

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LED LCD TV with LD91L chassis.

2. Designation

- 1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
- 2) Power Adjustment: Free Voltage
- 3) Magnetic Field Condition: Nil.
- 4) Input signal Unit: Product Specification Standard
- 5) Reserve after operation: Above 5 Minutes (Heat Run)
Temperature : at 25±5°C
Relative humidity : 65±10%
Input voltage : 220V, 60Hz
- 6) Adjustment equipments: Color Analyzer (CA-210 or CA-110), Pattern Generator(MSPG-925 Series or Equivalent), DDC Adjustment Jig equipment, Service Remote Control.
- 7) Push The "IN STOP KEY" - For memory initialization.

Case1 : Software version up

1. After downloading S/W by USB, TV set will reboot automatically.
2. Push "In-stop" key.
3. Push "Power on" key.
4. Function inspection
5. After function inspection, Push "In-stop" key.

Case2 : Function check at the assembly line

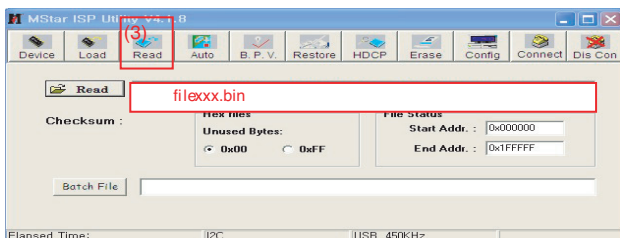
1. When TV set is entering on the assembly line, Push "In-stop" key at first.
2. Push "Power on" key for turning it on.
-> If you push "Power on" key, TV set will recover channel information by itself.
3. After function inspection, Push "In-stop" key.

3. Main PCB check process

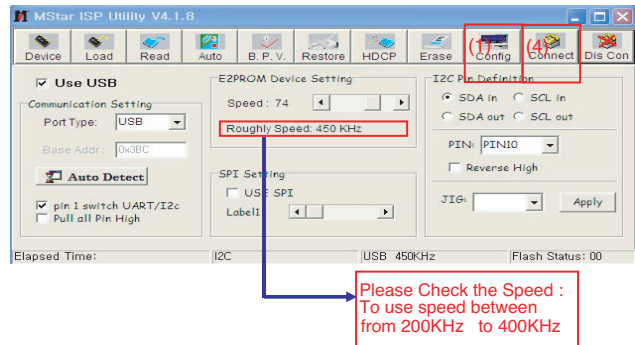
* APC - After Manual-Insult, executing APC

* Boot file Download

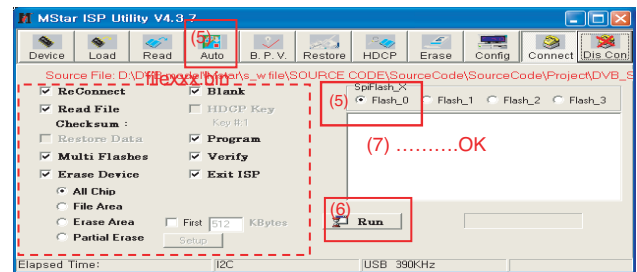
- 1) Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
- 2) Set as below, and then click "Auto Detect" and check "OK" message
If "Error" is displayed, Check connection between computer, jig, and set.
- 3) Click "Read" tab, and then load download file (XXXX.bin) by clicking "Read"



- 4) Click "Connect" tab. If "Can't" is displayed, check connection between computer, jig, and set.

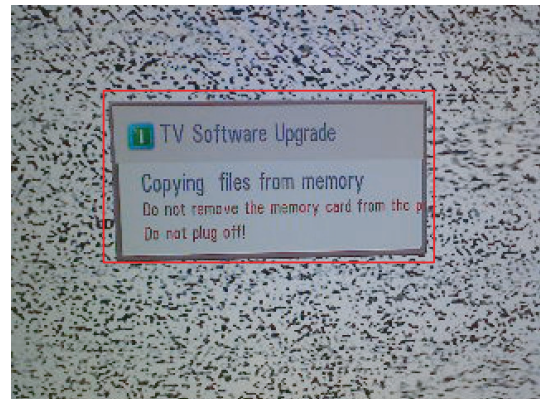


- 5) Click "Auto" tab and set as below
- 6) Click "Run".
- 7) After downloading, check "OK" message.

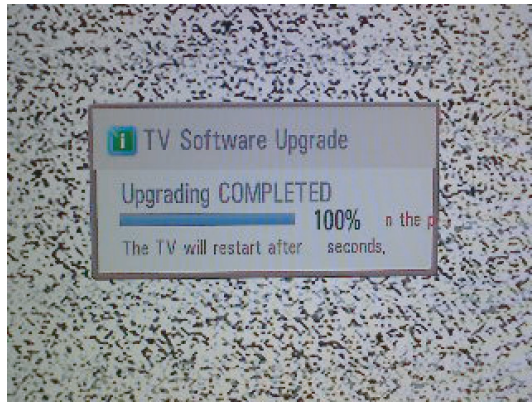
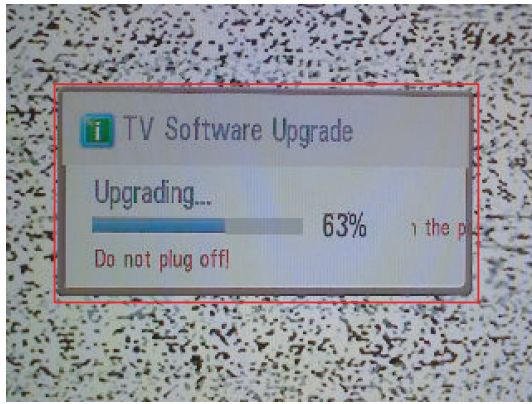


* USB DOWNLOAD

- 1) Put the USB Stick to the USB socket
- 2) Automatically detecting update file in USB Stick
- If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting
- 3) Show the message "Copying files from memory"



4) Updating is starting.



- 5) Updating Completed, The TV will restart automatically.
 6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
 * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust Tool Option again.

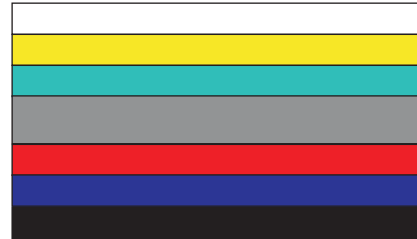
- 1) Push "IN-START" key in service remote controller
- 2) Select "Tool Option 1" and Push "OK" button.
- 3) Punch in the number. (Each model has their number)

Model	Tool option1	Tool option2	Tool option3	Tool option4
SL9xxx	26305	3106	57254	3360

4) Completed selecting Tool option.

3.1. ADC Process

- (1) External ADC(Only adjust in the component mode 480i)
 - Input the signal in the Component 1 - Component 480i (Adjusted only this mode)
 - MODEL: 209 in Pattern Generator(480i Mode)
 - PATTERN : 65 in Pattern Generator(MSPG-925 SERIES)



Adjustment pattern

- After enter Service Mode by pushing "ADJ" key,
- Enter the 5 item and then Push the "Start" key.

- (2) Internal ADC(Only adjust in the RGB)
 - After enter Service Mode by pushing "ADJ" key
 - Enter ADC Calibration mode by pushing "▶" key at "5. ADC Calibration"

<Caution> Using 'power on' button of the Adjustment R/C , power on TV.

* ADC Calibration Protocol (RS232)

Item	CMD1	CMD2	Data0	
Adjust 'Mode In'	A	A	0 0	When transfer the 'Mode In', Carry the command.
ADC Adjust	A	D	1 0	Automatically adjustment (The use of a internal pattern)

Adjust Sequence

- aa 00 00 [Enter Adjust Mode]
- xb 00 40 [Component1 Input (480i)]
- ad 00 10 [Adjust 480i Comp1]
- xb 00 60 [RGB Input (1024*768)]
- ad 00 10 [Adjust 1024*768 RGB]
- aa 00 90 End Adjust mode

3.2. Function Check

- (1) Check display and sound
 - Check Input and Signal items. (cf. work instructions)
 - 1) TV
 - 2) AV (SCART1/SCART2/ CVBS)
 - 3) COMPONENT (480i)
 - 4) RGB (PC : 1024 x 768 @ 60hz)
 - 5) HDMI
 - 6) PC Audio In

* Display and Sound check is executed by Remote control.

<Caution>

Not to push the INSTOP key after completion if the function inspection.

4. Total Assembly line process

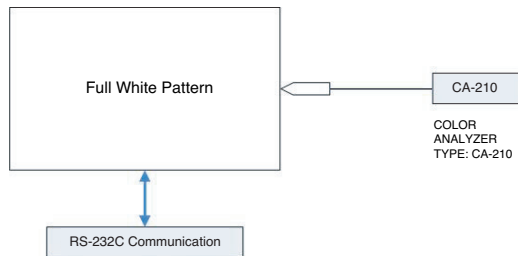
4.1. Adjustment Preparation

- W/B Equipment condition
CA210 : CH 14(LED), Test signal : Inner pattern (85IRE)
- Above 5 minutes H/run in the inner pattern. ("power on" key of adjust remote control)

Cool	13,000k	°K	X=0.269(±0.002)	<Test Signal> Inner pattern (216gray,85IRE)
			Y=0.273(±0.002)	
Medium	9,300k	°K	X=0.285(±0.002)	
			Y=0.293(±0.002)	
Warm	6,500k	°K	X=0.313(±0.002)	
			Y=0.329(±0.002)	

- Connecting picture of the measuring instrument (On Automatic control)

Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment R/C POWER ON -> Enter the mode of White-Balance, the pattern will come out



- Auto-control interface and directions

- Adjust in the place where the influx of light like floodlight around is blocked. (illumination is less than 10 lux).
- Adhere closely the Color Analyzer (CA210) to the module less than 10cm distance, keep it with the surface of the Module and Color Analyzer's Probe vertically.(80~100°).
- Aging time
 - After aging start, keep the power on (no suspension of power supply) and heat-run over 15minutes.
 - Using 'no signal' or 'full white pattern' or the others, check the back light on.

- Auto adjustment Map(RS-232C)

RS-232C COMMAND
[CMD Format]
START 6E A 50 A LEN A 03 A CMD A 00 A VAL A CS A STOP
- LEN : Number of Data Byte to be send
- CMD : Command
- VAL : FOS Data
- CS : Checksum of sent Data
- A : Acknowledge
Ex) [Send : JA_00_DD] / [Ack : A_00_okDDX]

[CMD	ID	DATA]	
Wb	00	00	White Balance Start
Wb	00	ff	White Balance End

	RS-232C COMMAND [CMD ID DATA]			MIN	CENTER (DEFAULT)			MAX
	Cool	Mid	Warm		Cool	Mid	Warm	
R Gain	jd	Ja	jd	00	172	192	192	255
G Gain	jh	Jb	je	00	172	192	192	255
B Gain	ji	Jc	jf	00	192	192	172	255
R Cut					64	64	64	128
G Cut					64	64	64	128
B Cut					64	64	64	128

In the SET applied LED module, as to physical characteristics of LED Module, the sets takes a 120 minutes by aging time to stabilize a color coordinates. So White Balance Control equipments get the SET Aging Time from SET and then going to control the W/B by revise color coordinates in the each time

Cautions) The Time Table of color coordinates by SET Aging Time

	H/R Time (Min)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		269	273	285	293	313	329
1	~5	281	297	290	307	318	343
2	6~20	280	288	289	301	317	338
3	21~30	278	285	287	297	316	334
4	31~	276	283	285	293	313	329

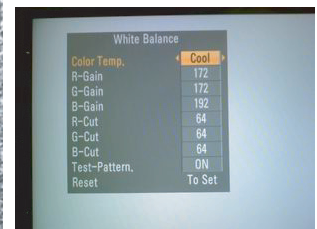
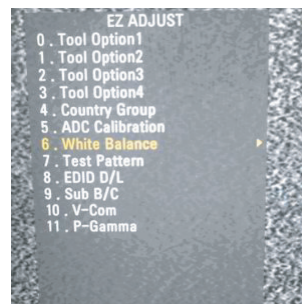
** Caution **

Color Temperature : COOL, Medium, Warm.

One of R Gain/ G Gain/ B Gain should be kept on 0xC0, and adjust other two lower than C0.
(when R/G/B Gain are all C0, it is the FULL Dynamic Range of Module)

- Manual W/B process using adjusts Remote control.

- Dynamic contrast : off
- Dynamic color : off
- OPC : off
- Energy saving mode : off
- After enter Service Mode by pushing "ADJ" key,
- Enter White Balance by pushing "▶" key at "3. White Balance".



- In the SET applied LED module, as to physical characteristics of LED Module, the sets takes a 120 minutes by aging time to stabilize a color coordinates. So White Balance Control equipments get the SET Aging Time from SET and then going to control the W/B by revise color coordinates in the each time

* Detail EDID Options are below

Product ID

Model Name	HEX	EDID Table	DDC Function
SL9**	0001	0100	Analog
	0000	0100	Digital

Serial No: Controlled on production line.

Month, Year: Controlled on production line:

ex) Monthly : '02' -> '02'

Year : '2009' -> '13'

Model Name(Hex):

MODEL	MODEL NAME(HEX)
42SL9000	00 00 00 FC 00 34 32 53 4C 39 30 30 30 2D 5A 41 0A 20
42SL9500	00 00 00 FC 00 34 37 53 4C 39 30 30 30 2D 5A 41 0A 20

Checksum: Changeable by total EDID data.

Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	67 03 0C 00 10 00 B8 2D
HDMI2	67 03 0C 00 20 00 B8 2D
HDMI3	67 03 0C 00 30 00 B8 2D
HDMI4	67 03 0C 00 40 00 B8 2D

4.5. Checking the function of Bluetooth

using adjusts Remote control

(1) Auto checking

- Auto checking is doing in "Power Only".
- Checking the result of searched(check that is in list or not).
- Go out of checking mode pushing button "Exit".

(2) Manual checking

- Push the button "Power Only" and "Exit".
- Push the button hot key "Bluetooth".
- Checking the result of searched(check that is in list or not).
- Go out of checking mode pushing button "Exit".



4.6. Outgoing condition Configuration

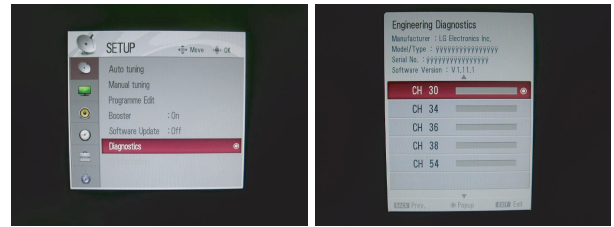
- When pressing "IN-STOP" key by Service remote control, Red LED are blinked alternatively. And then Automatically turn off. (Must not AC power OFF during blinking)

4.7. Internal pressure

Confirm whether is normal or not when between power board's ac block and GND is impacted on 1.5kV(dc) or 2.2kV(dc) for one second.

5. Serial number D/L

- Press "Power on" key of service remote control. (Baud rate : 115200 bps)
- Connect RS232 Signal Cable to RS-232 Jack.
- Write Serial number by use RS-232.
- Must check the serial number at the Diagnostics of SET UP menu. (Refer to below).



5.1. Signal TABLE

CMD	LENGTH	ADH	ADL	DATA_1	...	Data_n	CS	DELAY
-----	--------	-----	-----	--------	-----	--------	----	-------

CMD : A0h

LENGTH : 85~94h (1~16 bytes)

ADH : EEPROM Sub Address high (00~1F)

ADL : EEPROM Sub Address low (00~FF)

Data : Write data

CS : CMD + LENGTH + ADH + ADL + Data_1 + ... + Data_n

Delay : 20ms

5.2. Command Set

No.	Adjust mode	CMD(hex)	LENGTH(hex)	Description
1	EEPROM WRITE	A0h	84h+n	n-bytes Write (n = 1~16)

* Description

FOS Default write : <7mode data> write

Vtotal, V_Frequency, Sync_Polarity, Htotal, Hstart, Vstart, 0, Phase

Data write : Model Name and Serial Number write in EEPROM.

5.3. Method & notice

- Serial number D/L is using of scan equipment.
- Setting of scan equipment operated by Manufacturing Technology Group.
- Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download (Model Name and Serial Number)

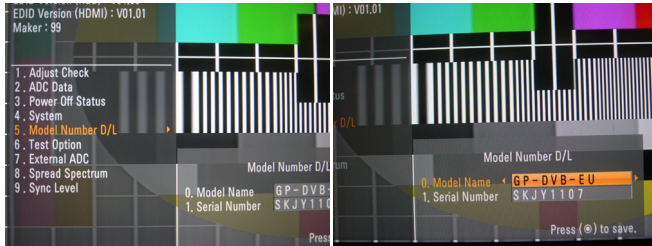
If the TV set is downloaded by OTA or Service man, sometimes model name or serial number is initialized.(Not always)

There is impossible to download by bar code scan, so It need Manual download.

1) Press the 'Instart' key of ADJ remote control.

2) Go to the menu '5.Model Number D/L' like below photo.

3) Input the Factory model name(ex 42LH4000-ZA) or Serial number like photo.



4) Check the model name Instart menu -> Factory name displayed (ex 42SL8000-ZB)

5) Check the Diagnostics (DTV country only) -> Buyer model displayed (ex 42SL8000-ZB)

