MSX500

X-Ray Inspection System

Operation Manual

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1. Safety Precautions and request

Thank you for purchasing the X Ray Inspection System MSX500. So that you can fully utilize the various feature of the system and to ensure correct and safe operation, please carefully read the following warnings / precautions.

⚠ **Warnin**		To prevent serious injury or server damage to the system, please observe the following warnings before using the system.
⚠ **Caution**		To prevent abstract or server damage to the system, please observe the following warnings before using the system.

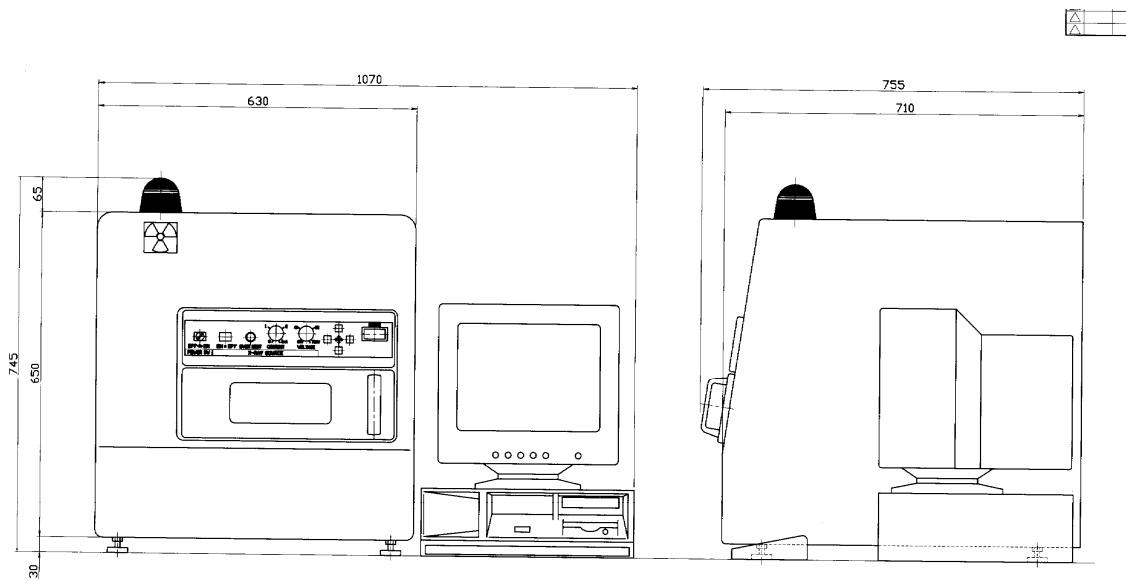|	
⚠ Warning	Do not touch the electric plug by the wet hand. ● There is fear of an electric shock
⚠ Warning	Never disassemble or modify of the system, in except for maintenance by the engineer. ● It may break down or it may become the cause of the accident.
⚠ Warning	Please keep the electrical ground level with the grounding terminal. In case you deal with the inside of the control board, please fully check that the power supply is off. ● There is fear of an electric shock.
⚠ Warning	Please check periodically whether dust has adhered to the circumference of the edge of a power supply plug, and the pug is inserting to the socket certainly. ● It may the cause of an electric shock and a fire.
⚠ Warning	Please cut off power supply when cleaning and check of the system. ● It may the cause of an electric shock and a injury.
⚠ Caution	Please do not damage the power supply cable. For example, Processing, Banding, Putting a weight, Inserts. ● It may the cause of an electric shock and fire.

⚠ Caution	Please be sure to extract with a plug when the pulling out the plug of the cable. Do not it with the cable. ● It may the cause of an electric shock and fire.

2. Nomenclature

2-1. Out Side Drawing

2-2. Front View of the System

Indication Lamp for X-Ray ON

Power Switch   Control Panel

X-Ray Generator

Table Control Switch

MSC

Door

CRT

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Breaker Switch   XY Table   X-Ray CCD Camera

PC
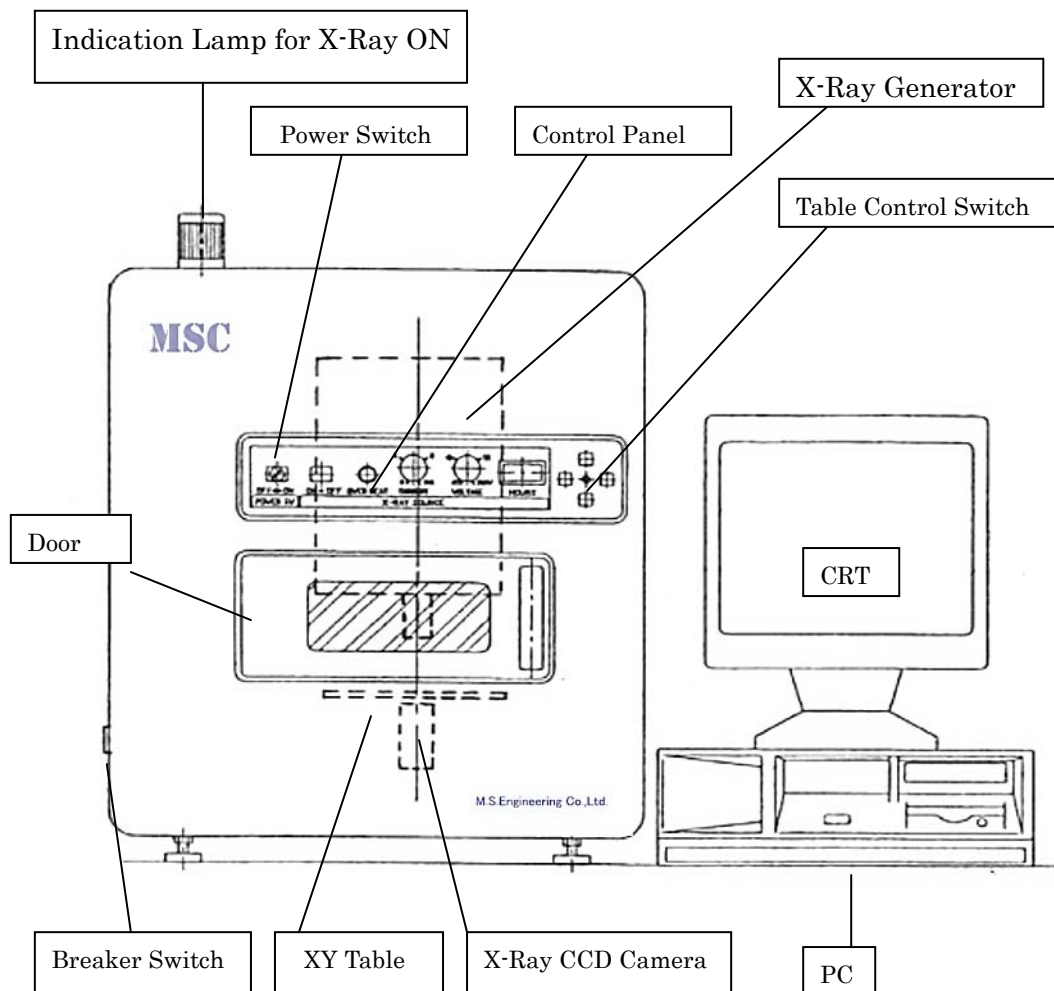
3．Original Structure

3-1．Image Magnification

Image Magnification	30X

＊　Magnification is image rate on the CRT.

3-2．X-Ray Generator and CCD Camera

The X Rays generated from The X-Ray Generator, then penetrate the sample.

The CCD camera changed it into the image.
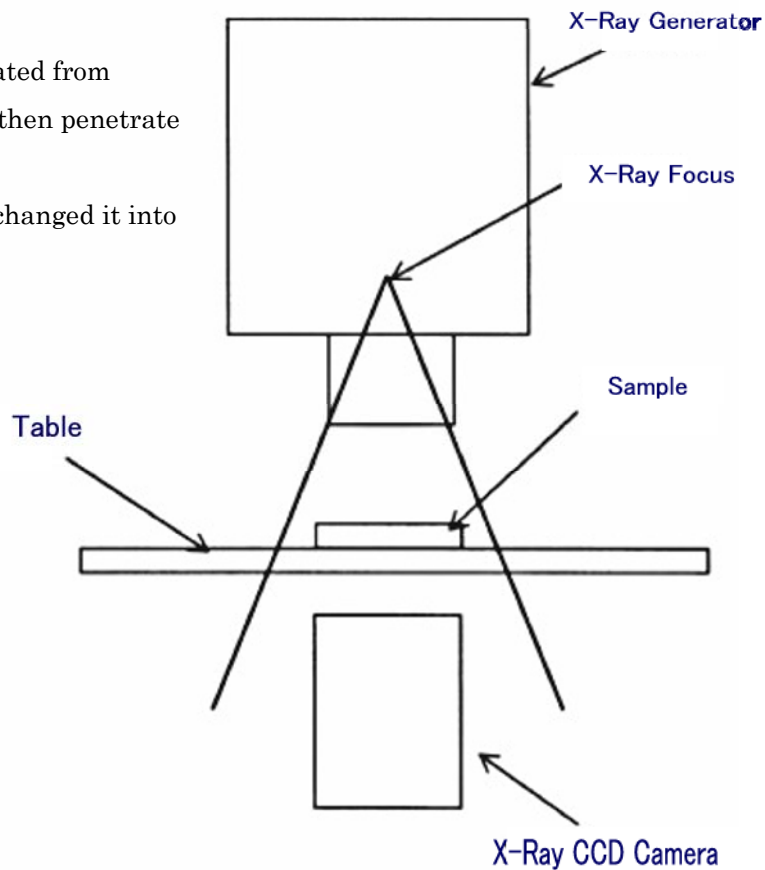
①　If X –Ray tube voltage is high, the frequency is going up, and the penetration will be upped.

If X-Ray tube current is high, Luminosity of the image will be goes up, but frequency of the X-Ray is not change.
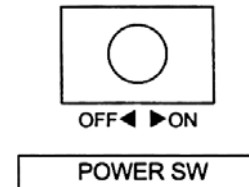
The monitor's image has reverse of the front and the back. But the right and the left are remains.

4. Operation Checkout

4-1. Control Panel
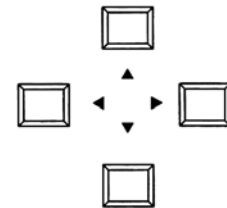
   (a)   **Power Switch**

     ● 「ON 」 System is in standby.

     ● 「OFF」 System is stopped.

Power supply to the PC from the system will be always ON.

ON-OFF of the PC is based on the own switch of the PC.

   （b）   **Table control Switch**

     ● The table moves in the same direction as the pushed switch.

     ● The table is moved while pushing the switch.

   （c）   **X-Ray System**
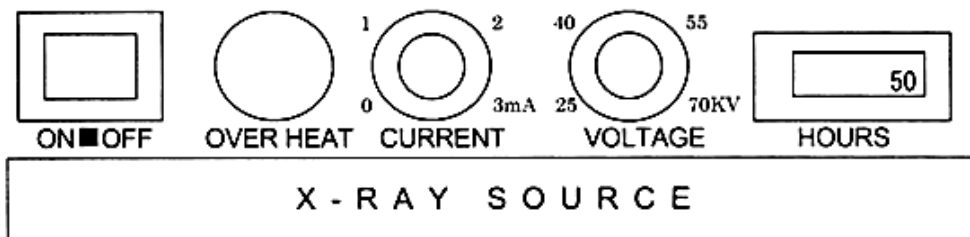
     ● 「ON■OFF」 Switch is for X-RAY generator.

       ・ If it turns ON, X-Ray will be irradiated, and the lamp of the switch is lighting. Simultaneously, The indicator lamp of the X-Ray will be lighting.

       ・ The switch is pushed again, irradiation of X-Ray is stopped.

     ● Indicator Lamp for Over Heart

- The Red Lamp will be lighting, if the X-Ray generator is over heated, and the generator of the X-Ray is stopped automatically.
- In this case, the power supply will be maintains ON. Then, cooling to the generator will be started automatically.
- The red lamp is light-out automatically when the system becomes normal. The system can be used again.
- Irradiation of X-Ray can be used about continuously for 1 hour.
- We recommend you it to turn off the switch of the X-Ray operation briskly when the irradiation is unnecessary.

● The Adjuster for X-Ray Current

It is fixed in contrast and the brightness of the image can be changed.
- The image will become bright if current is increased.

● The Adjuster of the X-Ray Voltage
- Penetration power will become strongly if the voltage is made high. In this case, contrast of the image will become bad.

● The Hours Counter
- The counter will be counts the time of the power switch is ON.
-

The skillful usage for the X-Ray System.

We recommend the power switch may be turned OFF when not irradiating X-Rays for a long time. Then the life of the X-Ray generator will become long.

4-2. Circuit Breaker

There is the circuit breaker in the left of the main body.

● If the breaker switch is OFF when the system is operation.
- The power switch is OFF first.
- Please reset of the breaker switch.

＊　In the case of the breaker switch is OFF again, please pull out the power cable from the power supply socket. Then, please contact to the technical service.

4-3. X-Ray Interlock

● If the door of the system opened with carelessly when the X-Ray is irradiated. The X-Ray generator will be stopped automatically.
  In this case, please shut the door first. Then, turn ON the switch of the X-Ray, The system will be re-operated.
● The sensor for the X-Ray interlock is setting upped on the upper of right hand side of the door.

| Caution | : Please ON-OFF of X-Ray irradiation by the switch on the System. It does not ON-OFF with the switch for interlocks in the door. |

4-4. Indication Lamp for X-Ray Operation

● Indicator lamp for X-Ray is blinking in yellow when the irradiated of X-Ray.
● If the indicator lamp is blinking, please be careful not open the door of the system.

5. Principal Specifications

Model		MSX500
X-Ray Tube	Tube Voltage	70KV maximum
	Tube Current	3mA maximum
	Focus Size	0.8mm
	Cooling	Air cooling
Detector	X-Ray CCD camera	2/3 inch (input size)
Computer	CPU	1.2GHz
	Memory	128MB
	Storage	CD-R/W/FDD3.5/HDD20GB
	OS	Windows2000
	CRT	15inch
	Image Controller	Improving image quality
		Image enhancement processing
		Contrast adjustment
		Brightness adjustment
Main Body	Dimensions	630W×745H×755Dmm （Body）
	Weight	120Kg approximately
	Power Supply Capacity	100V AC（110,220,380,V AC）500VA
	Radiation ('X-Ray)	Less than 1μSv/h
	X-Ray shield	X-Ray proofed special cabinet
	X-Ray image magnification	30x
	Table size	330×250mm
	Table stroke.	X stroke	120mm
		Y stroke	160mm

Specification may be changed without a preliminary announcement for improvement.

6. Warranty

The system was shipped by strict quality
control and inspection.
However, please inform the technical
service with the serial number of the system,
if there is should be fault.

Serial Number
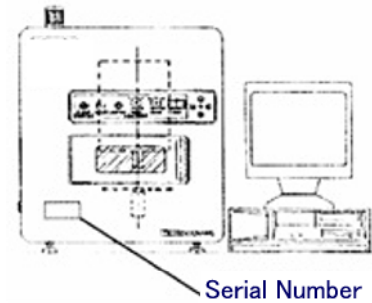
In the event of a malfunction attributable to the manufacturer, the system
will be repaired at no charge for one year from the date of the delivery of the
system and or the hours worked of the system are till 3000 hours. It is till
which or an early condition due date.

Any malfunction due to an act of God, a willful act, or an operator error
will be repaired at a cost. This warranty will not cover any malfunction due to
events beyond the control of the manufacturer. (e.g., acts of war)

7. Vision System

7-1. Abstract

The picture obtained with X ray system is possible into a clear and legible image with PC with the application software built in the system.

PC Conditions:

- IMB AT Compatible machine
- CPU ：1.2GHZ
- RAM ：128MB
- OS ：Windows 2000
- CRT ：Full colored 14 inch CRT
- Vision Board：FVX-CS-RICE/WIN

Operation Items:

- Brightness Control (at LIVE)
- Contrast Control (at LIVE)
- Image Enhancement (at Integration)
- Contrast Enhancement (at Integration)
- Data Saving
- Cross Cursor

Note: Please power switch ON in the Main Body first, and next, power switch of the PC must be ON. The software will not be start if the process is mistake.

7-2. Operation procedure

The application software is already installed on the PC, So, please start the system as the nest process:

1. Power switch is ON of the Main body of the X Ray System.
2. Power switch is ON of the PC, You can see the below screen.
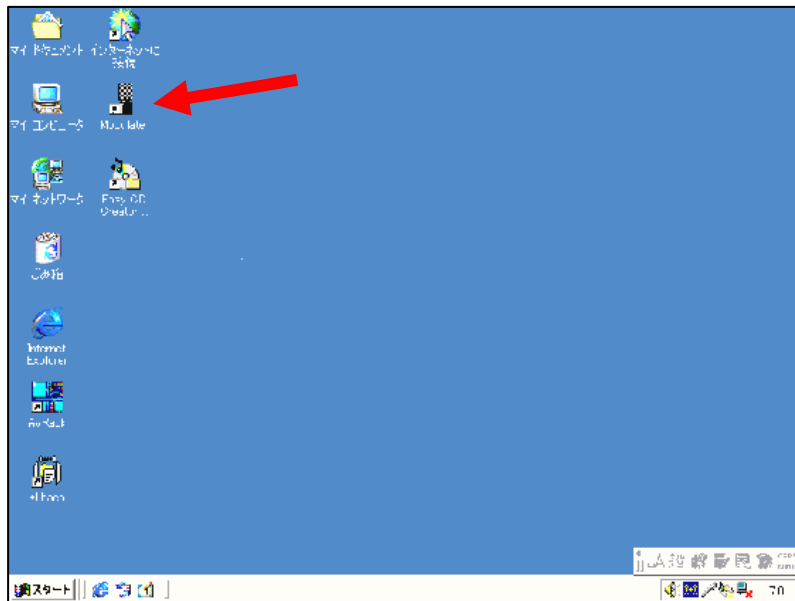
3. Icon of "Modulate" should be double crick,
4. Vision Screen is opened on the screen.
5. If an error message comes out in this process, please shut off all power supplies and perform the process of 1 to 4 again.
6. When you end operation, please click X at the upper right of the screen.

7-3. LIVE picture control

When IB- software was started, the picture from the X ray system is real-timely displayed on the screen.

The screen is in a LIVE
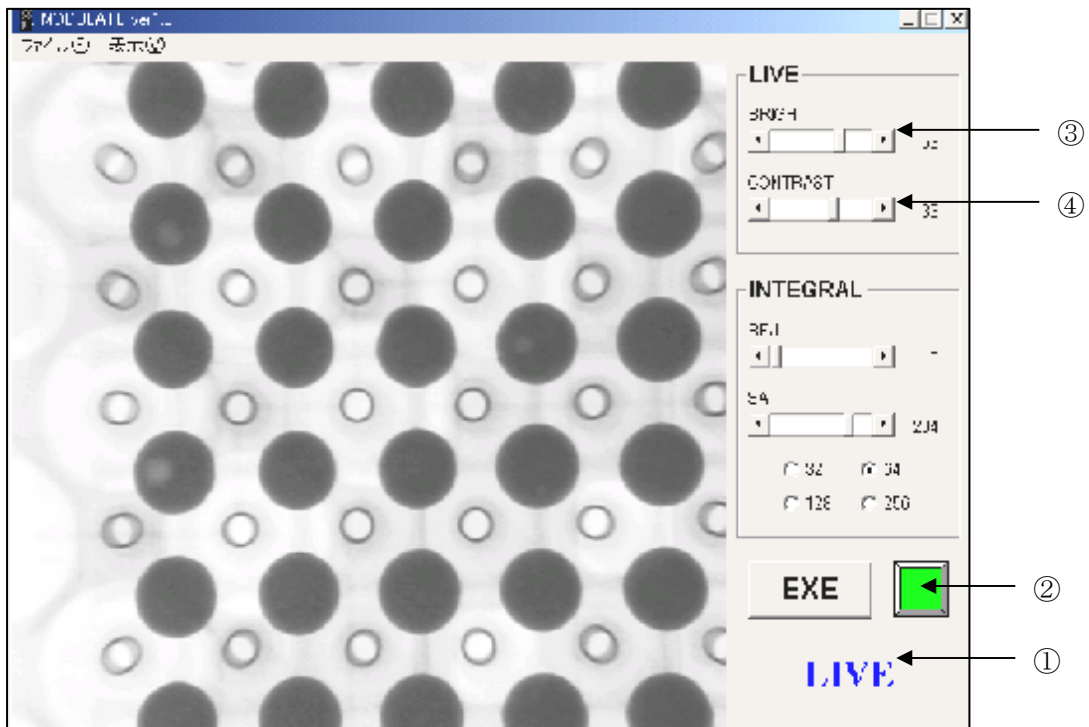
① :   Operation is in LIVE

② :   The mark is displayed by GREEN when operation is in LIVE

③ :   Brightness control: The position 0 is center of the bright of the image.

④ :   Contrast control: The position 0 is center of the contrast of the image.

Please on to the next step if the screen which you need can be displayed,

7-4. integrated picture control

　　The LIVE picture is contained an X ray noise. Then integration processing is in order to obtain a more cleared picture.
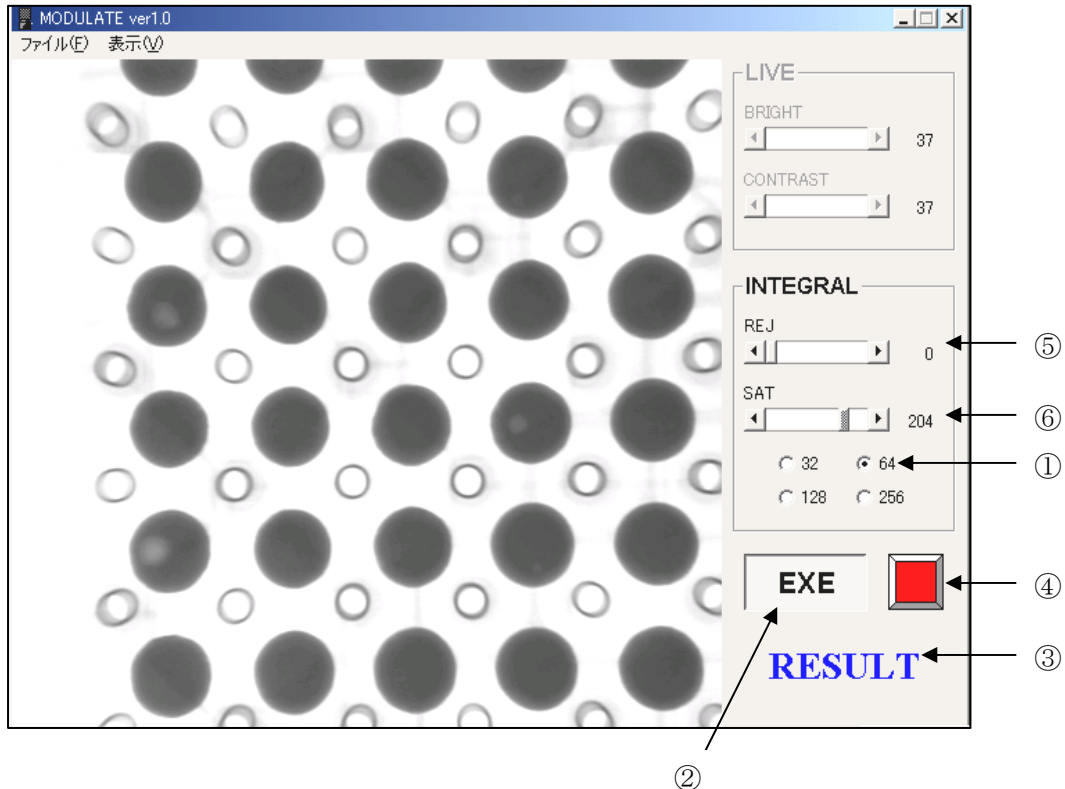
①：　The number of times of integration is chosen from four stages. The picture will be cleared if chosen large number, but in the case, the time will be long.

②：　The key which chooses LIVE or RESULT,　when you chosen the RESULT, in the case, Wait… will be indicated in the window and ④ will be displayed "Yellow". And then "Red" if the integration was completed.

③：　LIVE…Wait….…RESULT, It shows the function that selected.

④：　Green at LIVE, Yellow at Wait…, Red at RESULT are lighting.

⑤：　REJ: Setting of contrast enhancement range in black level.（0-255）

⑥：　SAT: Setting of contrast enhancement range in white level.（0-255）

7-5. Data Save

Please loading and saving of the data on OS of WINDOWS.
The data can be saving as file mode of bmp or jpeg.
The data can do processing freely by the application software which can
be operated with the same file mode. For example, they are the photo-shop,
Microsoft Photo Draw etc.

7-6. Cross Cursor

If View (V) at the upper left of a screen is clicked, cross cursor will
appears on the screen.
It is convenient to check of the center position of the screen, and the
level of a picture.