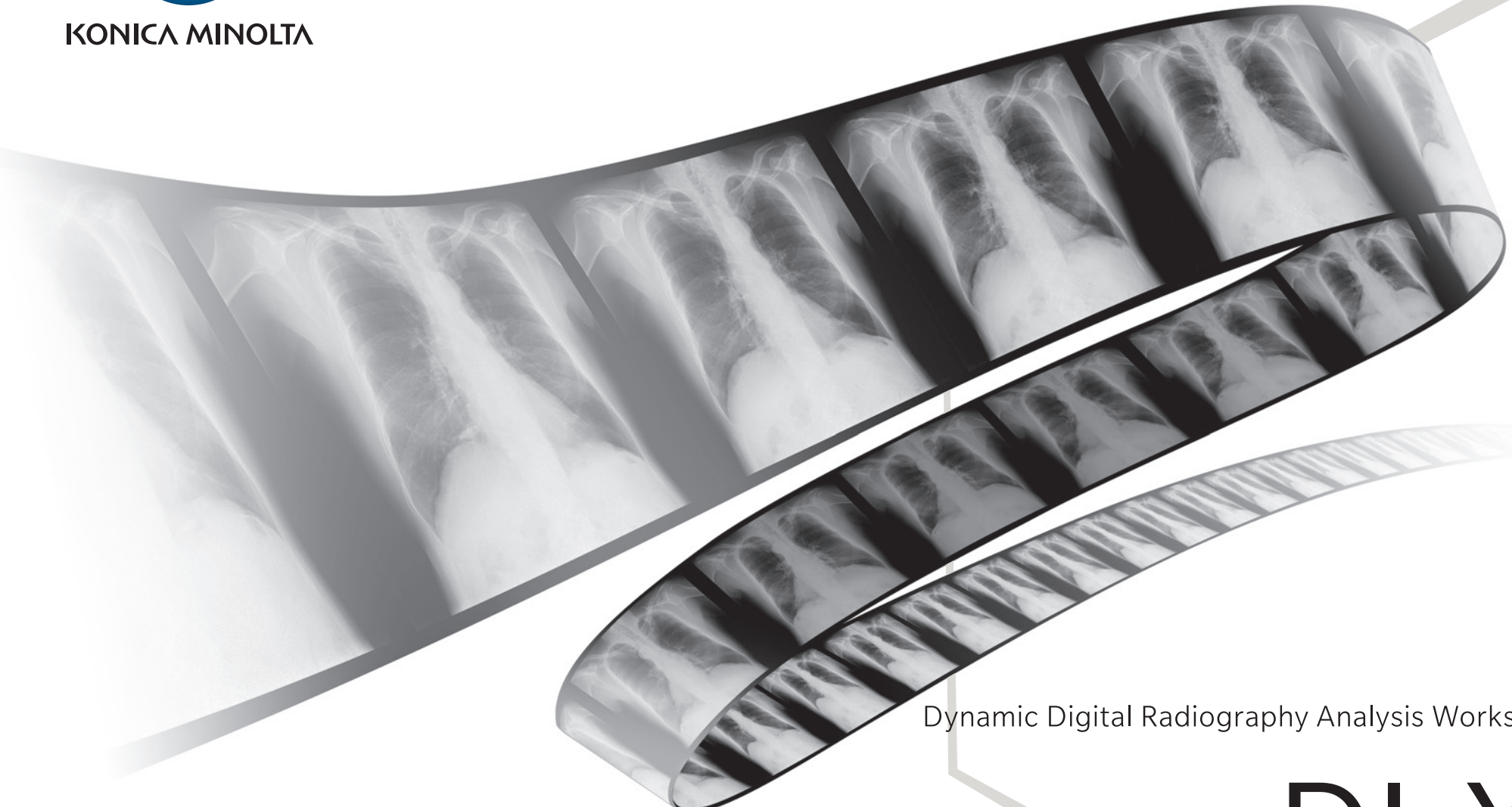KONICA MINOLTA

Dynamic Digital Radiography Analysis Workstation

DI-X1
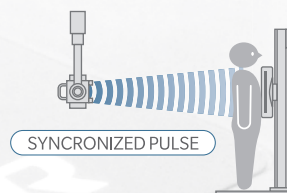
Giving Shape to Ideas

X-ray in motion
It is time to shift from static images to dynamic images

SYNCRONIZED PULSE

Dynamic Digital Radiography available in general radiography environment

Frame rate : 15fps

Exposure time : Up to 20 seconds

Dynamic digital radiography - Create a new value in new ways

The Dynamic Digital Radiography system is composed of the Dynamic Digital Radiography Analysis Workstation "DI-X1",
the casette type "AeroDR3 HD2", and a general-purpose radiography system[*1].
This breakthrough system generates dynamic images by continuously irradiating a pulsed X-ray
and displaying a series of frame-by-frame images.

General-purpose radiography system   AeroDR3 HD2 /CS-7   DI-X1
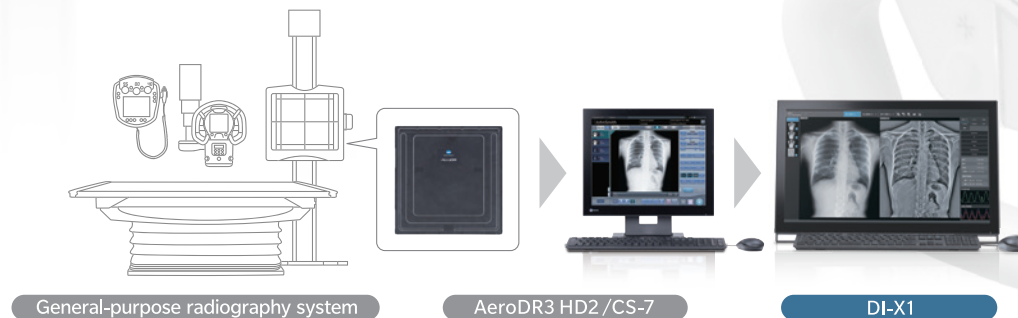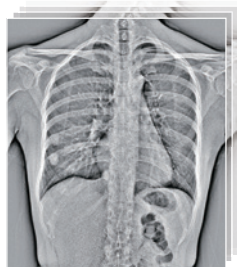
In pursuit of easy observation of "motions"

Visualizing "motions"

The image processing we developed to improve visibility for static images is also provided for the dynamic images.

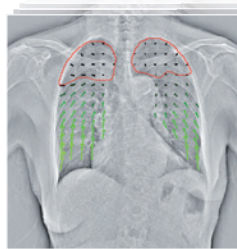**BS-MODE (Bone Suppression)**

FE-MODE (Frequency Enhancement)

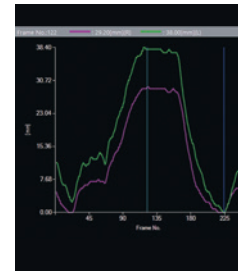
LM-MODE (Option)

Summary image

LM-MODE : Dynamic

Quantifying "motion"

The motion of structures such as diaphragms can be quantified and displayed graphically. By quantifying motions, the system can provide new perspective to the evaluation of symptoms and functions.

DM-MODE (Specific component tracking process)

Excursion Graph

Lung Field Area

Lung Field Measurement

Comparison with past exams graph for change rate of lung field area

TD-MODE (Tracheal diameter)

Tracheal diameter graph
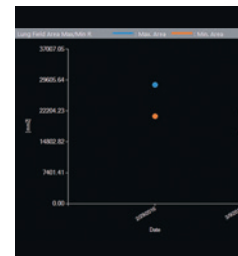
Measurement (Signal Value Change, Position Tracking)
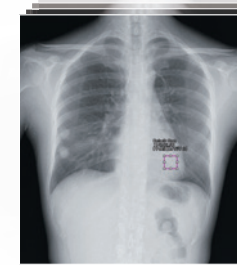
Signal Value Change

Position Tracking

◪ Extraction of signal value changes associated with "motion" of lung tissues
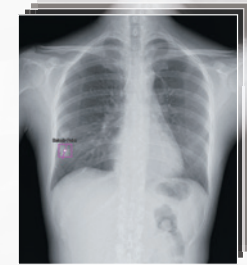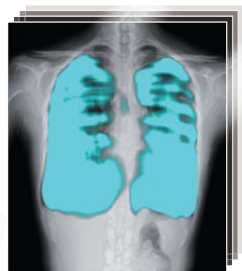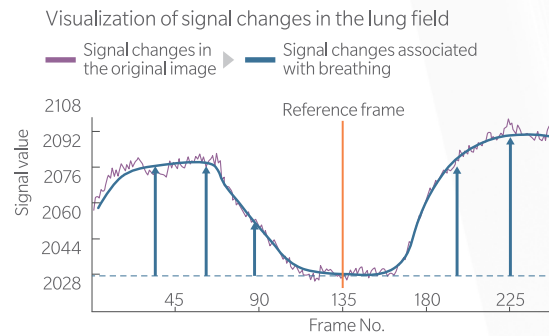
By capturing the signal value changes associated with the behavior of lung tissues such as alveoli and pulmonary blood vessels, and showing them on the display, the system expresses the slightest motions of the living body. This is expected to contribute to the information collection for a certain level of functional evaluation, even in simple X-ray studies in the screening stage before using advanced diagnosis devices such as CT and MRI.

PL-MODE (Reference frame rate calculation process)
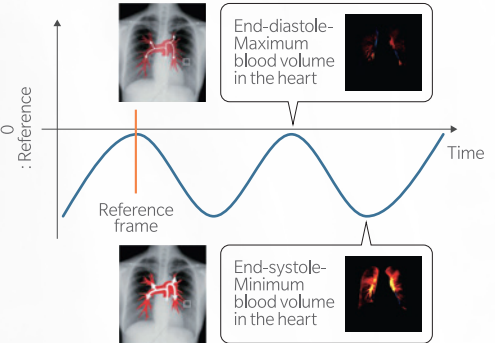Extracts and displays the image density changes in the lung field associated with breathing.

Concentration changes
in the lung field during breathing cycle

Visualization of signal changes in the lung field

— Signal changes in the original image ▶ — Signal changes associated with breathing

Reference frame

Signal value
2108 / 2092 / 2076 / 2060 / 2044 / 2028

Frame No.   45   90   135   180   225

PH-MODE (Cross-correlation calculation process)
Extracts and displays concentration changes in the lung field associated with the beating of blood vessels.

Image density changes
in the lung field during cardiac cycle

Visualization of signal changes in the lung field

Lung field area A

Heart area

Lung field area B

Calculate the similarity

Calculate the similarity

Similarity level — High / Low

PH2-MODE (Option)
Extracts and displays the signal value change in the lung field associated with the breathing of blood vessels

+510 : Low

Signal value

0 : Reference

−510 : High

End-diastole-Maximum blood volume in the heart

End-systole-Minimum blood volume in the heart

Reference frame

Time

PH2-MODE (Option)

Signal value ratio per lung Region
Calculate the signal value ratio of 6 areas;

$$Signal\ value\ ratio = \frac{Sum\ of\ signal\ values\ in\ the\ area}{Sum\ of\ signal\ values\ for\ the\ entire\ lung\ field}$$
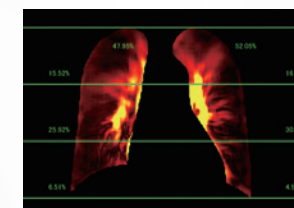
Signal value ratio per lung Region-Summary

＊You can view dynamic images from the two-dimensional codes.

In pursuit of easy observation of "motions"

▇ Measurement Summary(option)

In addition to multipurpose measurement results, excursion, lung field area, tracheal diameter, and measurement results can be summarized for viewing and DICOM PACS export.
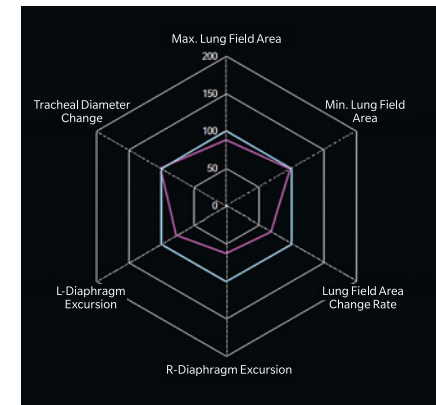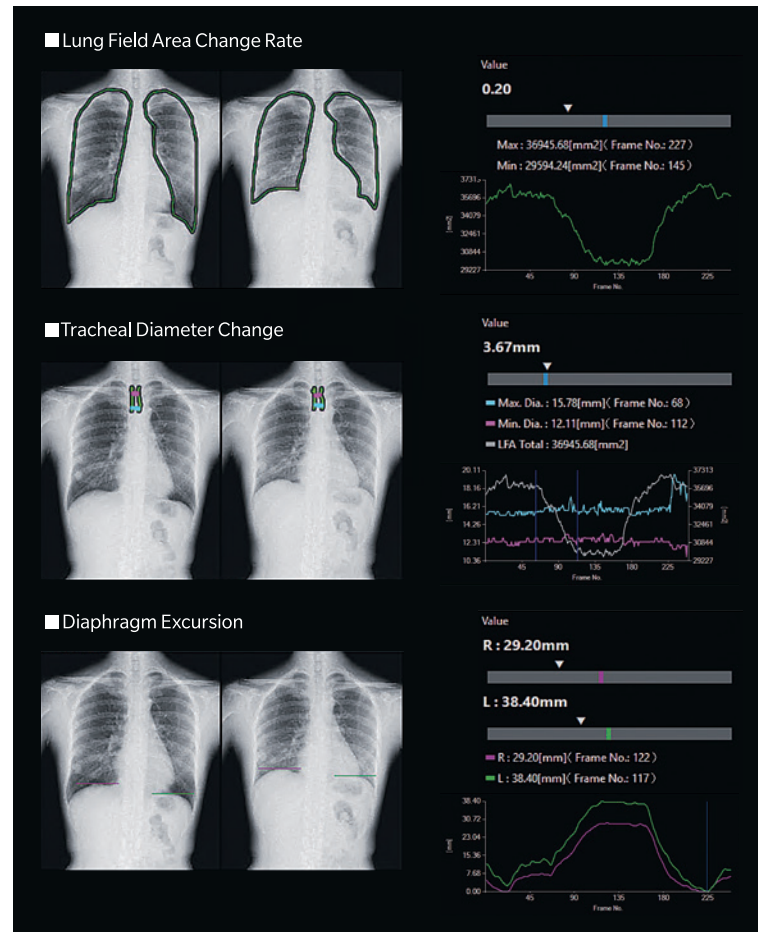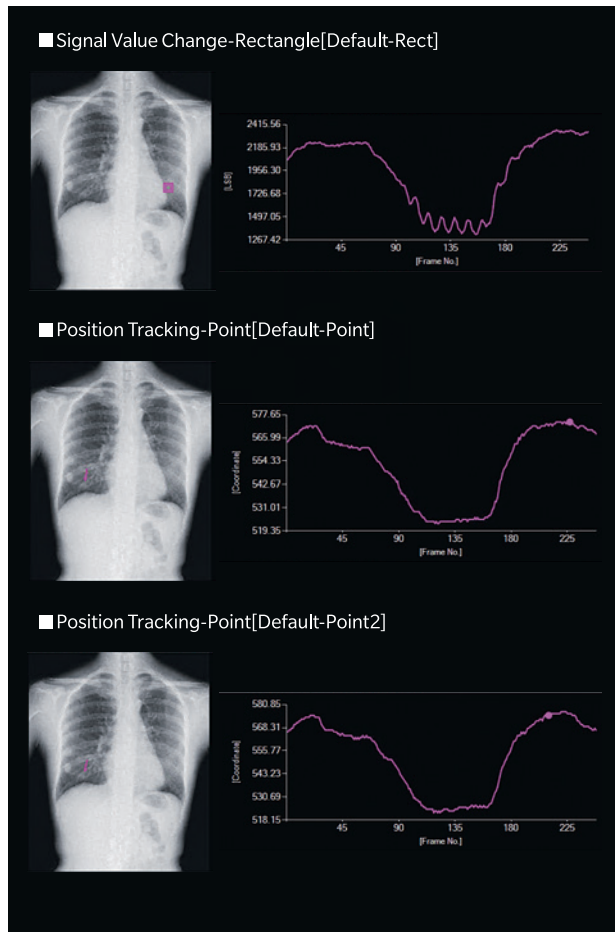
Specifications

▐▌ Main Specifications
of Dynamic Digital Radiography Analysis Workstation DI-X1

Product sales name: Image Diagnosis Workstation Konica Minolta DI-X1

DI-X1 server	
CPU	Intel Xeon® Processor E5-1650 v4 or higher
Memory	At least 64GB as standard
Operating system	Microsoft Windows10 IoT Enterprise 64bit
SSD or HDD	SSD : 512GB or more, and HDD : 4TB or more
PCI slot	At least 2 slots available (PCI-Express ×16)
Ethernet	Gb Ethernet
USB	4 ports or more
Keyboard	Full-size keyboard (USB or PS/2)
Mouse	Optical wheel mouse (USB)
Monitor	23-inch TFT monitor, etc. with full HD (1920 x 1080) resolution or higher

DI-X1 client	
CPU	Intel Core i7 processor 3.40 GHz or higher
Memory	16GB or more
Operating system	Microsoft Windows10 IoT Enterprise 64bit
Storage	HDD: 2TB or more
PCI slot	At least 2 slots available (PCI-Express x 16)
Ethernet	Gb Ethernet
USB	4 ports or more
Keyboard	Full-size keyboard (USB or PS/2)
Mouse	Optical wheel mouse (USB)
Monitor	23-inch TFT monitor, etc. with full HD (1920 x 1080) resolution or higher

▐▌ Main Specifications of AeroDR3 HD2

Product sales name: Digital Radiography SKR 3000

AeroDR3 HD2 1417size (for dynamic imaging)	
Scintillator	CsI
Detector size	14"×17"
Dimension	384(W) × 460(D) ×15 (H)mm
Weight	2.6kg
Pixel size*2	400μm
Available grids	34 lines / cm , 40 lines / cm
DQE	56% (1mR,1cycle/mm) 72% (1mR, 0cycle / mm)
Antibacterial	An inorganic antibacterial agent kneaded into the exterior material (complied JIS Z 2801 / ISO22196 test)
Communication*2	Dedicated wired Ethernet connection / Wireless LAN (IEEE802.11a / 802.11n compliant)

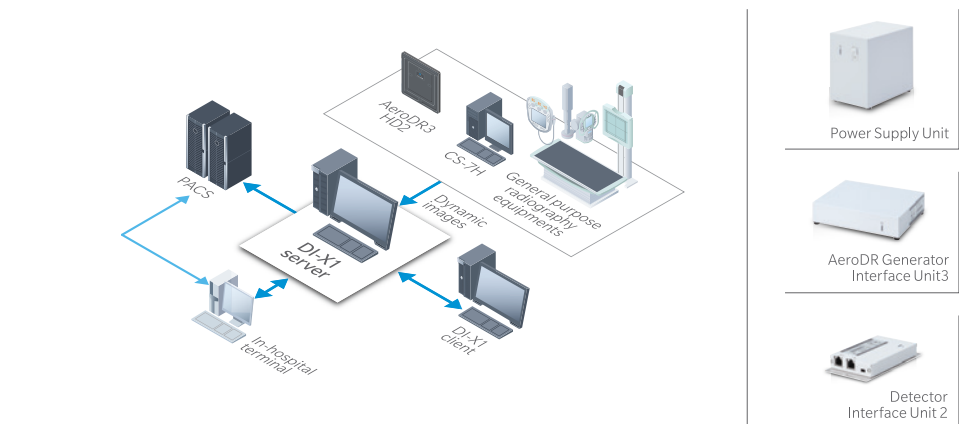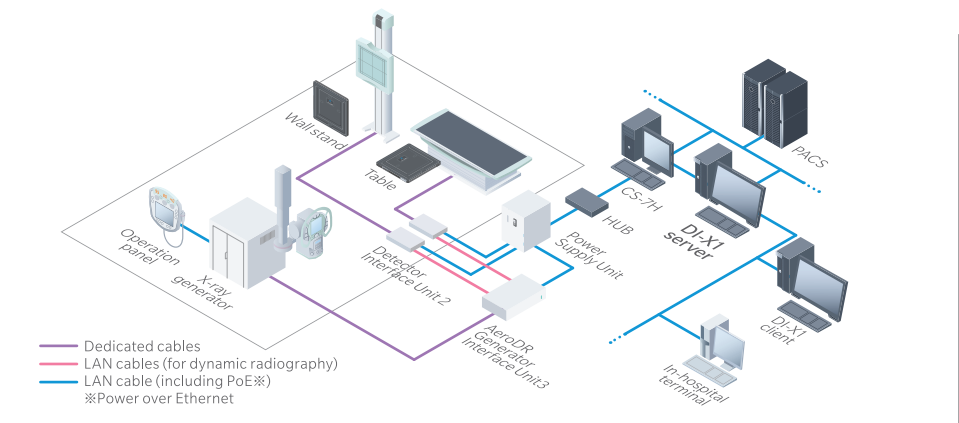| AeroDR3 HD2 1717size (for dynamic imaging)	
Scintillator	CsI
Detector size	17"×17"
Dimension	460(W)× 460(D)×15(H)mm
Weight	3.2kg
Pixel size*2	400μm
Available grids	34 lines /cm , 40 lines /cm
DQE	56% (1mR, 1cycle / mm) 72% (1mR, 0cycle / mm)
Antibacterial	An inorganic antibacterial agent kneaded into the exterior material (complied JIS Z 2801 / ISO22196 test)
Communication*2	Dedicated wired Ethernet connection / Wireless LAN (IEEE802.11a / 802.11n compliant)

*2 For dynamic imaging

Specifications

Console CS-7

Product sales name: Image Diagnosis Workstation CS-7

	CS-7H
Monitor	17-inch high viewing angle LCD multi-touch monitor
Image processing	Automatic grayscale processing Frequency processing (F processing) Equalization processing (E processing) Hybrid processing (HF processing/HE processing) Hybrid smoothing processing (HS processing) REALISM processing (RF processing/RE processing) REALISM smoothing processing (RS processing) Grid suppression processing Automatic irradiation field recognition processing
Image storage capacity	80GB or more
I/O port	Ethernet 10base-T/100base-TX/1000base-T USB 6 ports or more
DICOM support	DICOM Storage SCU DICOM Basic Grayscale Print Management SCU DICOM Modality Worklist Management SCU DICOM Modality Performed Procedure Step SCU
Image output gradation	12-bit (4,096 gradations)
Image output	Host : up to 4 ch. Printer : up to 2 ch.
Dimension/Weight	360(W) × 435(D) × 175(H) / 12 kg
Rated voltage	AC 100V-240V (single phase 50/60Hz)
Power consumption	109W or less
Main accessories	Control unit power cable, Operation unit power cable, Control unit - Operation unit connection cable, Keyboard x 1 / Mouse x 1
Main options	Magnetic card reader for patient ID registration, bar code reader, additional LAN card, sub-monitor adapter

System Configuration Examples

- Dedicated cables
- LAN cables (for dynamic radiography)
- LAN cable (including PoE※)
  ※Power over Ethernet

Wall stand, Table, Operation panel, X-ray generator, Detector Interface Unit 2, AeroDR Generator Interface Unit3, Power Supply Unit, HUB, CS-7H, DI-X1 server, PACS, DI-X1 client, In-hospital terminal

AeroDR3 HD2, CS-7H, General purpose radiography equipments, Dynamic images, PACS, DI-X1 server, In-hospital terminal, DI-X1 client

Power Supply Unit

AeroDR Generator Interface Unit3

Detector Interface Unit 2

★Specifications are subject to change without notice to improve performance. ★Hardware products are subject to change without notice to improve performance. ★"Dynamic Digital Radiography Analysis Workstation DI-X1" and "DI-X1" are the names of "Image Diagnosis Workstation Konica Minolta DI-X1".
★ "AeroDR3 HD2" is the name of "Digital Radiography SKR 3000". ★The KONICA MINOLTA logo and symbol are registered trademarks of Konica Minolta, Inc. in Japan and/or other countries. ★AeroDR is a registered trademark or trademark of Konica Minolta, Inc. in Japan and/or other countries.