

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LCD TV with LD911 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 "I n-stop" key.

Case2 : Function check at the assembly line

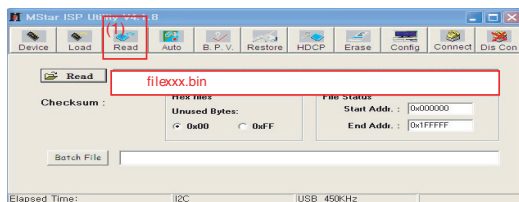
1. When TV set is entering on the assembly line, Push "In-stop" key at first.
2. Push "Power on" key for turning it on.
-> If you push "Power on" key, TV set will recover channel information by itself.
3. After function inspection, Push "In-stop" key.

3. Main PCB check process

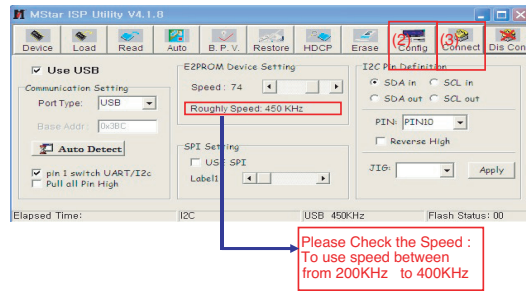
* APC - After Manual-Insult, executing APC

* Boot file Download

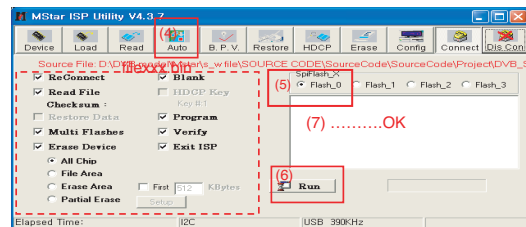
- 1) Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
- 2) Set as below, and then click "Auto Detect" and check "OK" message.
If "Error" is displayed, Check connection between computer, jig, and set.
- 3) Click "Read" tab, and then load download file (XXXX.bin) by clicking "Read".



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

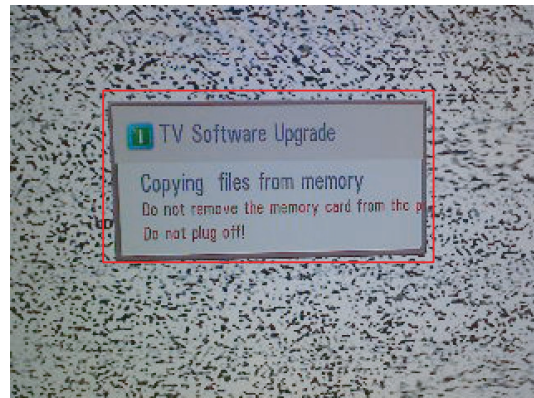


- 5) Click "Auto" tab and set as below
- 6) Click "Run".
- 7) After downloading, check "OK" message.

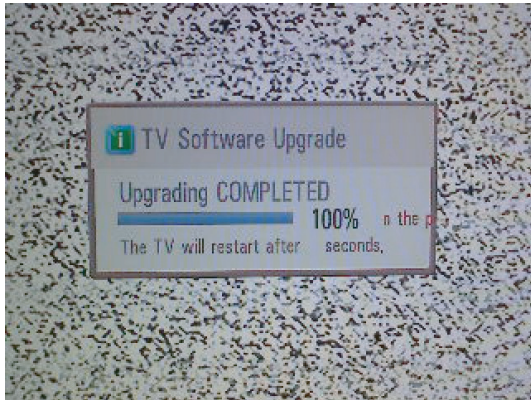
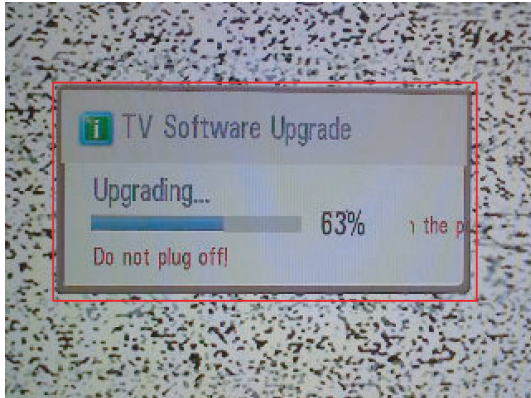


* USB DOWNLOAD

- 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.**

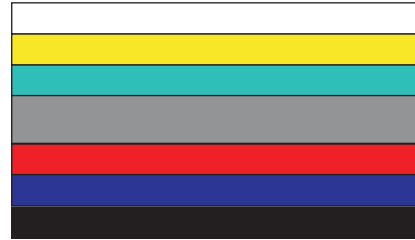
- 1) Push "IN-START" key in service remote controller
- 2) Select "Tool Option 1" and Push "OK" button.
- 3) Punch in the number. (Each model has their number)

Model	Tool option1	Tool option2	Tool option3	Tool option4
42LH9000	25411	3110	56742	20000

4) Completed selecting Tool option.

3.1. ADC Process

- (1) External ADC(Only adjust in the component mode 480i)
 - Input 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)



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

- (2) Internal ADC(Only adjust in the RGB mode)
 - 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

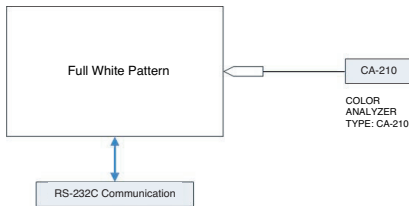
4.1. Adjustment Preparation

- 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	11,000k	°K	X=0.276(±0.002)	<Test Signal> Inner pattern (216gray,85IRE)
			Y=0.283(±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	jg	Ja		jd	00	172	
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
			276	283	285	293	313
1	~5	284	301	293	311	321	347
2	6~20	280	288	290	301	320	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

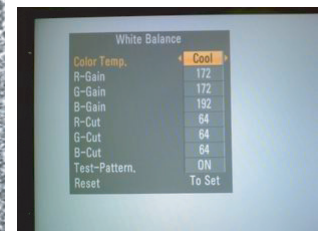
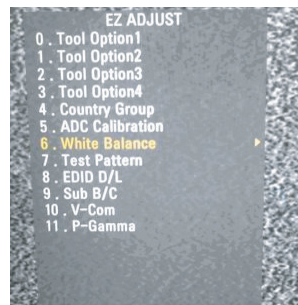
Dynamic color : off

OPC : off

Energy saving mode : off

- After enter Service Mode by pushing "ADJ" key,

- Enter White Balance by pushing "▶" key at "3. White Balance".



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* After done all adjustments, Press “In-start” button and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable.
If it is not same, then correct it same with BOM and unplug AC cable.
For correct it to the model’s module from factory JIG model.

* Push The “IN STOP” key after completing the function inspection.

4.2. DPM operation confirmation

(Only Apply for MNT Model)

Check if Power LED Color and Power Consumption operate as standard.

- Set Input to RGB and connect D-sub cable to set
- Measurement Condition: (100-240V@ 50/60Hz)
- Confirm DPM operation at the state of screen without Signal

4.3. DDC EDID Write (RGB 128Byte)

- Connect D-sub Signal Cable to D-sub Jack.
 - Write EDID Data to EEPROM(24C02) by using DDC2B protocol.
 - Check whether written EDID data is correct or not.
- * For SVC main Ass’y, EDID have to be downloaded to Insert Process in advance.

4.4. DDC EDID Write (HDMI 256Byte)

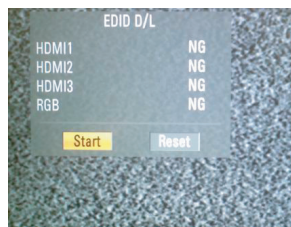
- Connect HDMI Signal Cable to HDMI Jack.
 - Write EDID Data to EEPROM(24C02) by using DDC2B protocol.
 - Check whether written EDID data is correct or not.
- * For SVC main Ass’y, EDID have to be downloaded to Insert Process in advance.

4.5. EDID DATA

- 1) All Data : HEXA Value
 - 2) Changeable Data
- *: Serial No : Controlled / Data:01
**: Month : Controlled / Data:00
***:Year : Controlled
****:Check sum

- Auto Download

- After enter Service Mode by pushing “ADJ” key,
- Enter EDID D/L mode.
- Enter “START” by pushing “OK” key.



* Edid data and Model option download (RS232)

Item	CMD1	CMD2	Data0	
Download 'Mode In'	A	A	0 0	When transfer the 'Mode In', Carry the command.
Download	A	E	00 10	Automatically Download (The use of a internal pattern)

<Caution>

- Never connect HDMI & D-sub Cable when the user downloading .
- Use the proper cables below for EDID Writing.

- Manual Download

* Caution

- 1) Use the proper signal cable for EDID Download
 - Analog EDID : Pin3 exists
 - Digital EDID : Pin3 exists
- 2) Never connect HDMI & D-sub Cable at the same time.
- 3) Use the proper cables below for EDID Writing.
- 4) Download HDMI1, HDMI2, separately because HDMI1 is different from HDMI2.



Item	Condition	Data(Hex)
Manufacturer ID	GSM	1E6D
Version	Digital : 1	01
Revision	Digital : 3	03

1) ANALOG DATA 128Byte (2Bi)

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D						
0x01			01	03	68	73	41	78	0A	CF	74	A3	57	4C	B0	23
0x02	09	48	4C	A1	08	00	81	80	61	40	45	40	31	40	01	01
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	7E	8A	42	00	00	1E	01	1D	00	72	51	D0	1E	20
0x05	6E	28	55	00	7E	8A	42	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20					
0x07															00	

2) DIGITAL DATA(HDMI-1/2/3/4) 256Byte

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D						
0x01			01	03	80	73	41	78	0A	CF	74	A3	57	4C	B0	23
0x02	09	48	4C	A1	08	00	81	80	61	40	45	40	31	40	01	01
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	7E	8A	42	00	00	1E	01	1D	00	72	51	D0	1E	20
0x05	6E	28	55	00	7E	8A	42	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20					
0x07															01	
0x00	02	03	26	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
0x01	22	15	01	26	15	07	50	09	57	07						
0x02			E3	05	03	01	01	1D	80	18	71	1C	16	20	58	2C
0x03	25	00	7E	8A	42	00	00	9E	01	1D	00	80	51	D0	0C	20
0x04	40	80	35	00	7E	8A	42	00	00	1E	02	3A	80	18	71	38
0x05	2D	40	58	2C	45	00	7E	8A	42	00	00	1E	66	21	50	B0
0x06	51	00	1B	30	40	70	36	00	7E	8A	42	00	00	1E	00	00
0x07	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

* Detail EDID Options are below
Product ID

Model Name	HEX	EDID Table	DDC Function
FHD Model	0001	01 00	Analog/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)
42LH9000	00 00 00 FC 00 34 32 4C 48 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

4.6. Checking the function of Bluetooth

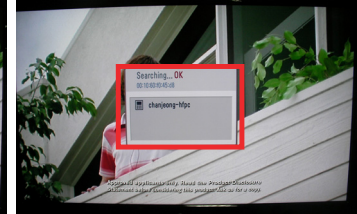
using adjusts Remote control

(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".



4.7. Checking the function of Local Dimming

(using adjusts Remote control)

- Dimming checking is doing in "Power Only".
- Enter the signal of component. (Pattern : 7(combination), Time : 225 (1920 *1080))
- Push the button "Tilt".
- Checking the function of Dimming refer to the picture at below.
- Push the button "Exit".

4.8. Outgoing condition Configuration

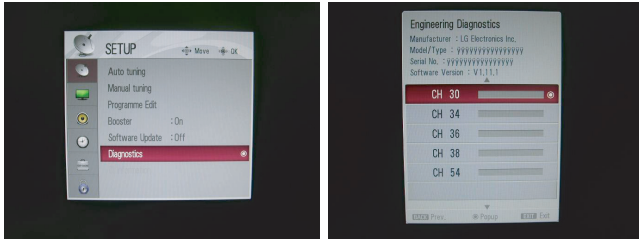
- When pressing "IN-STOP" key by Service remote control, Red LED are blinked alternatively. And then Automatically turn off. (Must not AC power OFF during blinking)

4.7. Internal pressure

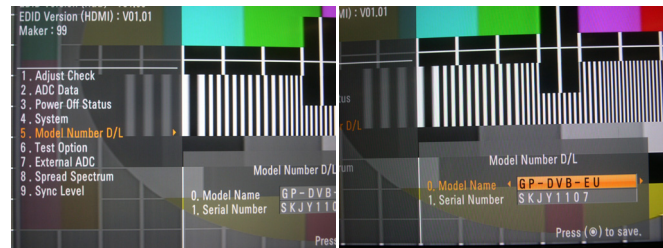
- Confirm whether is normal or not when between power board's ac block and GND is impacted on 1.5kV(dc) or 2.2kV(dc) for one second.

5. Model name&Serial number D/L

- press "Power on" key of service remocon.
(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).



- * 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 controller.
 - 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.



5.1. Signal TABLE

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

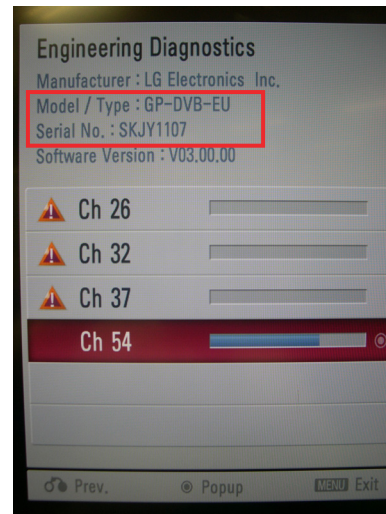
CMD : A0h
 LENGTH : 85~94h (1~16 bytes)
 ADH : EEPROM Sub Address high (00~1F)
 ADL : EEPROM Sub Address low (00~FF)
 Data : Write data
 CS : CMD + LENGTH + ADH + ADL + Data_1 + ... + Data_n
 Delay : 20ms

- 4) Check the model name Instart menu -> Factory name displayed (ex 42LH4000-ZA)
- 5) Check the Diagnostics (DTV country only) -> Buyer model displayed (ex 42LH4000)

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

- A. Serial number D/L is using of scan equipment.
- B. Setting of scan equipment operated by Manufacturing Technology Group.
- C. 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.