RICOH

Y058/Y059/Y060/Y061/ Y070/Y071/Y072/Y073 Service Training

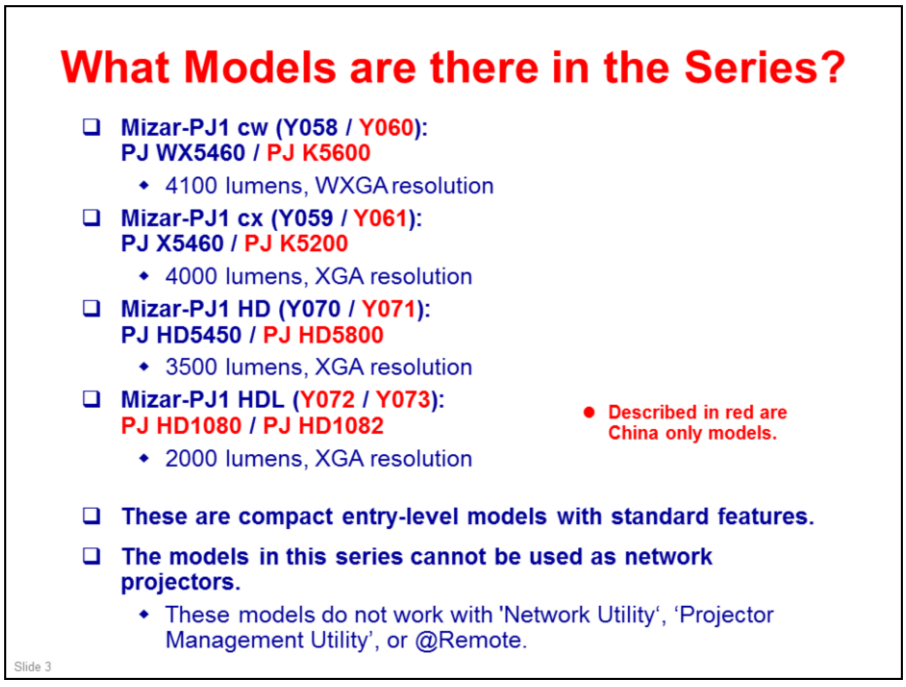
Mizar-PJ1

Slide 1

Version 1.0

This training course provides service technician training for the Poloaris-PJ1 series.

This section provides an overview of the machine, and the options that can be installed.



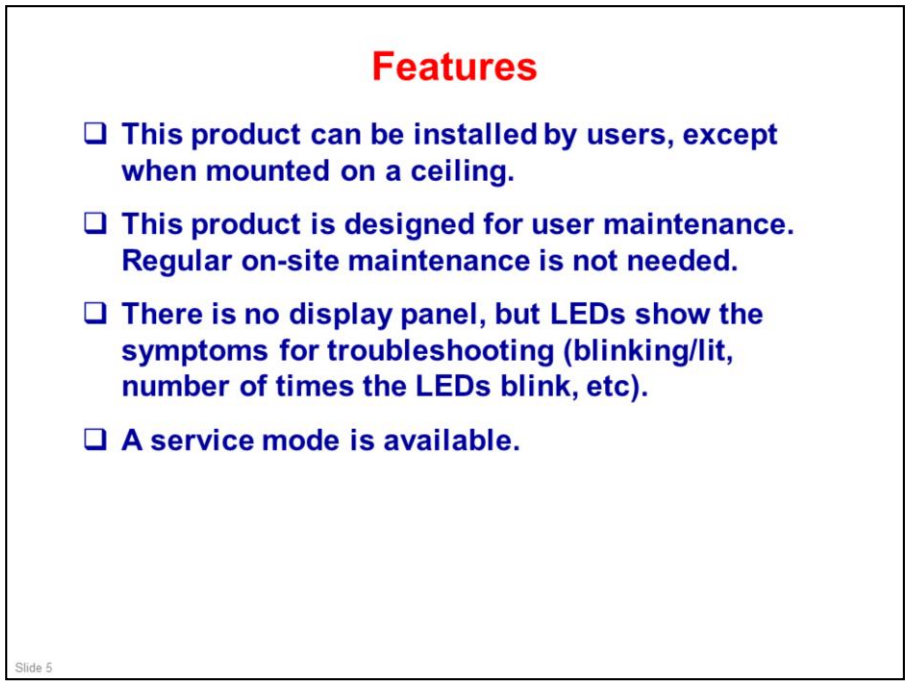
No additional notes

Main Specifications

	Mizar-PJ1 cw	Mizar-PJ1 cx	Mizar-PJ1 hd	Mizar-PJ1 hdl
Type	DLP			
Color wheel type	6 segments			
Brightness	4100 lm	4000 lm	3500 lm	2000 lm
Lamp type	260W high-pressure mercury			
Resolution	WXGA	XGA	HD	
Projection lens	For SVGA/XGA: F# 2.41 ~ 2.55, f=21.8 ~ 24 mm, 1.10X Mechanical Zoom Lens For WXGA: F# 2.50 ~ 2.67, f=21.8 ~ 24 mm, 1.10X Mechanical Zoom Lens			
Dimensions (W × D × H)	314.3 × 223.6 × 88.2 (without feet) 314.3 × 223.6 × 101.7 (with feet)			
Weight	2.6 kg (5.75 lbs)			
Standby Power Consumption	Eco mode: Typical 232W, Max 255W @110Vac Typical 227W, Max 250W @220Vac Full mode: Typical 306W, Max 337W @110Vac Typical 296W, Max 326W @220Vac			
Keystone	Vertical (Manual)			
Speaker	10W x 1			
Wireless LAN	No			
Wired LAN	No			
USB	Service Use Only			
HDMI	1.4 (x1)		1.4 (x2)	

Slide 4

No additional notes



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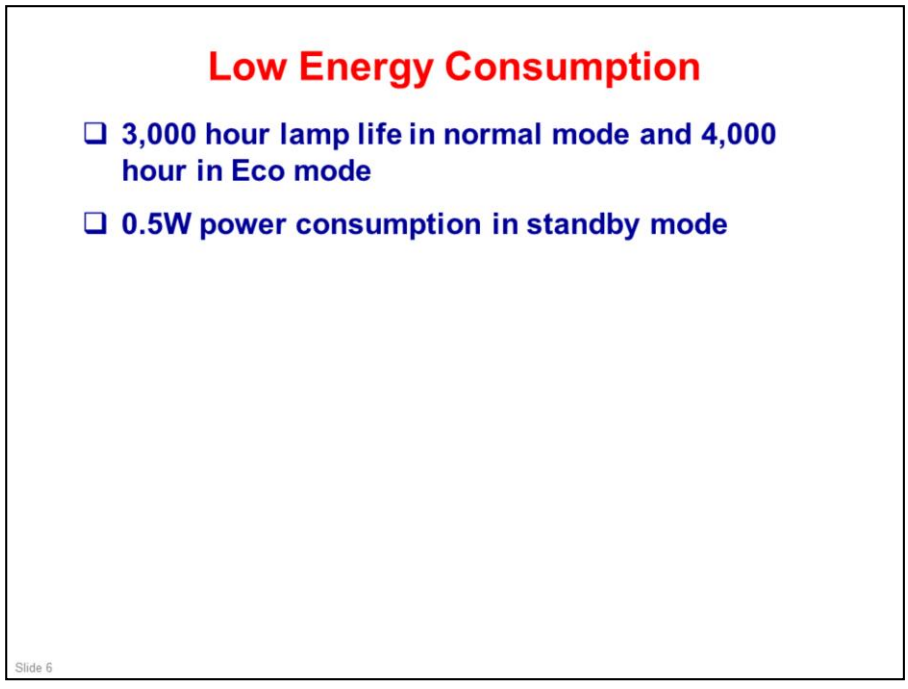
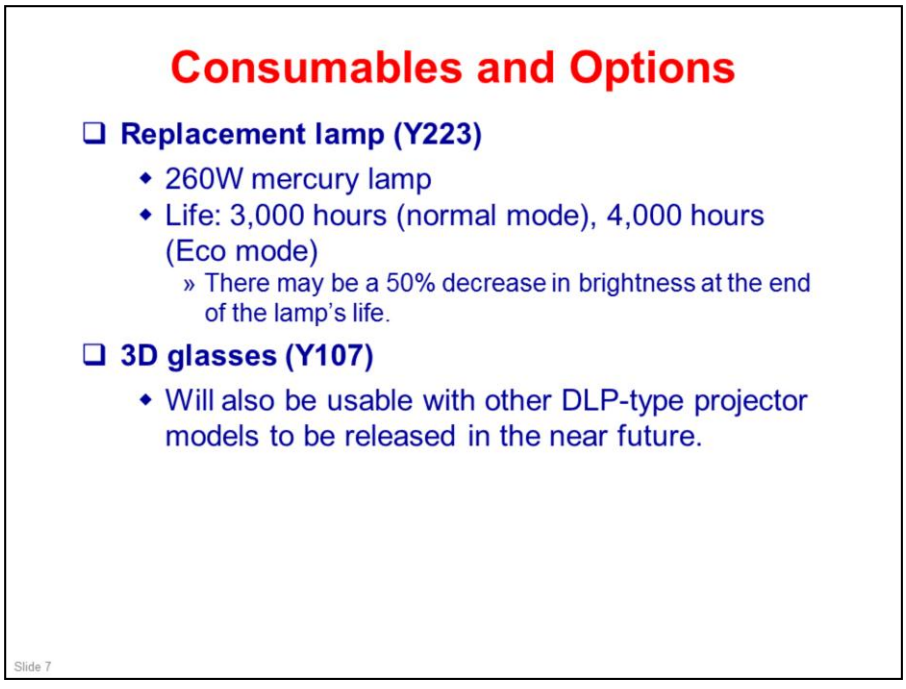


- Note that in the service mode menu, Eco Mode is referred to as ‘Low Mode’.



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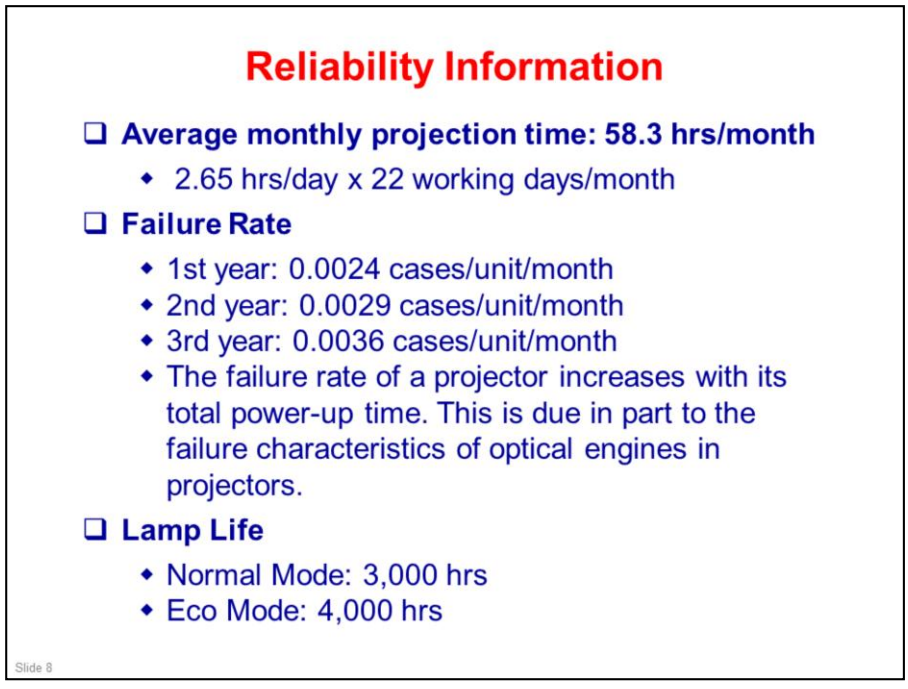

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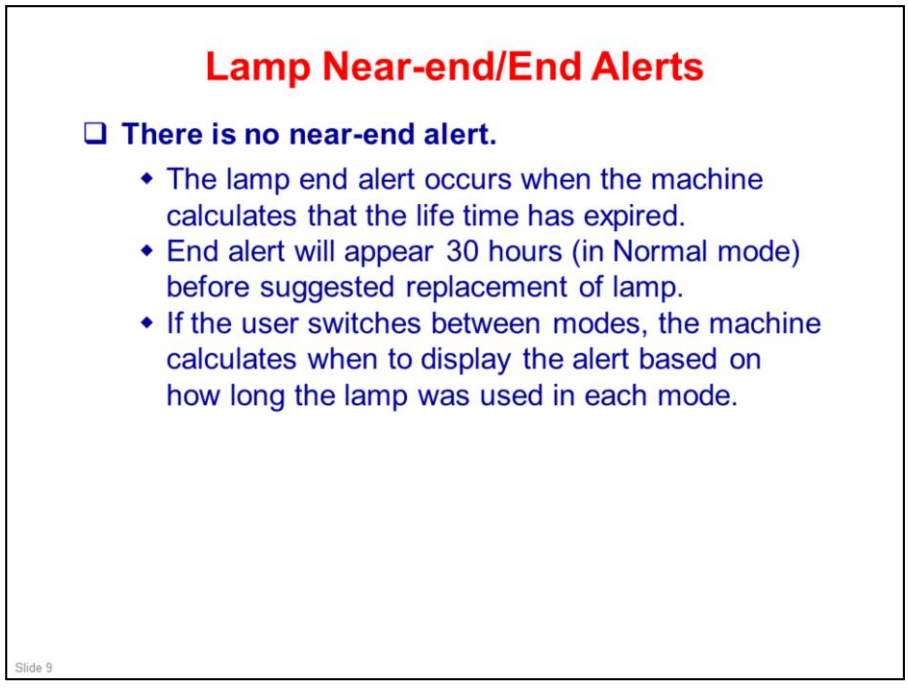

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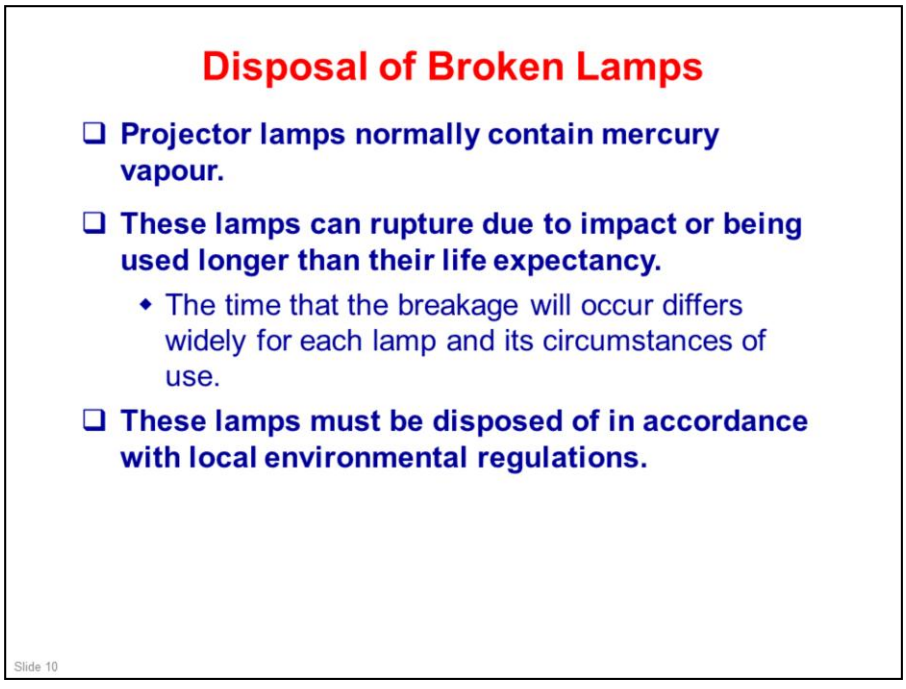

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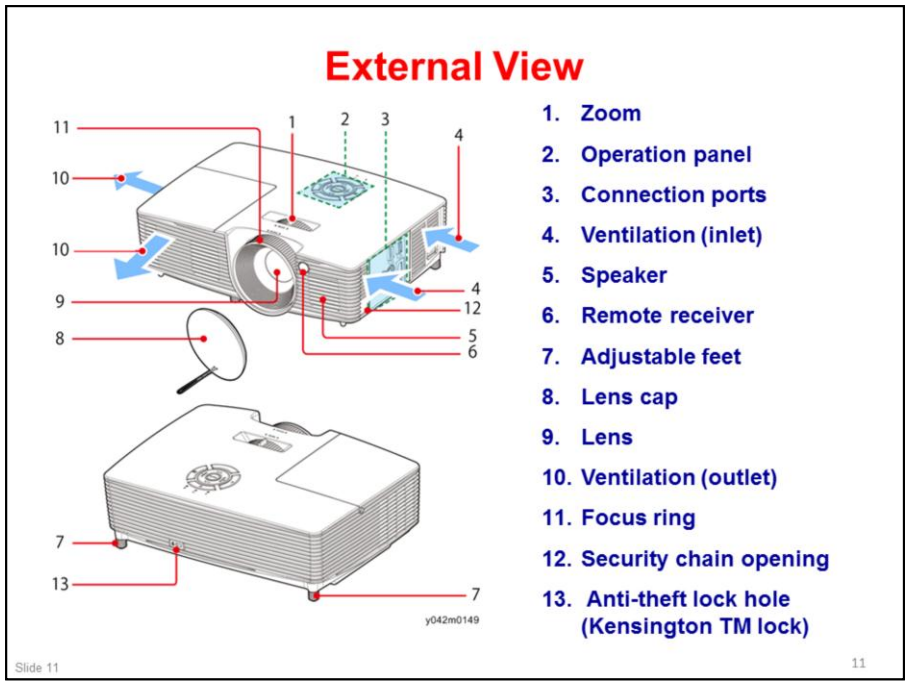

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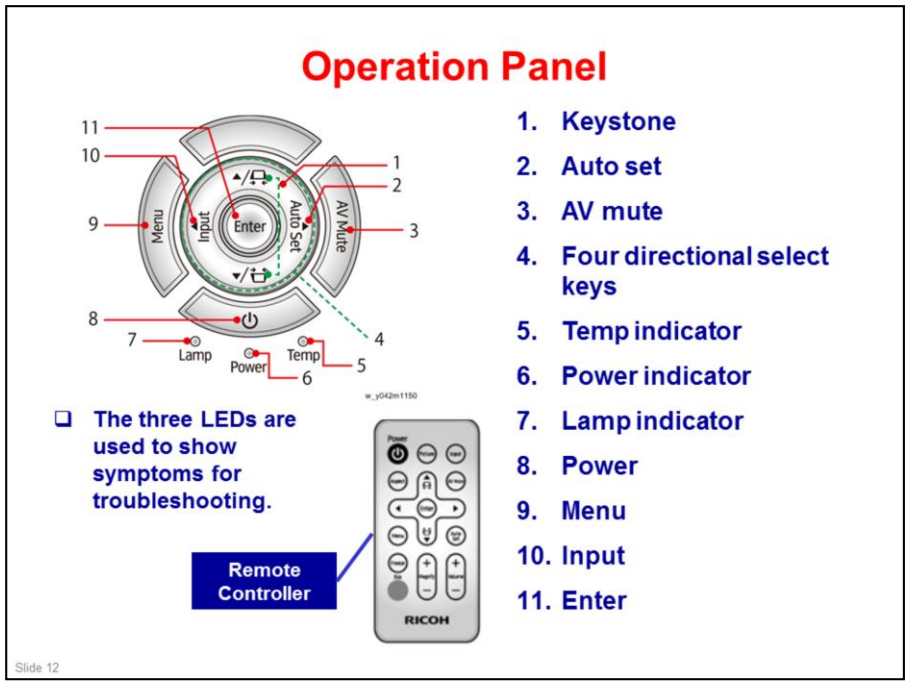

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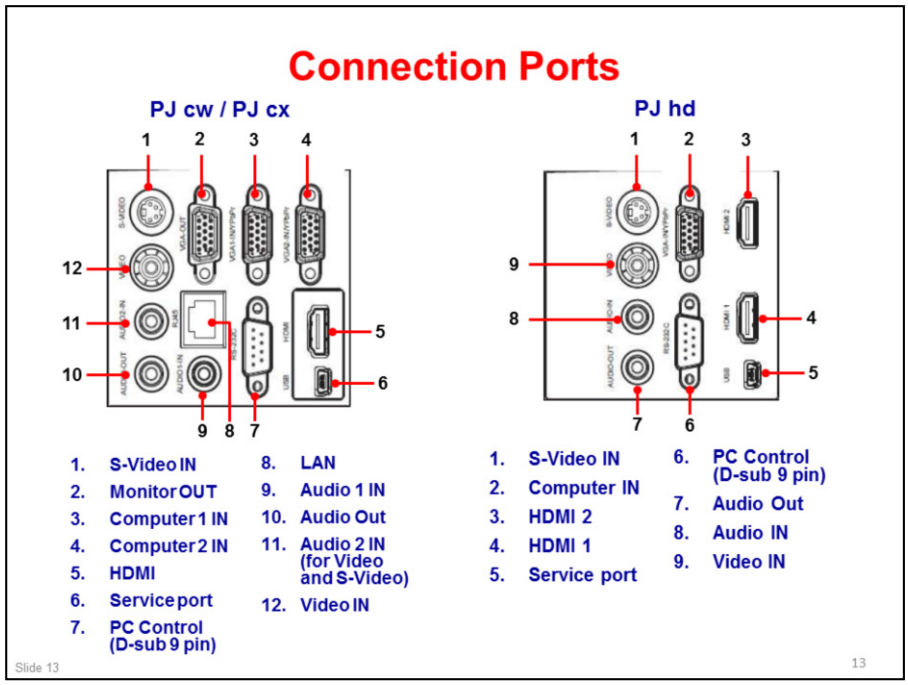
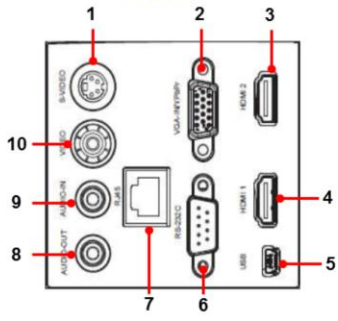


- S-VIDEO IN Connector: Input for S video signals from video equipment.
- MONITOR OUT Connector: Output for analog RGB signals or component video signal (Y/PB/PR) to another device.
- COMPUTER IN 1/2: Input for analog RGB signals from a computer or a component video signal (Y/PB/PR) from video equipment.
- AC IN: Connect the supplied power cord.
- HDMI Connector: Input for digital signals from a HDMI (High-Definition Multimedia Interface) compatible digital source
- SERVICE Port: Use this port to update the firmware.
- PC Control
- AUDIO IN Jack 1/2: Input for audio signals from a computer or video equipment.
- AUDIO OUT Jack: Output for audio signals from the projector.
- VIDEO IN Connector: Input for video signals from video equipment.

Connection Ports

PJ hdl



1. S-Video IN
2. Computer IN
3. HDMI 2
4. HDMI 1
5. Service port
6. PC Control (D-sub 9 pin)
7. LAN
8. Audio Out
9. Audio IN
10. Video IN

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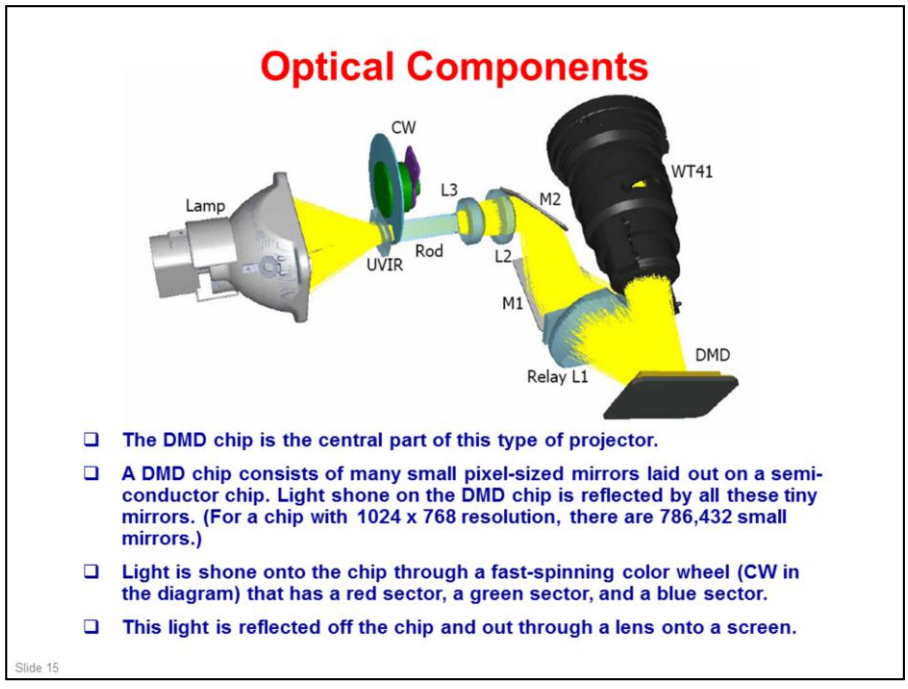
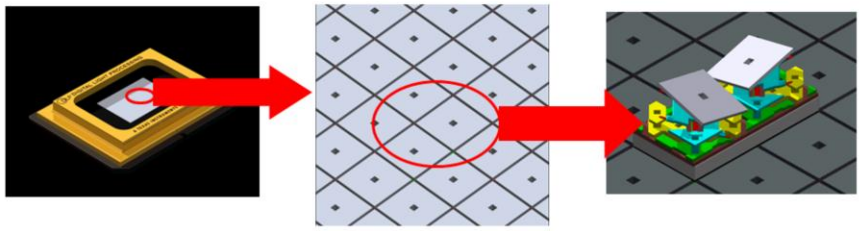


- Lamp: Light source
- UV-IR Filter: Lets visible light through (wavelengths between 380~780nm) and prevents UV and IR damage to other optical parts.
- CW (Color wheel): The wheel has a red segment, a green segment, and a blue segment. The wheel rotates to provide red, green, and blue light (the color of the output beam changes from red, to green to blue)
- Integrating Rod: Gives the light a uniform luminous flux.
- L3: Condensing lens. Condenses divergent light.
- L2: Condensing lens. Works with L3 to condense divergent light.
- M1: Mirror 1. Changes the light direction.
- M2: Mirror 2. Changes the light direction.
- Relay L1: Condenses and magnifies divergent light before it goes to the DMD.
- DMD Chip: Contains micro mirrors to generate the image
- Projection Lens (WT41 in the diagram): Projects the image onto the screen.

DMD Chip

- R, G, and B signals from the image generating device are sent to the DMD chip, and timed so that the red signal arrives at the same time that the red part of the wheel is in the beam path, and similarly for the green and blue signals.
- The DMD chip generates the R, G, and B images by re-positioning the micromirrors using micromachined hinges to make different pixelated images for each colour (meaning that each micromirror has an ON and an OFF position).
- For SVGA resolution, the mirrors are 16-micrometer squares, with a gap of about 0.8 micrometers between each mirror.



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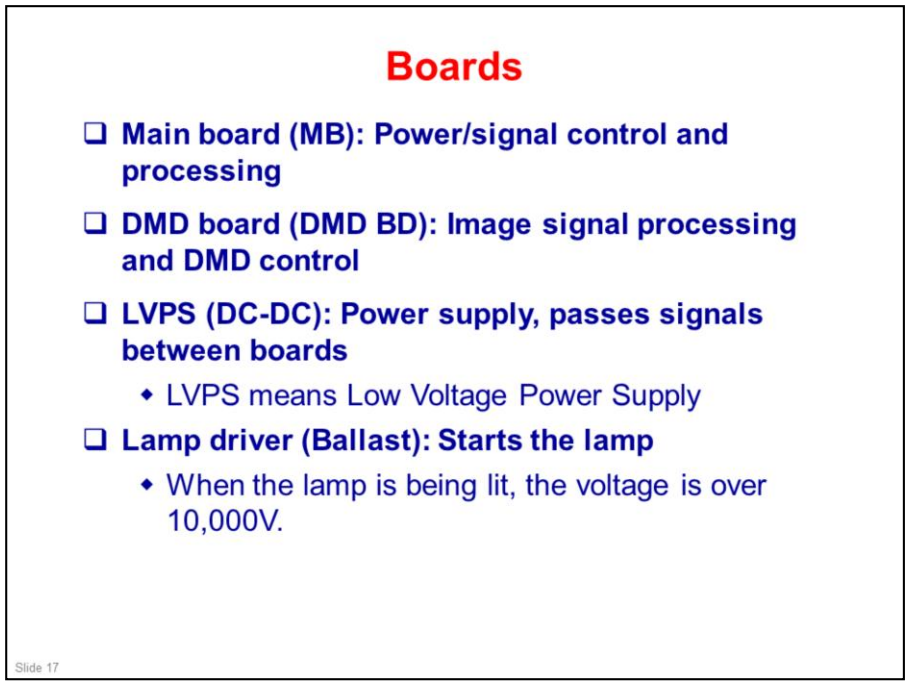
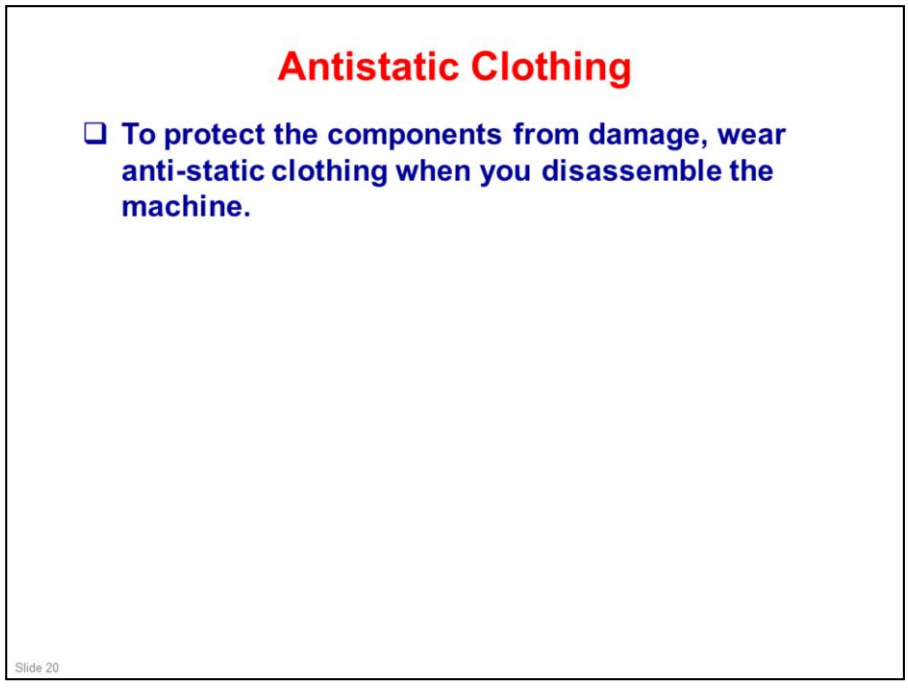
No additional notes



No additional notes

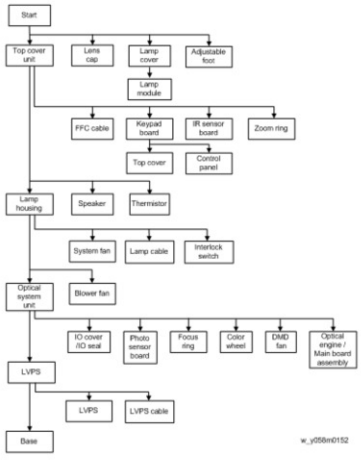
This section explains the basic points about servicing the machine.

No additional notes



No additional notes

Parts Replacement Hierarchy



- This flow chart describes the order in which the parts need to be removed for replacements/ maintenance from the top.
- The higher the level, the lesser the parts, and vice versa.

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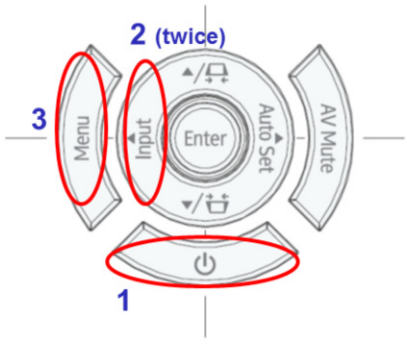
Entering Service Mode



- To enter the service mode, press “Power“ → “Input“ → “Input" → "Menu".
  - Note: You can use the remote controller for this.
- For the list of functions in the service mode, see ‘System Maintenance (Test & Inspection) - Service Mode - Service Mode Settings’ in the service manual.

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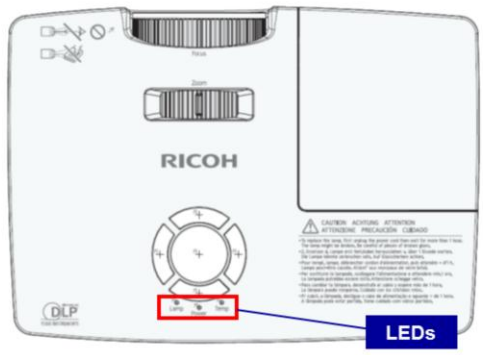
No additional notes

LED Display



- **The status of the three LEDs on the front panel indicate the machine's condition.**
  - See the table 'LED Display' in the Troubleshooting section of the service manual.

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No additional notes

Parts Replacement

- **After replacing parts, some adjustments may be needed. See the table below.**
  - This table and the procedures are in the following section of the service manual: Replacement and Adjustment - Electrical Adjustment - Adjustment Points vs Part Replaced
  - Whenever you replace a component, check this table to see if you have to do any of these procedures. The text in the Replacement and Adjustments procedures does not always refer to this table.

Action after repair	Change parts				Software
	Optical engine/ Main board assembly	Lamp module	Blower fan	Color wheel	After firmware update
Firmware update	V				V
ADC calibration	V				V
Color wheel index	V			V	
OSD reset		V			V
Re-write lamp usage hours	V				
Fan calibration	V		V		V

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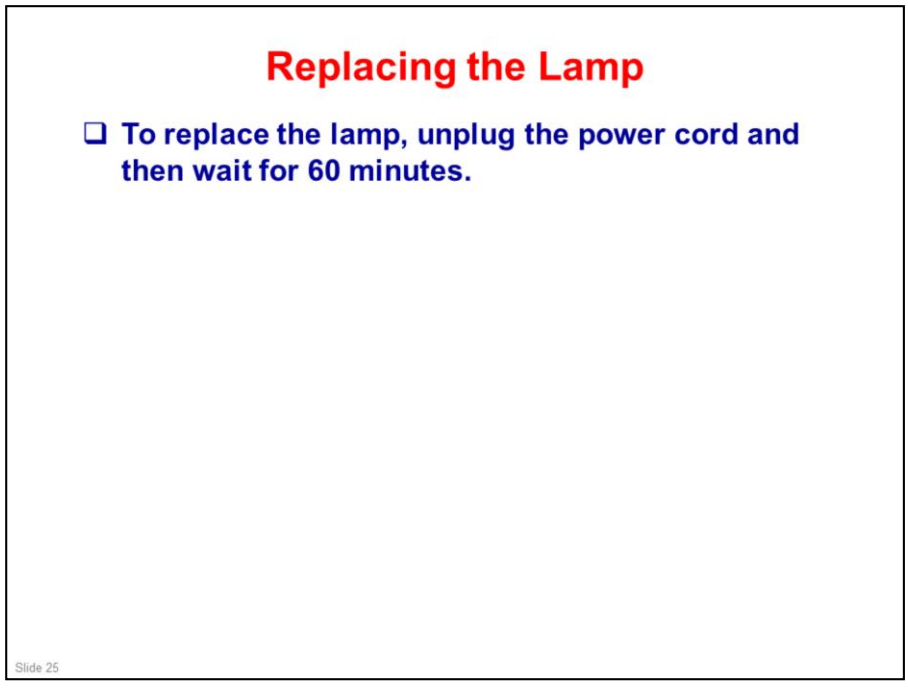
- OSD: On Screen Display



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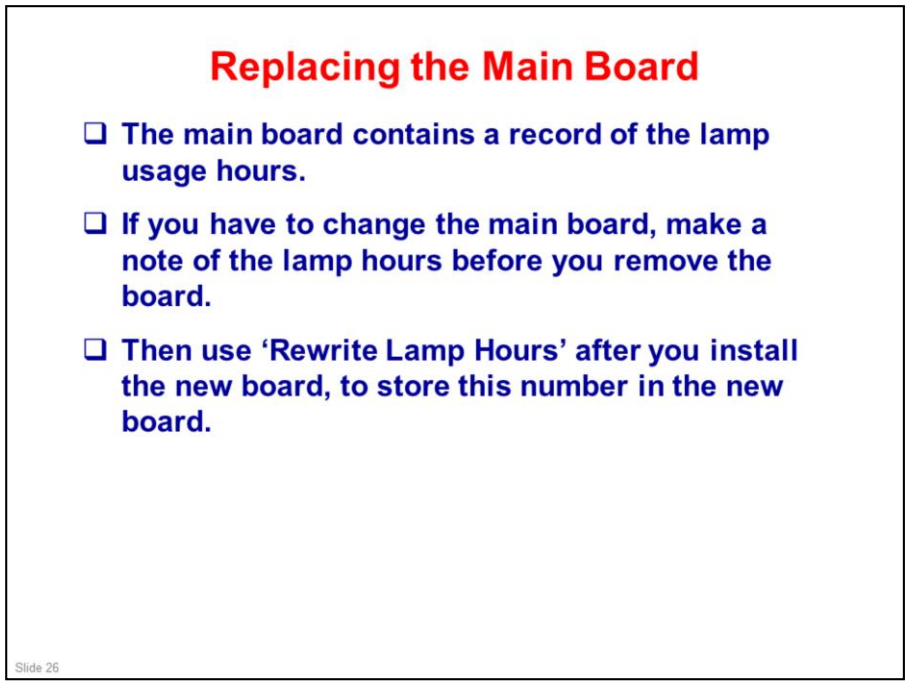

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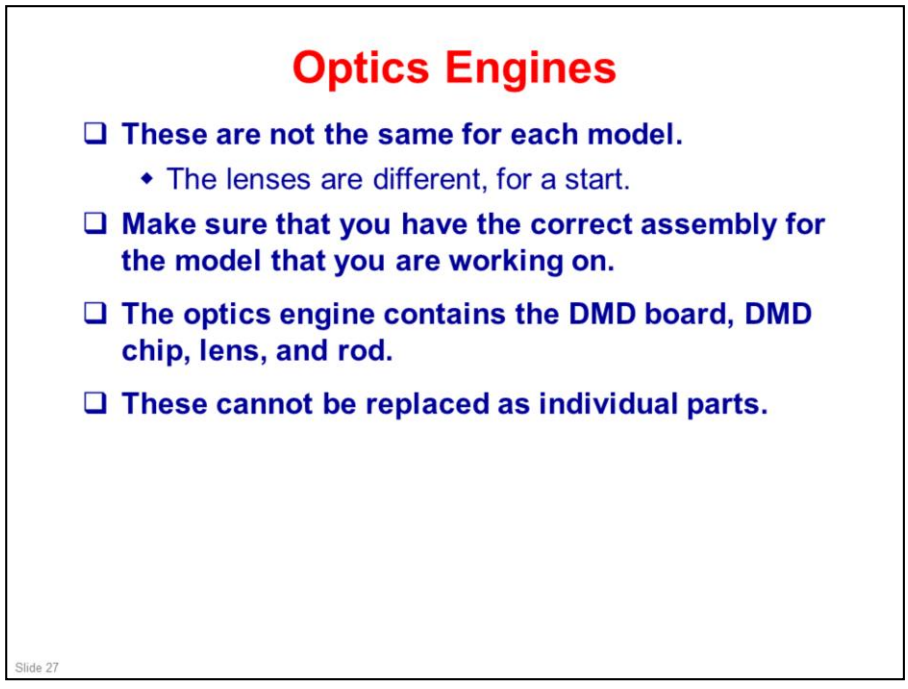

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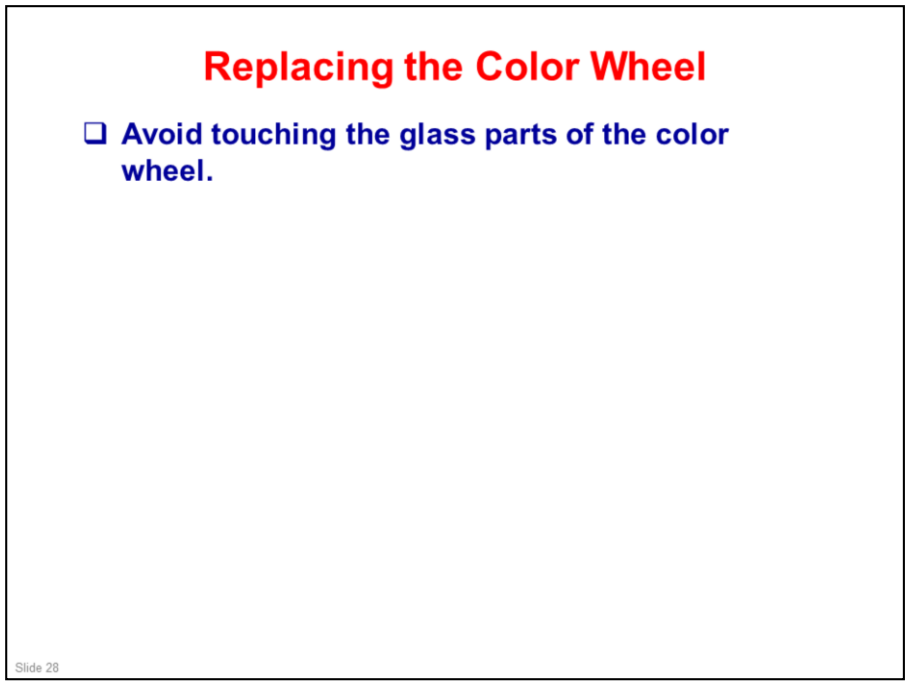

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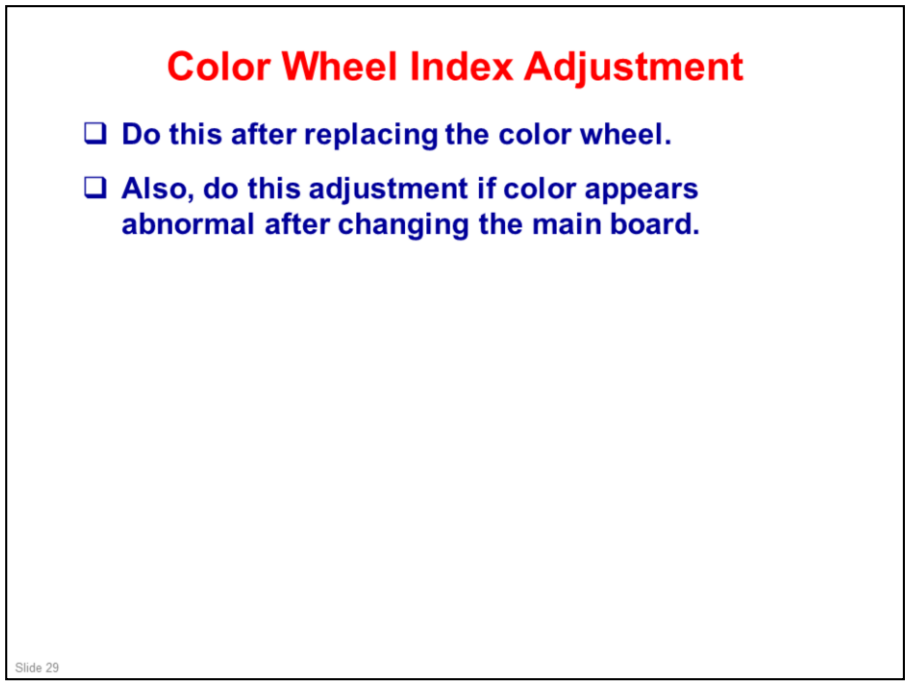
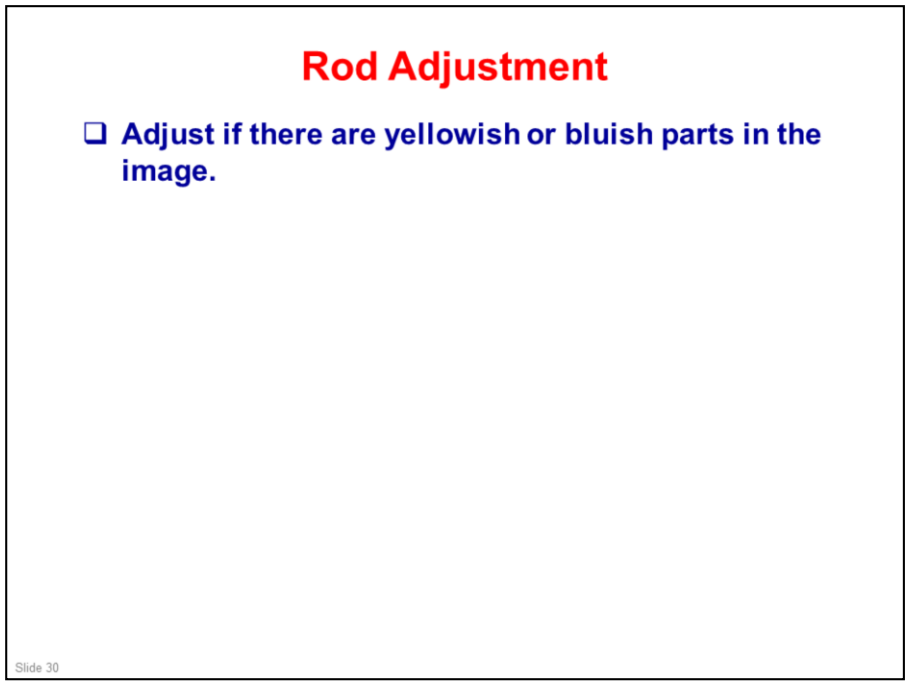


- The adjustment is in service mode. Note that the adjustment appears in two different menus. These adjustments are the same.



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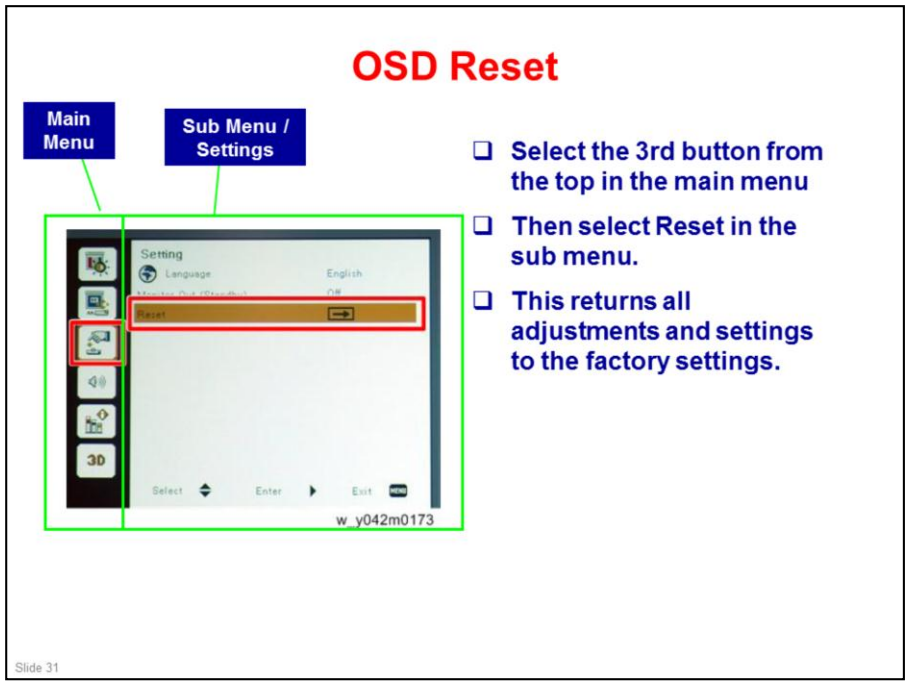

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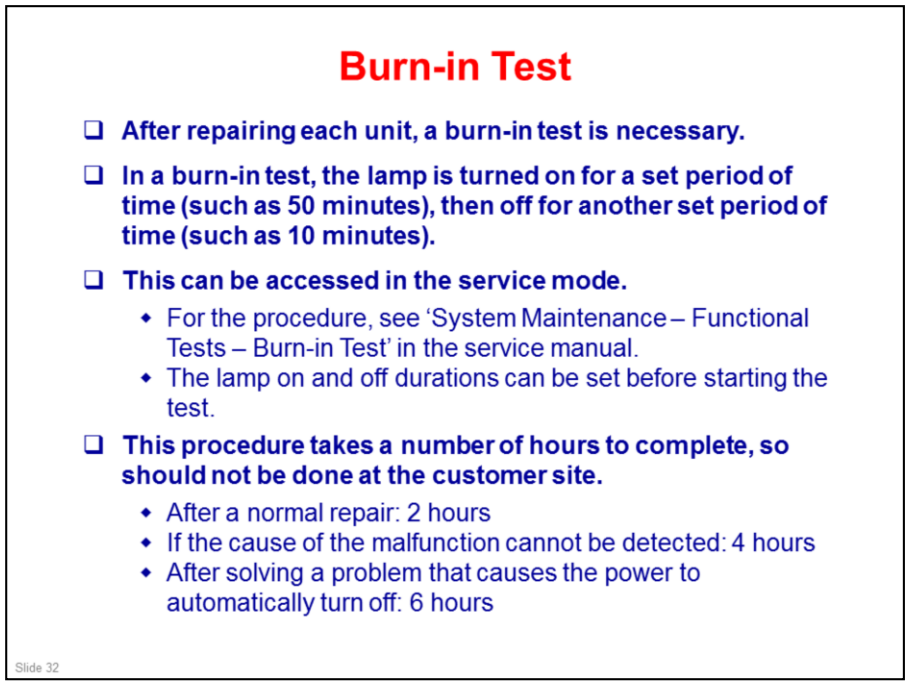
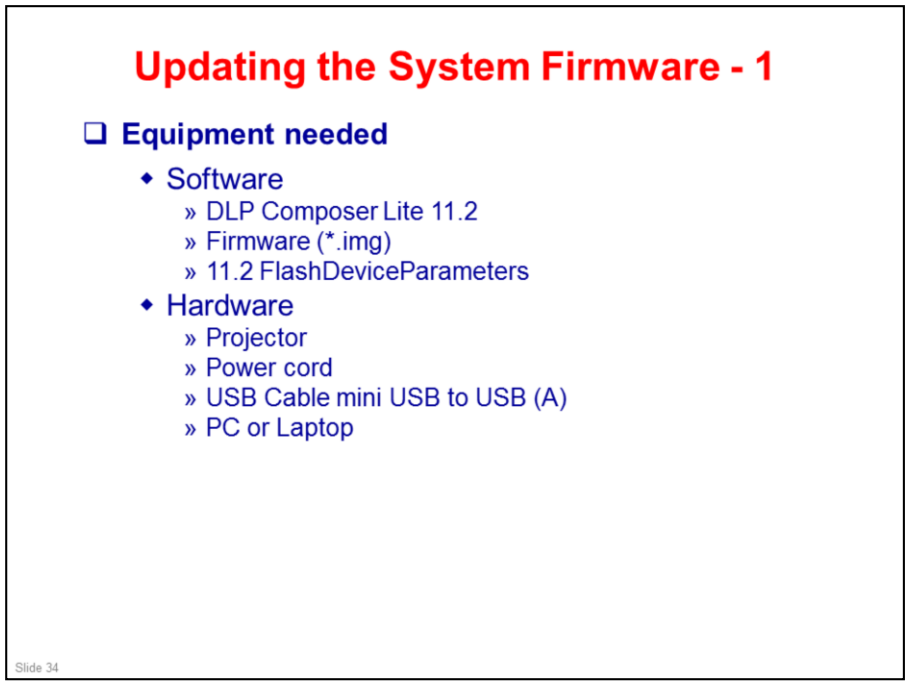
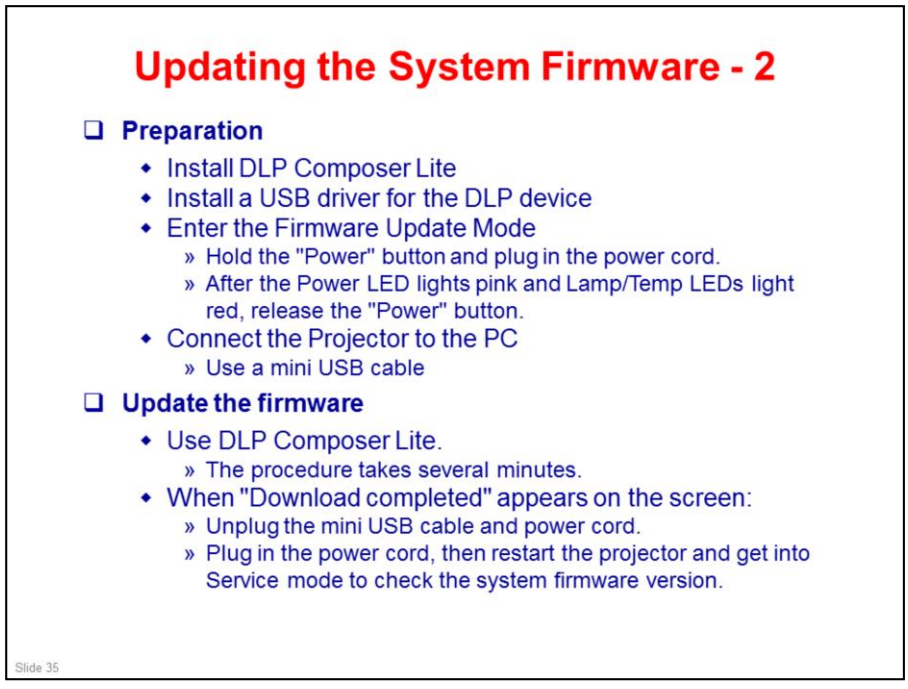


- The Functional Tests section of the manual contains a lot of test and measurement procedures. Take a quick look to see what kind of adjustments and measurements are available.

This section explains the basic points about updating the firmware.



- The detailed procedure is in the System Maintenance - Firmware Update section of the service manual.



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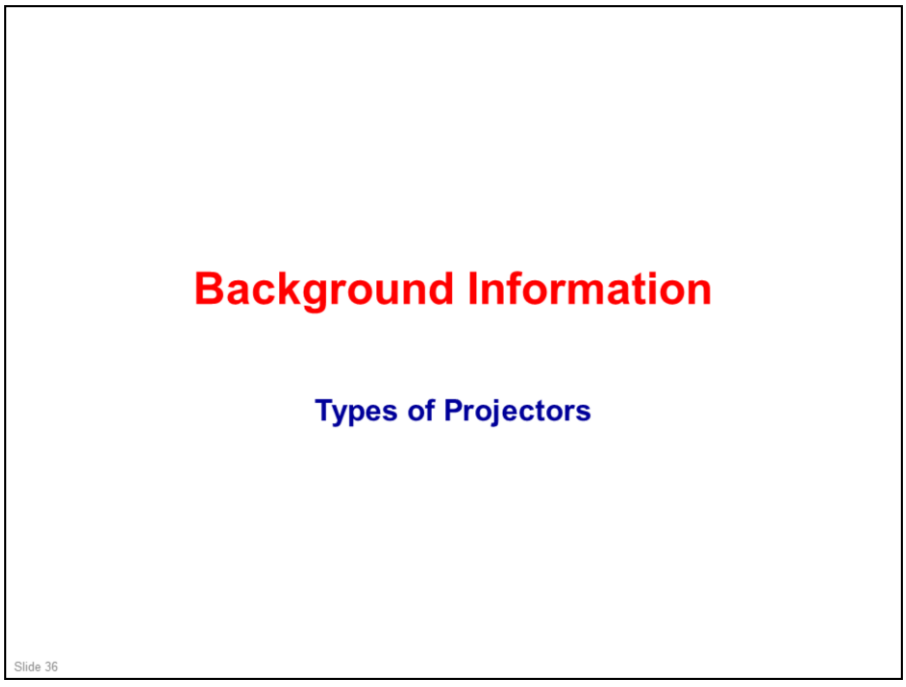
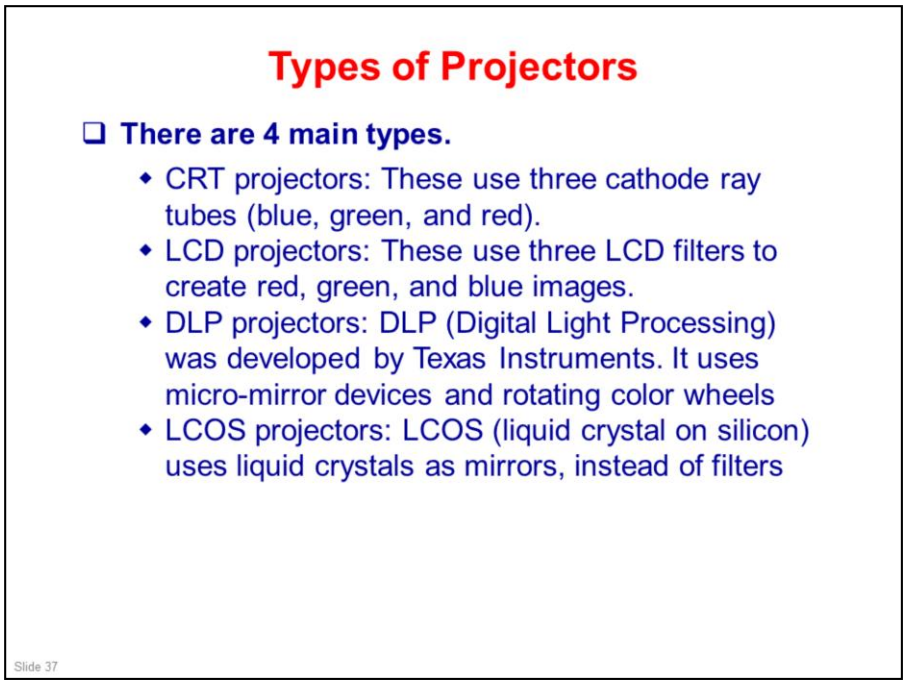


- This section briefly explains the various projector technologies on the market.



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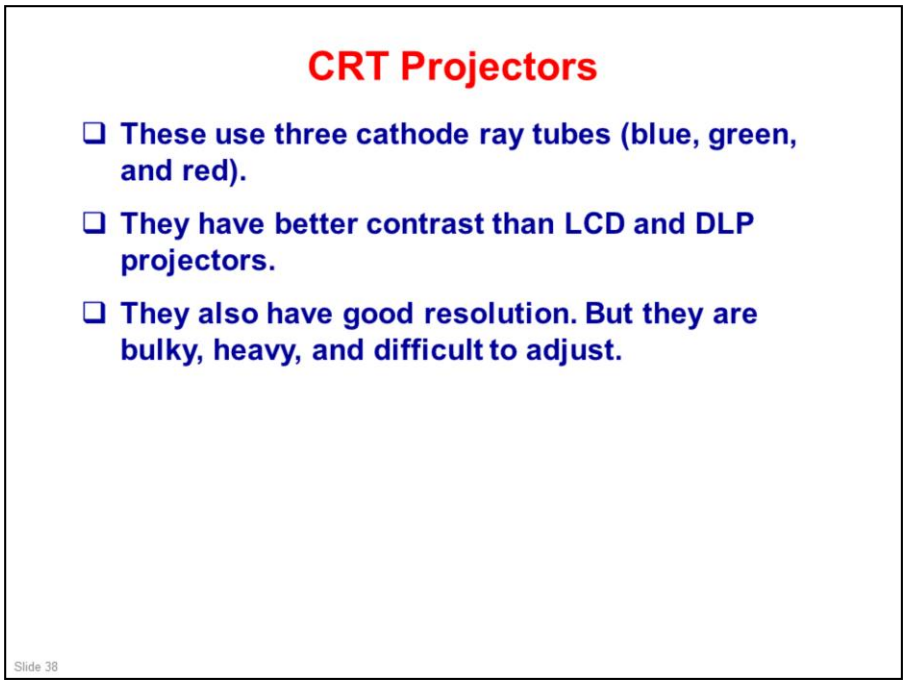

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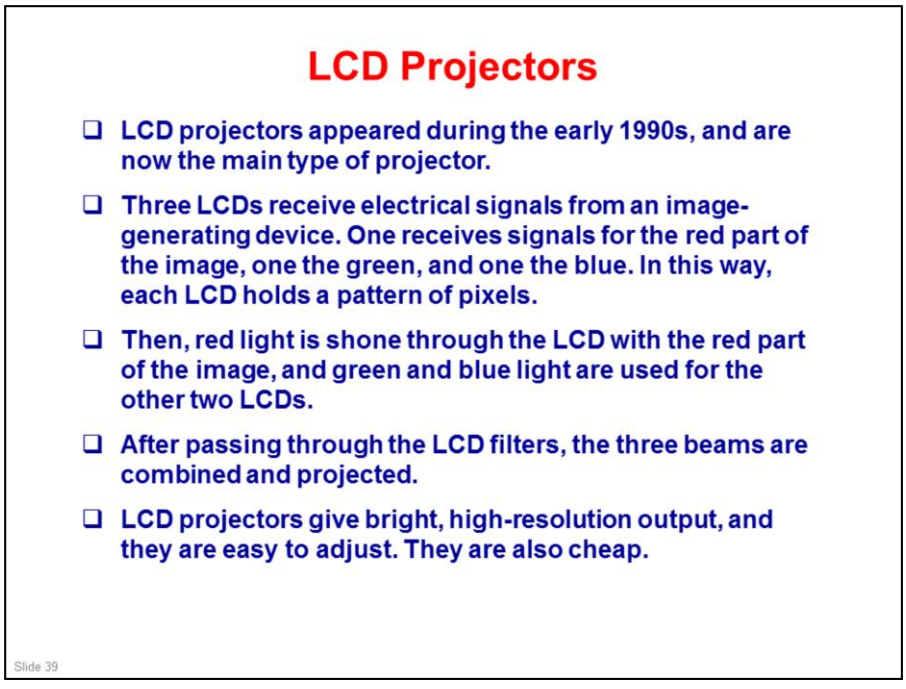

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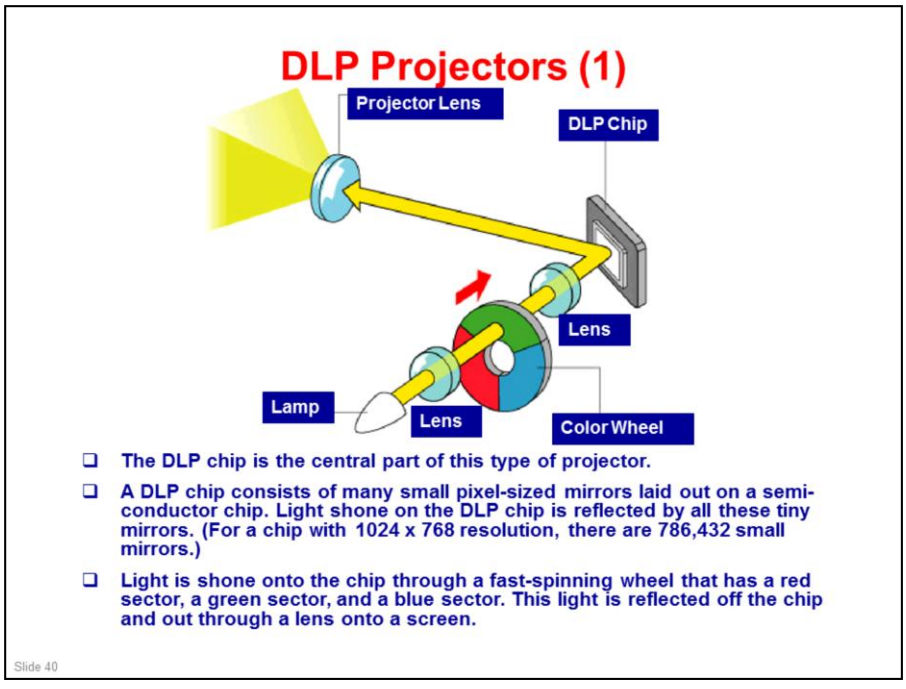
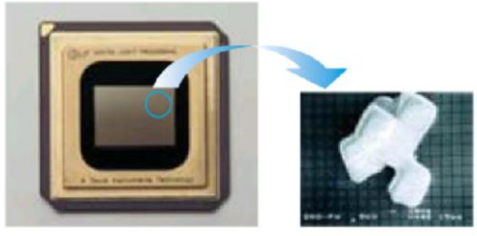


- DLP (Digital Light Processing) was developed by Texas Instruments in 1987.
- The DLP chip is also known as a Digital Micromirror Device (DMD).
- DLP technology uses light reflection, which leads to a brighter image than a light-transmission type of device such as an LCD projector.

DLP Projectors (2)

- R, G, and B signals from the image generating device are sent to the DLP chip, and timed so that the red signal arrives at the same time that the red part of the wheel is in the beam path, and similarly for the green and blue signals.
- The DLP chip generates the R, G, and B images by re-positioning the micromirrors using micromachined hinges to make different pixelated images for each colour (meaning that each micromirror has an ON and an OFF position).
- The mirrors can switch over every 15 microseconds, so moving images can be projected.
- For SVGA resolution, the mirrors are 16-micrometer squares, with a gap of about 0.8 micrometers between each mirror. Below, we can see the size of the mirrors compared to a grain of table salt.



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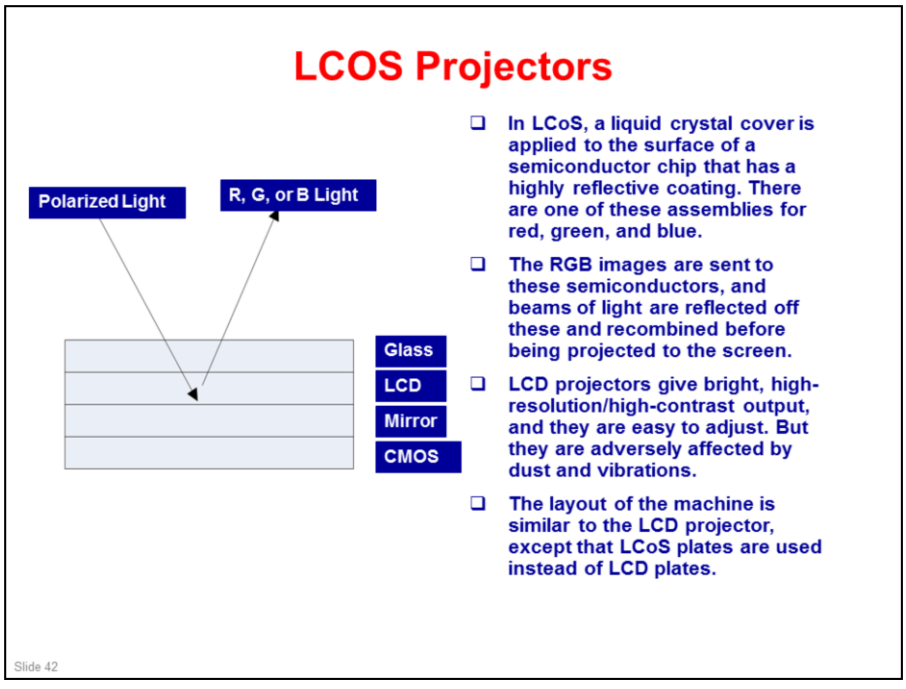
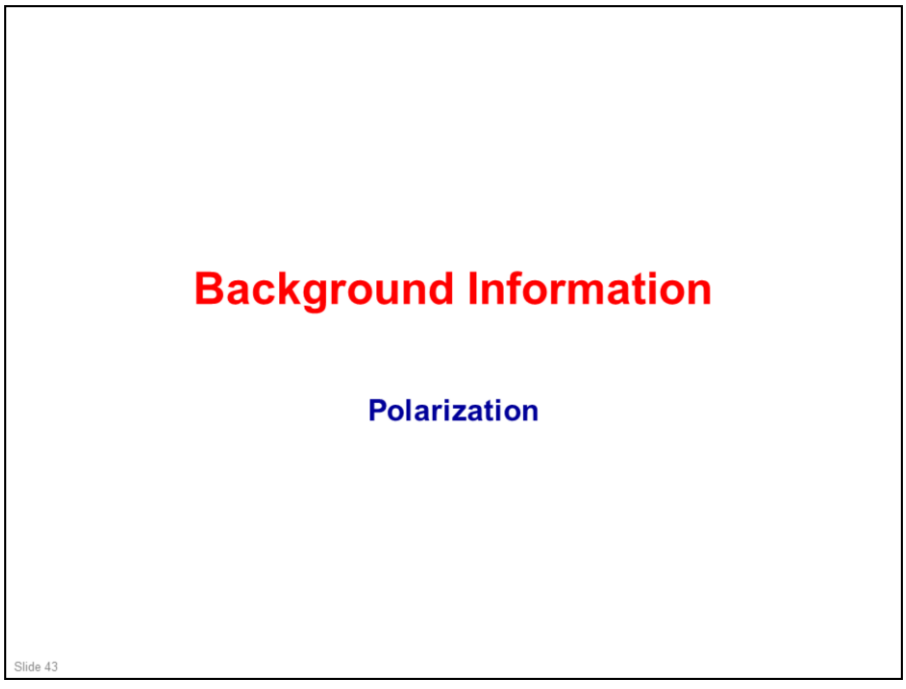
No additional notes



- LCOS: Liquid Crystal on Silicon
- The diagram shows a simplified cross section of an LCoS panel.



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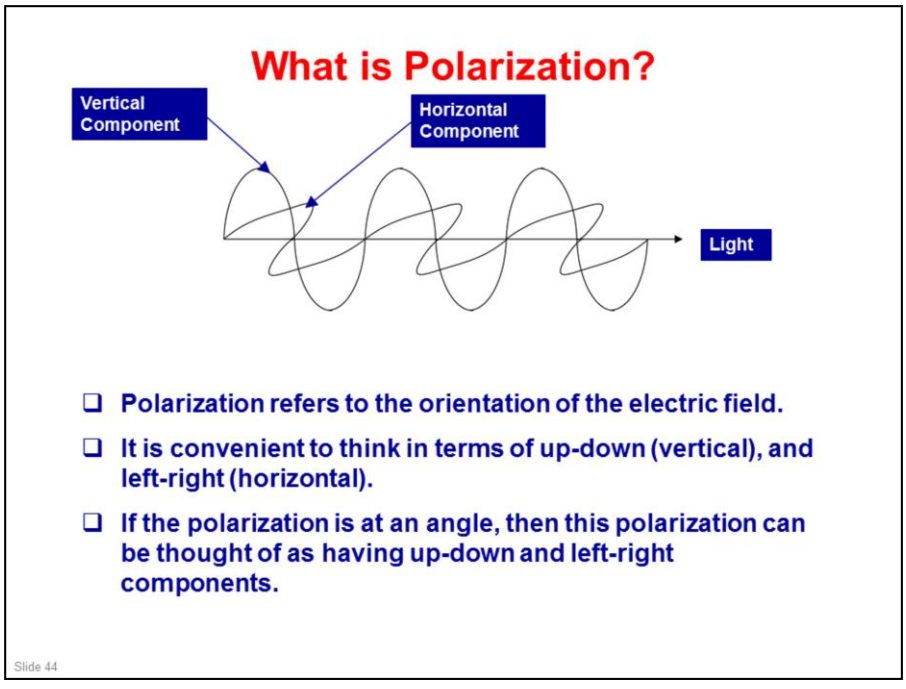

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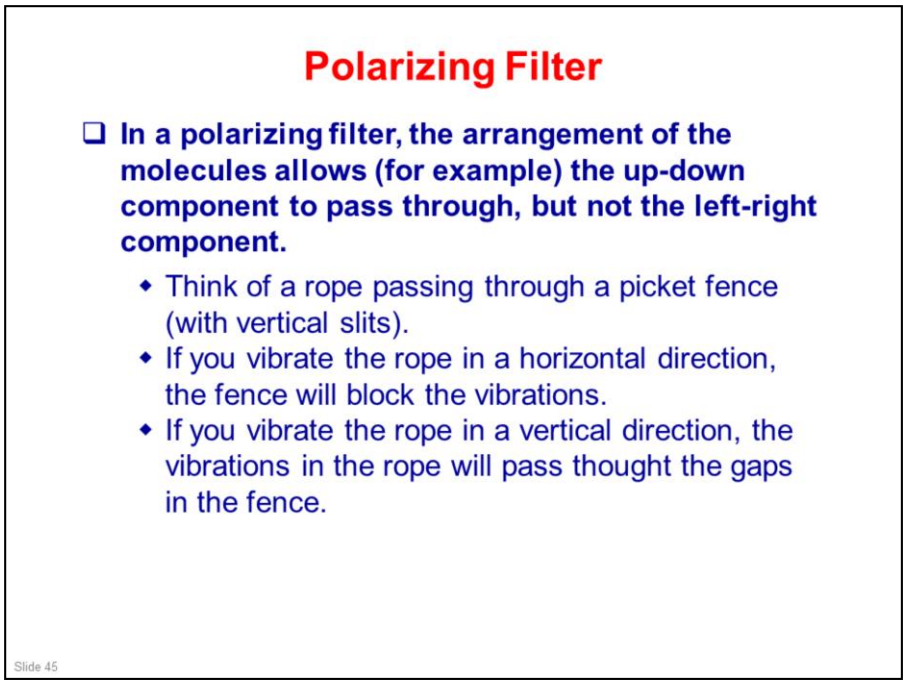

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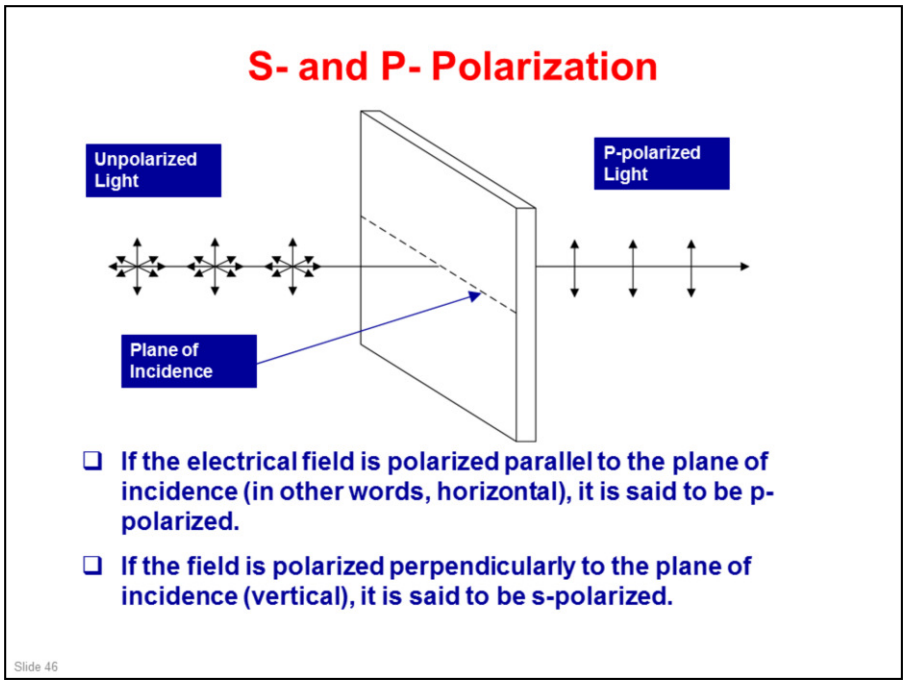
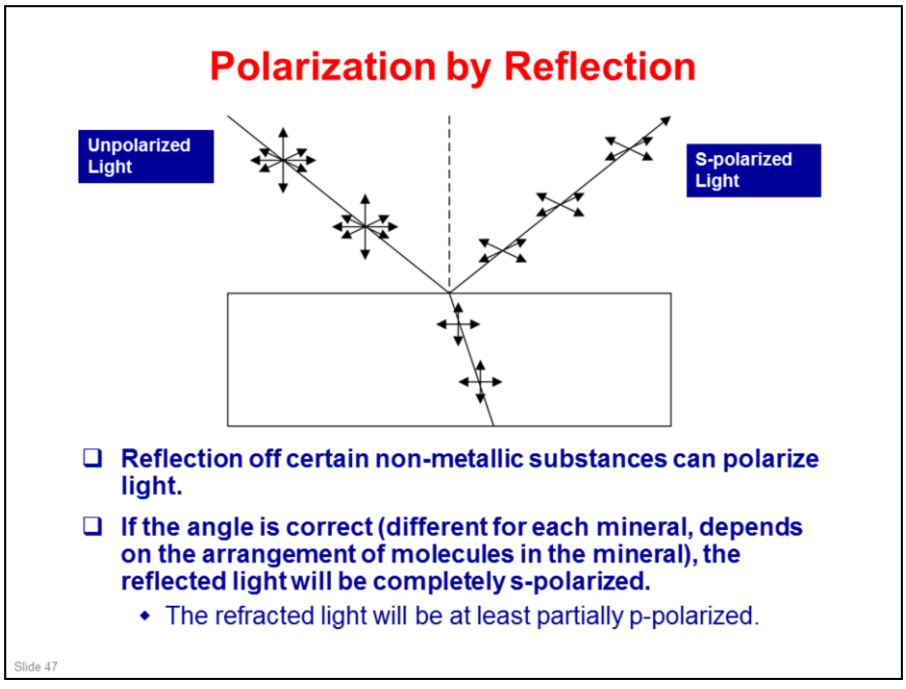


- This diagram shows the case of a p-polarizing filter.



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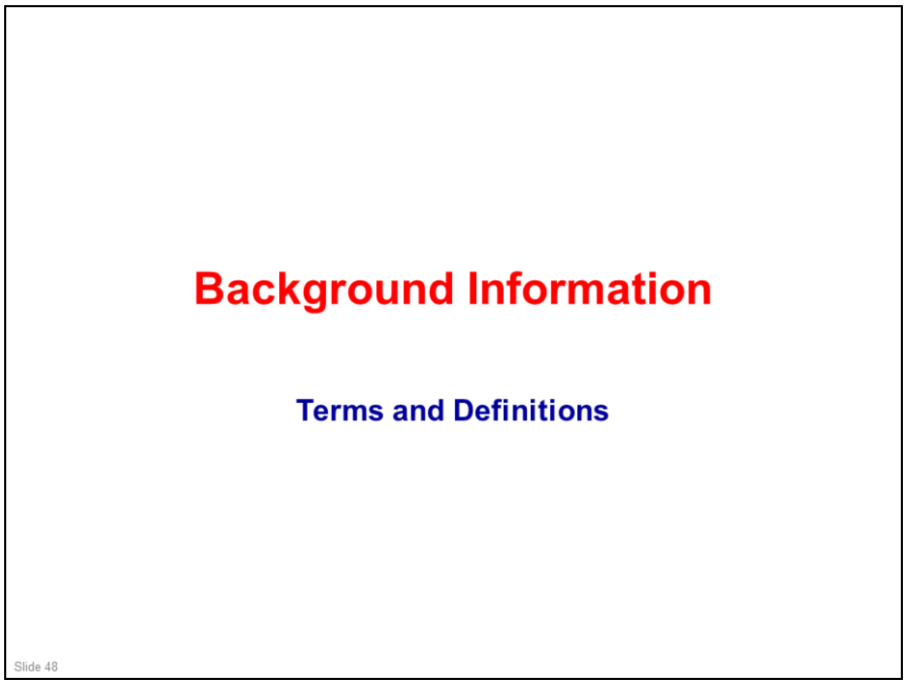
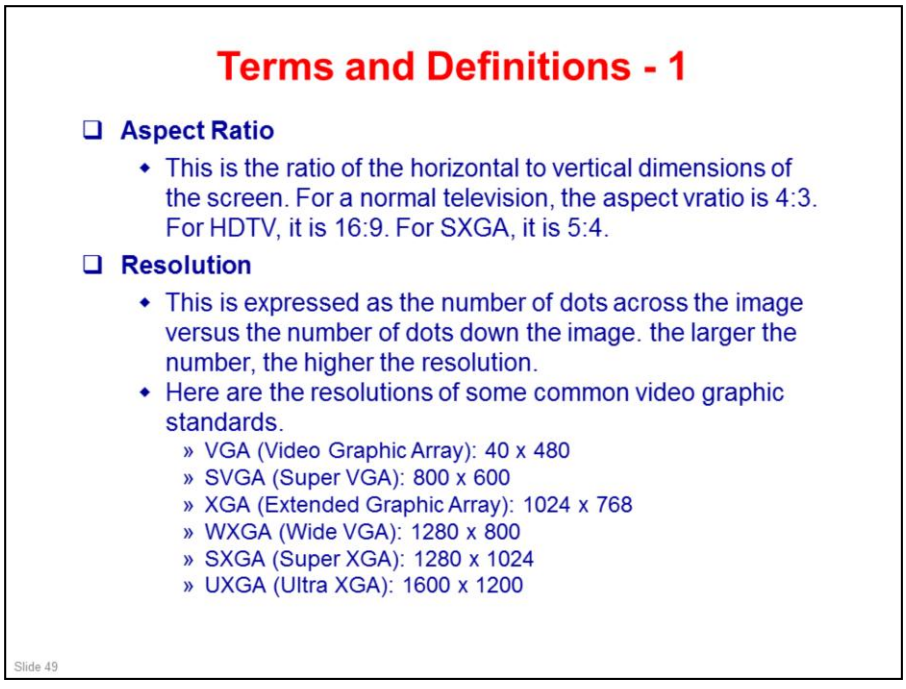


- Some details in this section may not apply to this model.



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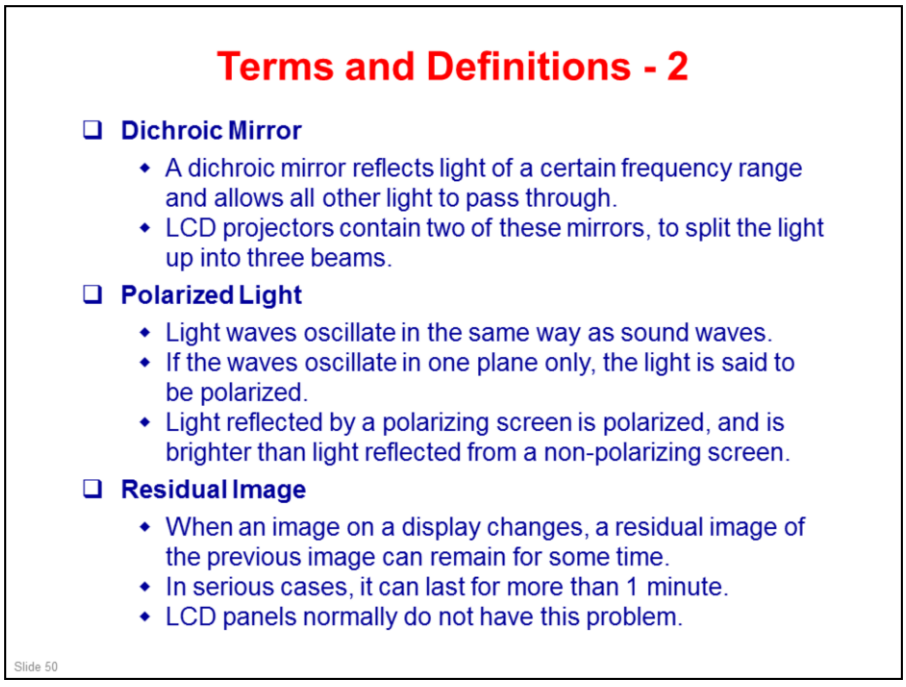

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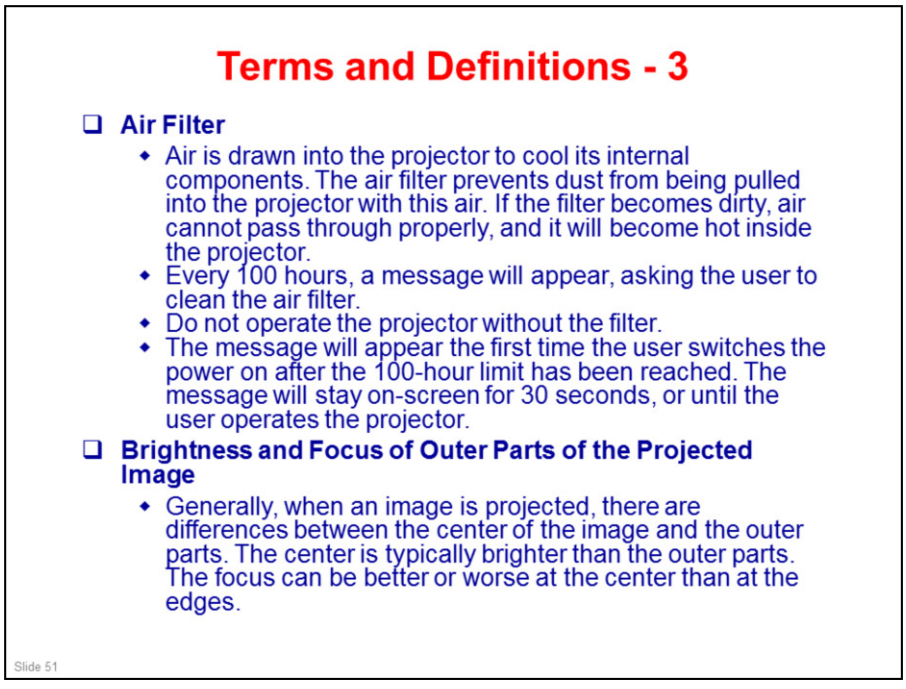

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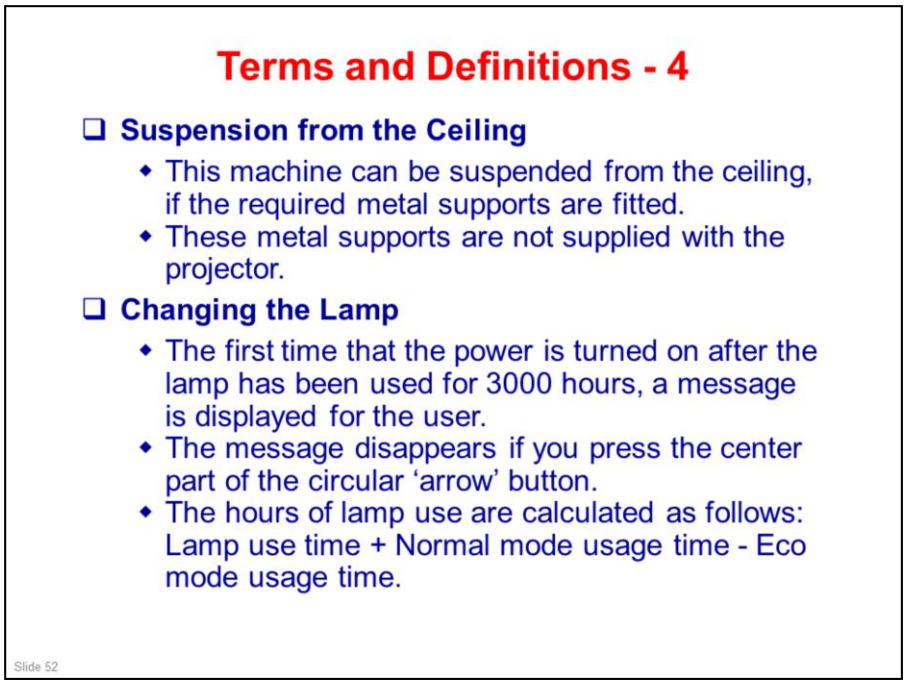
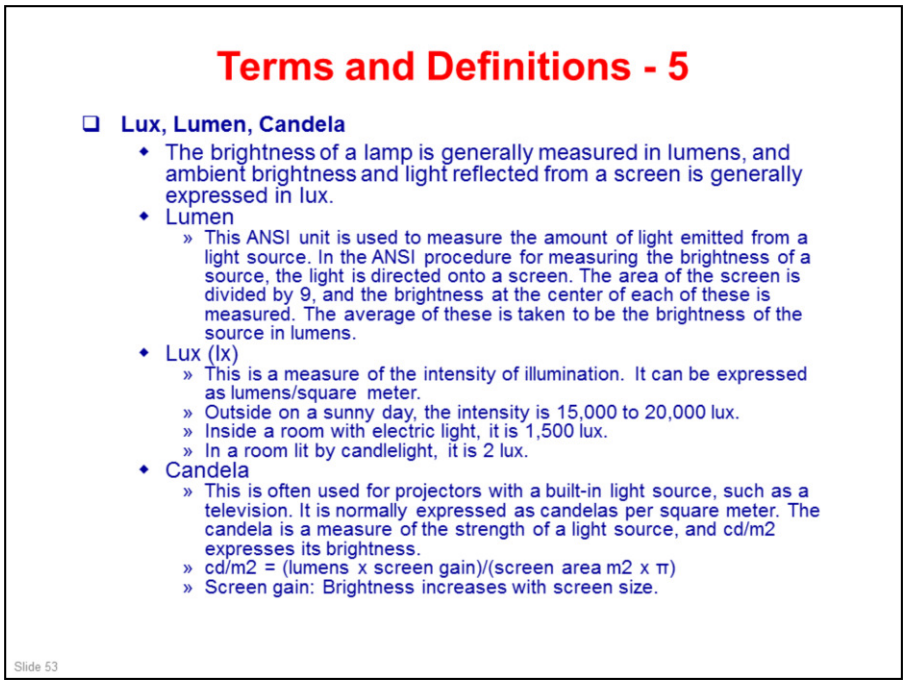


- Eco mode is the lower brightness mode that can be selected by the user. It is not an Energy Star function.



- Example of conversion between lumen, lux, candela
  - 1. From lumen (lm) to lux (lx)

    For a 40-inch screen with a 4:3 aspect ratio, the area is about 0.5 m2.

    For 1000 ANSI lumens, the amount in lux is: =1000/0.5, = 2000 lux
  - 2. From lumen (lm) to candelas (cd/m2)

    For a 40-inch projector with a screen gain of 2 (double that of an OHP projector screen), cd/m2 is:

    (1000x2)/(0.5×3.14) = 2000/1.57 = 1274 cd/m2

Terms and Definitions - 6

- **Uneven colour**
  - This term is used when the contrast and color of the image is not constant. There are many possible causes for this.
- **Gradation**
  - Between white and black, there are shades of grey. The number of levels between white and black are called gradations. The higher the number of gradations, the greater effect on the image, but if the contrast is not high, this effect is cancelled.
- **Color Separation**
  - A computer video signal is separated into a black-and-white signal and a colour signal. In a projector, it is separated into three colors (red, green, blue). The condition of the components that separate the light will have an effect on the quality of the image.

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No additional notes

Terms and Definitions - 7

- **Contrast**
  - In general, this is the ratio between the bright and dark parts of an image. A high contrast gives a clear image. A projector with an internal light source is unaffected by external light sources gives a high contrast image that is clear.
- **Jitter, Flickering**
  - Jitter is noise in the image that is mainly caused by temporary fluctuations in the movement of rotating components, such as the motors that drive the heads in a VCR unit. The effects can be seen on vertical lines in the image.
  - Flickering of the image also can occur.

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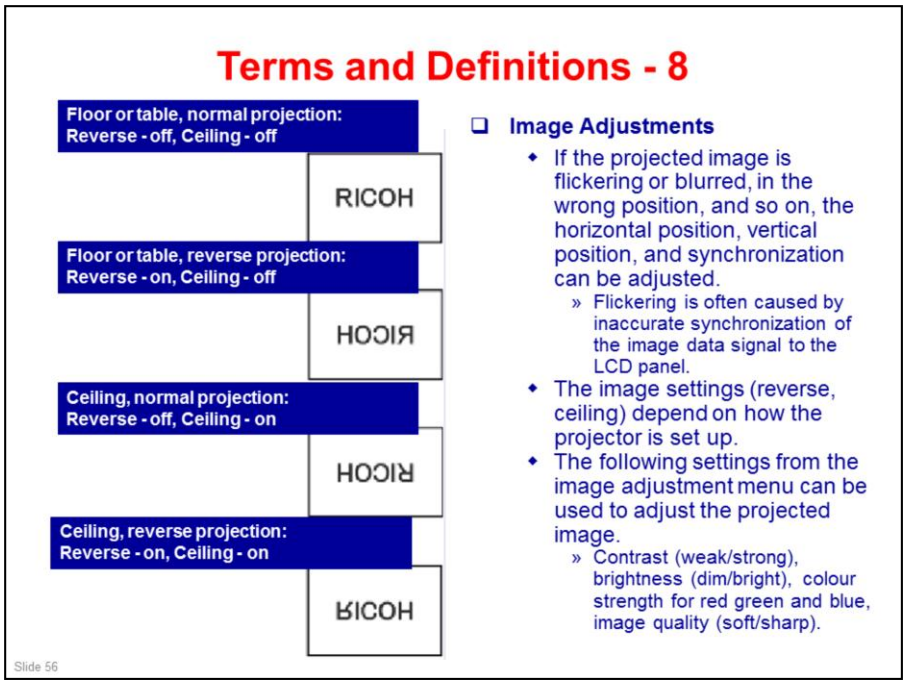
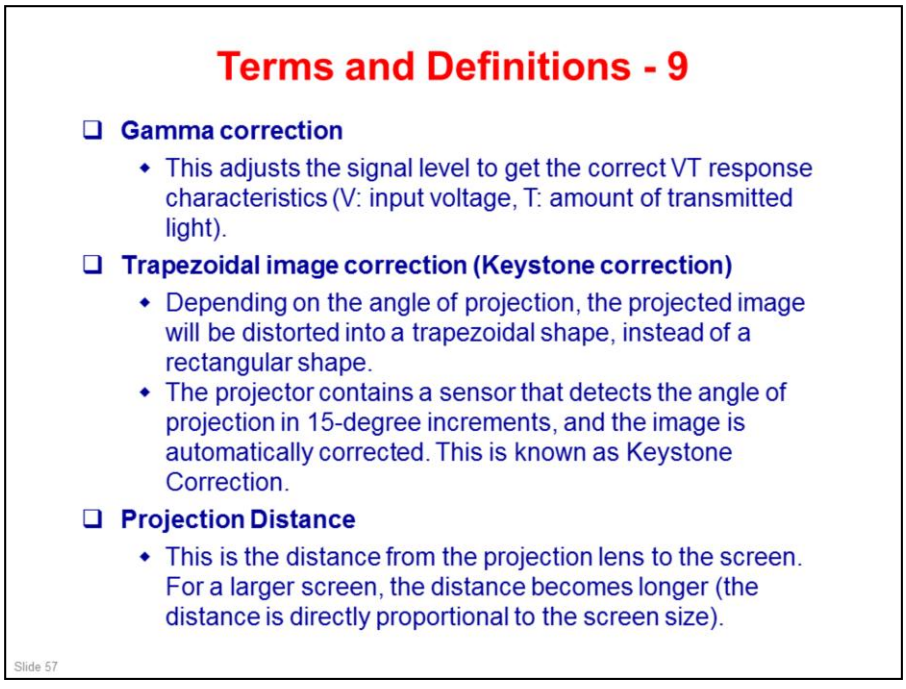
No additional notes



- Reverse, ceiling: These are in the customer settings menu.



No additional notes

Terms and Definitions - 10

- **Screen Gain**
  - A measure of how brightly a screen displays an image.
  - The higher the screen gain, the brighter the screen.
- **Relation between Screen Gain and Brightness**
  - Generally, the larger the screen, the darker it is. If you choose a screen with a higher gain, the brightness is preserved to some extent.
  - Also, choose a screen to suit the room. In a long room, use a high luminance screen. In a wide room, a high viewing angle screen.

	White screen for OHP projection	High viewing angle screen	High luminance screen
Viewing angle (horizontally)	1 (wide)	2	3
Brightness	3 (dark)	2	1
Price	1 (cheap)	2	3
Screen gain	3 (low)	2	1

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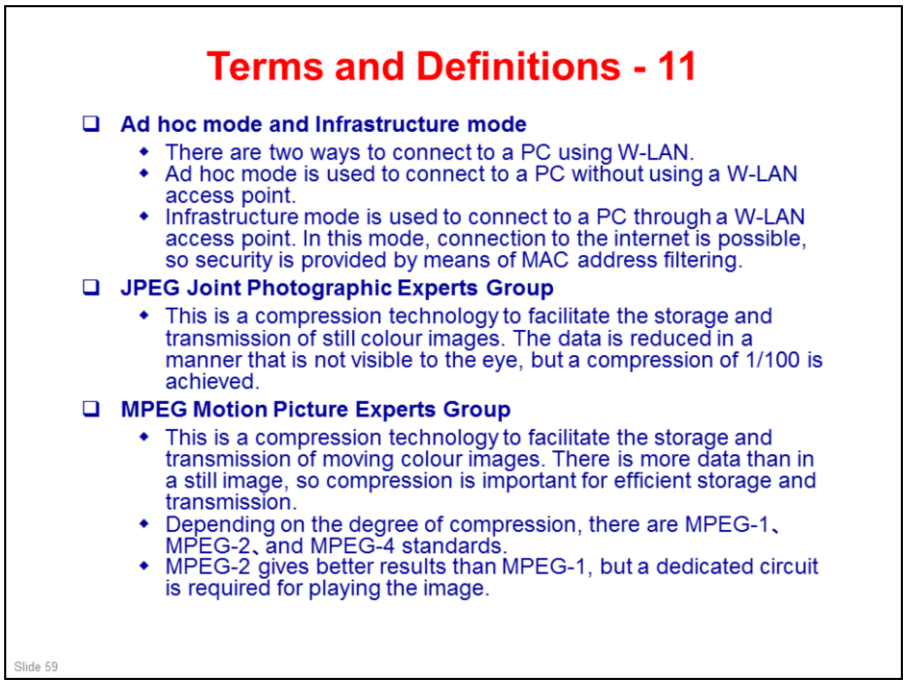
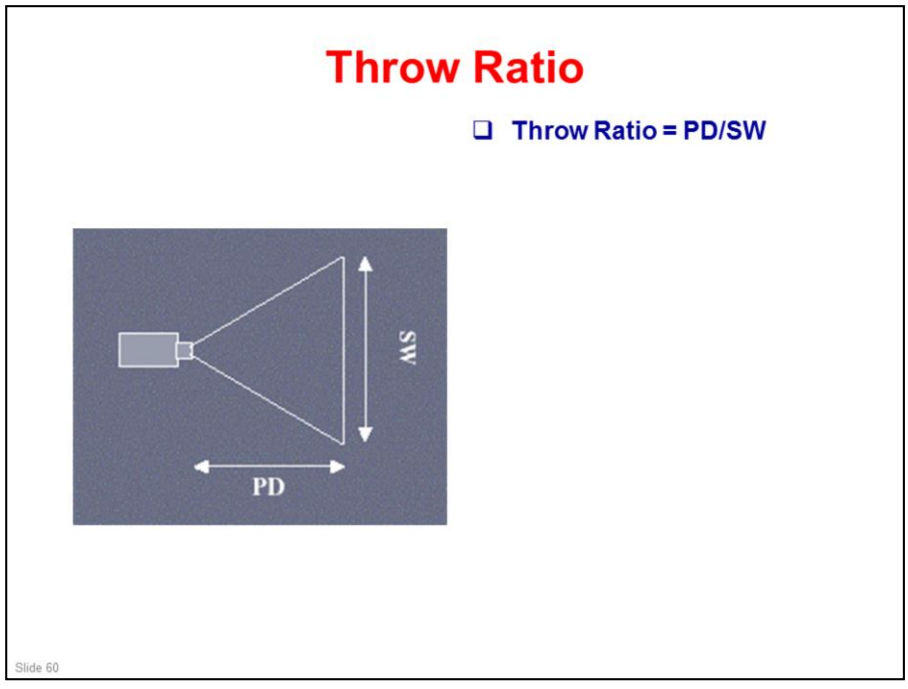
Screen Size Conversion Table

- Screen size (inches) is measured diagonally across the screen from top left to bottom right.

	4:3		16:9			4:3		16:9	
Size (in)	L (mm)	W (mm)	L (mm)	W (mm)	Size (in)	L (mm)	W (mm)	L (mm)	W (mm)
30	457	610	374	664	170	2591	3454	2116	3757
40	610	813	498	885	180	2743	3648	2240	3978
50	762	1016	623	1107	190	2896	3861	2365	4199
60	914	1219	747	1328	200	3048	4064	2489	4420
70	1067	1422	871	1547	210	3200	4267	2614	4641
80	1219	1626	996	1768	220	3353	4470	2738	4862
90	1372	1829	1120	1989	230	3505	4674	2863	5083
100	1524	2032	1245	2210	240	3658	4877	2987	5304
110	1676	2235	1369	2431	250	3810	5080	3112	5525
120	1829	2438	1494	2652	260	3962	5283	3236	5745
130	1981	2642	1618	2873	270	4115	5486	3360	5966
140	2134	2845	1742	3094	280	4267	5690	3485	6187
150	2286	3048	1867	3315	290	4420	5893	3609	6408
160	2438	3251	1991	3536	300	4572	6096	3734	6629

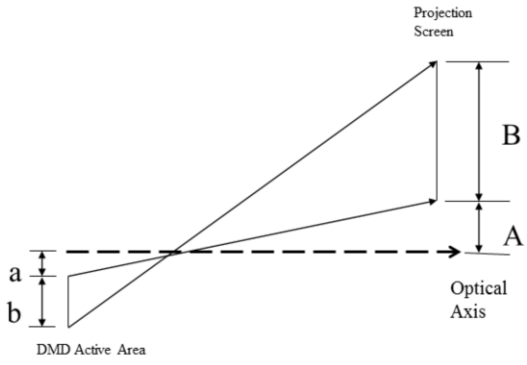


No additional notes



No additional notes

Projection Lens Offset



- Offset = [(A+B)/B]x100% =[(a+b)/b]x100%

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No additional notes

No additional notes