# ADJUSTMENT INSTRUCTION

## 1. Application Range

This spec. sheet is applied to all of the PP81C Chassis.

## 2. Specification

(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.

(2) Adjustment must be done in the correct order.

(3) The adjustment must be performed in the circumstance of 25±5$c$C of temperature and 65±10% of relative humidity if there is no specific designation.

(4) The input voltage of the receiver must keep 100~240V, 50/60Hz.

(5) Before adjustment, execute Heat-Run for 30 minutes at RF no signal.

## 3. ADC calibration

| | Component | RGB |
|---|---|---|
| MSPG-925FA | Model : 216 (720P@60Hz) | Model : 60 (1024X768@60Hz) |

## 3-1. PC input ADC

### (1) Auto RGB Gain/Offset Adjustment

1) Convert to PC in Input-source

2) Signal equipment displays
   Output Voltage : 700 mVp-p
   Impress Resolution XGA (1024 x 768 @ 60Hz)
   Model : 60   in Pattern Generator
    (1024 x 768 @ 60Hz Black and White Pattern)
   Pattern : 54   in Pattern Generator (MSPG-925 SERISE)
   [1/2 Black & White Pattern (Refer below picture)].



<Fig. 1> Adjustment pattern(RGB PC)

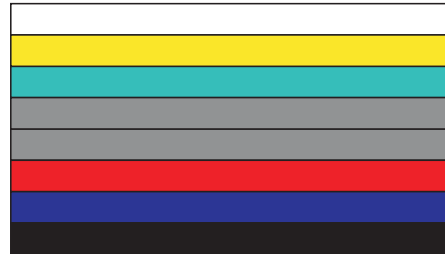3) Adjust by commanding AUTO_COLOR_ADJUST(0xF1) 0x00 0x02 instruction.

### (2) Confirmation

1) We confirm whether "0xF1(offset), 0xF2(gain)" address of EEPROM "0xBC" is "0xAA" or not.

2) If "0xF1", "0xF2" address of EEPROM "0xBC" isn't "0xAA", we adjust once more

3) We can confirm the ADC values from "0x00~0x05" addresses in a page "0xBC"

[ Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "Auto-RGB" by pushing "G" key at "Auto-RGB".

## 3-2. COMPONENT input ADC

### (1) Component Gain/Offset Adjustment

1) Convert to Component in Input-source

2) Signal equipment displays
   Impress Resolution  720P
   MODEL : 217   in Pattern Generator(720P/60Hz 100% Color Bar Mode)
   PATTERN : 65  in Pattern Generator( MSPG-925 SERISE)



Adjustment pattern (COMPONENT)

3) Adjust by commanding AUTO_COLOR_ADJUST(0xF1) 0x00 0x02 instruction

### (2) Confirmation

1) We confirm whether "0xF3(offset), 0xF4(gain)" address of EEPROM "0xBC" is "0xAA" or not.

2) If "0xF3", "0xF4" address of EEPROM "0xBC" isn't "0xAA", we adjust once more

3) We can confirm the ADC values from "0x06~0x0B" addresses in a page "0xBC"

[ Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "Auto-RGB" by pushing "G" key at "Auto-RGB".

# 4. PCB Assembly Adjustment Items

## 4-1. Option Adjustment Following BOM

Tool Option1
Tool Option2
Area Option



PP81A PDP P50WXGA
Version          X.XX
USB          Version
X.XX
UTT          XX
Tool Option1      7
Tool Option2      161
Area Option      16

<Fig. 2>

* Profile: Must be changed the option value because being different with some setting value depend on module, inch and market
* Equipment : Adjustment Remote Controller

(1) Push the IN-START key in the Adjust R/C.
(2) Input the Option Number that was specified in the BOM, into the Shipping area.
(3) Select "Tool Option1/ Tool Option2/ Area Option" by using D/E (CH+/-) key, and press the number key(0~9) consecutively
   ex) If the value of Tool Option1 is 7, input the data using number key "7" (Fig. 2)

   Caution: Don't Push "IN-STOP" key after PCB assembly adjustment.

(4) Adjustment method
   Before PCBA check, have to change the Tool option and Area option

[ About PDP
   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 Change "RF mode" and 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°Øs module from factory JIG model.

[ Don't push The IN-STOP KEY after completing the function inspection.

# 5. S/W Program Download

## 5-1. Profile

This is for downloading the s/w to the flash memory of the IC803

## 5-2. Equipment

(1) PC
(2) ISP_tool program
(3) Download jig

## 5-3. Connection Structure
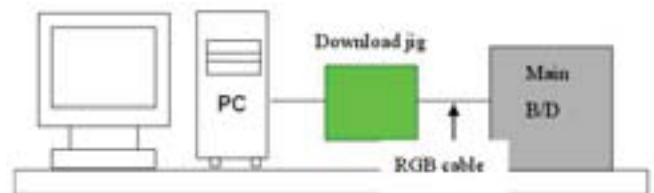


## 5-4. Connection Condition

(1) IC name and circuit number : Flash Memory and IC803
(2) Use voltage : 3.3V (5 pin)
(3) SCL : 15 pin
(4) SDA : 12 pin
(5) Tact time : about 2min and 30seconds

# 6. Download Method (PCB Ass'y)

## 6-1. Preliminary Steps

- HD
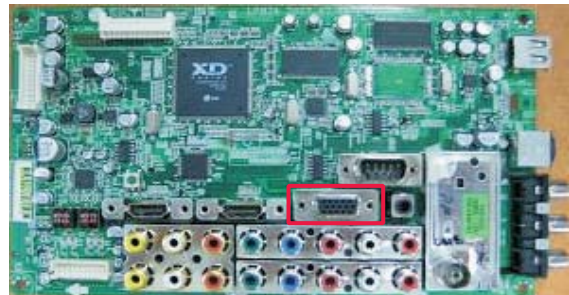


- FHD

(1) Connect the download jig to D-sub jack



(2) Connect the PC to USB jack

## 6-2. Download Steps

(1) Execute 'ISP Tool' program in PC, then a main window will be opened

Double click



(2) Click the connect button and confirm "Dialog Box".



(3) Click the config button and change speed
   E2PROM Device setting: over the 350Khz



(4) Read and write bin file
   Click "(1)Read" tab, and then load download file(XXXX.bin) by clicking "Read".



(5) Click "Auto(2)" tab and set as below
(6) Click "Run(3)".
(7) After downloading, check "OK(4)" message.



[ Notice : From this sentence, All working is mass production.

# 7. EDID(The Extended Display Identification Data) / DDC (Display Data Channel) Download

[ Caution
- Use the proper signal cable for EDID Download
- Never connect HDMI & D-SUB Cable at the same time.
- Use the proper cables below for EDID Writing

## 7-1. Profile: To be possible for plug and play

## 7-2. Equipment
(1) Adjusting PC with S/W for writing EDID Data.(S/W: EDID TESTER Ver.2.5)
(2) A Jig for EDID Download
(3) Cable : Serial(9Pin or USB) to D-sub 15Pin cable, D-sub 15Pin cable, DVI to HDMI cable.



## 7-3. Connection Structure



<Fig. 3> Connection Diagram of DDC Download

**Caution:** Never connect HDMI & D-SUB Cable at the same time.

## 7-4. EDID Data

| NO | Item | Condition | 16-진 Data |
|----|------|-----------|-----------|
| 1 | Manufacturer ID | OSM | 1E6D |
| 2 | Version | Digital : 1 | 01 |
| 3 | Revision | Digital : 3 | 03 |

o XGA/WXGA/Full HD EDID DATA
  <Analog : 128bytes>



<HDMI 1 : 256bytes>



<HDMI 2 : 256bytes>



<HDMI 3 : 256bytes>

o Detail EDID Options are below (ⓐ, ⓑ, ⓒ, ⓓ, ⓔ)

ⓐ Product ID

| Model Name | Product ID | | |
|---|---|---|---|
| | SET | +Etc | EDID table |
| 32HS/0FX-HB | N0133(H) | C387 | 97C3 |
| | S2S34(D) | C388 | 98C3 |
| | N0184(D) | C38E | 98C3 |
| 50FG/0FX-HB | N0130(A) | C386 | 98C3 |
| | N0185(D) | C384 | 94C3 |

ⓑ Serial No
=> Controlled on production line

ⓒ Month, Year
=> Controlled on production line:
   ex) Monthly: '11' -> '0B'
        Year: '2007' -> '11'

ⓓ Model Name(Hex)

| MODEL NAME | Model Name(HEX) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 태우 TV | 00 | 00 | FE | 00 | 4C | 47 | 54 | 56 | 04 | 20 | 20 | 20 | 00 | 00 | 00 | 00 |

ⓔ Checksum
=> Changeable by total EDID data

1) Analog(128Byte)

| (HEX) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50/60inch Model | 18 | 21 | 80 | 40 | 51 | 00 | 18 | 30 | 40 | 80 | 35 | 00 | 8C | 00 | 21 | 00 | 1C |
| 42inch Model | 84 | 19 | 00 | 30 | 41 | 00 | 18 | 30 | 40 | 34 | 00 | 8C | 00 | 21 | 00 | 00 | 1C |
| FULL HD Model | 1A | 36 | 80 | A0 | 70 | 38 | 1F | 40 | 30 | 20 | 25 | 00 | 00 | 44 | 21 | 00 | 1A |

| (HEX) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50/60inch Model | 00 | 1F | 00 | 80 | 51 | 00 | 1E | 30 | 40 | 80 | 37 | 00 | 8C | 00 | 21 | 00 | 18 |
| 42inch Model | 40 | 3F | 20 | 00 | 31 | 58 | 1C | 20 | 28 | 80 | 11 | 00 | 8C | 00 | 00 | 00 | 18 |
| FULL HD Model | 18 | 21 | 80 | A0 | 51 | 00 | 1E | 30 | 40 | 80 | 35 | 00 | 8C | 00 | 21 | 00 | 1C |

2) HDMI 1/2/3(256Byte)

| (HEX) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50/60inch Model | 18 | 21 | 80 | 40 | 51 | 00 | 18 | 30 | 40 | 80 | 35 | 00 | 8C | 00 | 21 | 00 | 1C |
| 42inch Model | 40 | 3F | 20 | 00 | 31 | 58 | 1C | 20 | 28 | 80 | 11 | 00 | 8C | 00 | 00 | 00 | 18 |
| FULL HD Model | F1 | 00 | 00 | 18 | 71 | 38 | 2D | 40 | 58 | 2C | 45 | 00 | C4 | 08 | 21 | 00 | 18 |

A

| | (HEX) | |
|---|---|---|
| FULL HD Model | 81 | 80 |
| XGA / WXGA | 01 | 01 |

B

| | (HEX) | |
|---|---|---|
| FULL HD Model | D1 | C0 |
| XGA / WXGA | 01 | 01 |

## 7-5. Preparation for Adjustment

(1) As above Fig. 3, Connect the Set, EDID Download Jig,, PC & Cable
(2) Turn on the PC & EDID Download Jig. And Execute the S/W : EDID TESTER Ver.2.5
(3) Set up the S/W option
   Repeat Number : 5
   Device Address : A0
   PageByte : 8



(4) Power on the Set

1) Sequence of Adjustment

1. DDC data of Analog-RGB
   (1) Init the data



(2) Load the EDID data.(Open File).



[ Analog – RGB : FP91A_RGB.ANA ]
[ Digital – HDMI1 : FP91A_HDMI1 DVI ]
[ Digital – HDMI2 : FP91A_HDMI2 DVI ]
[ Digital – HDMI3 : FP91A_HDMI3 DVI ]

(3) Set the S/W as below.

(4) Push the "Write Data & Verify" button. And confirm "Yes".



(5) If the writing is finished, you will see the "OK" message.



# 8. HDCP(High-Bandwidth Digital Contents Protection)

[ Confirmation

Before HDCP Download, you have to Set the Configuration that CMD delay.
-> Configuration -> Option-> I2C delay(Write Byte : 0.5 ms, Read Byte : 0.5ms, Read CMD Byte : 0.5ms)


(1) Connect D-sub Signal Cable to D-Sub Jack
(2) Input HDCP key with HDCP-key- in-program
(3) HDCP Key value is stored on Main M-STAR IC(LGE6891DD) which is 0x80~0x90 addresses of 0x00~0x01 page(EEPROM MAP PAGE0~PAGE1 / START :A080)
(4) AC off/on and on HDCP button of MSPG925 and confirm whether picture is displayed or not of using MSPG925
(5) HDCP Key value is different among the sets

# 9. Adjustment of White Balance

## 9-1. Purpose and Principle for Adjustment of the Color Temperature

(1) Purpose: Adjust the color temperature to reduce the deviation of the module color temperature.
(2) Principle : To adjust the white balance without the saturation, Fix the one of R/G/B gain to C0 and decrease the others.
(3) Adjustment mode: Two modes of Cool and Warm
(Cool data is automatically calibrated by the Medium data)

## 9-2. Required Equipment

(1) Remote controller for adjustment
(2) Color Analyzer : CA-100+ or CA-210 or same product
- PLASMA TV(ch : 10)

(3) Auto W/B adjustment instrument(only for Auto adjustment)
- Do the white balance adjustment under the 10LUX

[ Notice: When using the Color Analyzer with PDP, recommend the CA-100 more than CA-210.
If CA-100 can not available, it is also good to use the CA-210.

(4) PC (for communication through RGB)
(5) Pattern Generator (MSPG-925FA etc.)
-Before white balance, press the ADJ key 2times and do the reset like Fig. 4
-To enter White-balance mode, press the ADJ key 2times.

[ Caution: System control Host should be "DDC" for adjustment.

### White Balance

| CSM | | Cool |
|---|---|---|
| Red | Gain. | C0 |
| Green | Gain. | C0 |
| Blue | Gain. | C0 |
| Red | Offset | 80 |
| Green | Offset | 80 |
| Blue | Offset | 80 |
| Reset | | ► To set |

<Fig. 4>

## 9-3. Connecting Diagram of Equipment for Measuring (For Automatic Adjustment)
(method 1, using IIC, You connect RGB Cable)
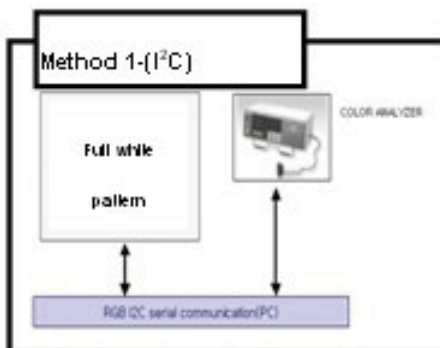


Method 1-(I²C)

Full white pattern

COLOR ANALYZER

RGB I2C serial communication(PC)

(1) Enter the adjustment mode of the white balance
- Enter the white balance adjustment mode at the same time heat-run mode when pushing the power on by power only key
- Maintain the white balance adjustment mode with same condition of Heat-run
- Maintain after AC off/on in status of Heat-run pattern display

(2) Release the white balance adjustment mode
- Release the adjust mode after AC off/on or std-by off/on in status of finishing the Hear-run mode
- push the "power on" key(IIC Mode) on Adjust remote-controller.
- Release the Adjust mode when receiving the aging off command(F3 00 00) from adjustment equipment)

(3) Enter the adjust mode of white balance
- Enter the white balance adjustment mode with aging command(F3, 00, FF)

o Color Temperature & Color Coordinates Setting
- When adjusting the Color Temperature, Color Analyzer CA-210(Matrix should be corrected through CH10 of CS-1000) should be used. When CA-210 have used, it don't need to fit the CH10.
- Adjust the Color Temperature based below adjustment color coordinates.

o Target Value CA-210(LCD : CH 9, PDP : CH10), CA-100(PDP)
(Standard color coordinate and temperature when using the CA-100+ or CA210 equipment)

| Mode | Color coordinate | | Temp | △uv |
|---|---|---|---|---|
| | X | Y | | |
| Medium | 0.285±0.002 | 0.293±0.002 | 9,300k | +0.000 |
| Warm | 0.313±0.002 | 0.329±0.002 | 6,500k | +0.003 |

o Synchronization relation between PSM and CSM

| PSM | CSM |
|---|---|
| Vivid | Cool |
| Mild | Warm |

o DDC Adjustment Command Set

| No. | Adjustment content | CMD(HEX) | ADR | VALUE | detail |
|---|---|---|---|---|---|
| 1 | Aging On/Off | F3 | 00 | FF/00 | 00 : OFF<br>01 : ON<br>FF : WB Ready |
| 2 | Input select | F4 | 00 | | 0x10 : TV<br>0x20 : AV1<br>0x21 : AV2<br>0x23 : AV3<br>0x40 : Component1<br>0x41 : Component2<br>0x60 : RGB PC<br>0x90 : HDMI1<br>0x91 : HDMI2<br>0x92 : HDMI3 |
| 3 | R GAIN | 16 | 00 | 00 - FE | Gain Adjustment |
| 4 | G GAIN | 18 | | 00 - FE | CSM COOL |
| 5 | B GAIN | 1A | | 00 -FE | |
| 6 | R GAIN | 16 | 01 | 00 - FE | Gain Adjustment |
| | G GAIN | 18 | | 00 - FE | CSM MEDIUM |
| | B GAIN | 1A | | 00 -FE | |
| | R GAIN | 16 | 02 | 00 - FE | Gain Adjustment |
| | G GAIN | 18 | | 00 - FE | CSM WARM |
| | B GAIN | 1A | | 00 -FE | |
| | CSM mode | F2 | 00 | 00 | COOL |
| | | | | 01 | MEDIUM |
| | | | | 02 | WARM |
| | EEPROM Read | E7 | 00 | 00 | EEPROM read |
| | EEPROM Write | E8 | 00 | data | EEPROM write |

[ R/G/B GAIN max value : C0

# 9-4. Connecting Diagram of Equipment for Measuring (For Automatic Adjustment)
(method2, using RS-232C, You connect RS-232C Cable)
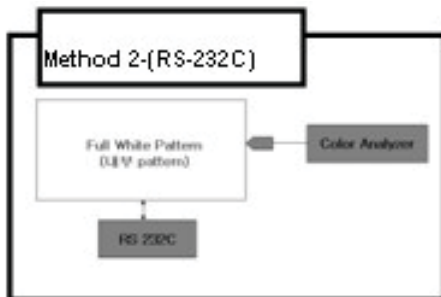


(1) Enter the adjustment mode of the white balance
- Enter the white balance adjustment mode at the same time heat-run mode when pushing the power on by power only key

- Maintain the white balance adjustment mode with same condition of Heat-run
- Maintain after AC off/on in status of Heat-run pattern display

(2) Release the white balance adjustment mode
- Release the adjust mode after AC off/on or std-by off/on in status of finishing the Hear-run mode
- push the "Tilt" key (RS-232C Mode) on Adjust remote-controller.
- Release the Adjust mode when receiving the aging off command(F3 00 00) from adjustment equipment)

(3) Enter the adjust mode of white balance
- you need push "tilt" key on Adjust remote-controller.
- Enter the white balance adjustment mode with aging command(F3, 00, FF)

## 9-5. Adjustment of White Balance for Manual Adjustment (method 3)

Adjustment mode: Two modes of Medium(Vivid) and Warm
(Cool data is automatically calibrated by the Medium data)

- Equipment : 1) Color analyzer(CA100+, CA210) should be used in the calibrated ch by CS-1000(.(LCD : CH9, PDP : CH10)
 2) Adjustment remocon

- For manual adjustment, it is also possible by the following sequence.
 Operate the zero-calibration of the CA-100+ or CA-210, then stick sensor to the module when adjusting.

(1) Select white pattern of heat-run by pressing "POWER ON" key on remote control for adjustment then operate heat run longer than 15 minutes. (recommend)
 (If not executed this step, the condition for W/B will be different)
(2) Changing to the AV mode by remote control.(Push front-AV)
(3) Input external pattern(85% white pattern).
(4) Stick sensor to center of the screen and select each items (Red/Green/Blue Gain and Offset) using D/E (CH +/-) key on R/C..
(5) Adjust R/ G/B Gain using F /G(VOL +/-) key on R/C.
(6) Adjust two modes of Medium(Vivid) and Warm as below figure.
 (Fix the one of R/G/B and change the others)
 1) Default : Medium(Vivid)
 2) Push the "VOL +" key twice : Warm

| Mode | Color coordinate | | Temp | △uv |
|---|---|---|---|---|
| | X | Y | | |
| Medium | 0.285±0.002 | 0.293±0.002 | 9,300k | +0.000 |
| Warm | 0.313±0.002 | 0.329±0.002 | 6,500k | +0.003 |

[ Refer to the below case to know what value is fixed.

[CASE]
First adjust the coordinate much away from the target value(x, y).
1. x, y > target
 1) Decrease the R, G.

2. x, y < target
 1) First decrease the B gain,
 2) Decrease the one of the others.
 - In case of decreasing the x, decreasing the R : fix G
 - In case of decreasing the y , decreasing the G : fix R

3. x > target , y < target
 1) First decrease B, so make y a little more than the target.
 2) Adjust x value by decreasing the R

4. x < target , y > target
 1) First decrease B, so make x a little more than the target.
 2) Adjust x value by decreasing the G

(7) When adjustment is completed, Exit adjustment mode using EXIT key on R/C.

Caution: Each PCB assembly must be checked by check JIG set.
 (Because power PCB Assembly damages to PDP Module, especially be careful)

# 10. POWER PCB Assy Voltage Adjustment (Va, Vs voltage Adjustment)

## 10-1. Test Equipment: D.M.M 1EA

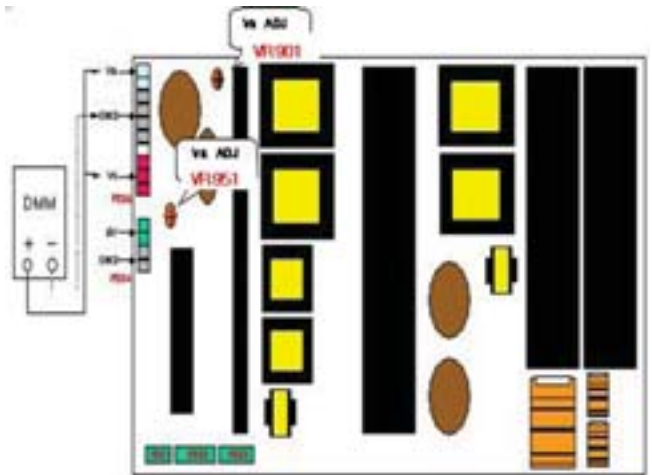## 10-2. Connection Diagram for Measuring
Refer to Fig. 5

## 10-3. Adjustment Method

### (1) Va Adjustment
1) After receiving 100% Full White Pattern, HEAT RUN.
2) Connect + terminal of D. M..M. to Va pin of P812, connect -terminal to GND pin of P812.
3) After turning VR901,voltage of D.M.M adjustment as same as Va voltage which on label of panel right/top (deviation; ±0.5V)

### (2) Vs Adjustment
1) Connect + terminal of D. M..M. to Vs pin of P812, connect -terminal to GND pin of P812.
2) After turning VR951 401, voltage of D.M.M adjustment as same as Vs voltage which on label of panel right/top ( deviation ; ±0.5V)


<Fig. 7> Connection Diagram of Power Adjustment for Measuring