

## Check List

1. This Check List describes the quality of operation warranted to general users. When users inquire about quality or request inspection, refer to this Check List. Use this list also when checking operation after repair.
2. When using this list during shipping or receiving inspection, judge the quality according to the purpose of the inspection, not by directly referring to this level.
3. For individual taste or special usage, some users may not be satisfied with this level of quality and will request a different one. In such cases, adjust the level as requested by them as much as possible.
4. Checking items which are characterized as sensory test are not included. Adjust these items according to product or user ' s request.

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## 2 (2181)

### Condition of Measure and Appreciation

Basically measure and appreciation at the below condition. But it is allowed to use another condition as long as not to influence the examination results.

(The concrete settings refer to the operation manuals of the PC or monitor.)

#### 1. Settings of Screen Area and Colors (System settings of PC)

		Windows	Macintosh
Screen Area	17 inch type monitor	1024x768 pixels	1024x768 pixels
	20 inch type monitor	1152x870 pixels	1152x864 pixels
Colors		16.7 million colors	True Color (24-bit) or True Color (32-bit)

Mac: Control panel → Monitor & sounds → Monitor → Contrast of colors and Resolution.

Win: Control panel → display → property of display → detail of display → Color palette and Field of desktop.

#### 2. Settings of monitor size

Adjust size and position of monitor adjustment menu as the center gray scale width of monitor calibration image.

(Moni1.PSD: file from the 2181 Adjustment Program CD) is about 80mm at 100% display.

After above adjustment, the length of a diagonal line of the monitor's display area is below.

17 inch type monitor:	About 393mm
20 inch type monitor:	About 462mm

#### 3. Gamma Settings (Mac system set up)

Control panel- Color settings of Monitor → Set Color Sync. Profiles of the monitor you use.

#### 4. Settings of monitor color temperature, brightness, contrast

Color temperature of the monitor: 6500K

At monitor calibration image (Moni1.PSD: file from the 2181 Adjustment Program CD), adjust brightness and contrast as the difference between 0 and 5, 255 and 250 of RGB are recognized slightly and the difference between 0 and 10, 255 and 245 of RGB are recognized distinctly.

#### 5. Surroundings

Perpendicular illuminance to the monitor surface is less than 200lux.

There is no reflects such as fluorescent on the monitor surface.

### Settings of Photoshop

#### 1. Photoshop ver for measurement and appreciation

Photoshop ver for measurement and appreciation are from ver.4 to ver.7.

When use newer versions than Photoshop 5, set up color setting as 2.

(For Photoshop4, no need to set up especially.)

#### 2. Color setting of newer versions than Photoshop 5

For Photoshop5, Default Color Setting is "sRGB". This setting convert RGB data when open images.

So you must set up below setting. (This is unrelated for Photoshop4.)

Windows:	RGB	Custom
	Gamma	2.2
	White point	Custom (Custom value x=0.312, y=0.329)
	Primaries	Trinitron
	Monitor	Display Using Monitor Compensation OFF
Macintosh:	RGB	Custom
	Gamma	1.8
	White point	Custom (Custom value x=0.312, y=0.329)
	Primaries	Trinitron
	Monitor	Display Using Monitor Compensation OFF

## 3. Image cache memory setting

Edit Preferences - Memory & Image cache... Check off "Use cache for histograms"

**Screen Dust**

## 1. Measure Equipment: Photoshop

## 2. Capture Condition:

Light source	Luminance Box
Illumination	EV10
Lens	2613
Capture Distance	Stick a lens to a luminance box.
Exposure Mode	A mode (F8)
WB	Preset ( A light source)
Focus	position
Image Size	3008x2000 (L)
Compression Mode	Fine or Std.

## 3. How to measure:

- 1). Stick to a luminance box and capture, and open in PC.
- 2). with 33.3% magnification, select Image > Color compensation > Level compensation in Photoshop, set the Input level to 32 1 233 to confirm whether any stains can be seen on the screen.

## 4. Quality Regulations:

When stain is admitted, follows the following judgment standards, when setting Input level of level Compensation (select Image > Color compensation > level compensation in Photoshop to 32 1 233.

When you measure L\* stain and its peripheral, L\* ratio must be 1.3% or less.

$$L^* \text{ ratio} = (L^* \text{ around stain bristle tail} - L^* \text{ at stain bristle tail position}) / L^* \text{ around stain bristle tail} \times 100 \leq 1.3$$

## 5. Do the cleaning on the CCD, when users point out the dust on the CCD.

\*It is easy to find the dust on screen by using "Auto Levels" of Adobe Photoshop.  
This command is located in the "Adjustment" sub-menu in the "Image" menu.

## 4 (2181)

### Standard

Exposure

Manual Shutter-speed Manual Shutter-speed

SS	Period (ms)	Tolerance (ms)	Allowable range	Exposure variation
1/4000	0.244	0.156 - 0.383	With in 0.45EV  With in 0.30EV	Difference between Max. and Min. value among range A, B, and C: within $\pm 0.6\text{EV}$ Difference between range A & B, B & C: within $\pm 0.3\text{EV}$
1/2000	0.488	0.333 - 0.714		
1/1000	0.977	0.793 - 1.202		
1/500	1.950	1.590 - 2.40		
1/250	3.910	3.17 - 4.81		
1/125	7.810	6.35 - 9.62		
1/60	15.60	12.7 - 19.2		
1/30	31.30	29.2 - 33.5		
1/15	62.50	58.3 - 67.0		
1/8	125	117 - 134		
1/4	250	233 - 268		
1/2	500	467 - 539		

X-sync Time Lag

X-sync delay time

Shutter speed	Item	Allowance
1/180	X-sync delay time	0.3 ms or longer
	From X ON to the 2nd curtain appearance	1.45 ms or longer

Resolving Power

Required Equipment

PC (Adobe Photoshop installed)

2766 Resolving Power Chart (W)

LENS: 2613

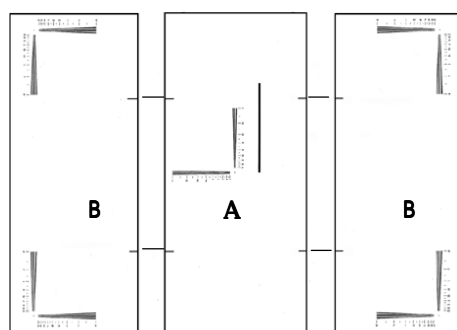
Fluorescent Stand SQ967W

CF card

AC adapter (AC-11)

Tripod

\* 2766 Resolving Power Chart (W) contains 3 charts. Set the A-chart at the center, then set the B-charts at its both side. (Align 3 charts with the positioning lines on them.)



Check

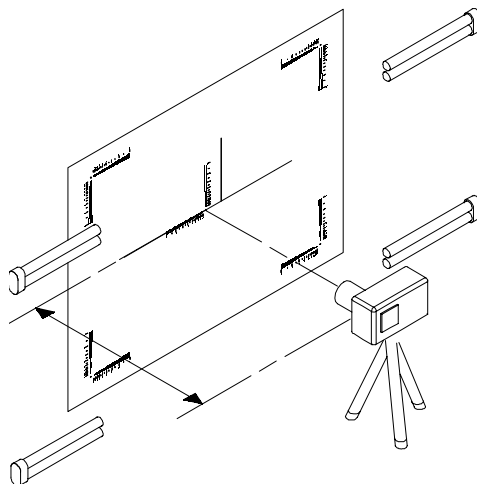
1. Insert the CF card in the card slot of the camera, and set the camera on the tripod.
2. Set up the equipment and distance as shown on the following table.

Image size	3008x2000 (L) or 2256x1496 (M)
Compression Mode	Fine or Std.
Exposure Mode	A mode (Aperture full open)
Focus Mode	Auto Focus
Flash Mode	Cancell
Distance	Approx. 3m (Using Standard lens 2613)

3. Capture the charts (for Wide-angle) at the when focusing from both end for 5 times.

\* Light up the chart (center and 4 corners) with the fluorescent stand SQ967W (inverter fluorescent light)). The dim lighting may result in the incorrect reading due to low contrast.

If the amount of the light is insufficient, capture each half separately.



4. Open the images with Adobe Photoshop on PC, check the resolving power.

\* Do not apply any image correction to test images on Photoshop. (Image correction such as contrast, tone Curves compensation or histogram operation may cause incorrect reading.)

\* All the 10 pictures taken should have resolving power as below when read under magnification of 2.5X.

Standard Center: 884 lines or greater

Moreover, satisfy the following about the scene of resolving power best among ten scenes.

Standard Center: 1400 lines or greater/ Corners: 775 lines or greater

Reading	Number of lines (television resolution)	Reading	Number of lines (television resolution)
A	1400	G	800
B	1300	H	700
C	1200	I	600
D	1100	J	500
E	1000	K	400
F	900		

#### Image quality

Check Grayscales, Color Reproduction, Ambient Exposure Accuracy and Flash Exposure Accuracy to verify performance.

Capture images with the given condition and save them to a computer, and then read the color data with the Color Calculator 2 (2766-0008-75).

#### Color Calculator 2 Installation

1. Load the Color Calculator 2 CD-ROM to the computer.
2. Click on English folder in the CD-ROM.
3. Double-click on SET UP.exe. The installer program starts automatically.
4. Continue the installation according to the screen until "Finish" appears.

## Using Color Calculator 2

1. Click Program in Start menu, and click on "Color Calculator".
2. Click on Read Image button and select the desired image in Select Image window.
3. Set the modes as below.

Check Item	Grayscales, Color reproduction	Exposure Accuracy	Exposure Accuracy with built-in flash
Chart	Macbeth Color Checker	Luminous surface of Light Source	Gray Chart
Color Space	sRGB		
Color Display Mode	RGB+L*a*b*		
Calculate Mode	Multi Area	Center Single Area	
Cropping Area Size	20×20 Pixel	256×256 Pixel	

4. In Multi Area mode, click and drag the edge of the frame to select the entire color chart.
5. Click on Calculate button. Data calculation starts, and the result is listed in the right window.

Multi Area mode: The average readings for each of 24 areas are listed.

Center Single Area: The average reading for the center area is listed.

## Macbeth Color Checker

	LS				
B	G	R	Y	M	C
1	2	3	4	5	6

## Exposure Accuracy

## MeasuringCondition

Luminance Box: EV10

Lens: Attach the lens (#2163) tightly to luminous surface.

Focus: MF (infinity)

Image size: 3008x2000 (L), 2256x1496 (M) or 1504x1000 (S)

Compression Ratio: Std.

Exposure Condition: Proper Exposure

Standard Confirm the reading of average G value meets the standard.

Standard: G = 106 to 130

## Flash Control Accuracy

## MeasuringCondition

Chart: Standard Reflection Paper II

Lens: Attach the lens (#2163) be sure to set the chart right in front of the camera so that the chart center aligns with the optical axis.

Light Source: Flash (Perform this check in darkroom)

Distance (from the subject): 2.0m

Focus: MF (2.0m)

Image size: 3008x2000 (L), 2256x1496 (M) or 1504x1000 (S)

Compression Ratio: Std.

Exposure Condition: Proper Exposure

Standard Confirm the reading of average G value meets the standard.

Standard: G = 118 to 143

## Grayscales

## MeasuringCondition

Chart: Macbeth Color Checker

Light Source: Light Source-A (Tungsten) 6500+/-100 lux.

Lens: Attach the lens (#2163) be sure to set the chart right in front of the camera so that the chart center aligns with the optical axis.

Distance (from the subject): 1.5m

Focus: MF (1.5m)

Image size: 3008x2000 (L), 2256x1496 (M) or 1504x1000 (S)

Compression Ratio: Std.

Exposure Condition: Proper Exposure

## Standard

Read L\* value of each square, and confirm all readings suffice the standard.

Chart	L*
1 (White)	90 ± 5
2	79 ± 10
3	64 ± 10
4 (Gray)	45 ± 10
5	22 ± 10
6 (Black)	5 ± 10

## Color Reproduction

## MeasuringCondition

Chart: Macbeth Color Checker

Light Source: Light Source-A (Tungsten) 6500+/-100 lux.,

Light source-C (Light source-A + LB B16 filter),

White Fluorescent (FL-10W) 700+/-200lux.,

Daylight Fluorecent (FL-10N) 700+/-200lux.,

Flash (Built-in)

Lens: Attach the lens (#2163) be sure to set the chart right in front of the camera so that the chart center aligns with the optical axis.

Magnification: The taking a picture distance is adjusted with the focal length so that the width of the wide area AF display is corresponding to as many as four patches of Macbeth Color Checker.

White-balance: Auto WB for Built-In flash

Preset WB for other light source

Image Size: 3008x2000 (L) or 2256x1496 (M)

Compression Ratio: Fine or Std.

Exposure Condition: L\* of a white patch of Macbeth color chart may become 95 ± 5.

## Standard

Read a\* and b\* value of each square, and confirm that all readings suffice the standard.

The tolerance level is all ± 10

	Light Source-A		Light Source-C		White Fluorescent		Daylight Fluorecent		Flash (Built-in)	
	a*	b*	a*	b*	a*	b*	a*	b*	a*	b*
B	22	-44	19	-44	25	-47	18	-41	14	-49
G	-36	17	-35	23	-34	29	-33	24	-30	18
R	53	44	48	36	39	30	49	37	52	33
Y	-11	52	-8	56	-14	62	-4	58	-11	44
M	47	6	44	-8	40	-12	46	-5	36	-11
C	-6	-32	-11	-27	-5	-30	-11	-25	-22	-20
LS	13	17	12	13	10	19	15	16	7	8

8 (2181)

Current Leak

Current leak (7.4 volts/ 3 A) (Using Power Supply Adapter <2755-0005-75>

Item			Standard
Main Switch	OFF		300micro A or below
	ON	Back LCD ON	500mA or below
		Back LCD OFF	300mA or below
		APO status	650micro A or below

BC Lock voltage

BC lock voltage  
(Using Power Supply Adapter for 2766 <2766-0013-76>)  
(With 0.5 ohm attachment yellow plug)

Item	Standard
Lock	4.44V
Unlock	4.74V