

3. Alignment & Adjustment

3-1 Service Instruction

■ Check items listed after changing each

Replaced Items \ Check Items	S/W Version	Front LED	Index Delay	Actuator Gain	V-Position H-Position	CCA	Board LED	Tilt Focus
Main Board	● (1st)		● (3rd)	● (5th)	● (2nd)	● (4th)		
Power Board		●					●	
Optical Engine		●	● (3rd)	● (5th)	● (2nd)	● (4th)		● (1st)
DMD Board				●				●
Lamp		●				●		
Color Wheel			●			●		
Front LED Assy		●						
Actuator Subdetector Board		●						

※ If you change Main Board and optical engine, check in order.
(For example, in case of "Main Board", first 'S/W', second 'V/H position' and third 'Index'...)

1. Software version check :

After Entering the Service mode, Check the list below

* S/W Notation

"T_D240SUS0-XXXX" indicates "Einstein BASIC MODEL USA, ver. XXXX".

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T-D240SUS0-XXXX
T-D240SUS5-XXXX
ACL xx.xx.xx
RFS....
20xx-xx-xx
TL-DSP-xxxx
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2. Front LED check : In this S/M it is page 6-8

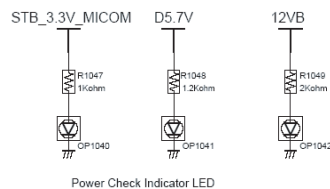
3. Index Delay adjustment : See page 3-11.

4. Actuator Gain adjustment : See page 3-13.

5. Vertical / Horizontal Position adjustment : See page 3-11.

6. CCA : See page 3-12.

7. Board LED check : Check all the LED are turned on.



8. Tilt/Focus adjustment : See page 3-15.

3-2 How to Access Service Mode

1. Turn off the power to put the unit into the STAND-BY mode.
2. In order to enter the Service Mode, Press "Mute" → "1" → "8" → "2" → "POWER" button on the Remote Control.
In case entry into SERVICE MODE is unsuccessful, repeat the procedures above.
3. Initial DISPLAY State in times of Service Mode Switch overs

Option
DDP3021(K220)
CCA(ON)
SP Actuator
DNle
X240
X240 NTSC
MST3389
STV8258DSX
Cinema CCA
ESP
CHECKSUM
SERVICE

T-EINSUS0-XXXX
T-EINSUS5-XXXX
ACL xx.xx.xx
RFS....
20xx-xx-xx
TL-DSP-xxxx

4. Buttons operations within Service Mode

MENU	Full Menu Display / Move to Parent Menu
Direction keys ▲ / ▼	Item Selection by Moving the Cursor
Direction keys ◀ / ▶	Data Increase/Decrease for the Selected Item
Source	Cycles through the active input source that are connected to the unit
Enter	Item Selection/execution

3-3 Factory Data

★ The underlined are items applied during the service adjustment. None of the others should be adjusted.

1. OPTION

No	Item	Range	Default	Remark
1	<u>Factory Reset</u>			All setting is back to the factory setting
2	Lamp Control	Dynamic/always	Dynamic	Dynamic, Always
3	WB Reset	on/off	OFF	Initialize the White Balance value
4	EER Reset			Clear the EEPROM
5	<u>User Reset</u>			All setting is back to the default
6	<u>DIGITAL → DMD</u>			Transfer engine adjustment data from digital to DMD
7	Lamp Clear			Clear the Lamp life time
8	Lamp life		0h	Lamp on time counter
9	AUTO POWER	on/off	ON	on/off
10	MUTE TIME		600ms	Time which the screen will be black while switching channels
11	EDID WRITE			Sound Delay Module ON/OFF selection
12	DELAY MOD	on/off	OFF	Sound Delay Module ON/OFF selection
13	DBG/ANY SEL	Debug/Any net	Debug	Select the use of the Service jack
14	DDC Protection	on/off	OFF	DDC write ON/OFF selection
15	Downloadable RRS	on/off	ON	
16	LNA Default	AUTO/OFF	AUTO	LNA setting OFF/Auto selection
17	PROTECT	on/off	ON	Protection ON/OFF selection
18	WATCH DOG	on/off	ON	Watch Dog ON/OFF selection
19	WD COUNT		0	Count for Watch Dog event
20	HDCP HPD	on/off	on	HDMI/DVI HOT PLUG Control
21	Melody vol	0~10	1	Melody Volume Control
22	<u>Test Pattern (GR)</u>			scaler test pattern
23	<u>DMD → Digital</u>			Transfer engine adjustment data from DMD to digital

2. DDP3021(K220)

No	Item	Range	Default	Remark
1	<u>V-Position</u>	0-60	30	Screen upper and lower adjustment
2	<u>H-Position</u>	0~120	60	Screen left and right adjustments
3	LAMP SYNC		Pulse	Pulse(P), Pass(T)
4	<u>INDEX DELAY</u>	0~359	50	Synchronizes the base position of the color wheel with the corresponding color signal. This is critical to the natural color display. If the index delay is not properly set, even the correct CCA coordinates will not help when displaying natural colors.
5	SEQ SELECT	0~15	0x5	Sequence Selection
6	<u>V-FLIP</u>	Normal/Flip	Flip	Vertical Flip Operation
7	<u>H-FLIP</u>	Normal/Flip	Flip	Horizontal Flip Operation
8	GAMMA	0 ~ 15	4	Gamma Table Selection
9	MPC	OFF/ON	ON	MPC Function On/Off
10	DMD_BIAS	B,C,D,E		DMD Bias pin voltage selection
11	Lamp Boost	0~63	15	Lamp Boost value selection
12	Lamp Sync Delay	0~4095	120	Lamp Sync delay value selection
13	Version		0x1	
14	<u>Optic Select</u>		SAMSUNG	SAMSUNG and ZEISS Selection
15	<u>Lamp Select</u>		Philips	Philips/Osram/Ushio
16	<u>Optic detect</u>	Auto/L620/K220	Auto	Optic Detect Select
17	Lamp Watt		132W	120W/132W Selection
18	<u>Test Pattern(DDP)</u>		0	This displays the built-in pattern of the DDP3021 chip. DDP3021 drives the DMD panel, so displaying this pattern means there is no error in the DDP3021 projection function and the panel itself.

3. CCA(ON)

No	Item	Range	Default	Remark
1	CCA	On/Off	On	CCA On/Off Selection
2	Red-x	0~32768	680	Red-x adjustment
3	Red-y	0~32768	327	Red-y adjustment
4	Red-Y	0~32768	105	Red-Y adjustment
5	Green-x	0~32768	276	Green-x adjustment
6	Green-y	0~32768	748	Green-y adjustment
7	Green-Y	0~32768	203	Green-Y adjustment
8	Blue-x	0~32768	149	Blue-x adjustment
9	Blue-y	0~32768	58	Blue-y adjustment
10	Blue-Y	0~32768	53	Blue-Y adjustment
11	White-x	0~32768	274	White-x adjustment
12	White-y	0~32768	285	White-y adjustment
13	White-Y	0~32768	775	White-Y adjustment
14	Yellow-x	0~32768	460	Yellow-x adjustment
15	Yellow-y	0~32768	540	Yellow-y adjustment
16	Yellow-Y	0~32768	286	Yellow-Y adjustment
17	Cyan-x	0~32768	177	Cyan-x adjustment
18	Cyan-y	0~32768	280	Cyan-y adjustment
19	Cyan-Y	0~32768	146	Cyan-Y adjustment
20	WB Spread			Spread CCA value to all mode
21	DRedX	0~32768	680	Target Red X value for CCA
22	DRedY	0~32768	327	Target Red Y value for CCA
23	DGreenX	0~32768	276	Target Green X value for CCA
24	DGreenY	0~32768	748	Target Green Y value for CCA
25	DBlueX	0~32768	149	Target Blue X value for CCA
26	DBlueY	0~32768	58	Target Blue Y value for CCA
27	DCyanX	0~32768	177	Target Cyan X value for CCA
28	DCyanY	0~32768	280	Target Cyan Y value for CCA
29	DMagentaX	0~32768	291	Target Magenta X value for CCA
30	DMagentaY	0~32768	123	Target Magenta Y value for CCA
31	DYellowX	0~32768	460	Target Yellow X value for CCA
32	DYellowY	0~32768	540	Target Yellow Y value for CCA
33	D_White_X	0~32768	274	Target White X value for CCA
34	D_White_Y	0~32768	285	Target White Y value for CCA

4. SP Actuator

No	Item	Range	Default	Remark
1	<u>Actuator Gain</u>	0~175	60	Actuator Gain adjustment
2	<u>Actuator On/Off</u>		On	Actuator On/Off selection

5. DNle

No	Item	Range	Default	Remark
1	<u>Test Pattern</u>		0	Test Pattern Selection
2	NR_MAX Y/C	0~255	32	Temporal NR Gain
3	NR_MIN Y/C	0~255	16	Temporal NR Gain
4	Core	0~15	4	NEOnDCE User Set Up
5	B_RATIO		12000	Low level information for the minimum value
6	BLACK_TILT	0~255	128	Black Stretch Area
7	W_RATIO		12000	High level information for the minimum value
8	WHITE_TILT	0~255	200	White Stretch Area
9	GAIN1X	0~63	10	Gain of horizontal high frequency region
10	GAIN1Y	0~63	8	Gain of vertical high frequency region
11	GAIN2X	0~63	10	Gain of horizontal middle frequency region
12	GAIN2Y	0~63	4	Gain of vertical middle frequency region
13	GAIN3X	0~63	1	Gain of horizontal low frequency region
14	CORING_ON		ON	ON,OFFCoring On/Off
15	SCALE_R	0~255	50	Log Mapping Gain
16	WTE_CSC		YCCRGB	YCCRGB,YPPRGB
17	DITHER_MOD		0	1,2,3
18	RED_C_COEFF		128	Gain adjustment of the contrast for the Red signal
19	GRN_C_COEFF		128	Gain adjustment of the contrast for the Green signal
20	BLU_C_COEFF		128	Gain adjustment of the contrast for the Blue signal
21	RED_B_COEFF		128	Gain adjustment of the brightness for the Red signal
22	GRN_B_COEFF		128	Gain adjustment of the brightness for the Green signal
23	BLU_B_COEFF		128	Gain adjustment of the brightness for the Blue signal
24	ALPMAU/L	0~255	50	
25	Sub Contrast	0~150	115	Brightness adjustment for the high-light parts of the screen
26	Sub Brightness		230	Brightness adjustment for the low-light parts of the screen
27	Sub offset	0~255		

6. X240

No	Item	Range	Default	Remark
1	Main/Sub	Main/Sub	Main	
2	Y/UV	Y/UV	Y	
3	Filter		gh121a	

7. X240 NTSC

No	Item	Range	Default	Remark
1	IN PHASE LINE	0 ~ 31	24	In Phase Line sensitivity for the Comb filter
2	IN PHASE FRAME	0 ~ 31	26	In Phase Frame sensitivity for the Comb filter
3	OUT PHASE LINE	0 ~ 31	12	Out Phase Line sensitivity for the Comb filter
4	OUT PHASE FRAME	0 ~ 31	22	Out Phase Frame sensitivity for the Comb filter
5	CORING	0 ~ 63	4	HP luma coring level of a 10bit luma signal.
6	LUMA_BW	0 ~ 3	0	Luma Bandwidth Limitation(0-None ; 1-Low ; 2-Medium ; 3-Forced)
7	CHROMA_BW	0 ~ 4	4	selection of the post chroma filtering
8	CKILL_TH1	(-)32 ~ 32	48	Unsigned offset for the minimum burst detection threshold.
9	CKILL_TH2	(-)32 ~ 32	80	Signed offset for the minimum burst detection threshold.
10	LUMA_GAIN	0 ~ 1023/10step	512	Luma gain 0x200 nominal value is 100%
11	LUMA_OFFSET	0 ~ 1023/10step	0	Luma offset zero nominal for 0 IRE
12	CR_GAIN	0 ~ 1023/10step	482	Cr gain 0x200 nominal value is 100%
13	CR_OFFSET	0 ~ 512/10step	0	Cr offset 0x000 nominal for 0 IRE
14	CB_GAIN	0 ~ 1023/10step	482	Cb gain 0x200 nominal value is 100%
15	CB_OFFSET	0 ~ 512/10step	0	Cb offset 0x000 nominal for 0 IRE
16	Y_DELAY_POS	0 ~ 65535	0	Enables over-write values for chroma & luma delays.
17	Y_DELAY_NEG	0 ~ 65535	12	First and second over-write delay at 27MHz for Y.
18	CR_DELAY_POS	0 ~ 65535	0	Third and forth over-write delay at 54MHz for Cb.
19	CR_DELAY_NEG	0 ~ 65535	13	First and second over-write delay at 54MHz for Cb.
20	CB_DELAY_POS	0 ~ 65535	0	Third and forth over-write delay at 54MHz for Cr.
21	CB_DELAY_NEG	0 ~ 65535	13	First and second over-write delay at 54MHz for Cr.
22	NOISE_ME	Read	0	Noise level(0: no noise, 3: high noise)
23	AGC_ON/OFF	0~3	OFF	Selection AGC on/off
24	AGC_GAIN		50	Adjust AGC gain.

8. MST3389(disable)

No	Item	Range	Default	Remark
1	Pixel_shift_Time	0(Off)/1/30/60	60	Set Pixel shift Time
2	Pixel_shift_Offset	0(Off)/1/2/3/4/5	1	Set Pixel shift Offset
3	Video mute time	0(Off)/1/2/10	8	Set video mute time
4	RED CUTOFF	0 ~ 255	128	ADC R channel offset(lower value -> higher DATA out)
5	GREEN CUTOFF	0 ~ 255	128	ADC G channel offset(lower value -> higher DATA out)
6	BLUE CUTOFF	0 ~ 255	128	ADC B channel offset(lower value -> higher DATA out)
7	PHASE	0 ~ 64	0	Adjust ADC comparator(sampling) phase (64 steps).
8	RED GAIN		128	ADC R channel Gain. 00: Smallest input range, maximum gain.
9	GREEN GAIN		128	ADC G channel Gain. 00: Smallest input range, maximum gain.
10	BLUE GAIN		128	ADC B channel Gain. 00: Smallest input range, maximum gain.
11	PLLDIV_H	0 ~ 4096	105	ADC PLL Divider ratio -1 (high byte)
12	PLLDIV_L		208	ADC PLL Divider ratio -1 (low byte)
13	PLLGAIN	0 ~ 32	16	select ADC PLL VCO range and Charge pump current.
14	CLPDLY		16	Set Clamp Pulse Delay to HSYNC reference edge.
15	CLPDUR		8	Set Clamp Pulse width in pixel clock.
16	HSOPW		32	ADC HSOUT pulse width in pixel clock.
17	SYNC_CTRL		64	Set Sync control by various option.
18	SOGMID_CTRL		184	ADC R&B channel level select clamping level select.
19	SEP_THR		32	VSYNC separator Threshold in 5MHz(ADC).
20	PRECST		0	Pre-Coast width(before VSYNC) for COAST extension.
21	POSTCST		0	Pre-Coast width(after VSYNC) for COAST extension.
22	ADC_BW0		0	On-line ADC input 3dB Bandwidth for R&G channels.
23	ADC_BW1		0	On-line ADC input 3dB Bandwidth for B channels.

* This menu is not activated.

9. STV8258DSX

No	Item	Range	Default	Remark
1	Stereo Pilot high	0 ~ 255	35	Threshold High for Stereo Detection
2	Stereo Pilot low	0 ~ 255	16	Threshold Low for Stereo Detection
3	SAP Pilot high	0 ~ 255	128	Threshold high for SAP detection
4	SAP Pilot low	0 ~ 255	96	Threshold low for SAP detection
5	D_AV Delay	0 ~ 255	88	Set the delay time for LS channel.
6	A_AV Delay	0 ~ 255	88	Set the delay time for LS channel.

10. Cinema CCA

No	Item	Range	Default	Remark
1	DRedX		680	Target Red X value for CCA
2	DRedY		327	Target Red Y value for CCA
3	DGreenX		276	Target Green X value for CCA
4	DGreenY		748	Target Green Y value for CCA
5	DBlueX		149	Target Blue X value for CCA
6	DBlueY		58	Target Blue Y value for CCA
7	DCyanX		177	Target Cyan X value for CCA
8	DCyanY		280	Target Cyan Y value for CCA
9	DMagentaX		291	Target Magenta X value for CCA
10	DMagentaY		123	Target Magenta Y value for CCA
11	DYellowX		460	Target Yellow X value for CCA
12	DYellowY		540	Target Yellow Y value for CCA
13	D-White-X		313	Target White X value for CCA
14	D-White-Y		329	Target White Y value for CCA

11. ESP

No	Item	Range	Default	Remark
1	Dynamic Co Global	on/off	OFF	
2	Dynamic Co Local	on/off	OFF	
3	Dynamic Co Skin	on/off	OFF	
4	Dynamic Strength	Low/Medium/Max	Medium	
5	Dynamic Con Gain	0~100	0	
6	Dynamic Sat	on/off	OFF	
7	Dynamic Sat Gain	0~255	176	
8	Sharp Picture	on/off	OFF	
9	Sharp VLUT	TBD/Ugain	TBD	
10	Sharp Filter	HD Low/SD/UCF	HD Low	
11	Sharp Picture Gain	0~255	176	

12. CHECKSUM 0000

Excute Checksum calcaution

13. SERVICE

No	Item	Range	Default	Remark
1	<u>V-Position</u>	0 ~ 60	30	Screen upper and lower adjustment
2	<u>H-Position</u>	0 ~ 120	60	Screen left right adjustment
3	<u>User Reset</u>	Pulse/Pass	Pulse	All setting is back to the default
4	<u>INDEX DELAY</u>	0 ~ 256	50	Index delay adjustment
5	LAMP SYNC	Pulse/Pass	Pulse	
6	<u>CCA</u>			CCA menu
7	<u>Digital→DMD</u>			Transfer engine adjustment data from digital to DMD
8	<u>DMD→Digital</u>			
9	Lamp Life		0h	Duration of use of lamp
10	Lamp clear			Lamp Life item does Reset
11	Mute time	490ms ~ 1000ms	600ms	
12	<u>Lamp Select</u>		Philips	Philips/Osram/Ushio
13	<u>Optic Select</u>		SAMSUNG	SAMSUNG and ZEISS Selection
14	Lamp Watt		120W	120W/132W Selection
15	<u>Actuator gain</u>		60	Adjust Actuator gain

3-4 Service Adjustment

3-4-1 Vertical / Horizontal Position Adjustment

1. Turn off the power to put the unit into the STAND-BY mode.
 2. In order to enter the Service Mode, Press "Mute" → "1" → "8" → "2" → "POWER" button on the Remote Control.
 3. Select "Service" on the first display of the Service mode menu.
 4. Select the V-position for vertical positioning and H-position for horizontal positioning by using the ▲ ▼ (up, down) buttons.
 5. The V Postion / H Position Adjustment indicating to use ◀ ▶ (left, right) buttons.
- ※ Do not set the V-position value to 34 or 35. (Setting to these values will cause horizontal lines on the right side of the screen.)

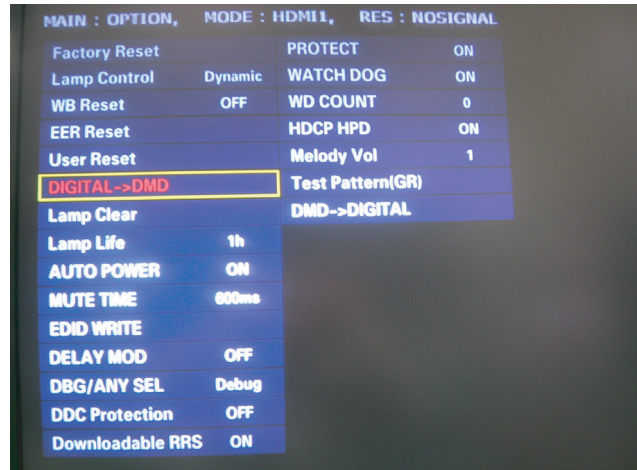
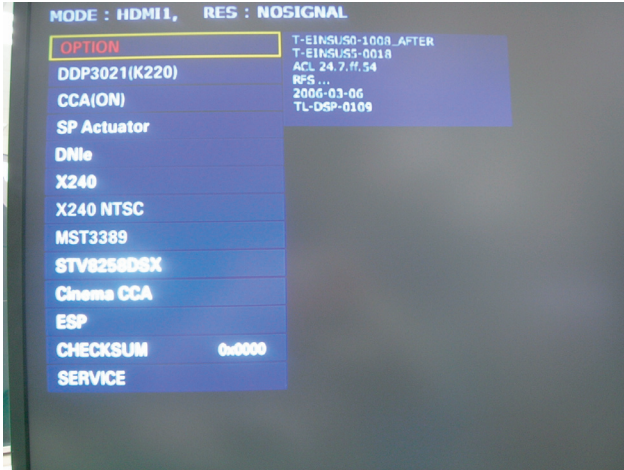
3-4-2 INDEX DELAY Adjustment

1. Turn off the power to put the unit into the STAND-BY mode.
2. In order to enter the Service Mode, Press "Mute" → "1" → "8" → "2" → "POWER" button on the Remote Control.
3. Select "Service" on the first display of the Service mode menu.
4. Press the ▲ ▼ (Up or Down) button to move to INDEX DELAY, then press ENTER to select.
5. The INDEX DELAY setup screen (with 4 grayscale bars at the bottom of the screen) will be displayed.
6. Press the ◀ ▶ (Left of Right) button to adjust the red color(Green, Blue, White) at the bottom of the screen at its minimum and maximum values of changing from red to magenta, then adjust to the mean value.

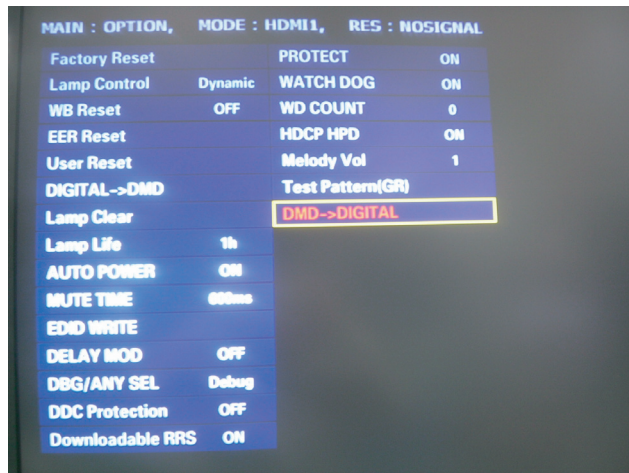
3-4-3 CCA Adjustment Service Methods : CCA Adjustment is needed after changing a light engine or digital board

■ CCA : In DLP TV, even the same RGB color may differ depending on the light engine. CCA (Color Coordinate Adjustment) corrects the color to achieve the color accuracy. CCA performs color correction after measuring and inputting the current light engine's data on actual color coordinates for displayed Red, Green, Blue, and White color patterns, using a color coordinate measuring equipment. At this moment, color correction is performed below.

- 1) This procedure is needed if the Main PCB or DMD Board are changed.
- 2) If the DMD PCB is changed then you use the Digital→DMD adjustment item in the Option menu of service mode.



- 3) If the Main PCB is changed use the DMD→Digital adjustment.



*** Attention**

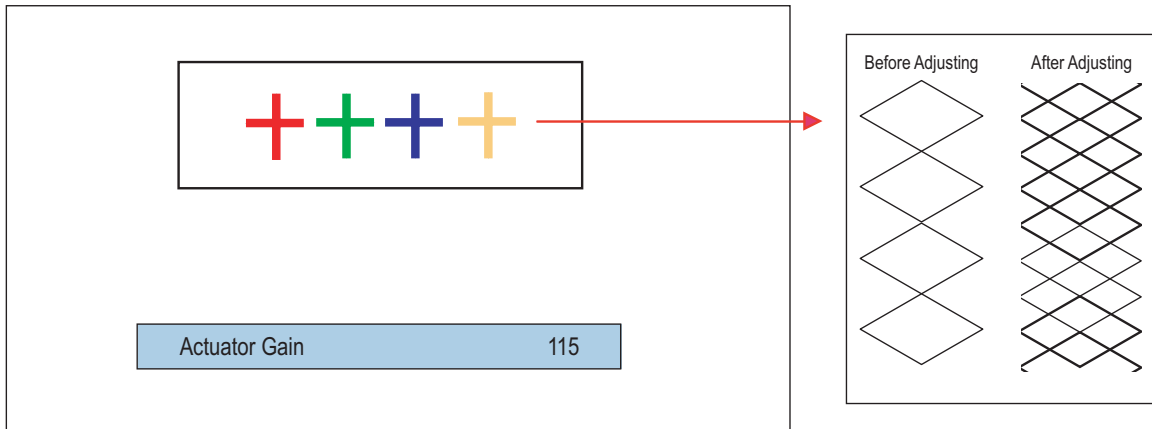
Performing CCA is independent on current display's resolution and input signal type if you don't measure color coordinates data. Measuring color coordinates data requires specific equipment not possessed by service personnel, that makes performing manual adjustment impossible. Adjusting CCA is applied to all the signal mode. Don't change desired value because it will be harmful to the color of the SET.

CCA and Index Delay adjustment procedure for when the Color Wheel is changed DMD→Digital and Digital →DMD do not apply in that situation

3-4-4 ACTUATOR GAIN Adjustment

1. Before Adjustment

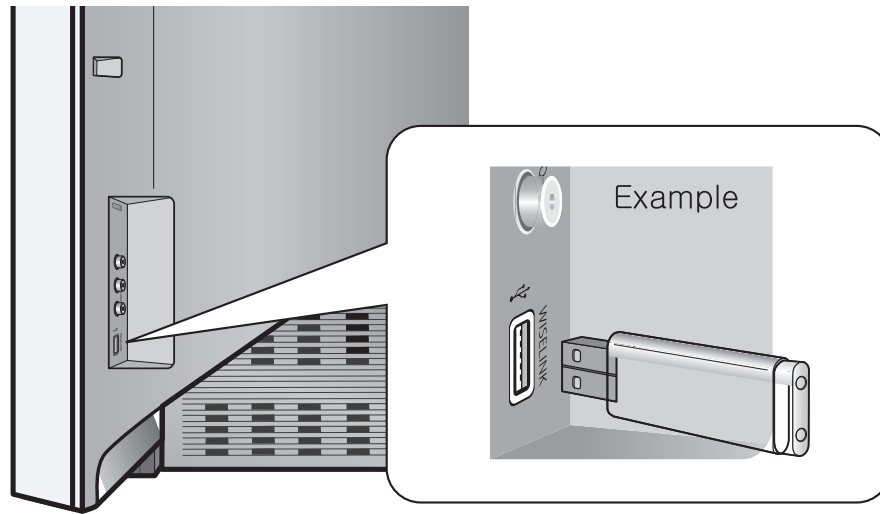
- 1) Turn off the power to put the unit into the STAND-BY mode.
- 2) In order to enter the Service Mode, Press "Mute" → "1" → "8" → "2" → "POWER" button on the Remote Control.
- 3) Select "Service" on the first display of the Service mode menu.
- 4) Press the ▲ ▼ (Up or Down) button to move to ACTUATOR GAIN, then press ENTER to select.
- 5) Adjustment indicating to use ◀ ▶ (left, right) buttons.



2. Making Adjustments

- 1) As shown in the picture above, change the actuator values to eliminate saw tooth shapes.
 - To fine tune, increase the data value ensuring that you get the center between the starting and ending points of the disappearing saw tooth shape.

3-5 Software Upgrade



1. Prepare the USB memory stick with the built-in firmware.
2. Select Cable channel 3, and press "Mute" → "7" → "8" → "9" → "Exit" buttons.
3. When the downloading window appears, insert the USB stick to the wiselink port on the side of the TV.
4. TV goes off and turns back on when the download is automatically complete. Remove USB stick to complete the upgrade.

※ Check for the Firmware Version

- 1) Turn off the power to put the unit into the STAND-BY mode.
- 2) In order to enter the Service Mode, Press "Mute" → "1" → "8" → "2" → "POWER" buttons on the Remote Control.
- 3) In case entry into SERVICE MODE is unsuccessful, repeat steps 1 and 2 directly above.
- 4) You can check the firmware version at the bottom of the Factory menu.

T-D240SUS0-XXXX
T-D240SUS5-XXXX
ACL xx.xx.xx
RFS....
20xx-xx-xx
TL-DSP-xxxx

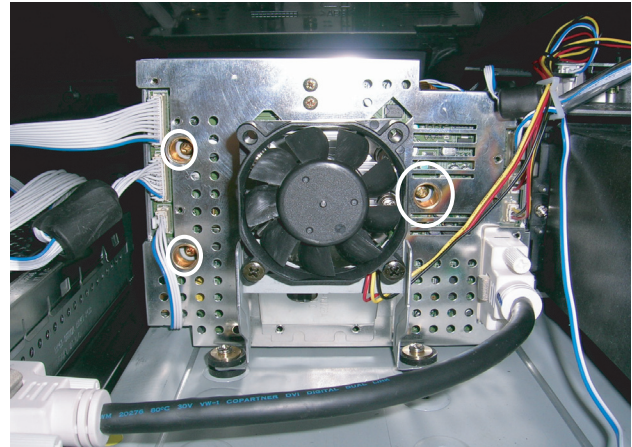
3-6 Replacements & Calibration

3-6-1 Tilt the Screen

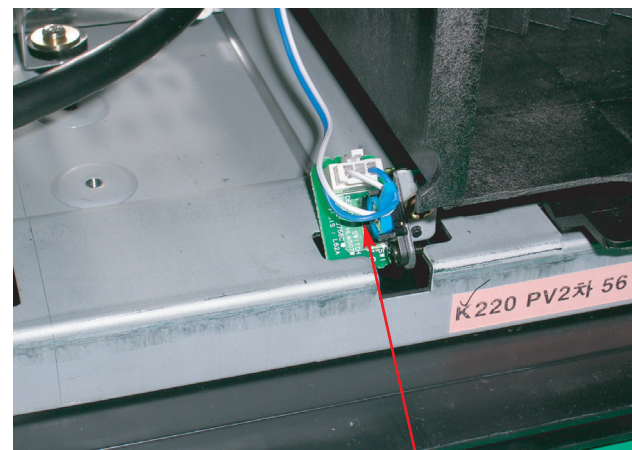
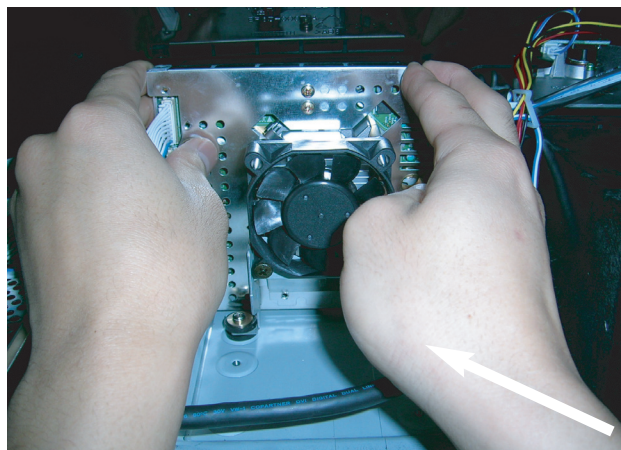
1. Remove the 9 point screws. Remove the Bottom cover.
Fix the safety switch on the right with tape so that the set can be turned on after removing the bottom cover.
: TH,B,M4.L15,BLK,SWRCH18A



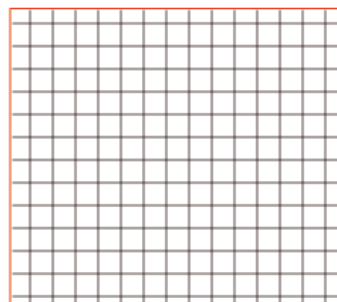
2. loose the 3 points screws.
* Left 2 points screws
: PWH,S,M3,L8,ZPC(YEL),SWRCH18A



3. Turn off the power to put the unit into the STAND-BY mode.
In order to enter the Service Mode, Press "Mute" → "1" → "8" → "2" → "POWER" button on the Remote Control.
Select DDP3021 of the Service Mode menu. Press the ▲ ▼ (Up or Down) button to move to TEST PATTERN, then press ENTER to select. Press the ► (Right) button until you see CROSSHATCH PATTERN.
Then, adjust the screen position, by holding both of the upper corners of the DMD board.



CROSSHATCH PATTERN

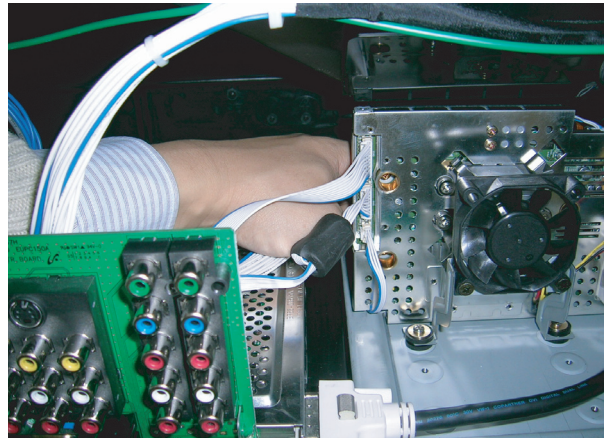
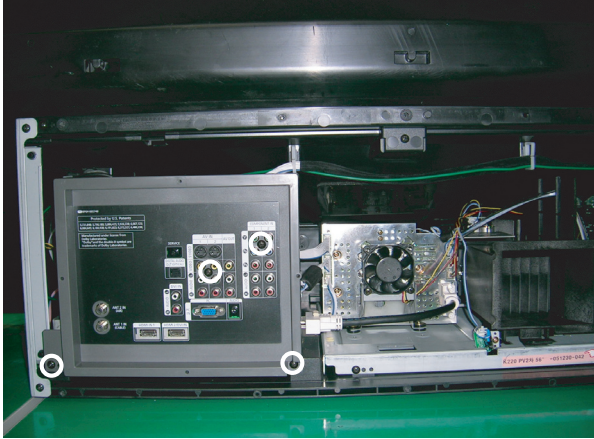


Fix the safety switch on the right with tape so that the set can be turned on after removing the bottom cover.

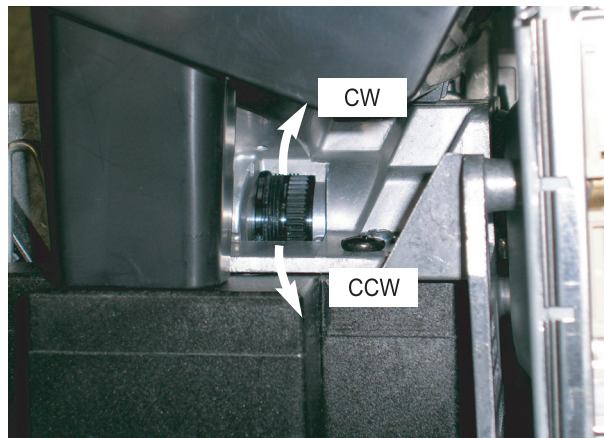
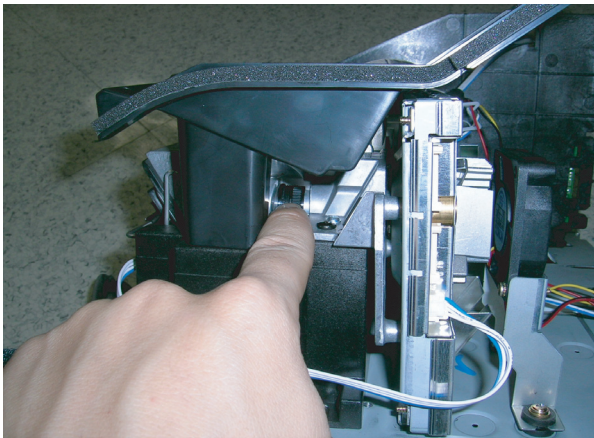
- ※ Even when those screws are removed, the board does not separate it can be moved within the adjustable range because there is a spring screw at the center that holds it.
- ※ When adjusting the screen, it is better for two people to work together.
One person should adjust the picture position while the other person looks at the screen.
- ※ The movement direction of the board and the picture are opposite.
 - When the board is lifted upward, the screen descends down.
 - When it is tilted to the left, the screen tilts to the right.
- ※ When the picture adjustment is completed:
First, tighten the two screws on the left of the DMD board and then slowly tighten the one screw on the bottom right.
Be careful not to touch the board while tightening the screws.
(When using an electric-powered screwdriver, be careful that the torque is not too high.)

3-6-2 Align the Focus

1. Loosen and remove the 4 screws on the terminal board and jack.
: TH,B,M4.L15,BLK,SWRCH18A



2. It is not necessary to remove the engine assy to make the adjustment.
Insert your hand / finger into the set as shown in the diagram below. Move the focus alignment dial of Projection lens to the clockwise or counter clockwise until the picture is clear displayed.



MEMO