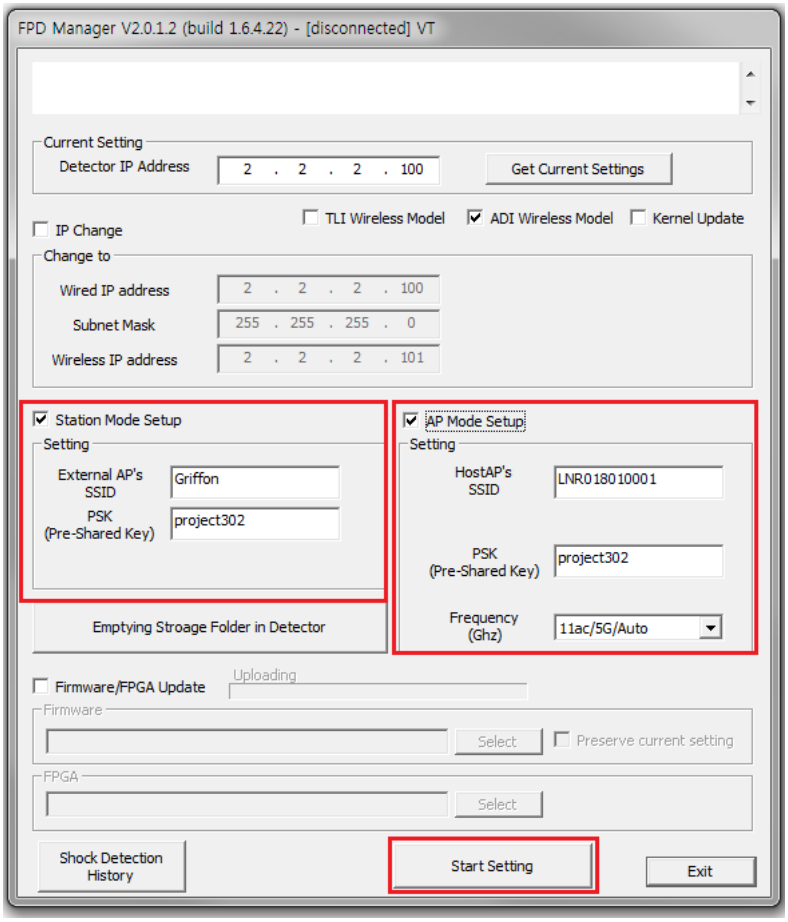
3. Type the detector's current IP address in "Detector IP Address" from "Current Setting" as below.

- Detector's Ethernet Controller is operated with Second IP address, 192.168.124.80.



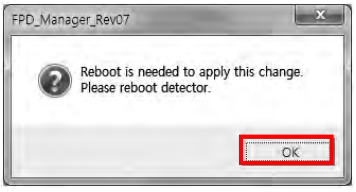
4. Current SSID and PSK (Pre-Shared Key) is displayed once the "Get Current Settings" button is pressed.

5. Select "Station Mode Setup" and "AP Mode Setup". Type the SSID and PSK, and click "Start Setting".



- Station Mode Setup: When external AP is being used, use the same SSID and PSK as applied.
- AP Mode Setup: When built-in AP is being used, use the same SSID and PSK as applied.
- Frequency (Ghz): Default Channel is set to 11n/2.4G/Auto. (802.11n/2.4Ghz/ACS). The ACS (Automatic Channel Selection) feature is setting automatically channel for good AP Mode connection quality. If the Channel causes conflict, the channel can be changed through this program.

6. Click "OK" once the message below pops up.



7. Turn off the power of detector and after 5 seconds, turn the power back on.

2.3 Firmware, FPGA Update

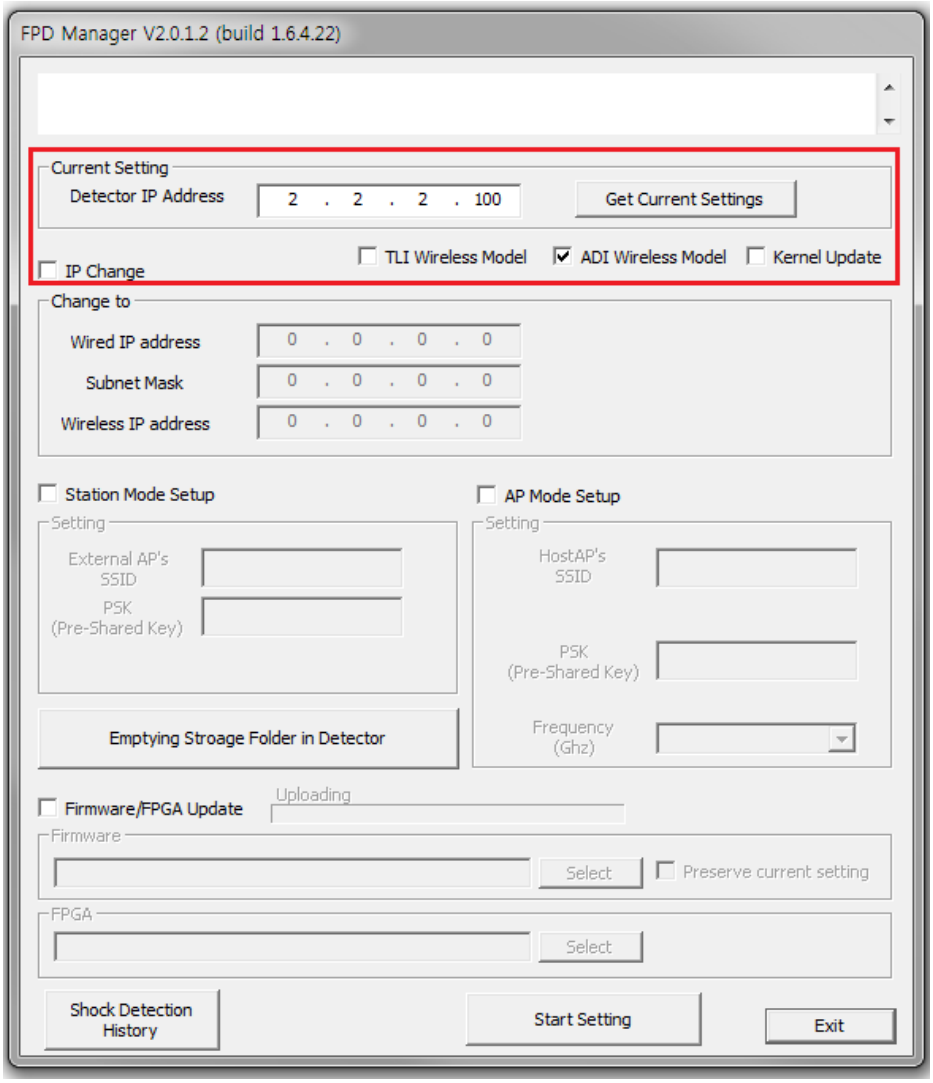
1. Turn on the power of the detector and connect it to the PC.

   [Connect as wired mode (IP address: 2.2.2.101) with Link cable or wireless mode (IP address: 2.2.2.100).]

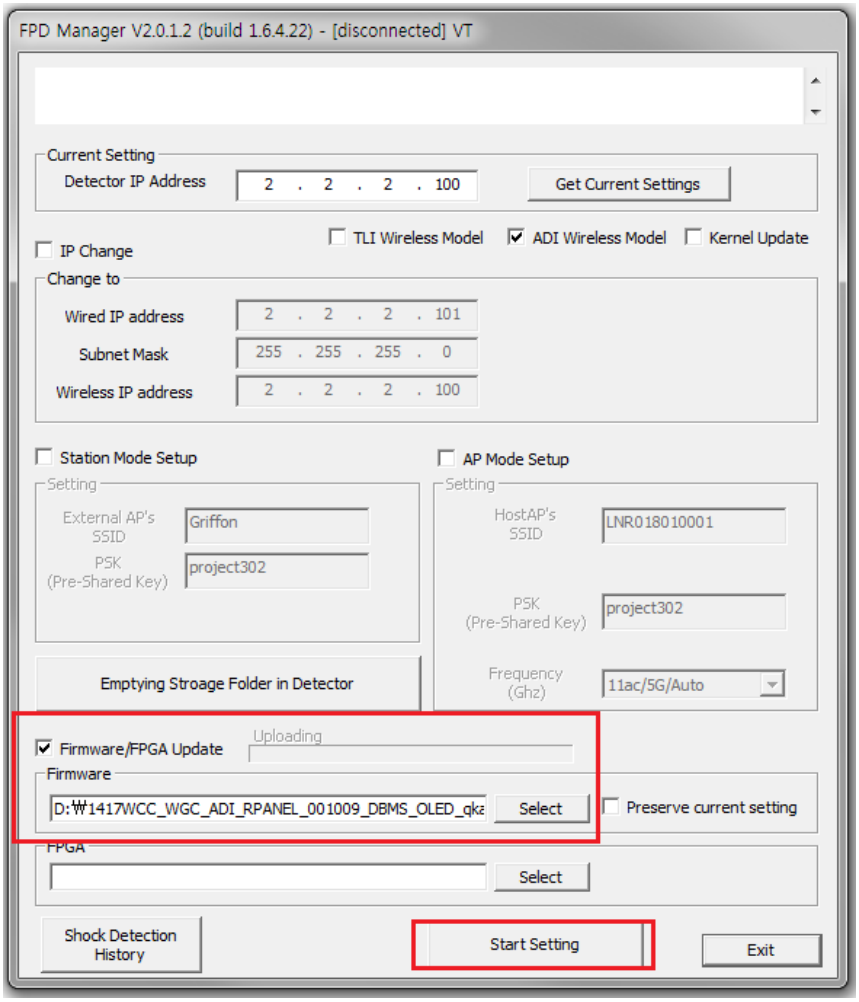
2. After the power of detector is on, open "FPD_Manager.exe".

3. Type the detector's current IP address in "Detector IP Address" from "Current Setting" as below.

- Detector's Ethernet Controller is operated with Second IP address, 192.168.124.80.

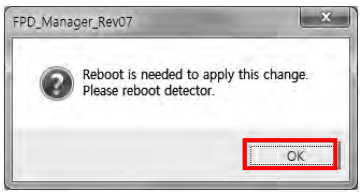


4. Select "Firmware/FPGA Update" and click "Select" to browse the Firmware and FPGA. Once the files are selected, click "Start Setting".



- Firmware File: File extension is either Davinci or tar.
- FPGA file: File extension is bin.

5. Click "OK" once the message below pops up.



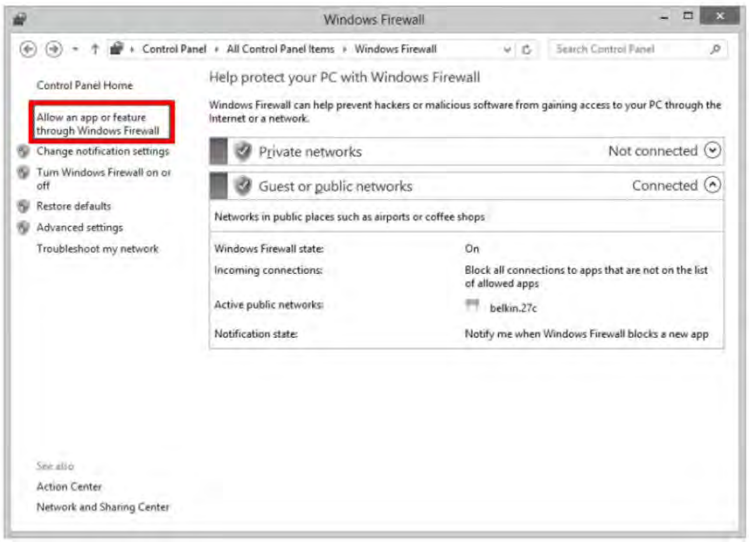
6. Turn off the power of detector and after 5 seconds, turn the power back on.

- Detector IP address might be changed to 192.168.1.80 after updating depends on Firmware.

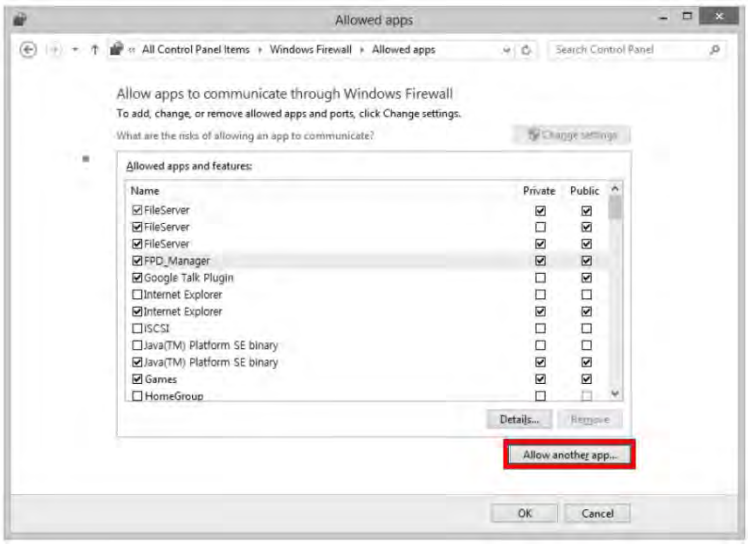
2.4 Set Windows Firewall to use FPD_Manager (For Win 7)

- FPD_Manager would not be performed properly if Windows Firewall blocks FPD_Manager. Please follow the steps below in this case.

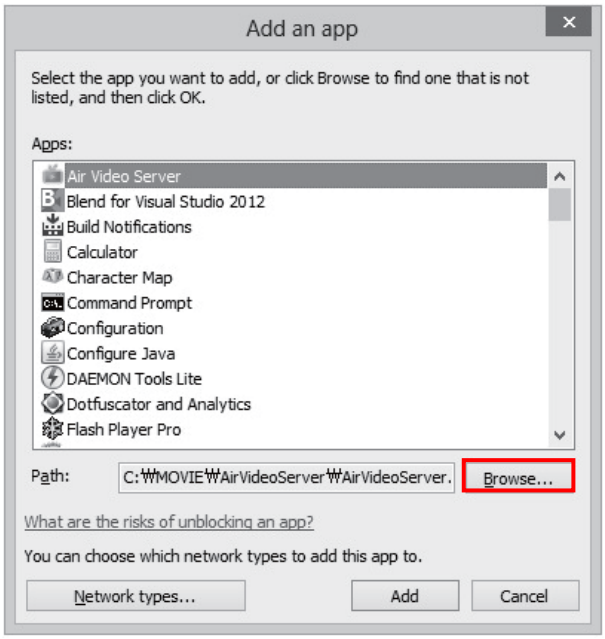
1. ‘Control Panel’ -> ‘Windows Firewall’ -> ‘Allow an app or feature through Windows Firewall’



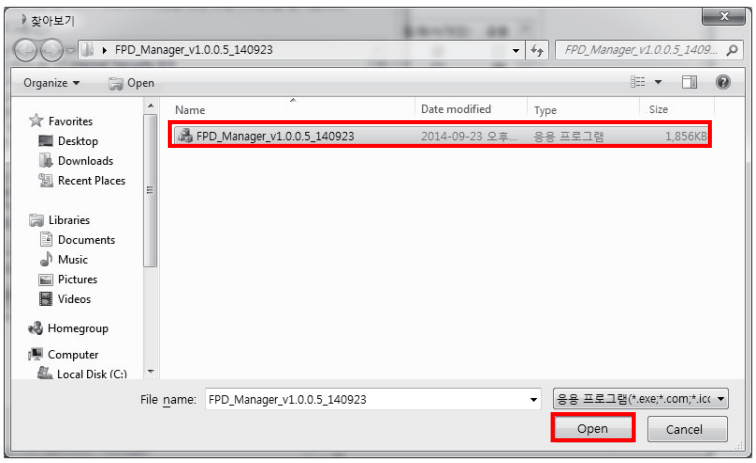
2. Check "Name", "Private" and "Public" if FPD_Manager program is already on the list. Click "Allow another app..." when FPD_Manager program is not on the list.



3. Select the program and add if it is already on the list. Click "Browse" when the program is noon the list.

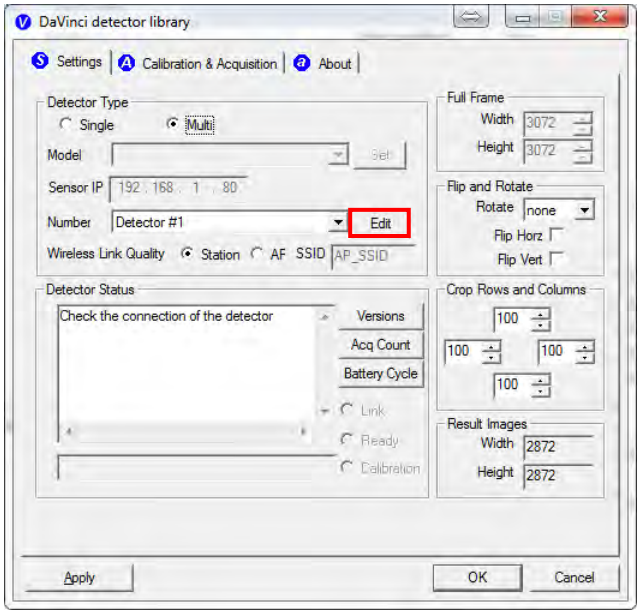


4. Browse and open FPD_Manager program and repeat step ②.

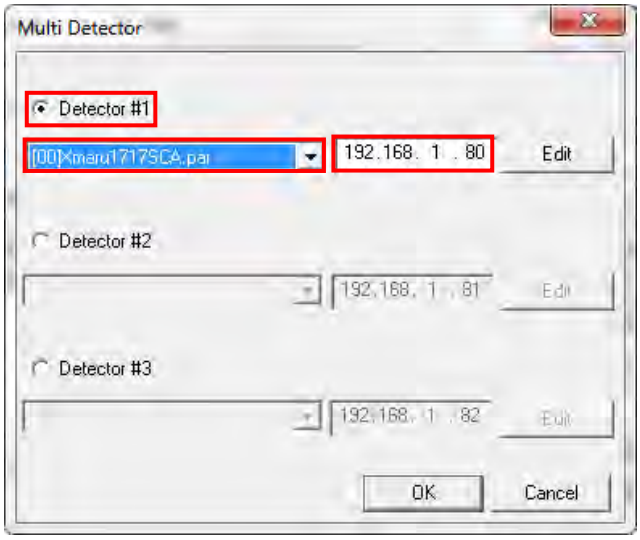


3. Multi Detector Set Up

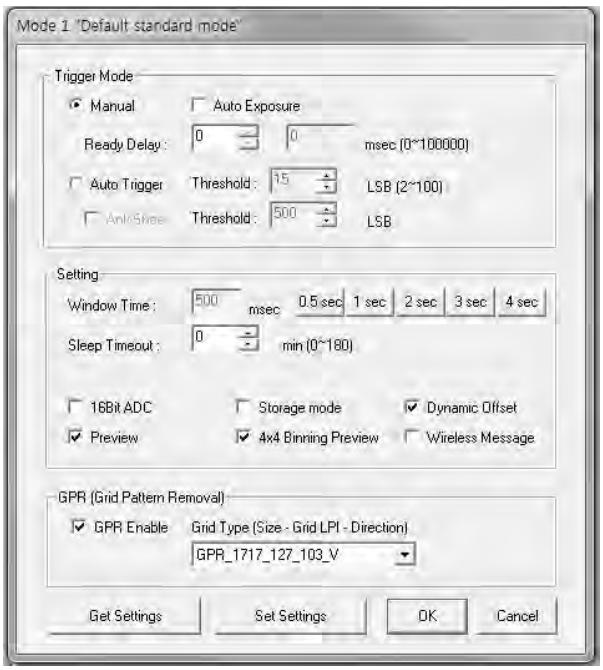
1. Open “_vadav.lnk” from "C:\davinci”.
2. Click "Edit" under the "Settings" tab.



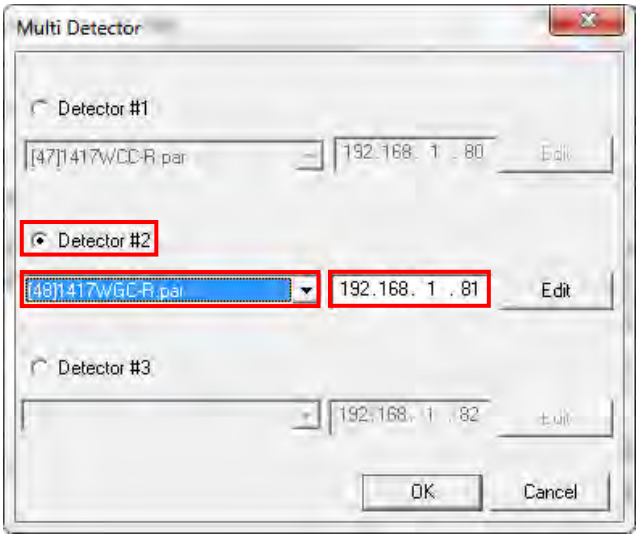
3. Select "Detector #1". Choose the product model and type the IP address.



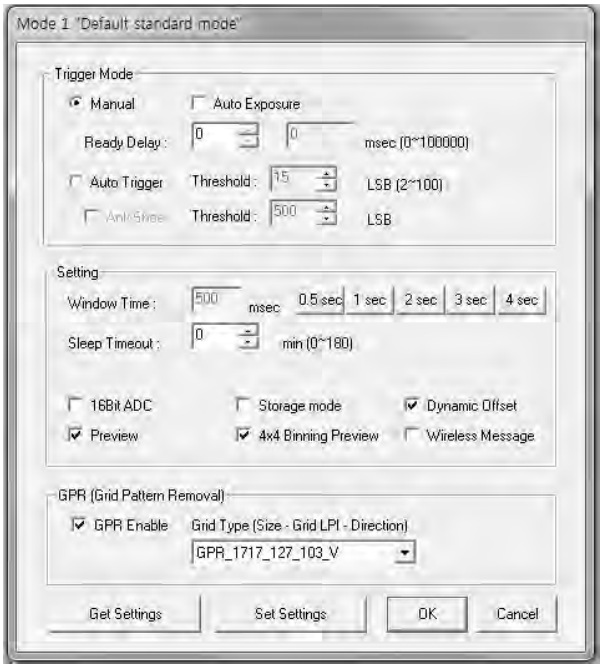
4. Click "Edit" from "Detector #1". Set up the "Trigger Mode" and "Setting". (For change parameter settings, must click “Get Settings” button)



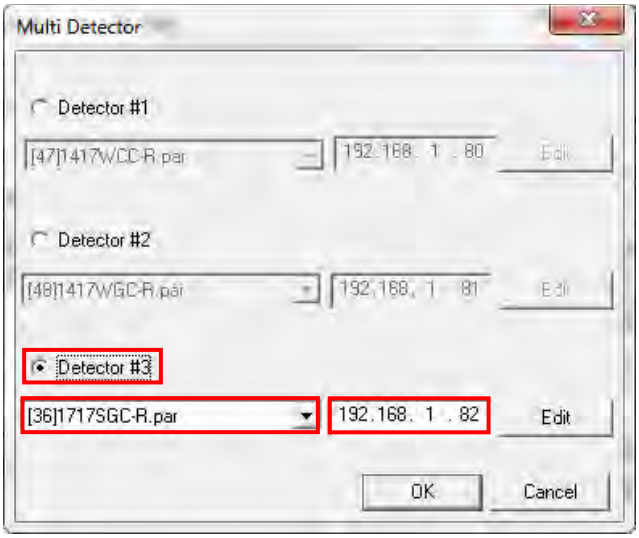
5. Select "Detector #2". Choose the product model and type the IP address.



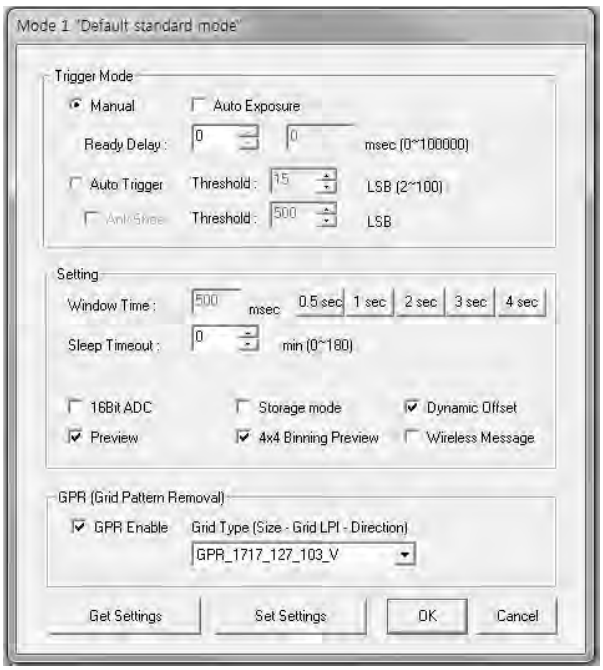
6. Click "Edit" from "Detector #2". Set up the "Trigger Mode" and "Setting". (For change parameter settings, must click “Get Settings” button)



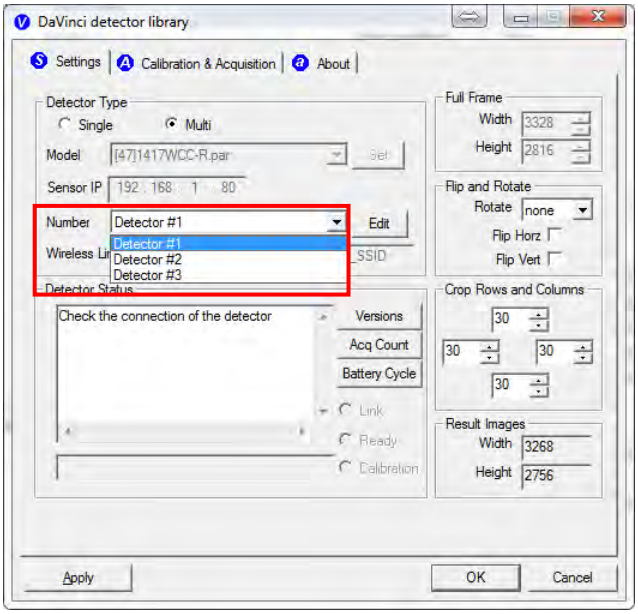
7. If a third detector is being used, select "Detector #3". Choose the product model and type the IP address.



8. Click "Edit" from "Detector #3". Set up the "Trigger Mode" and "Setting". (For change parameter settings, must click “Get Settings” button)



9. Choose the detector from the "Number" option and perform the calibration.



- The calibration folder is named according to the third and fourth numbers of the IP address. (e.g. C:\Davinci\CAL_ 01_80)
- For further instructions on calibration, please refer to **3.2Calibration** in Part.1 User & Installation Manual.

4. Troubleshooting

If any problem occurs during the usage of the product, please use this chapter as a troubleshooting guide.

Follow the instructions to resolve the problem. If the problem is not resolved, please contact our OSKO Inc. Customer Service team (E-mail: service@oskomedical.com).

4.1 LAN Connection Issue

1. Wireless Mode

1. Check the power

- Make sure the remaining battery percentage is above 25%.
- Check that the power of the detector is on.

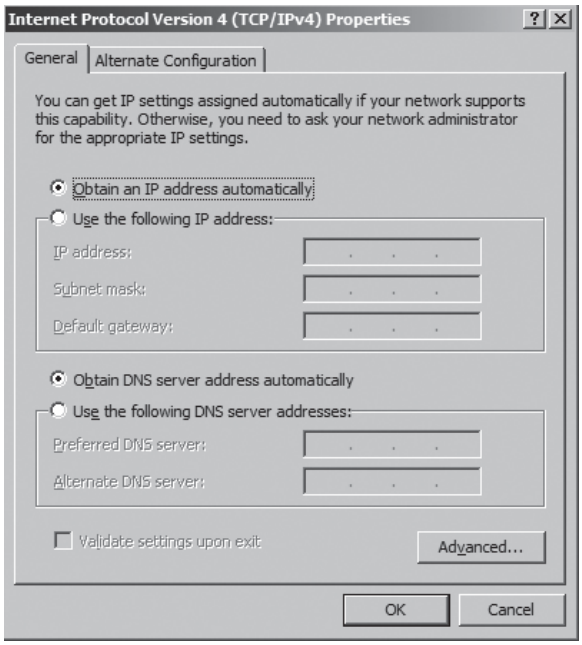
2. Check the AP (Access Point) IP setting

Make sure the AP (Access Point) is set up as recommended.

- SSID: Griffon
- Internal network
  - IP address: 2.2.2.1
  - Subnet mask: 255.255.255.0
  - Dynamic IP allocation range: 2.2.2.2 ~ 2.2.2.254
- Pre-Shared Key(PSK): project302
  - Authentication methods: WPAPSK or WPA2PSK
  - Password methods: TKIP/AES
- Channel (Frequency)
  - Avoid the crowded channel option.
  - Use the "Auto-Channel selection" function if the external AP has the feature.

3. Check PC Set up

Make sure that the "Obtain an IP address automatically" is selected from "Internet Protocol Version 4 (TCP/IPv4)".



2. Wired Mode

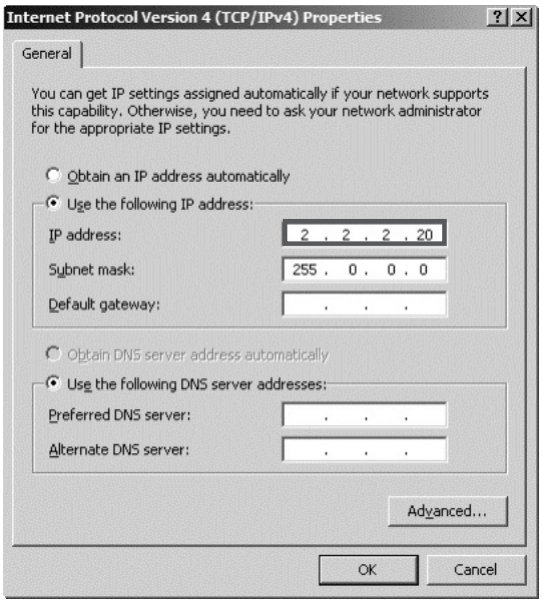
1. Check the power

□ Check the link cable and the power cord are connected properly

□ Check that the power of the detector is on.

2. Check PC Set up

Make sure that the IP address is set to “2.2.2.20”from" Internet Protocol Version4 (TCP/IPv4)"



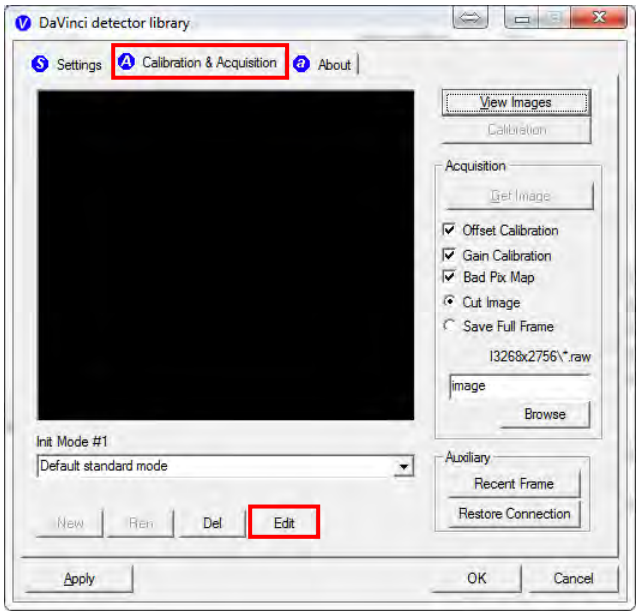
4.2 Lost IP Address (Use one of the methods below)

1. Use a second IP address (192.168.124.80) and change the IP address
2. Press the “Reset” button to reset the IP address. (Default IP : 2.2.2.100)

4.3 When using a reciprocating bucky

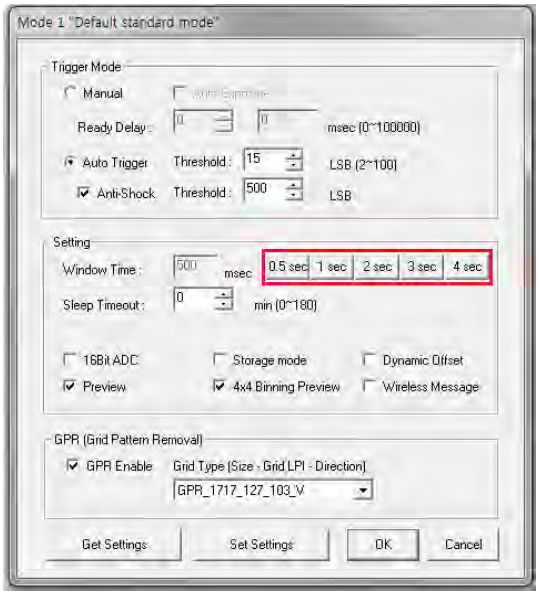
If there is image noise casued by the electromagnetic, follow the instructions below.

1. Open ″_vadav.lnk″ from "C:\davinci″.
2. Click the "Calibration & Acquisition" tab.



3. Click "Edit".

4. Change "window time" from 2 to 4 sec and click “OK” (For change parameter settings, must click “Get Settings” button)



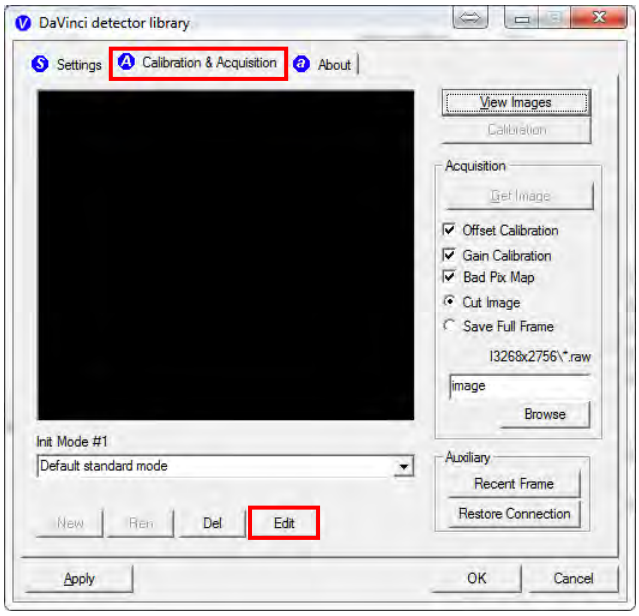
- The Window time default value is 0.5sec

4.4 Auto Trigger Mode

Follow these instructions when the panel auto triggers on its own and/or unintentionally acquires blank images.

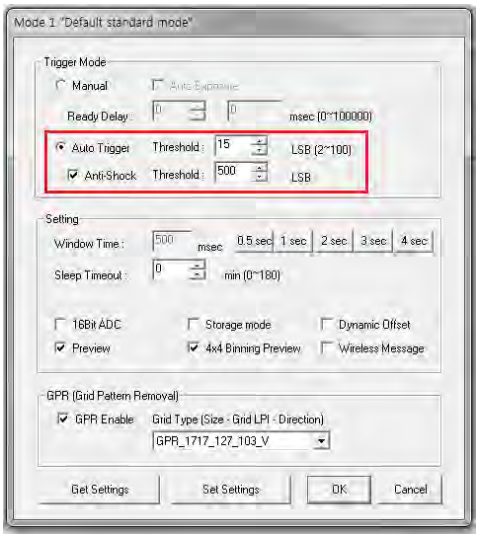
1. Open "_vadav.lnk" from "C:\davinci".

2. Click the "Calibration & Acquisition" tab.



3. Click "Edit".

4. Change "Auto Trigger Threshold" from 5 to 100 and click "OK". (For change parameter settings, must click "Get Settings" button)



- The Auto Trigger Threshold default value is 15

Supplement.1 Generator Specification

All the medical generators are avabile to use.

The specifications of the generators avalible are below.

kV Range	mA Range	mAs Range
40 ~ 150 kV	1.0 ~ 1000 mA	0.1 ~ 1000 mAs

- **If you need further information for generators, please contact your OSKO Inc. representative.**

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