LCD TV

Tanzanite

TRAINING MANUAL

Agenda

SAMSUNG Electronics

SAMSUNG DIGITall
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UNDERSTANDING OF LCD TV

CONTENTS

I.   LCD TV advantage

II.   Basic theory of LCD PANEL

III.   Basic block of LCD TV

IV.   Basic block of main PBA

V.   What is scaler?

VI.   TV signal types

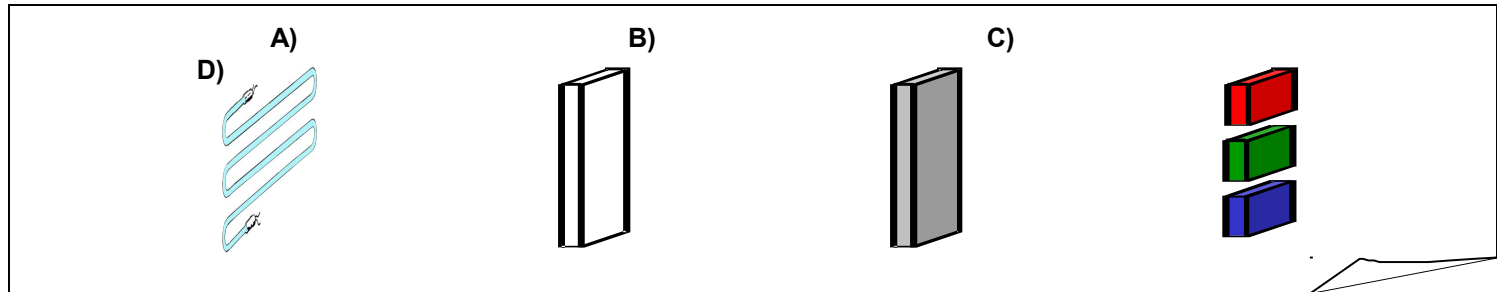VII.   TV connector types

LCD TV Advantage

- High Sharpness, Resolution

- Thin and Light (40 Inch is 5cm thickness)

- Low Power Consumption

- Real HDTV

- Long Life

Basic Theory Of LCD PANEL

A) Lamp Make Light

B) TFT Adjust LCD Array

C) LCD Array can Adjust Light amount (Like Camera Iris)
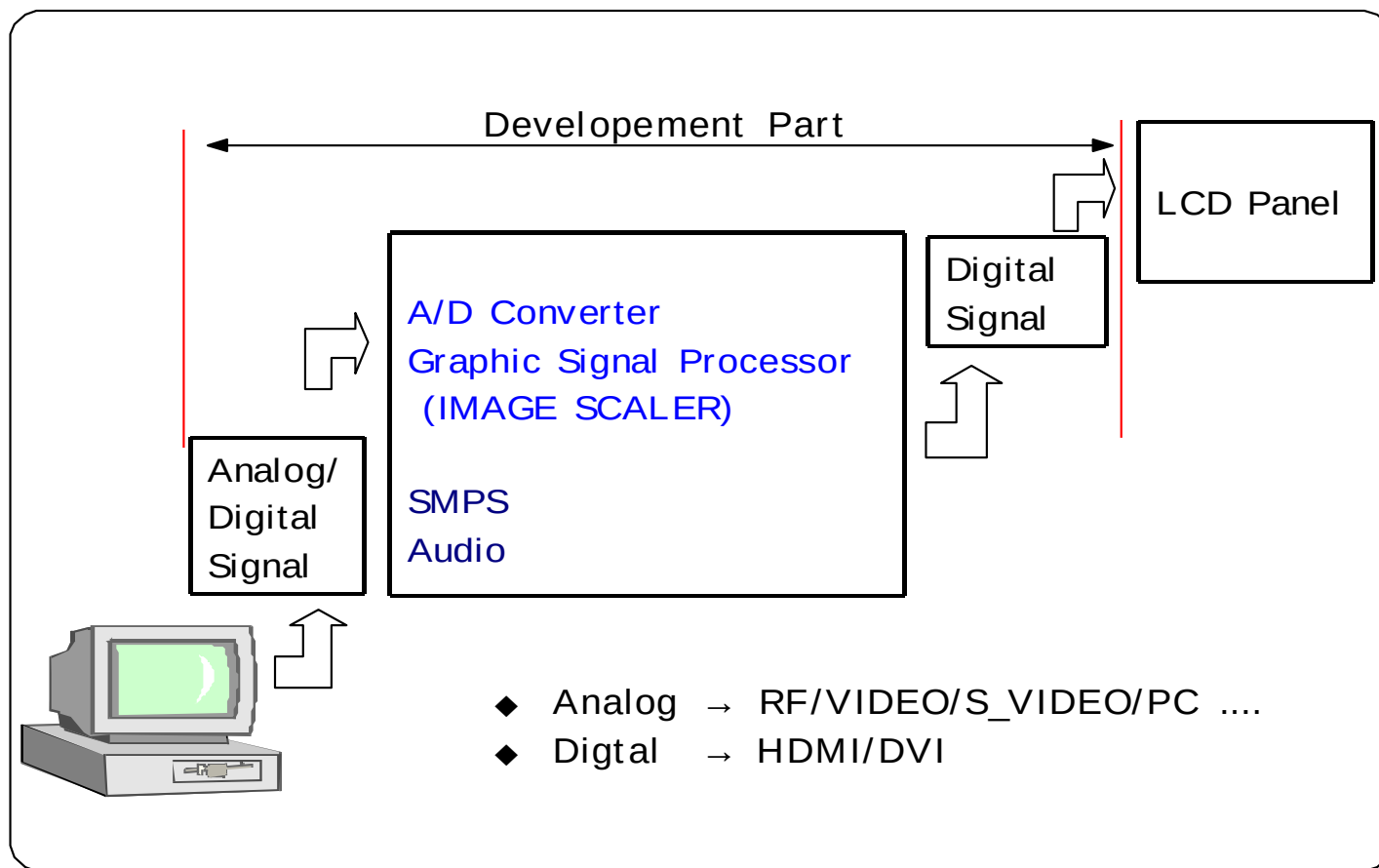
D) Color Filter Make RGB Color

A) Back Light   B) TFT   C) LCD   D) Color Filter
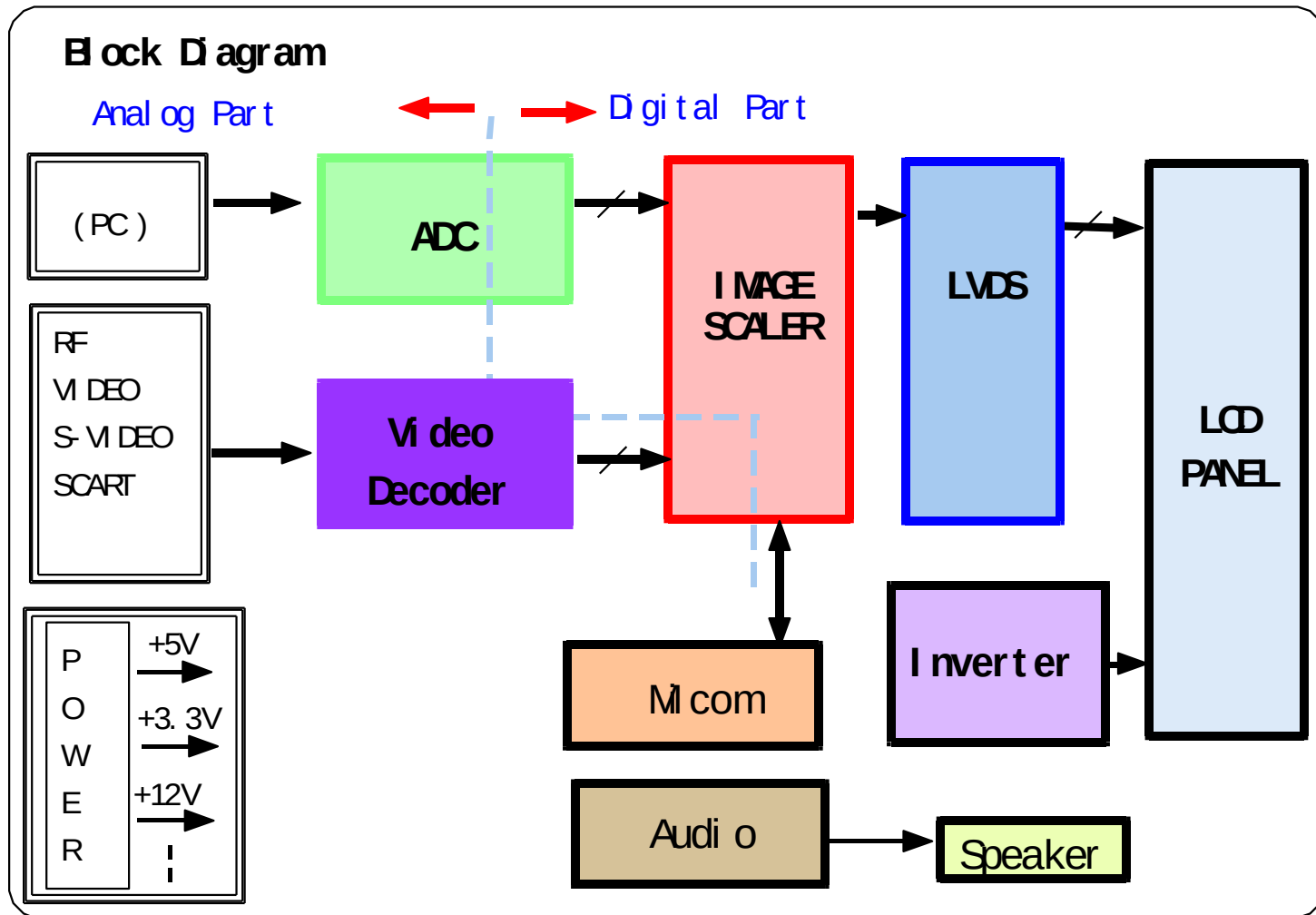
Basic Block of LCD TV

Developement Part

LCD Panel

Digital Signal

A/D Converter
Graphic Signal Processor
 (IMAGE SCALER)

SMPS
Audio

Analog/
Digital
Signal

◆ Analog → RF/VIDEO/S_VIDEO/PC ....
◆ Digtal   → HDMI/DVI

Basic Block of Main PBA

Block Diagram

Analog Part ← → Digital Part

(PC) → **ADC** → **IMAGE SCALER** → **LVDS** → **LCD PANEL**

RF
VIDEO
S-VIDEO
SCART
→ **Video Decoder** → **IMAGE SCALER**

POWER
+5V
+3.3V
+12V

IMAGE SCALER ↕ **Micom**

Inverter → **LCD PANEL**

Audio → **Speaker**

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What is SCALER?

- CRT can display any resolution picture without conversion
  but LCD and PDP can do only with scaler
- Accepting input images from multiple sources and displaying
  them on any flat panel display
- Scaler is most important IC in flat panel display
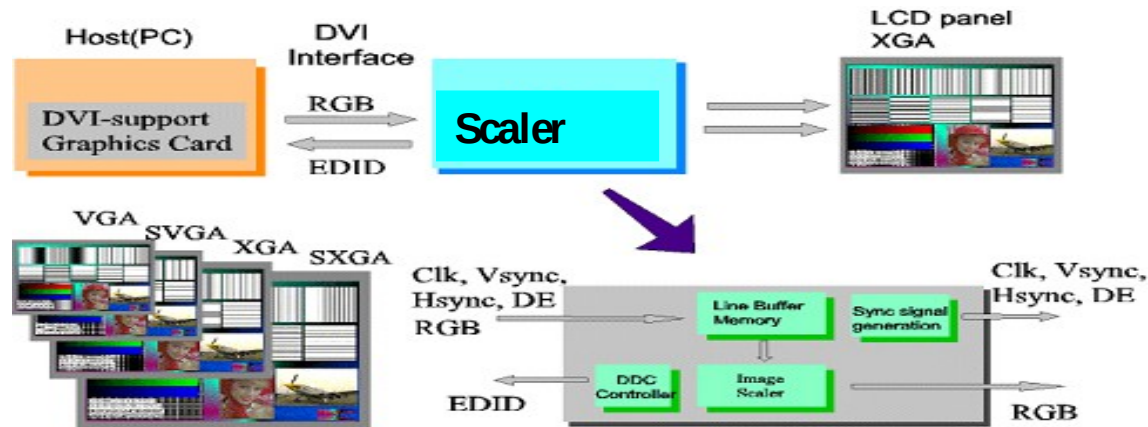
Signal types

1. RF(Radio Frequency)
   - 50~900Mz Frequency Domain
   - Composite signal+sound signal
2. CVBS(Usually AV)
   - Composite video and sound signal
3. Super VHS
   - Separate Y and C from composite signal
4. RGB
   - Usually use PC, 15pin D-sub
5. Analog Component (Y,Pb,Pr)
   - Usually Component
6. Digital Component(Y,Cb,Cr)
7. DVI(Digital Visual Interface)
   - Standard from DDWG(Digital Display Working Group)
   - TMDS(Transition Minimized Differential Signaling Signal)
8. HDMI(High Definition Multimedia Interface)
   - DVI+Digital Sound

TV signal connector types

Composite

S-Video

Component

HDMI

HDMI Cable
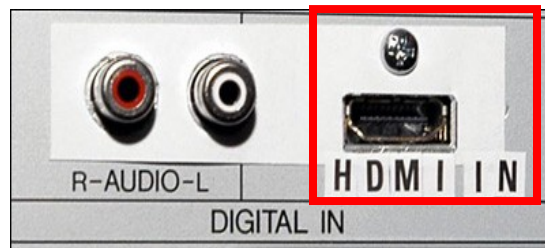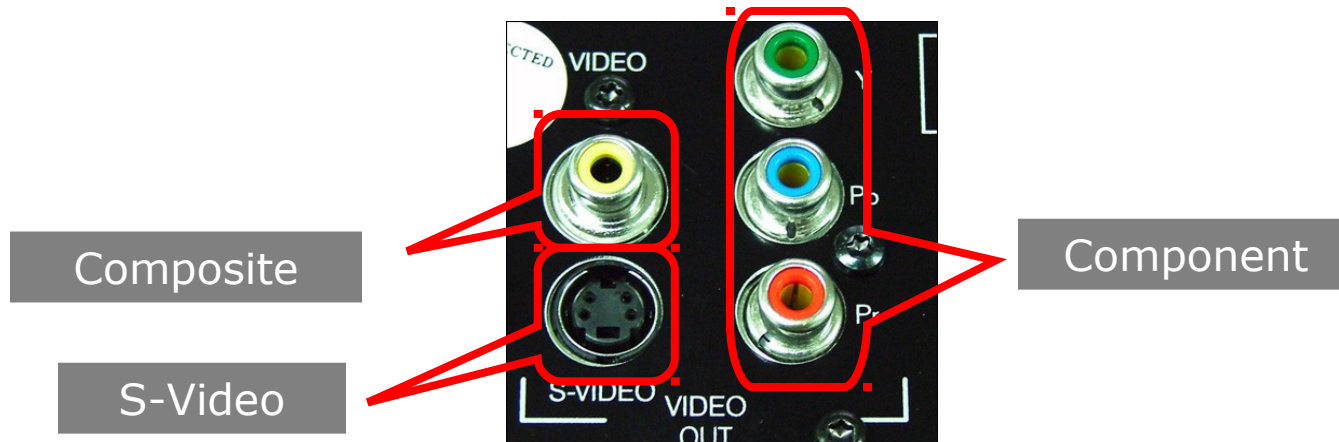
Inside of
Tanzanite Model

CONTENTS

Introduction

- Best Picture Quality

- Simple Function, New Design

- Acceptable Price

- Support HDMI

- Some Functions

Items	Tanzanite	
Model Name	LE32A**	
General	Size (W*D*H) w/o Stand	797*79*531 (mm)
	Display area	697.68(H) x 392.26(V)
	Weight with Stand	14kg
	Panel Resolution	1366*768
	A/V	2 Scarts in back, 1 Side AV
	S-Video	1 Side S-VHS
	component	1 component in back 480i/p,/576i/p,720p,1080i
	PC	1 Dsub in back
	HDMI	2 HDMI in back, 1 Side HDMI
	Tuner	1 RF DTV tuner
	Sound Output	16 ohm, 10W
	PIP	X
	Sound option	SRS TruSurround XT
	DNIe	O
	Headphone	O
	Response time	<8ms
	Luminance [cd/m2, typical]	450
	C/R [typical]	2000
	Anynet	O
	View Angle(H/V)	178/178
	Power Supply	AC 110~240V,60/50Hz
	Power Consumption	180W
	Color System	PAL/SECAM/NT4.43
	Sound System	BG,DK,I,L

Items		Tanzanite	
Model Name		LE37A**	LE40A**
General	Size (W*D*H) w/o Stand	916*87*595 (mm)	971*87*628 (mm)
	Display area	819.6(H) x 460.8(V)	885.2(H) x 497.7(V)
	Weight with Stand	19kg	20.7kg
	Panel Resolution	1366*768	1366*768
	A/V	2 Scarts in back, 1 Side AV	2 Scarts in back, 1 Side AV
	S-Video	1 Side S-VHS	1 Side S-VHS
	component	1 component in back 480i/p,/576i/p,720p,1080i	1 component in back 480i/p,/576i/p,720p,1080i
	PC	1 Dsub in back	1 Dsub in back
	HDMI	2 HDMI in back, 1 Side HDMI	2 HDMI in back, 1 Side HDMI
	Tuner	1 RF DTV tuner	1 RF DTV tuner
	Sound Output	16 ohm, 10W	16 ohm, 10W
	PIP	X	X
	Sound option	SRS TruSurround XT	SRS TruSurround XT
	DNIe	O	O
	Headphone	O	O
	Response time	<8ms	<8ms
	Luminance [cd/m2, typical]	450	450
	C/R [typical]	2000	2000
	Anynet	O	O
	View Angle(H/V)	178/178	178/178
	Power Supply	AC 110~240V,60/50Hz	AC 110~240V,60/50Hz
	Power Consumption	190W	200W
	Color System	PAL/SECAM/NT4.43	PAL/SECAM/NT4.43
	Sound System	BG,DK,I,L	BG,DK,I,L

Control & Connection Panel

Viewing the Connection Panel

LE40A43

[TV Side Panel]

[TV Rear Panel]

COMMON INTERFACE

Power Input
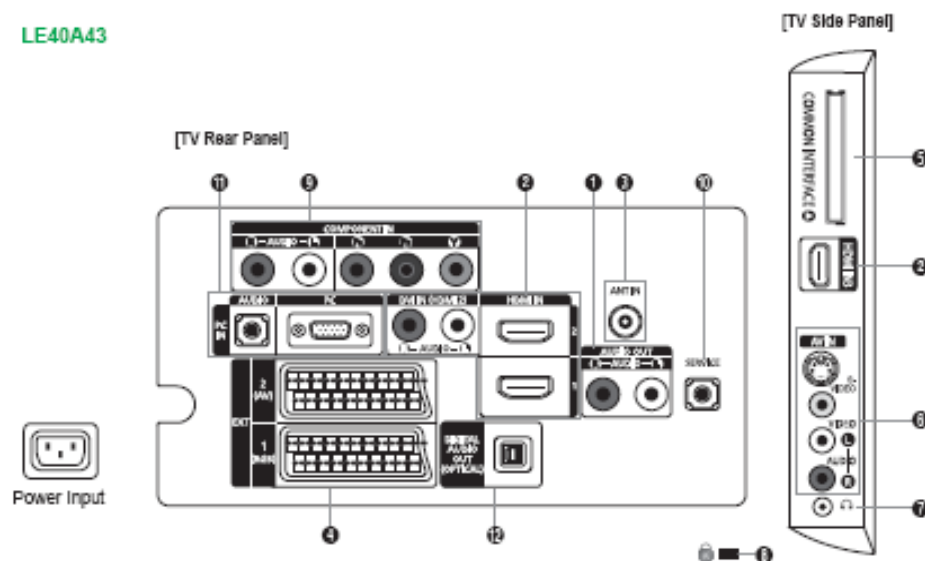
➢ The product colour and shape may vary depending on the model.

➢ Whenever you connect an external device to your TV, make sure that power on the unit is turned off.
➢ When connecting an external device, match the colour of the connection terminal to the cable.

Control & Connection Panel

1. AUDIO OUT(R-AUDIO-L)
- Connect RCA audio cables to AUDIO OUT "R-AUDIO-L" on the rear of your set and the other ends to corresponding audio in connectors on the Amplifier or DVD Home Theatre.

2. HDMI IN 1, HDMI IN 2, HDMI IN 3
- Supports connections between HDMI-connection-enabled AV devices (Set-Top Boxes, DVD players)
- No additional Audio connection is needed for an HDMI to HDMI connection.
-When using an HDMI/DVI cable connection, you must use the HDMI IN 2 jack.

★ What is HDMI?
- "High Definition Multimedia interface" allows the transmission of high definition digital video data and multiple channels of digital audio.
-The HDMI/DVI terminal supports DVI connection to an extended device with the appropriate cable (not supplied). The difference between HDMI and DVI is that the HDMI device is smaller in size, has the HDCP (High Bandwidth Digital Copy Protection) coding feature installed, and supports multi - channel digital audio.

DVI IN(HDMI2)[R-AUDIO-L]
- DVI audio outputs for external devices.
★ Supported modes for HDMI/DVI and Component

	480i	480p	576i	576p	720p	1080i
HDMI/DVI 50Hz	X	X	X	O	O	O
HDMI/DVI 60Hz	X	O	X	X	O	O
Component	O	O	O	O	O	O

Control & Connection Panel

3 ANT IN

To view television channels correctly, a signal must be received by the set from one of the following sources:
-An outdoor aerial / A cable television network / A satellite network

4 EXT 1, EXT 2

Connector	Input			Output
	Video	Audio (L/R)	RGB	Video + Audio (L/R)
EXT 1	O	O	O	Only TV or DTV output is available.
EXT 2	O	O		Output you can choose.

-Inputs or outputs for external devices, such as VCR, DVD, video game device or video disc players.

5 COMON INTERFACE Slot (DTV Only)

- When not inserting "CI CARD" in some channels, "Scrambled Signal" is displayed on the screen.
- The pairing information containing a telephone number, CI CARD ID, Host ID and other information will be displayed in about 2~3 minutes. If an error message is displayed, please contact your service provider.
-When the channel information configuration has finished, the message "Updating Completed" is displayed, indicating that the channel list is now updated.

★ You must obtain a CI CARD from a local cable service provider. Remove the CI CARD by carefully pulling it out with your hands since dropping the CI CARD may cause damage to it.
★ Insert the CI-Card in the direction marked on it.

Control & Connection Panel
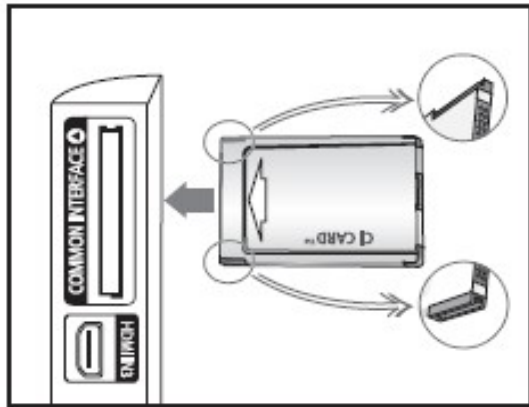
6 S-VIDEO or VIDEO / R-AUDIO-L
- Connect RCA or S-VIDEO cable to an appropriate external A/V device such as VCR, DVD or Camcorder.
-Connect RCA audio cables to "R - AUDIO - L" on your set and the other ends to corre sponding audio out connectors on the A/V device.

7 H eadphones jack
-Headphone may be connected to the headphone output on your set. While the head phone is connected, the sound from the built-in speakers will be disabled.

8 Kensington Lock (depending on the model)
- The Kensington lock (optional) is a device used to physically fix the system when used in a public place.
- If you want to use a locking device, contact the dealer where you purchased the TV.
- The place of the Kensington Lock may be different depending on its model.

Control & Connection Panel

9 COMPONENT IN

- Connect component video cables (optional) to component connector ("PR", "PB", "Y") on the rear of your set and the other ends to corresponding component video out connectors on the DTV or DVD.
- If you wish to connect both the Set-Top Box and DTV (or DVD), you should connect the Set-Top Box to the DTV (or DVD) and connect the DTV (or DVD) to component connector ("PR", "PB", "Y") on your set.
- The PR, PB and Y connectors on your component devices (DTV or DVD) are sometimes labeled Y, B-Y and R-Y or Y, Cb and Cr.
- Connect RCA audio cables (optional) to "R - AUDIO - L" on the rear of your set and the other ends to corresponding audio out connectors on the DTV or DVD.
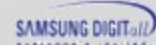
10 SERVICE

-Connector for SERVICE only.

11 PC IN [PC] / [AUDIO]

-Connect to the video and audio output jack on your PC.

12 DIGITAL AUDIO OUT (OPTICAL) DTV Only

- Connect to a Digital Audio Component.
★ When the HDMI IN jacks are connected, the DIGITAL AUDIO OUT (OPTICAL) jack on the TV outputs 2 channel audio only. If you want to hear 5.1 channel audio, connect the Optical jack on the DVD player or Cable/Satellite Box directly to an Amplifier or Home Theater, not the TV.
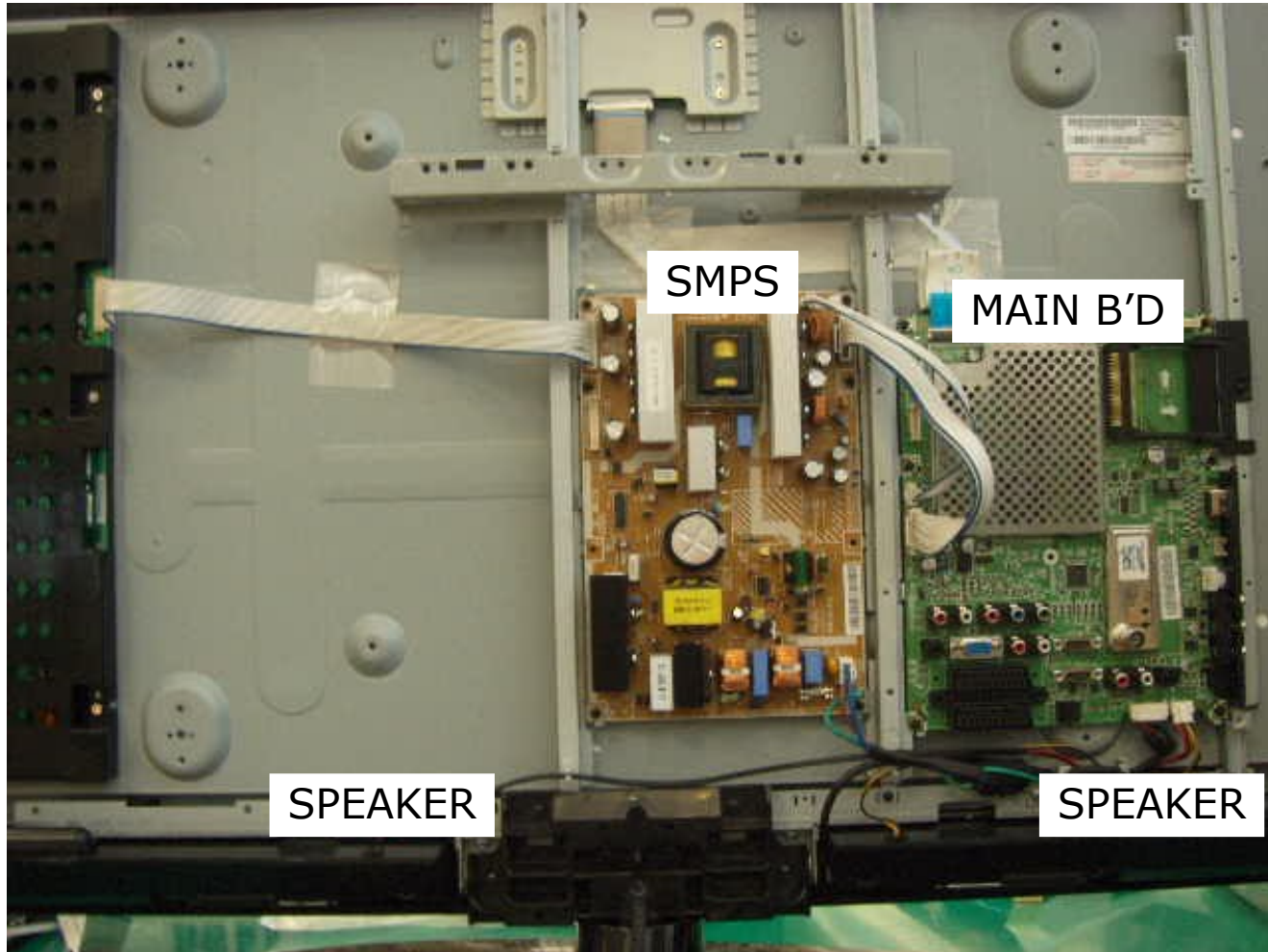
Block Diagram

Input Jack

PCMCIA

ANT

DVB NIM Tuner

HDMI 1,2,3

DVI Audio

EXT 1/2

PC

COMPONENT

VIDEO

S-VIDEO

CX16244*2

TS

SIF

CVBS

HDMI 1
HDMI 3
HDMI 2

HDMI Switch Sii9185

SC1:RGB
SC1:CVBS,FB
SC2:CVBS

R,G,B,Hsync,Vsync

Y,Pb,Pr

CVBS

Y,C

DDR 32MB

FLASH 4MB

OSC
27MHz
PWM

EMMA2SL

CPUI
DEMUX
MPEG A/V-DECODER
PAL ENCODER
HOST-INTERFACE
PERIPHERALS

SPDIF

I2S Sound

TV out

Monitor out

DTV_SPDIF

BA7657F

Audio SW 74HC4052

MSTAR Lola2 (256-QFP)

Micom
3D Comb
Multi Decoder
De-iterlacer
Scaler
LVDS Out
WXGA Output
1000Page TTX
Sound Process
10bit Process
2 HDMI input

Rx,Tx

DDR 8M*16

Flash MX25L,16M Bit

FILTER
Y,Pb,Pr,CVBS

AUDIO DAC EW8521

DTV R/L

UART MAX232

LVDS

FBE3
LVDS

Max9728A AMP

Audio AMP NTP3100
I2S

DTV Part

MAIN Part

Main/DTV/Logic Service Jack

Display Panel

Head phone

Monitor out

EXT1_out

SPDIF out

L
Speaker
R

Inner Feature of 32"

🔹 SMPS, Main Board, Panel

SMPS

MAIN B'D

SPEAKER

SPEAKER

Inner Feature of 37"
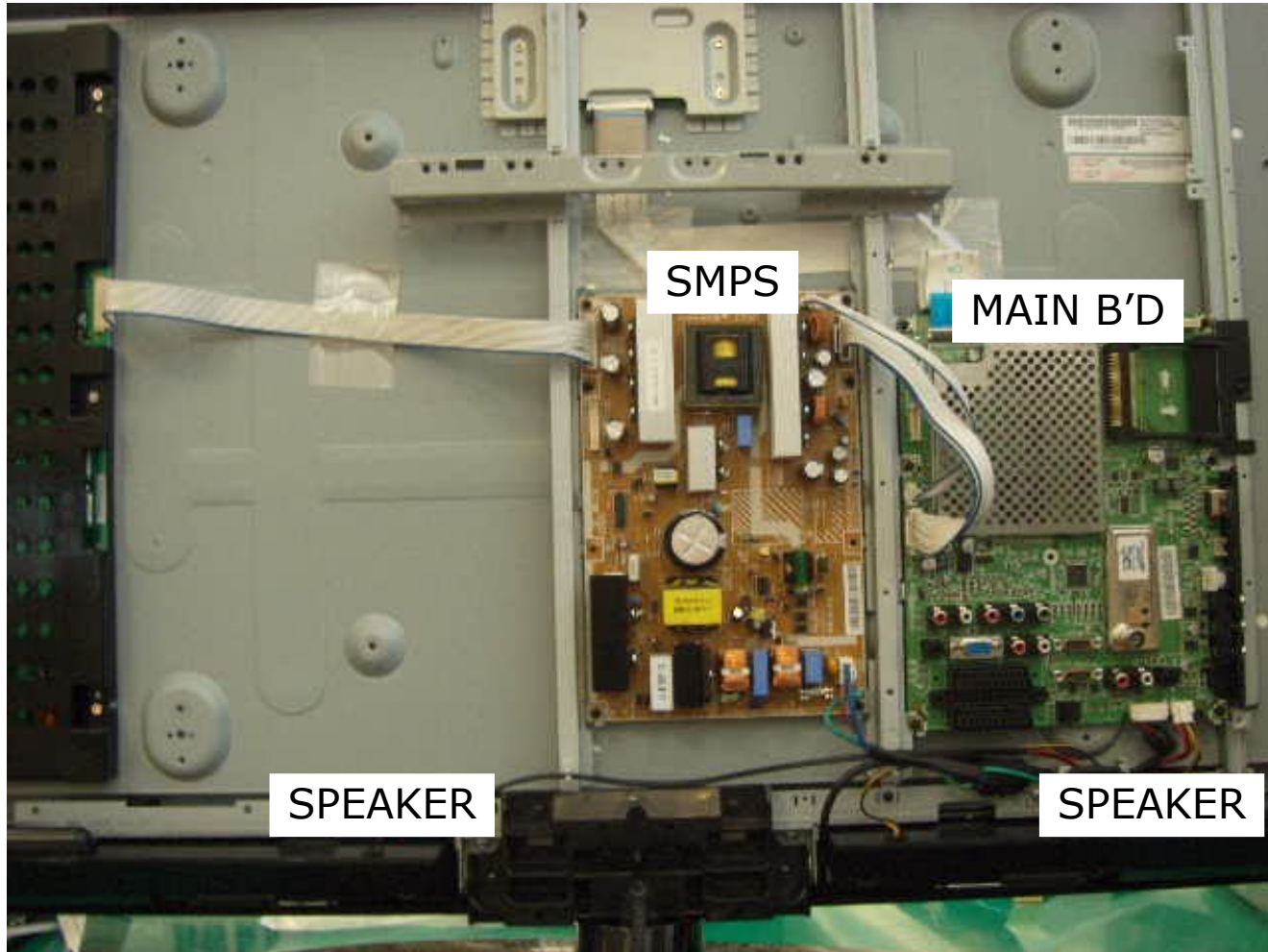
📦 SMPS, Main Board, Panel

Inner Feature of 40"
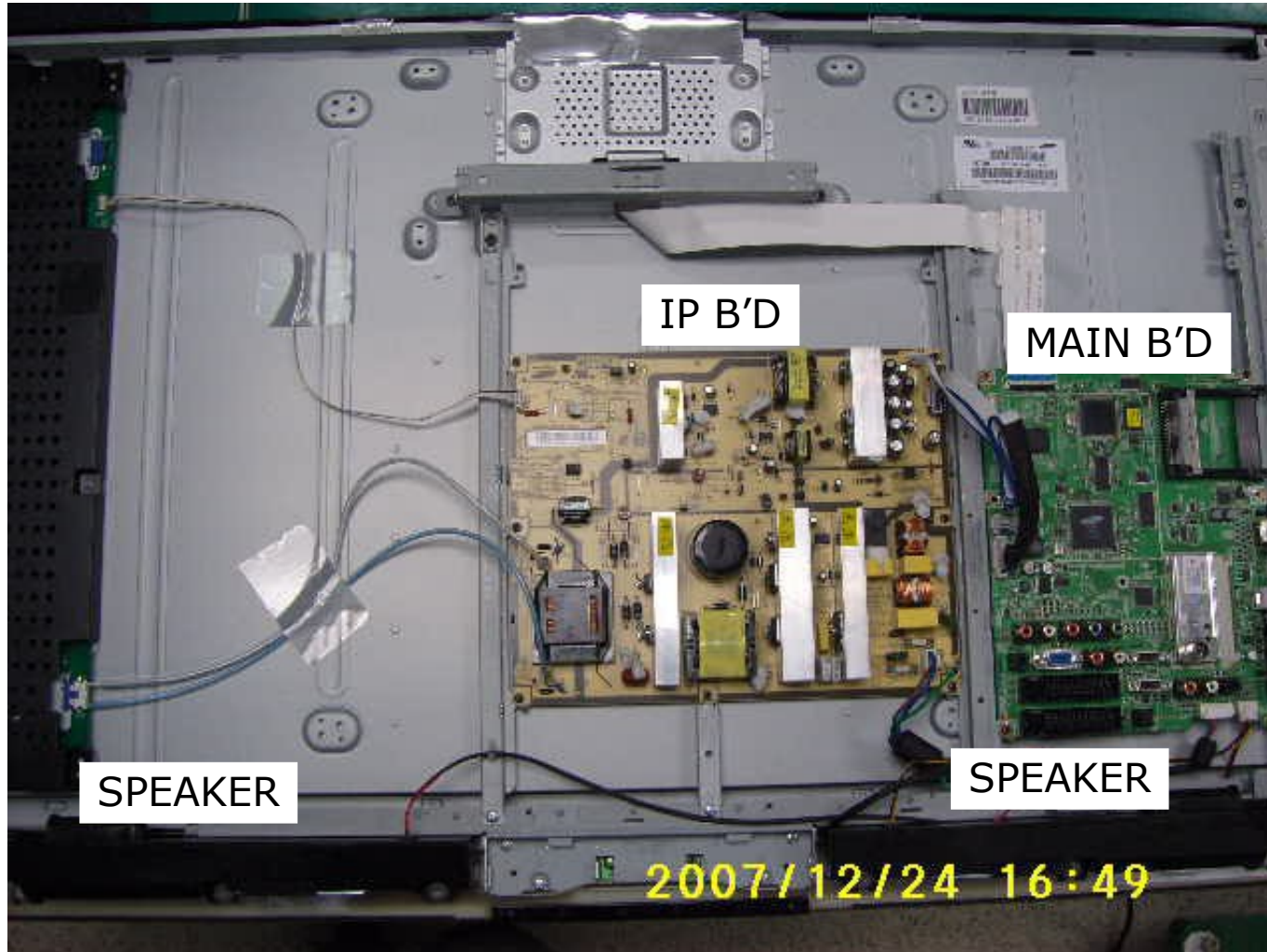
📦 IP, Main Board, Panel

Some Functions of Tanzanite

✎ My Color Control : Preferred Color Adjustment (Blue, Green, Pink)

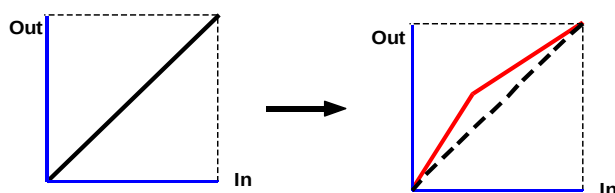✎ Dynamic Contrast : Enhancing Contrast Ratio (Up to 2000:1)

✎ Brightness Sensor : Sensing the outside brightness and controlling brightness
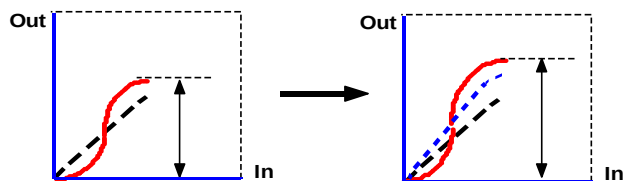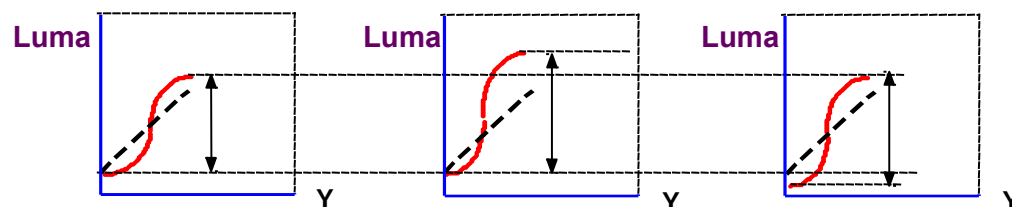
Some Functions of Tanzanite

-Dynamic Contrast

※ Reproducing optimized contrast by detecting the characteristics and contrast level of input signal.

→ Enhancing dynamic contrast (Up to 1600:1)

Mid range dynamic range Enhancement
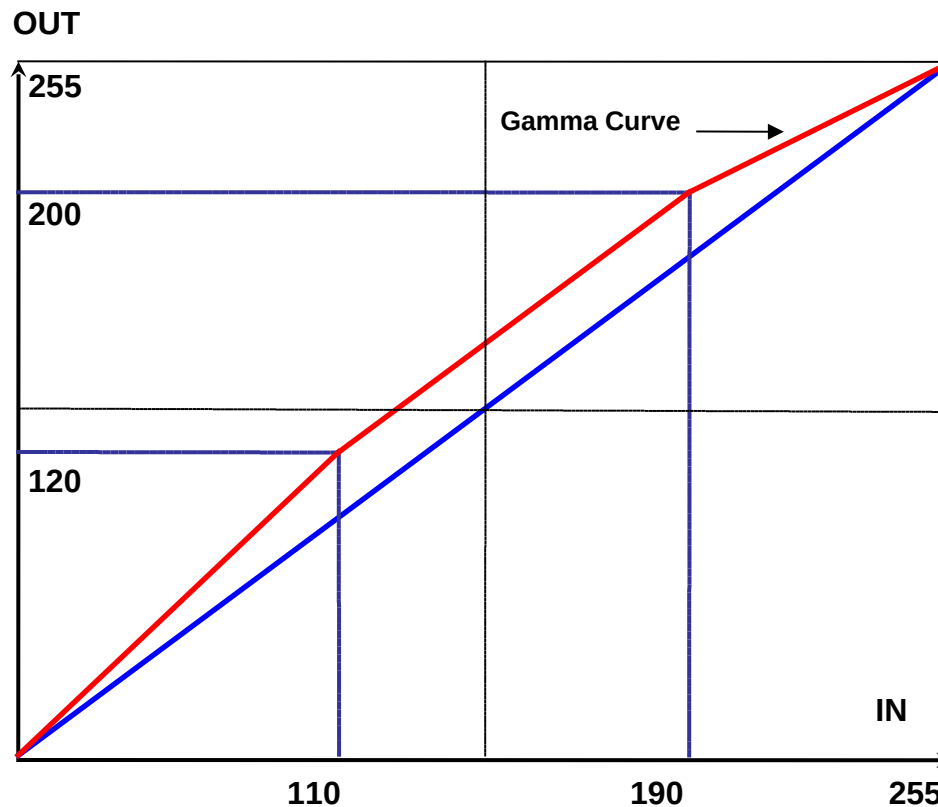
Contrast Enhancement

Dimming

Some Functions of Tanzanite

-Contrast Enhancement Factor

Some Functions of Tanzanite

-Contrast Enhancement & Dimming

< Dark Image >
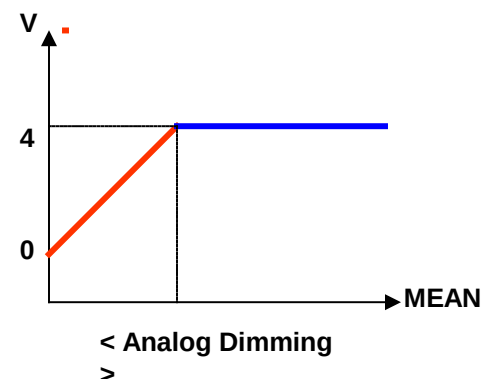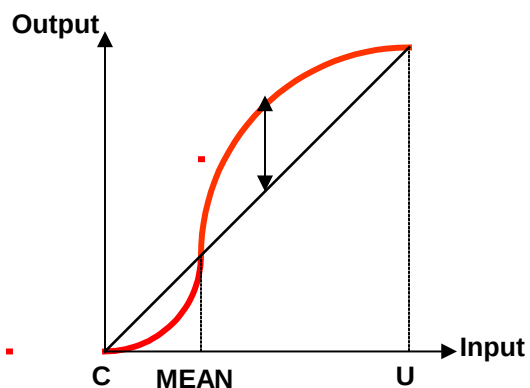
< Bright Image >

Output

Input

C   MEAN   U

Output

Input

C   MEAN   U

0   MEAN   255

0   MEAN   255

V

4

0

MEAN

< Analog Dimming >

Duty(%)

98

50

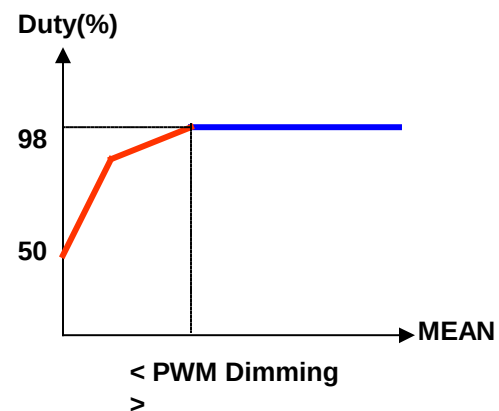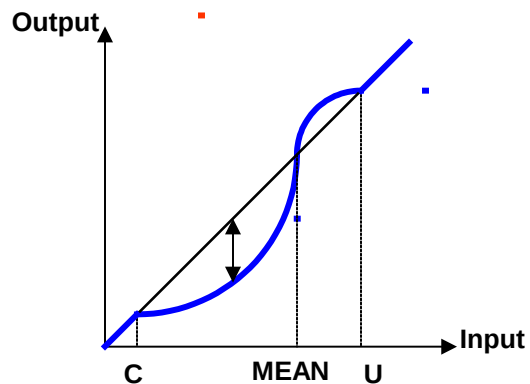MEAN
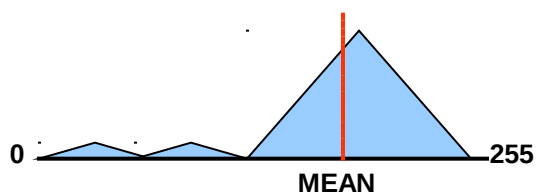
< PWM Dimming >

Some Functions of Tanzanite

User control functions

1. Source key : Select Video source
   1.1 : Cabinet side Function key
     PAL 32"/37"/40" : TV→Ext1→Ext2→AV→
           S-Video→Component→PC→HDMI1→HDMI2→HDMI3→(DTV)
   1.2 : Remote control Function key
     PAL 32"/37"/40" : TV→Ext1→Ext2→AV→
           S-Video→Component→PC→HDMI1→HDMI2→HDMI3→(DTV)

2. Menu key : Open the OSD and Exit the highlighted function.

3. ◀ ▶   : - Moves the selector left or right on the OSD.
                 - Increase or decrease the values of the selected function
   - VOL + : Increase or decrease the level of audio volume.
                 (in the Anynet mode, You can control only TV volume)

4. ▼ ▲   : Moves the selector up or down on the OSD.
   - CH +   : Increase or decrease the channel number .

5. Power   : 1) Turn ON/OFF the TV.
                 2) Indicates the status of the Monitor.
                   - Black : Normal Operation.
                   - Red : Power Off or Disconnected Signal Cable.
                   - Red Blinking : PC DPMS Mode.

Some Functions of Tanzanite

OSD functions and adjustments

1. Picture
    - Mode : Change the image to Dynamic/Standard/Movie
    - Backlight : Change the screen brightness by adjusting the LCD backlight brightness
                (0~10)
    - Contrast : Adjusts the lightness and darkness between objects and the background.
    - Brightness : Adjusts the brightness of the whole screen
    - Sharpness : Adjusts the outline of objects to either sharpen them or make them more
                dull.
    - Color : Adjusts the colors, making them lighter or darker
    - Tint : Adjusts the color of objects, making them more red or greem for a more natural
            look.
    - Detailed settings : Black Adjust (Off/Low/Medium/High)
                          Dynamic Contrast (Off/Low/Medium/High)
                          Gamma (-3 to +3)
                          Color Space (Auto/Wide/Custom)
                          White Balance (R/G/B Offset, R/G/B Gain, Reset)
                          Flesh Tone (-15 to +15)
                          Edge Enhancement (Off/On)

Some Functions of Tanzanite

OSD functions and adjustments –continue-

- Picture Option : Color Tone (Cool2/Cool1/Normal/Warm1/Warm2)
　　　　　　　　　Size (Auto Wide/16:9/Wide Zoom/Zoom/4:3/Just Scan)
　　　　　　　　　Screen Mode (16:9/Wide Zoom/Zoom/4:3)
　　　　　　　　　Digital NR (Off/Low/Medium/High/Auto)
　　　　　　　　　DNIe (Off/Demo/On)
　　　　　　　　　HDMI Black Level (Normal/Low)
　　　　　　　　　Blue Only Mode (Off/On)

◆Blue Only Mode : You can emphasize the Blue color by switching off the Red and Green colors. This function is for AV device measurement experts.

- Reset : You can return to the factory defaults picture settings.

Some Functions of Tanzanite

OSD functions and adjustments –continue-

2. Sound
   - Mode : Change the sound mode to Standard/Music/Movie/Speech or adjust Custom
           setting.
   - Equalizer : Change EQ. and balance
   - SRS TSXT : Select mode of SRS (On/Off)
   - Auto Volume : On/Off
   - TV Speaker : On/Off
   - Sound Select : Main/Sub (ATV Only)

3. Channel
   - Country/Auto Store/Manual Store/Channel Manager/Sort/Name/Fine tune/(LNA)

Some Functions of Tanzanite

OSD functions and adjustments –continue-

4. Setup
  - Plug & Play : Execute Plug & Play
  - Language : Select country language
  - Time : Setting the current clock
          Setting the Sleep Timer
          Setting the On Time / Off Time
  - Melody : TV Power on/off melody sound can be adjusted.
          (Off/Low/Medium/High)
  - Entertainment : Enables you to select the optimal display and sound for sports,
                  cinema, and games.
  - Energy Saving : Adjusts the screen brightness depending on the surrounding
                  lighting conditions. (Off/Low/Medium/High/Auto)
  - PIP : PIP / Source / Size / Position / Programme (ATV Only)

Some Functions of Tanzanite

OSD functions and adjustments –continue-

5. Input
- Source List : TV ➔ Ext.1 ➔ Ext.2 ➔ AV ➔
            S-Video ➔ Component ➔ PC ➔ HDMI1 ➔ HDMI2 ➔ HDMI3 ➔ (DTV)
- Edit Name : Name the device connected to the input jacks to make your input source
            selection easier.
- Anynet+(HDMI-CEC) : Anynet+ is an AV network system that enables an easy to use
            AV interface for users by controlling all connected AV devices
            through the Anynet+ menu when Samsung Electronics AV
            devices are connected.

Key parts of Tanzanite

SCALER : SEMS01

DTV DECODER : D61211GM

SOUND AMP : NTP3100

DTV-COMP SW : BA7657

SCALER: SEMS01

GENERAL DESCRIPTION

The SEMS01 is a high performance and fully integrated IC for multi-function LCD monitor/TV with resolutions up to UXGA(1600x1200) / WSXGA+(1680x1050).
It is configured with an integrated triple-ADC/PLL, an integrated DVI/HDCP/HDMI receiver, a multi-standard TV video and audio decoder, two video de-interlacers, two scaling engines, the MStarACE-3 color engine, an on-screen display controller, an 8-bit MCU and a built-in output panel interface.
By use of external frame buffer, IP/POP is provided for multimedia applications. Furthermore, 3-D video decoding and processing are fulfilled for high-quality TV applications.
To further reduce system costs, the MST69981CL also integrates intelligent power management control capability for green-mode requirements and spread-spectrum support for EMI management.

SCALER: SEMS01

FEATURES

. LCD TV controller with PIP/POP display functions
. Input supports up to UXGA & 1080P
. Panel supports up to UXGA(1600x1200) / WSXGA+(1680x1050)
. TV decoder with 3-D comb filter
. Multi-Standard TV sound demodulator and decoder
. 10-bit triple-ADC for TV and RGB/YPbPr
. 10-bit video data processing
. Integrated DVI/HDCP/HDMI compliant receiver
. High-quality dual scaling engines & dual 3-D video de-interlacers
. 3-D Video noise reduction
. Full function PIP/PBP/POP
. MStarACE-3 picture/color processing engine
. Embedded On-screen display controller (OSD) engine
. Built-in MCU supports PWM & GPIO
. Built-in dual-link 8-bit LVDS transmitter
. 5 Volt tolerant inputs
. Low EMI and power saving features
. 256-pin LQFP

SCALER: SEMS01

NTSC/PAL/SECAM Video Decoder

. Supports NTSC M, NTSC-J, NTSC-4.43, PAL(B,D,G,H,M,N,I,Nc), and SECAM
. Automatic TV standard detection
. Motion adaptive 3-D comb filter for NTSC/PAL
. 8 configurable CVBS & Y/C S-video inputs
. Supports Teletext level-1.5, WSS, VPS, Closed-caption, and V-chip
. Macrovision detection
. CVBS video output

Multi-Standard TV Sound Decoder

. Supports BTSC/NICAM/A2/EIA-J demodulation and decoding
. FM stereo & SAP demodulation
. L/Rx4, mono, and SIFx2 audio input
. L/Rx3 loudspeaker and line output
. Supports sub-woofer output
. Built-in audio output DAC's
. Audio processing for loudspeaker channel, including volume, balance, mute,
 tone, EQ, and virtual stereo/surround
. Optional advanced surround available (Dolby1, SRS2, BBE3… etc)

SCALER: SEMS01

Digital Audio Interface

. I2S digital audio input & output
. S/PDIF digital audio input & output
. HDMI audio channel processing capability
. Programmable delay for audio/video synchronization

Analog RGB Compliant Input Ports

. Three analog ports support up to UXGA
. Fast blanking and function selection switch support full SCART functions
. Supports HDTV RGB/YPbPr/YCbCr up to 1080P
. Supports Composite Sync and SOG (Sync-on-Green) separator
. Automatic color calibration

SCALER: SEMS01

DVI/HDCP/HDMI Compliant Input Port Note 1

. Two DVI/HDMI input ports with built-in switch
. Operates up to 165 MHz (up to UXGA @60Hz)
. Supports TMDS clock up to 225MHz @ 1080P 60Hz with 12-bit deep-color resloution
. Single link on-chip DVI 1.0 compliant receiver
. High-bandwidth Digital Content Protection (HDCP) 1.1 compliant receiver
. High Definition Multimedia Interface (HDMI) 1.2 compliant receiver with CEC support
. Long-cable tolerant robust receiving
. Support HDTV up to 1080P

Auto-Configuration/Auto-Detection

. Auto input signal format and mode detection
. Auto-tuning function including phasing, positioning, offset, gain, and jitter detection
. Sync Detection for H/V Sync

SCALER: SEMS01

Digital Video Input

. One 4:2:2 ITU-R BT.656 8/10-bit digital video input port
. One 4:2:2 ITU-R BT.601 16-bit digital video input port

High-Performance Scaling Engines

. Fully Programmable shrink/zoom capabilities
. Nonlinear video scaling supports various modes including Panorama

Video Processing & Conversion

. 3-D motion adaptive video de-interlacers
. Edge-oriented adaptive algorithm for smooth low-angle edges
. Automatic 3:2 pull-down & 2:2 pull-down detection and recovery
. PIP/PBP/POP with programmable size and location, supports multi-video
  applications

SCALER: SEMS01

. MStar 3rd Generation Advanced Color Engine (MStarACE-3) automatic picture
  enhancement gives:
  - Brilliant and fresh color
  - Intensified contrast and details
  - Vivid skin tone
  - Sharp edge
  - Enhanced depth of field perception
  - Accurate and independent color control
. sRGB compliance allows end-user to experience the same colors as viewed on
  CRTs and other displays
. Programmable 12-bit RGB gamma CLUT
. DLC with 32-segment histogram
. 3-D video noise reduction
. Frame rate conversion

SCALER: SEMS01

On-Screen OSD Controller

. 16/256 color palette
. 256/512 1-bit/pixel font
. 128/256 4-bit/pixel font
. Supports texture function
. Supports 4K attribute/code
. Horizontal and vertical stretch of OSD menus
. Pattern generator for production test
. Supports OSD MUX and alpha blending capability
. Supports blinking and scrolling for closed caption applications

8-bit LVDS/TTL Panel Interface

. Supports dual link LVDS up to UXGA(1600x1200) / WSXGA+(1680x1050)
. Supports 8-bit single TTL panel
. Supports 2 data output formats: Thine & TI data mappings
. Compatible with TIA/EIA
. With 6/8 bits options
. Reduced swing for LVDS for low EMI
. Supports flexible spread spectrum frequency with 360Hz~11.8MHz and up to 25% modulation

SCALER: SEMS01

Integrated Micro Controller

. Embedded 8032 micro controller
. Configurable PWM's and GPIO's
. Low-speed ADC inputs for system control
. SPI bus for external flash
. Supports external MCU option controlled through 4-wire double-data-rate direct
  MCU bus or 8-bit direct MCU bus

External Connection/Component

. 16-bit data bus for external frame buffer (SDR or DDR DRAM)
. All system clocks synthesized from a single external clock

DECODER:D61211GM

DESCRIPTION

The μPD61211/13 devices, EMMA2SL, are members of the second generation of multimedia processors based on NEC's Enhanced MultiMedia Architecture (EMMA™). These devices provide nearly all the functionality required to realise a high performance and cost-effective digital set-top box or integrated digital TV.

FEATURES

- MPEG1 and MPEG2-TS/PS compliant
- High performance MIPS32™ 4KEc™ main CPU core
- High performance MIPS32™ 4KEm™ sub-CPU core
- Integrated DVB descrambling with family options for Irdeto
- 36 PID filters, 32 section filters
- Video Outputs: 4 DACs for RGB, component video, S-video and composite output with support for PAL, NTSC and SECAM
- 5 graphics planes

DECODER:D61211GM

▪ Support for Macrovision™ analog video copy protection (μPD61213 only)

▪ Audio Output: 2-channel PCM and SPDIF

▪ Peripherals support:
  • two fast UARTs with 16byte FIFOs
  • two I2C interfaces
  • two Smart Card interfaces
  • infrared receiver
  • three wire clocked serial interface

▪ System timers, RTC and Watchdog timer

▪ Motorola/Intel Bus.

DECODER:D61211GM

AppDiag2
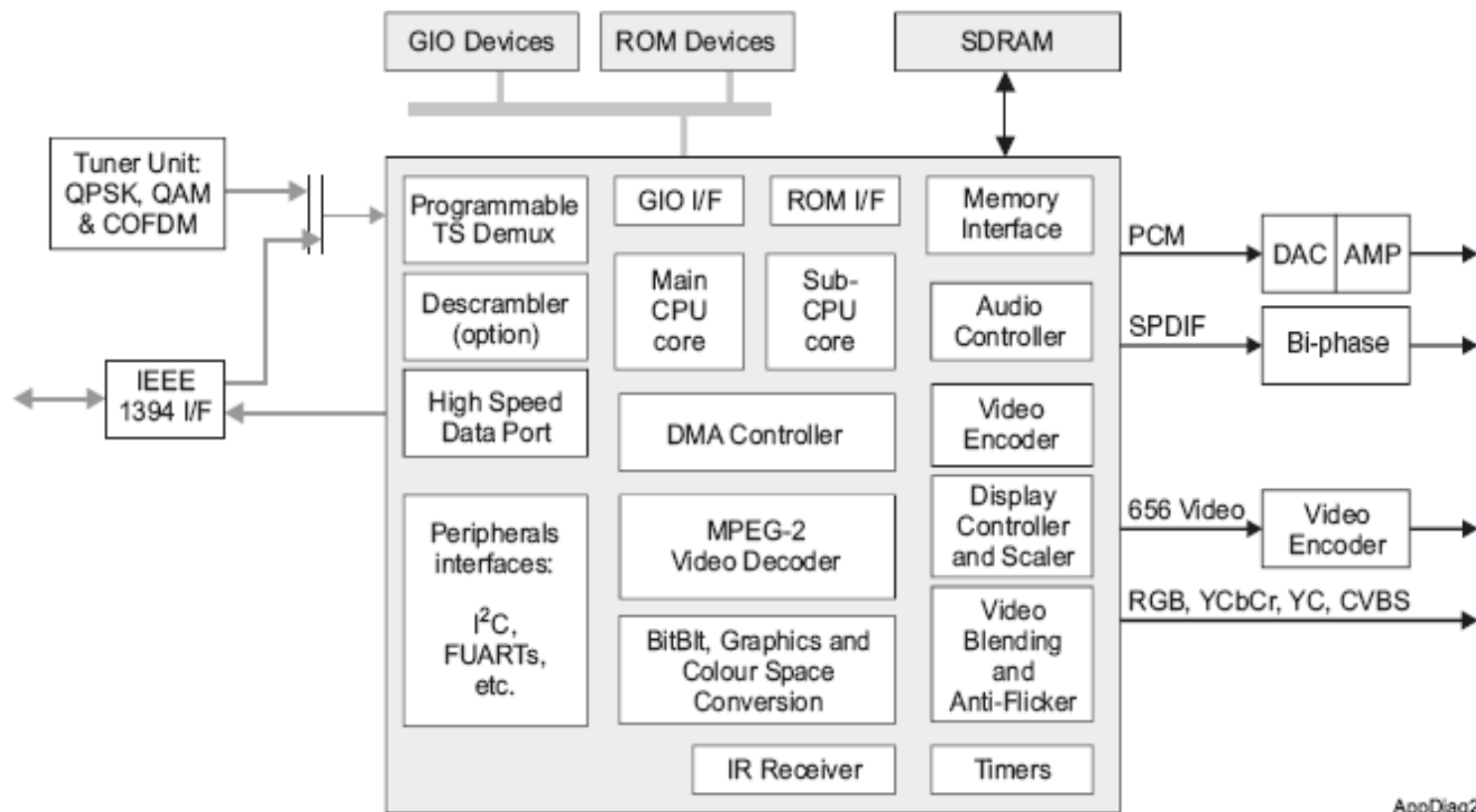
DECODER:D61211GM

Main Processor

- High Performance MIPS32 4KEc CPU core
- 32bit RISC MIPS architecture
- Supports the MIPS-I, MIPS-II and a subset of the MIPS-III instruction sets
- 4KByte instruction cache, 4KByte data cache
- 2 way cache accessing
- EJTAG debug support

Sub-Processor

- High Performance MIPS32 4KEm CPU core for audio MPEG decoding
- 4KByte instruction cache, 4KByte data cache
- 8KByte scratch-pad memory support

Unified Memory Interface

- Supports 8 and 16bit bus width DDR SDRAM
- Unified CPU/MPEG/Graphics memory

DECODER:D61211GM

▪ Supports data rates up to 133MHz
▪ Supports 8, 16, 32 or 64Mbytes total memory

ROM/GIO Interface

▪ Total address area 64Mbyte for ROM
▪ Supports normal, page and flash ROM
▪ Supports NOR and NAND flash ROM
▪ 2 chip select signals for ROM
▪ 8MByte total address area for GIO
▪ 2 chip select signals for GIO
▪ PCMCIA support (16-bit PC Card only)

DMA

▪ Supports DMA transfers to/from GIO and memory-to-memory

DECODER:D61211GM

Programmable TS De-multiplexer

▪ Single stream input configurable as a parallel or serial port
▪ Supports MPEG2-TS
▪ Maximum input bit rate 100Mbit/sec
▪ High Speed Data port output for external IEEE1394 link devices
▪ 36 PID filters:
  • 1 Video PID
  • 2 Audio PIDs
  • 1 PCR PID
  • 32 general PIDs
▪ 32 section filters (8-Byte/16-byte depth)

Descrambler

▪ Supports decryption with 16 key-pairs

DECODER:D61211GM

MPEG video decoder

- MPEG-2 MP@ML standard compliant
- Supports MPEG-1 and -2 elementary streams

Audio Processor

- MPEG-1 and -2, layer 1 and 2
- PCM L+R audio output
- SPDIF output
- Test-tone and Mixing

Graphics engine

- 2-D image data transfer
- Colour space conversion: RGB32 to YCbCr
- Colour expansion

SOUND AMP:NTP3100

Features

- Stereo (20W x2)
- Wide Supply Voltage Range (7.5V~24V)
- Floating Point Operation
- 16 Programmable Biquad Filters
    Speaker Compensation
    DC cut, LPF, HPF
    Parametric Equalizer
- 100 dB Dynamic Range
- Adaptive Loudness Compensator based on Psycho Acoustics
- Dynamic range control
- Loudness

Applications

- Plasma TV, LCD TV
- Docking Station
- Mini-Component Audio

SOUND AMP:NTP3100

Description

NTP3100 is a single chip full digital audio amplifier including power stage for stereo amplifier system. NTP3100 is integrated with versatile digital audio signal processing functions, high-fidelity fully digital PWM modulator and two high-power full bridge MOSFET stages.

NTP3100 receives 2-channel serial audio data with sampling frequency from 8 kHz to 192kHz. It delivers 2x20W in stereo mode without heat sink.

Combining use of built-in mixer and biquad-filters can make additional preprocessing like bass management, loudness control, loud speaker response compensation and preset parametric equalizers possible.

All the functions of NTP3100 are set by I2C register configuration.

SOUND AMP:NTP3100

Package

56 pin MLF 8mm by 8mm
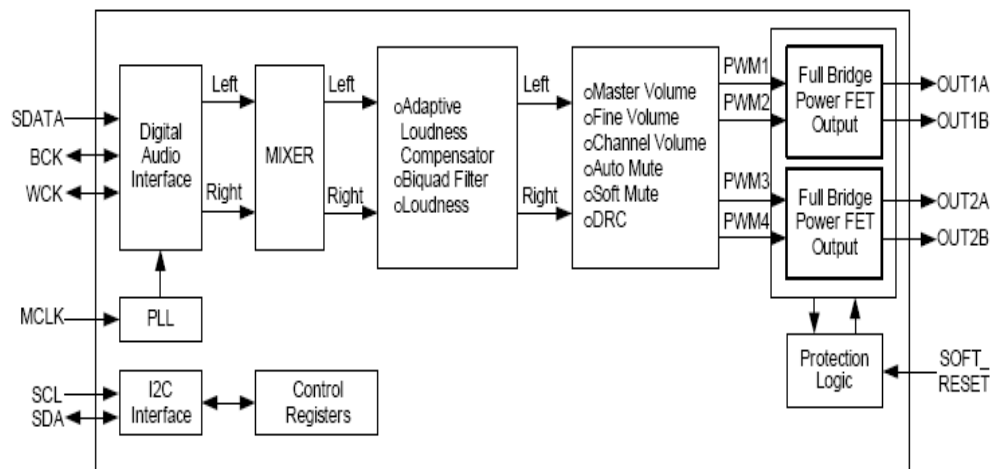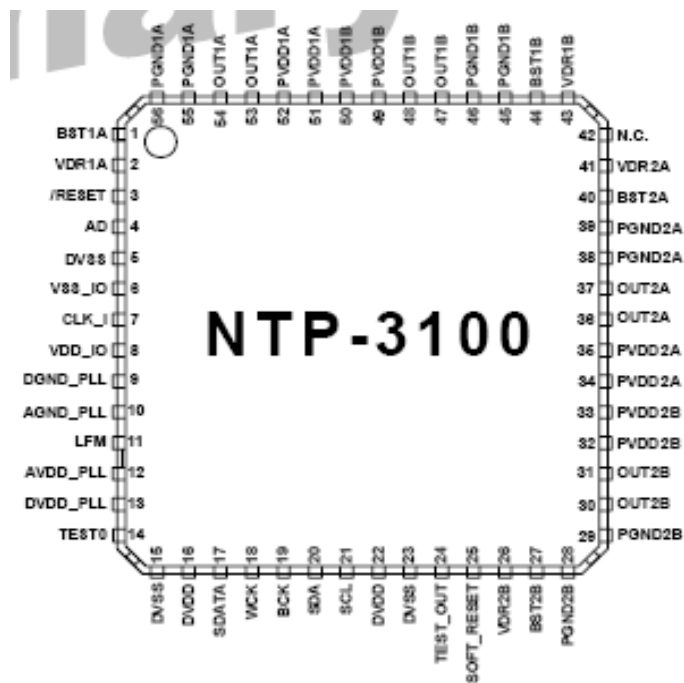
SOUND AMP:NTP3100

PIN DESCRIPTIONS

PIN	NAME	TYPE[1]	DESCRIPTION
1	BST1A	P	Bootstrap supply, external capacitor to OUT1A is required
2	VDR1A	P	Gate drive voltage regulator decoupling pin, capacitor to GND
3	/RESET	I	Active Low to reset NTP3100, Schmitt trigger input
4	AD	I	I2C device Address selection
5	DVSS	-	Ground
6	VSS_IO	-	Ground
7	CLK_I	I	System master clock, Schmitt trigger input
8	VDD_IO	P	voltage supply for I/O, 3.3V
9	DGND$_{PLL}$	-	Ground
10	AGND$_{PLL}$	-	Ground
11	LFM	I	External loop filter
12	AVDD$_{PLL}$	P	voltage supply for PLL analog circuit, 1.8V
13	DVDD$_{PLL}$	P	voltage supply for PLL digital circuit, 1.8V
14	VSS	-	Ground
15	DVSS	-	Ground
16	DVDD	P	voltage supply for core logic, 1.8V
17	SDATA[2]	I	I^{2}S serial data input
18	WCK[2]	I/O	I^{2}S word clock
19	BCK[2]	I/O	I^{2}S bit clock
20	SDA[2]	I/O	I^{2}C data
21	SCL[2]	I	I^{2}C clock
22	DVDD	P	voltage supply for core logic, 1.8V
23	DVSS	-	Ground
24	TEST_OUT	O	Test Signal Output
25	/SOFT_RESET	I	Active Low to reset internal power stage , Pull up

PIN	NAME	TYPE	DESCRIPTION
26	VDR2B	P	Gate drive voltage regulator decoupling pin, capacitor to GND
27	BST2B	P	Bootstrap supply, external capacitor to OUT1A is required
28/29	PGND2B	-	Ground
30/31	OUT2B	O	Power stage PWM output 2B
32/33	PVDD2B	P	Voltage supply for power stage
34/35	PVDD2A	P	Voltage supply for power stage
36/37	OUT2A	O	Power stage PWM output 2A
38/39	PGND2A	-	Ground
40	BST2A	P	Bootstrap supply, external capacitor to OUT2A is required
41	VDR2A	P	Gate drive voltage regulator decoupling pin, capacitor to GND
42	NC	-	No connection
43	VDR1B	P	Gate drive voltage regulator decoupling pin, capacitor to GND
44	BST1B	P	Bootstrap supply, external capacitor to OUT2A is required
45/46	PGND1B	-	Ground
47/48	OUT1B	O	Power stage PWM output 1B
49/50	PVDD1B	P	Voltage supply for power stage
51/52	PVDD1A	P	Voltage supply for power stage
53/54	OUT1A	O	Power stage PWM output 1A
55/56	PGND1A	-	Ground

Preliminary

DTV-COMP SW:BA7657

BLOCK DIAGRAM
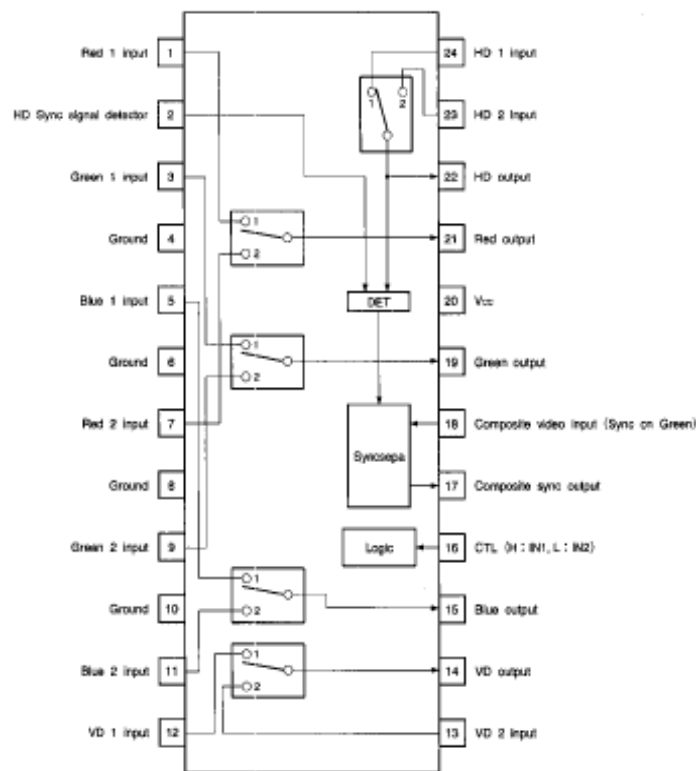
DTV-COMP SW:BA7657

FEATURES

▪ Operates on a single 5V power supply.
▪ Internal broadband RGB switch (frequency characteristics : 250MHz, -3dB)
▪ Internal HD / VD switch.
▪ Internal synchronization separator for synchronizing signals superimposed onto G signals.

BOARD DESCRIPTION

CONTENTS

1. Main B'D Layout

2. Main B'D Pin Characteristic

3. SMPS Board

4. Power B'D Layout

5. Power B'D Pin Characteristic

SAMSUNG Electronics

MAIN BOARD LAYOUT

SAMSUNG Electronics

MAIN BOARD LAYOUT

CN1001- Main Board power supply

PIN	1	2	3	4	5	6	7	8	9
NAME	DIMMING	GND	GND	GND	13V	13V	13V	3.3V	SW

CN2001-SPEAKER CONNECTOR

PIN	1	2	3	4
NAME	R+ OUT	R- OUT	L+ OUT	L- OUT

MAIN BOARD LAYOUT

JA4006-Front control

PIN	1	2	3	4
NAME	IR	GND	A5V	LED_STB
PIN	5	6	7	8
NAME	BUZZER	KEY_INPUT 1	KEY_INPUT2	GND

FUNCTING DEFINE:

-- A5V   Front control board power supply

-- KEY INPUT1,2 key control, form the Menu , channel up/down Etc.

-- IR   remote control signal

-- LED_STB   control the timing and standby LED color

MAIN BOARD LAYOUT

CN6001-LVDS Signal

PIN	1	2	3	4	5	6
NAME	FBE_ODD_TX0-	FBE_ODD_TX0+	FBE_ODD_TX1-	FBE_ODD_TX1+	FBE_ODD_TX2-	FBE_ODD_TX2+
PIN	7	8	9	10	11	12
NAME	GND	FBE_ODD_TXCLK-	FBE_ODD_TXCLK+	FBE_ODD_TX3-	FBE_ODD_TX3+	FBE_EVEN_TX0-
PIN	13	14	15	16	17	18
NAME	FBE_EVEN_TX0+	GND	FBE_EVEN_TX1-	FBE_EVEN_TX1+	GND	FBE_EVEN_TX2-
PIN	19	20	21	22	23	24
NAME	FBE_EVEN_TX2+	FBE_EVEN_TXCLK-	FBE_EVEN_TXCLK+	FBE_EVEN_TX3-	FBE_EVEN_TX3+	GND
PIN	25	26	27	28	29	30
NAME	GND	GND	N.C.	PANEL_Vcc	PANEL_Vcc	PANEL_Vcc

MAIN BOARD LAYOUT

IP SPEC

INPUT CHARACTERISTICS

1.1 INPUT VOLTAGE RANGE ☐ 90Vac TO 264Vac , SINGLE PHASE.
   NORMAL VOLTAGE: 100-240Vac

1.2 INPUT FREQUENCY RANGE ☐ 47Hz TO 63Hz.
   NORMAL FREQUENCY: 50-60Hz

1.3 MAX INPUT AC CURRENT ☐ 2.0Arms @90VAC.

1.4 INRUSH CURRENT ☐ PEAK INRUSH CURRENT AT ANY ALLOWABLE OPERATING
                     TEMPERATURE SHALL NOT OPEN LINE FUSE, RECIFIER DIODE
                     OR CAUSE PERMANENT DAMAGE TO THE SUPPLY.

1.5 DPMS DISSAPATION ☐ LESS THAN 0.9 WATT AT 13V/15mA, AT 230Vac/60Hz.
                     OR NO LOAD 0.5W MAX AT 230Vac/60Hz

MAIN BOARD LAYOUT

IP SPEC

OUTPUT CHARACTERISTICS

2.1 Power

Output Terminal	Output Load Spec(A)		
	MIM. (A)	TYPICAL (A)	MAX. (A)
13V	0.015	1.5A	1.8A
18V	For inverter		

2.2 ELECTRICAL OUTPUT CHARACTERISTUCS

1) OUTPUT VOLTAGE AND CURRENT

OUTPUT VOLTAGE	MINIMUM VOLTAGE	MAXIMUM VOLTAGE	OUTPUT CURRENT	REMARK
+13.0 VDC	+12.5VDC	+14.0VDC	1.8 A	
+18.0VDC			1.8A	

MAIN BOARD LAYOUT

IP SPEC

2) LOAD REGUATION

OUTPUT VOLTAGE	MINIMUM VOLTAGE	MAXIMUM VOLTAGE	CONDITIONS	REMARK
			110 VAC 25℃	
+13.0 VDC	+12.5VDC	+14.0VDC	1.8 A	
+18.0VDC			1.8A	

3) LINE REGULATION

OUTPUT VOLTAGE	MINIMUM VOLTAGE	MAXIMUM VOLTAGE	CONDITIONS	REMARK
			90~264 VAC 25℃	
+13.0 VDC	+12.5VDC	+14.0VDC	1.8 A	
+18.0VDC			1.8A	

MAIN BOARD LAYOUT

IP SPEC

4) RIPPLE & NOISE

OUTPUT VOLTAGE	60Hz RIPPLE & NOISE
12.5VDC ~ 14.0VDC	0.2Vpp(200mV)

MAIN BOARD LAYOUT

IP SPEC

2.2 OUTPUT CHARACTERISTICS :

2.2.1   TURN-ON DELAY TIME : 3Sec MAX. @ 264Vac/50Hz INPUT.

2.2.2   HOLD UP TIME : 5mS MIN. @100VAC/60Hz INPUT.

2.2.3   EFFICIENCY
WHEN 90-264VAC LINE INPUT VOLTAGE(110VAC), THE EFFICIENCY SHALL BE 80% OR
BETTER UNDER MAXIMUN LOAD.

2.2.4   SHORT CIRCUIT PROTECTION :
THE POWER SUPPLY SHALL NOT BE DAMGE BY SHORT BETWEEN DC OUTPUT AND DC GROUND

CONDITION		RESULT(SPEC)
INPUT VOLTAGE	110VAC/240VAC	NO DAMAGE
OUTPUT VOLTAGE	13.0V/1.8A	AUTO RECOVERY
OUTPUT VOLTGAE	18.0V/1.8A	

MAIN BOARD LAYOUT

IP SPEC

2.2.5 OVER VOLTAGE PROTECTION (LATCH OR AUTORECOVERY) :
THE VOLTAGE WILL NOT EXCEED THE UPPER TRIP LIMIT.
FOR RESTART THE UNIT, RECYCLE AC INPUT AT 100V

OUTPUT VOLTAGE	MAXIMUM OVP TRIP VOLTAGE
+13VDC/1.5A	+21VDC

2.2.6 OVER POWER PROTECTION (LATCH OR AUTORECOVERY) :
THE POWER SUPPLY REACHES TEMPERATURE EQUILIBRIUM, OVER POWER
PROTECTION SHALL OPERATE, AFTER ONE HOUR BURN-IN AND REACHED
TEMPERATURE EQUILIBRIUM.

MAIN BOARD LAYOUT

IP SPEC

2.3 OUTPUT CHARACTERISTICS (INVERTER) :

    2.3.1 PANEL TYPE : CMO 22″ PANEL .

    2.3.2 SCOPE : THE INVERTER UNIT TO DRIVE FOUR CCFT BACKLIGHT LAMP.

    2.3.3 Vpwm-adj = 0V, Vanlog-adj = 0V , Von = 3.3V, @ 25℃ WARM UP

	MIN	TYPE	MAX	REMARK
Iin	----	1.6Adc	1.8Adc	Vin = 18Vdc
Freq.	37KHz	41KHz	45KHz	Io 1,2,3,4
IL	7.m0Arms	7.5mArms	8.0mArms	Io 1,2,3,4
CURRENT BALANCE	0	0.4mArms	0.5mArms	Io 1,2/3,4

MAIN BOARD LAYOUT

IP SPEC

2.3.4 Vpwm-adj = 0V, Vanlog-adj = 3.3V , Von = 3.3V, @ 25℃ WARM UP

	MIN	TYPE.	MAX.	REMARK
IL	4.9mArms	5.5mArms	6.0mArms	Io 1,2,3,4
CURRENT BALANCE	0	0.4mArms	0.5mArms	Io 1,2/3,4

2.3.5 Vpwm-adj = 4.5V, Vanlog-adj = 0V , Von = 3.3V, @ 25℃ WARM UP

	MIN	TYPE.	MAX.	REMARK
Dimming Frequency	318KHz	333KHz	348KHz	Hz
IL	3.0mArms	3.5mArms	4.0mArms	Io 1,2,3,4
CURRENT BALANCE	0	0.4mArms	0.5mArms	Io 1,2/3,4

2.3.6 KICK-OFF VOLTAGE (NO LOAD), Von = 3.3V

	MIN	TYPE.	MAX.	REMARK
Vs	1900Vrms	---	---	@ 0℃

MAIN BOARD LAYOUT

IP SPEC

Connector

1. CN101 □ CABLE ASS'Y 9 Pin connector, (YEONHO : SMH200-09, YST200;YBNH200-09, YBST200)
   PIN DEFINITION □ PIN 1--------- (BRT_ADJ) PWM Dimming control (0-4.5v)
                    PIN 2 & 3 & 4----------GND
                    PIN 5 & 6 & 7----------13V
                    PIN 8 --------(BRT_ADJ) ANALOG Dimming control (0-3.3v)
                    PIN 9 ------- (BL NO/OFF) CFLL Drive SIGNAL (Active HIGH)

2. CN201 & CN202 (YEONHO : 35002WR-04L)

3. PIN DEFINITION □ PIN 1 & 3 --- HOT (HIGH VOLTAGE FOR CCFL)
                    PIN 2 & 4--- COLD (LOW VOLTAGE FOR CCFL)

4. AC SOCKET (3 PIN) : (SOLTEAM : ST-01DJ-BBBV-3)

MAIN BOARD LAYOUT

IP SPEC

GENERAL REQUIREMENT OF WORLDWIDE STANDARD

1. MEET SAFETY REQUIRMENT.
UL60065, CSA C22.2 NO.60065, IEC 60065 FOR UL,CUL,CB,EK.
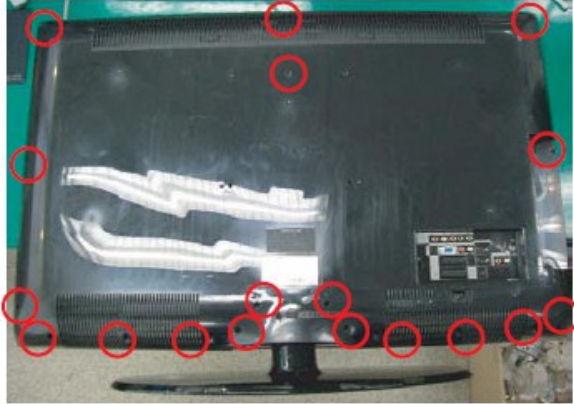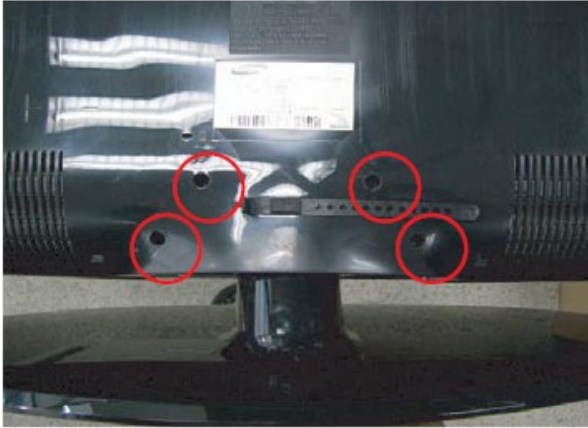
2. IMMUNITY TEST □ (EN55024)
 - IEC61000-4-2 ELECTROSTATIC DISCHARGE LMMUNITY TEST (ESD) Level 4 Criterion B
  (1) AIR DISCHARGE TEST(WITH SYSTEM) □ ±2KV, ±4KV, ±8KV, ±15KV.
  (2) CONTACT DISCHARGE TEST(WITH SYSTEM) □ ±2KV, ±4KV, ±8KV.
 - IEC61000-4-3 Radio Frequency Electromagnetic Field Immunity Test (RS): Level 2,
   criterion A. (WITH SYSTEM)
 - IEC61000-4-4 Electrical Fast Transient/Burst Immunity Test (EFT) Level 2 □ 1KV/5KHz
   on AC power port for 1 minute, criterion B. (WITH SYSTEM)
 - IEC61000-4-5 Surge Immunity Test (PLD) □ (WITH SYSTEM)
  (1) L to N □ 1.0KV/1.2*50uS, criterion B.
  (2) L/N to FG □ 2.0KV/1.2*50uS, criterion B.
 - IEC61000-4-6 Conducted Disturbances Induced by Radio-Frequency Field Immunity
   Test (CS) □ Level 2 criterion A. (WITH SYSTEM)
 - IEC61000-4-11 Voltage Dips and Voltage Interruptions Immunity Test □
  (1) Criterion B for > 95%, 0.5period Voltage Dips.
  (2) Criterion C for > 30%, 25period Voltage Dips;> 95%, 250period Voltage Interruptions.

Disassembly Tanzanite

Description	Picture Description	Screws
1. Place monitor face down on cushioned table. Remove the screws from the Stand. Remove stand.		○ x 18
		○ x 4

2. Lift up rear cover and remove the stand.		

3. Remove Screw from the stand BRKT and lift up the stand BRKT.		◯ x 4
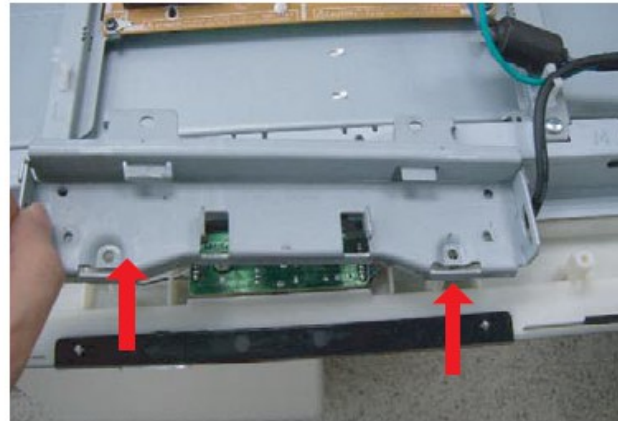
4. Disonnect cable from the boards.		
5. Remove the screws of Main Board and SMPS.		 ◯ x 12
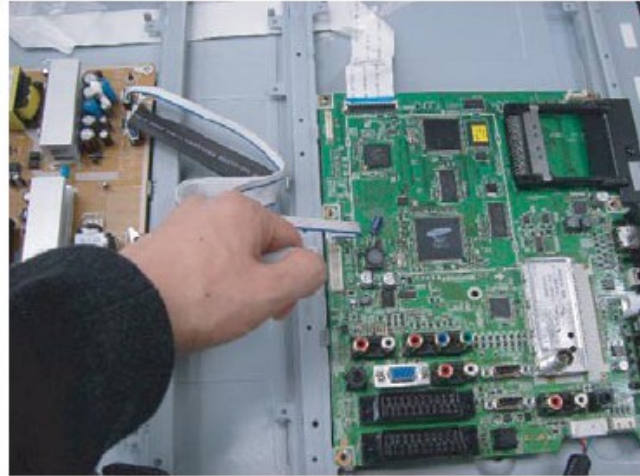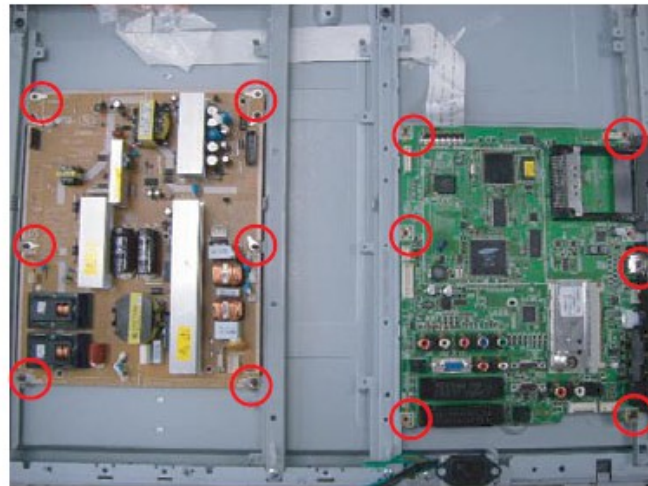
6. Remove screws and lift up the BRKT from the front cover. And then take the panel off.

○ x 6

○ x 5

CONTENTS

A) Power Trouble Shooting

- Power part is composed of power board and main board(small power)

- Check connectors between power board and main board

- Check main board power output on the board

- When you check main board power(small power IC), There are two types of power IC. One is PWM type, another is regulator type. PWM type should check after inductor. Regulator type should check on the output pin.

- Check each Voltage output

Check After Inductor
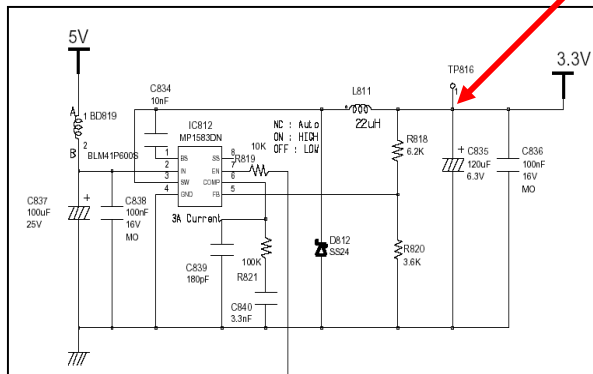
Check On Pin

1 PWM Type
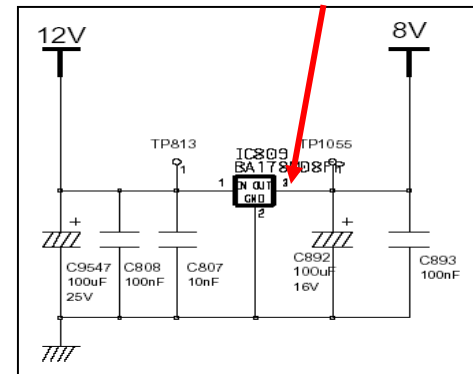
2 Regulator Type

B) Analog Part

🔹 It is easy to check analog video signal than digital video signal

🔹 Use reference signal input (EX. 16 Gray)

🔹 Check Signal Level and sync

🔹 Check Signal path until input of Video decoder
(Tuner ➔ Switch ➔ Video Decoder, AV Connecter ➔ Switch ➔ Video
Decoder, Scart ➔ Switch ➔ Video Decoder)
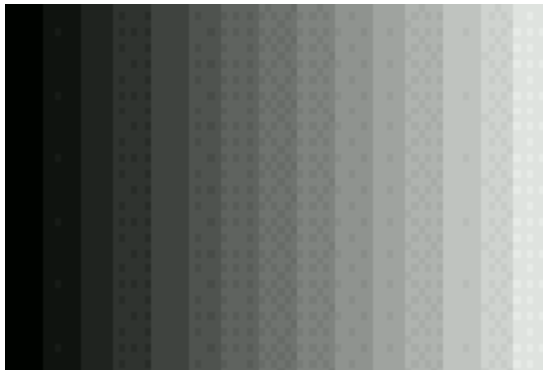
16 Gray Patten
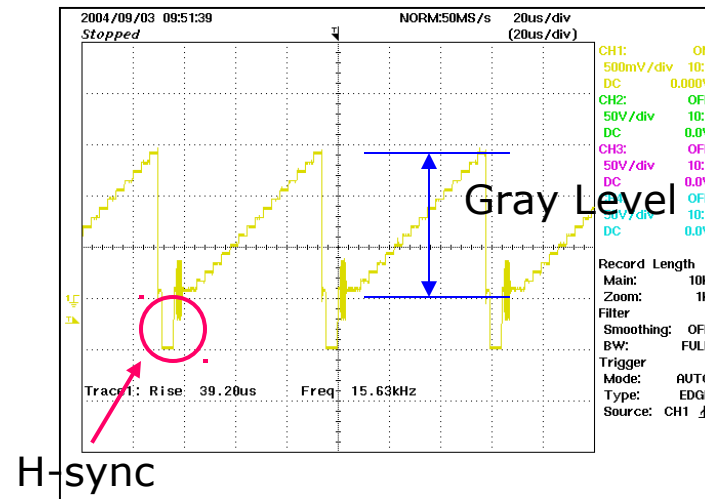
16 Gray Wave Form

C) Digital Part

- It is difficult to check digital video signal because of too fast and small signal

- Check digital video signal, Use H-sync, V-sync and Clock for basic

- Each digital video ICs connected with data line, H-sync, V-sync and Clock line

- Check H-sync period, V-sync period, Clock period

- If period is out of spec, Change the IC
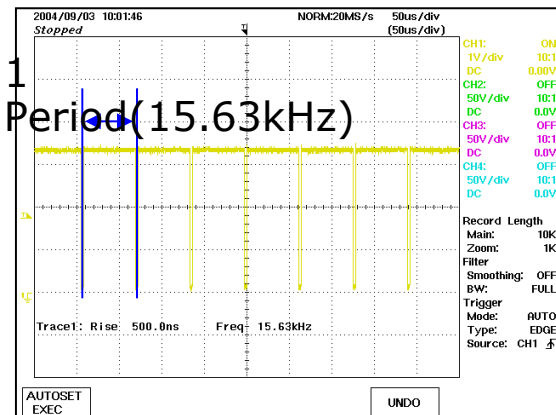
H-Sync
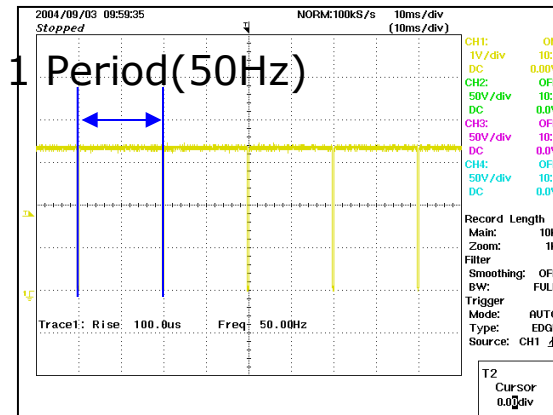
V-Sync
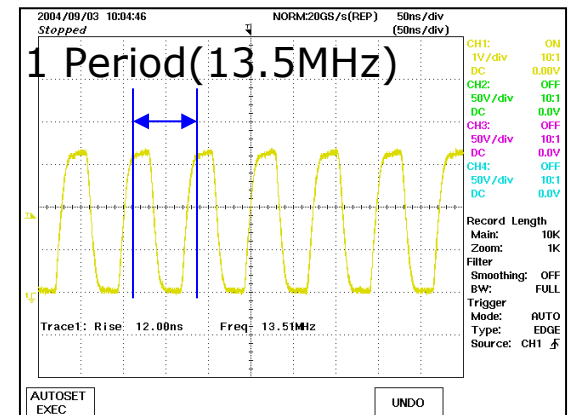
Clock

This example is Normal PAL TV signal Sync and Clock

D) Sound Part

🔹 Sound block of Bordeaux is composed of Sound Processor, AMP, Speakers.

🔹 If there is no sound or sound noise ,Trace the sound path
  (Input → Sound Processor → AMP → Speaker)

| TUNER |
| VIDEO |
| S-VIDEO |
| SCART |
| COMPONENT |
| PC |
| HDMI |

STV Sound Processor

SOUND AMP

SPEAKER

4-1-1. No Power

Symptom	– The LEDs on the front panel do not work when connecting the power cord. – The SMPS relay does not work when connecting the power cord. – The units appears to be dead.
Major checkpoints	The IP relay or the LEDs on the front panel does not work when connecting the power cord if the cables are improperly connected or the Main Board or SMPS is not functioning. In this case, check the following: – Check the internal cable connection status inside the unit. – Check the fuses of each part. – Check the output voltage of SMPS. – Replace the Main Board.
Diagnostics	 LAMP off, power indicator LED red color? —No→ Check a connection a power cable. ↓ Yes ❶ Does proper DC 13V appear at pin20 of CN1101? —No→ Change a Assy PCB Power. ↓ Yes ❷ Does proper DC A3.3V appear at C1040? —No→ Check a IC1011 / Change a main PCB ass'y ↓ Yes ❸ Does proper DC 5V, 3.3V, 1.2V appear at C1015, C1039, C1063? —No→ Check a IC1002, IC1012, IC1006. / Change a main PCB ass'y ↓ Yes A power is supplied to set?
Caution	Make sure to disconnect the power before working on the SMPS/IP.

4-1-2. No Video (Analog PC signal)

Symptom	– Audio is normal but no picture is displayed on the screen.
Major checkpoints	– Check the PC source – Check the SEMS01 – This may happen when the LVDS cable connecting the Main Board and the Panel is disconnected.
Diagnostics	 **Power Indicator is off. Lamp on, no video.** → Yes **Check a PC source and check the connection of DSUB cable?** → No → **Input a analog PC signal and connected cable(DPMS).** ↓ Yes ❶ **Does the signal appear at BD3014, 3015, 3016 (R, G, B)?** → No → **PC cable. Change a PC cable.** ↓ Yes ❷ **Does the digital data appear at the output of LVDS (RA5012~13)?** → No → **Check a IC5001. Change a main PCB ass'y** ↓ Yes **Check a LVDS cable? Replace a lcd panel?** → No → **Please, Call to Samsung Co. LTD.**
Caution	Make sure to disconnect the power before working on the SMPS/IP.

R,G,B Output Signal

4-1-3. No Video (HDMI - Digital Signal)

Symptom	– Audio is normal but no picture is displayed on the screen.
Major checkpoints	– Check the HDMI source – Check the SEMS01 – This may happen when the LVDS cable connecting the Main Board and the Panel is disconnected.
Diagnostics	 **Power Indicator is off. Lamp on, no video.** → Yes ❶ Check the connection of HDMI cable? → No → Input a HDMI cable. ↓ Yes ❷ Does the digital data appear at R5055~65? → No → Check a IC3001. Change a main PCB ass'y. ↓ Yes ❸ Does the digital data appear at the No output of LVDS (RA5012~14)? → No → Check a IC5001. Change a main PCB ass'y. ↓ Yes Check the LVDS cable? Replace the LCD panel? → No → Please, Contact Tech support
Caution	Make sure to disconnect the power before working on the SMPS/IP.

Digital Output Data

Signal of HDMI(Data)

4-1-4. No Video (Tuner_CVBS)

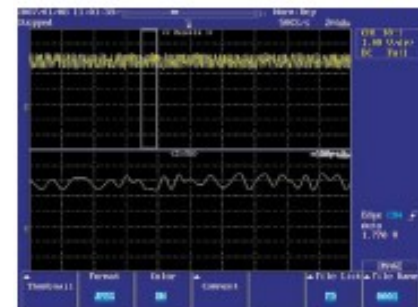|	
Symptom	– Audio is normal but no picture is displayed on the screen.
Major checkpoints	– Check the Tuner CVBS source – Check the SEMS01 – This may happen when the LVDS cable connecting the Main Board and the Panel is disconnected.
Diagnostics	
Caution	Make sure to disconnect the power before working on the SMPS/IP.

CVBS Output Signal

Tuner CVBS Output Signal

Diagnostics flow

Power Indicator is off. Lamp on, no picure. — No → Connect the RF cable and check RF signal.

↓ Yes

❶ Does the signal appear at L3001? — No → Check a B+ voltage (#3 of Tuner) 5V, change a main PCB ass'y.

↓ Yes

❷ Does the signal appear at R3169 of IC2601? — No → Change a main PCB ass'y.

↓ Yes

Check the LVDS cable? Replace the LCD panel? — No → Please, Call to Samsung Co. LTD.

4-1-5. No Picture (S-VIDEO_Y,C)

| Symptom	– Audio is normal but no picture is displayed on the screen.
Major checkpoints	– Check the S-Video_Y,C source – Check the SEMS01 – This may happen when the LVDS cable connecting the Main Board and the Panel is disconnected.
Diagnostics	 **Power Indicator is off. Lamp on, no picure.** → No → **Connect the s-video cable. Operating a video player.** ↓ Yes ❶ **Does the Y/C signal appear at R3299, R3218?** → No → **Check a connection hamess.** ↓ Yes **Check a LVDS cable? Replacea lcd panel?** → No → **Please, Call to Samsung Co. LTD.**
Caution	Make sure to disconnect the power before working on the SMPS/IP.

Digital Output Data

Analog Signal(Y,C)
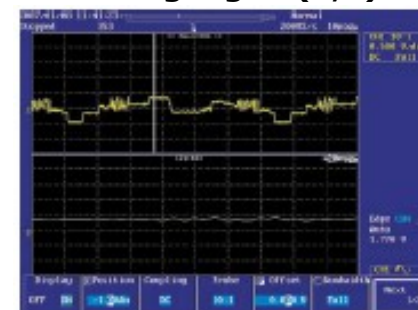
4-1-6. No Sound

Symptom	– Audio is normal but no picture is displayed on the screen.
Major checkpoints	– Check the RF Source – Check the SEMS01 – This may happen when the LVDS cable connecting the Main Board and the Panel is disconnected.
Diagnostics	
Caution	Make sure to disconnect the power before working on the SMPS/IP.

Diagnostics flow:

- Picture is display, no sound. → No → Connect a sound cable. control a volume.
- Yes
- ❶ Does the signal appear at C2058~65? → No → Check sound cables of each source, and a connection harness.
- Yes
- ❷ Does the signal appear at #3,#13 of IC2002? → No → Check IC2002. Change a main PCB ass'y.
- Yes
- ❸ Does the signal appear at BD2006~9? → No → Change a main PCB ass'y.
- Yes
- Replace the speaker ass'y.

The Signal Inputed to IC2002
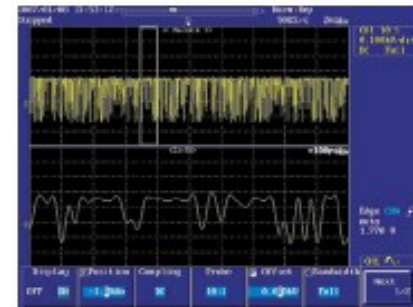


The Signal Inputed to IC2001
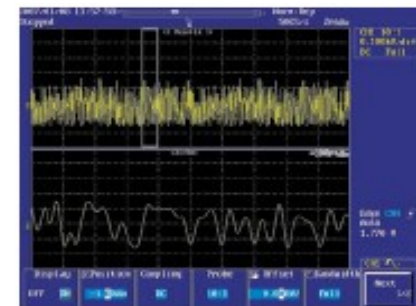
White Balance - Calibration

1. You can adjust the white ratio in factory mode (1:Calibration, 3:White-Balance).

2. Since the adjustment value and the data value vary depending on the input source, you have to adjust these in CVBS, Component 1 and HDMI 1 modes.

3. The optimal values for each mode are configured by default. (Refer to Table 1, 2) It varies with Panel's size and Specification.

- Equipment : CS-210
- Pattern: MIK K-7256 #92 "Flat W/B Pattern" as standard
- Use other equipment only after comparing the result with that of the Master equipment.

- Set Aging time : 60min ↑

- Calibration and Manual setting for WB adjustment.
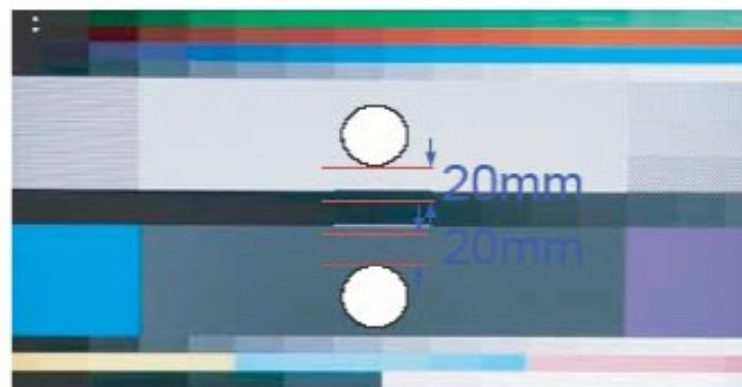
HDMI : Time #6 720P, Pattern #24 Chessboard Calibration ⟶ Manual adjustment #92 pattern (720p)

COMP: Time #6 720P, Pattern #24 Chessboard Calibration ⟶ Manual adjustment at #92 pattern (720p)

CVBS: Time #2 PAL, Pattern #24 Chessboard Calibration ⟶ Manual adjustment at #92 pattern (NTSC)

PC: Time #21 1024*768, Pattern #24 Chessboard Calibration ⟶ Manual adjustment at #92 pattern (NTSC)

- If finishing in HDMI mode, adjustment coordinate is almost same in AV/COMP mode.
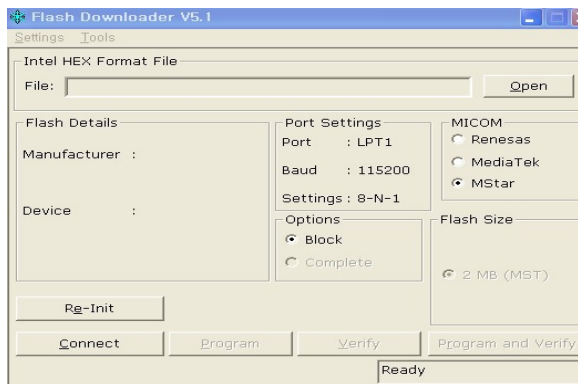
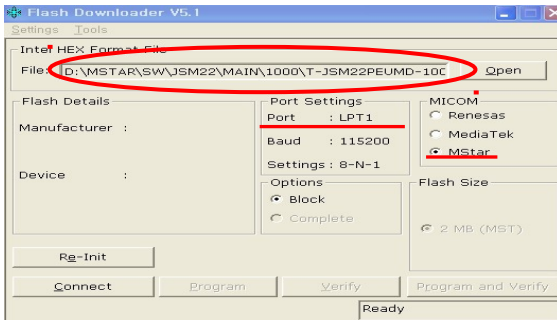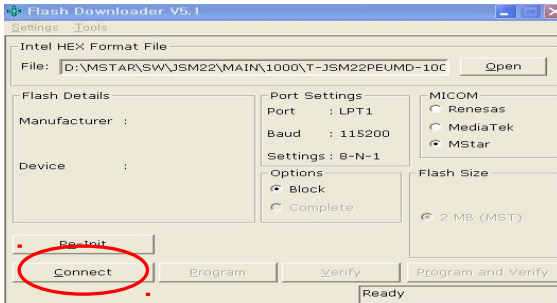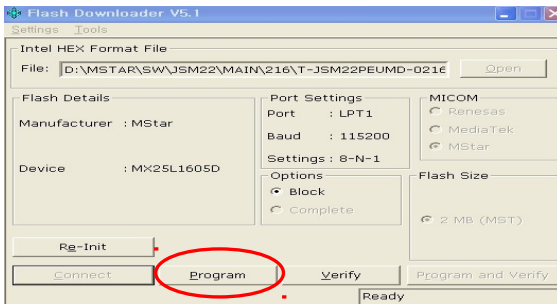- White Balance Manual Adjustment

HOW TO UPGRADE

HOW TO UPGRADE

1. ATV S/W

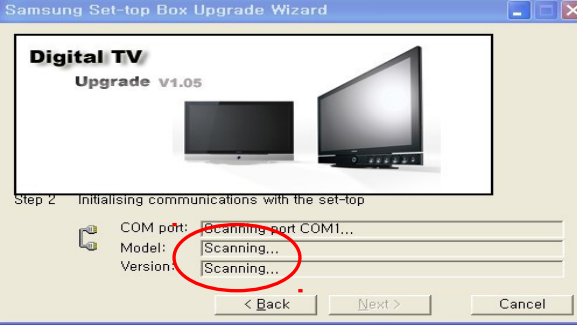| Order	Description		ETC.
1	Open the Flash Downloader.		□
2	Connect DDC Manager to the TV Set with D-SUB Cable.		□

HOW TO UPGRADE
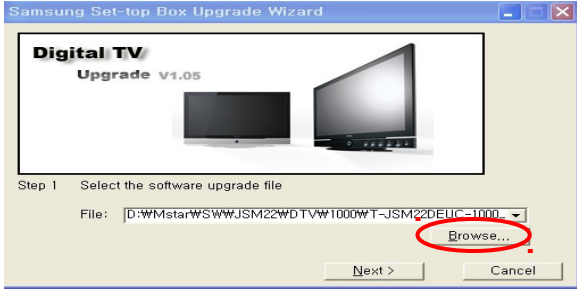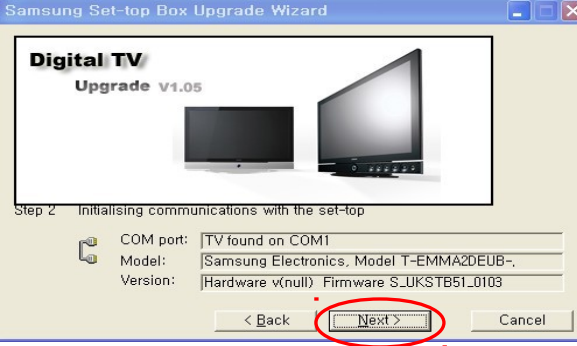
3	1) Choose the ATV S/W. 2) Check the download port. (LPT1) 3) Click "Mstar" for Micom.		▢
4	Click "Connect"		Before clicking the icon, TV shoud be turned on.
5	Click "Program"		▢

HOW TO UPGRADE

2. DTV S/W

Order	Description		ETC.
1	Connect PC and TV Set with Serial cable. TV should be turned on.		
2	Open the Samsung Set-top Box upgrade Wizard.		

HOW TO UPGRADE

3	1) Choose the DTV S/W by clicking "Browse" 2) After choosing the S/W, click the "Next" icon.		□
4	When it display "Scanning…", power off and on the TV set.		It doesn't matter soft or hard power off and on.
5	After scaning COM port, Model, and Version, click "Next"		□

HOW TO UPGRADE

After S/W Upgrade

▪ How to Access Service Mode
▪ Entering Factory Mode
  <Power OFF> ☞ <INFO> ☞ <MENU> ☞ <MUTE> ☞ <Power ON>

▪ Factory Data
  1. Option Table(Service)
  2. WB Adjust
  3. Information
  4. Advanced Menu
     If you want to enter here, press "0000".

HOW TO UPGRADE

▪ **How to Initialize.**

Click "1. Option Table(Service)" → "Factory Reset" in Factory Menu.
You can make every setting in Factory Initial Status.

ATTACHMENT

CONTENTS

I.   What is HDMI?

II.   What is a TrusurroundXT

ITEM	DVI	HDMI
DATA SPEED	1.78G BPS	2.2G BPS
AUDIO	NONE	CD OR HIGHER QUALITY DATA
REMOTE CONTROL	NONE	AV-LINK CAPABILITIES REPLACES INFRARED REPEATERS INTEGRATED REMOTE CONTROL SYSTEM
CONNECTOR		
FUTURE COMPATIBILITY	NONE	ACCOMMODATES ATSC DTV FORMATS SUPPORTS 8 CHANNEL AUDIO SPARE BANDWIDTH FOR FUTURE APP. (55% EXTRA AFTER HD TRANSMISSION)
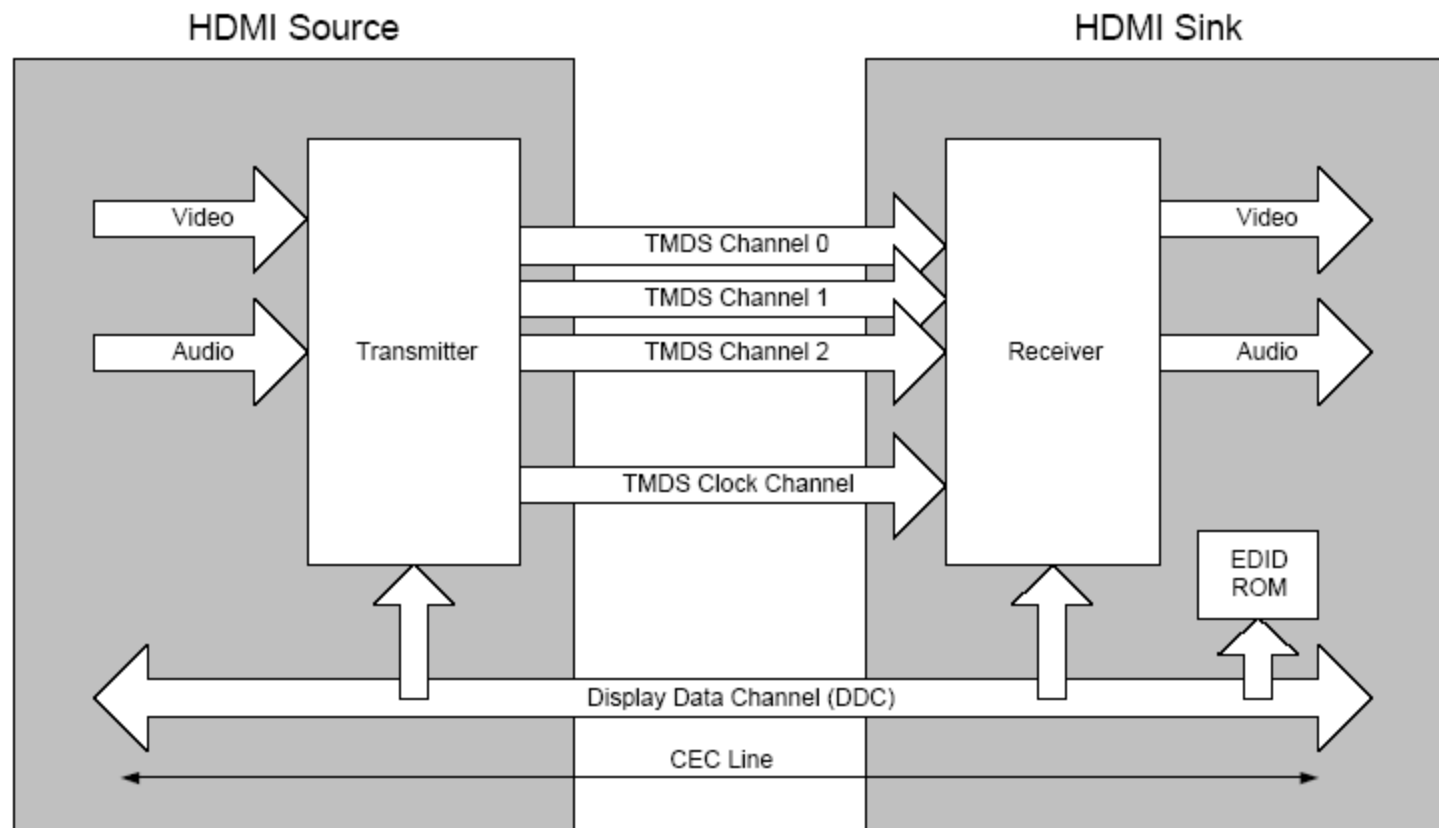
HDMI block diagram

HDMI system architecture is defined to consist of Sources and Sinks. A given device may have one or more HDMI inputs and one or more HDMI outputs. Each HDMI input on these devices shall follow all of the rules for an HDMI Sink and each HDMI output shall follow all of the rules for an HDMI Source.

As shown HDMI block diagram the HDMI cable and connectors carry four differential pairs that make up the TMDS data and clock channels. These channels are used to carry video, audio and auxiliary data. In addition, HDMI carries a VESA DDC channel. The DDC is used for configuration and status exchange between a single Source and a single Sink. The optional CEC protocol provides high-level control functions between all of the various audiovisual products in a user's environment.

Audio, video and auxiliary data is transmitted across the three TMDS data channels. The video pixel clock is transmitted on the TMDS clock channel and is used by the receiver as a frequency reference for data recovery on the three TMDS data channels. Video data is carried as a series of 24-bit pixels on the three TMDS data channels. TMDS encoding converts the 8 bits per channel into the 10 bit DC-balanced, transition minimized sequence which is then transmitted serially across the pair at a rate of 10 bits per pixel clock period.

Connector Drawings
All dimensions in millimeters
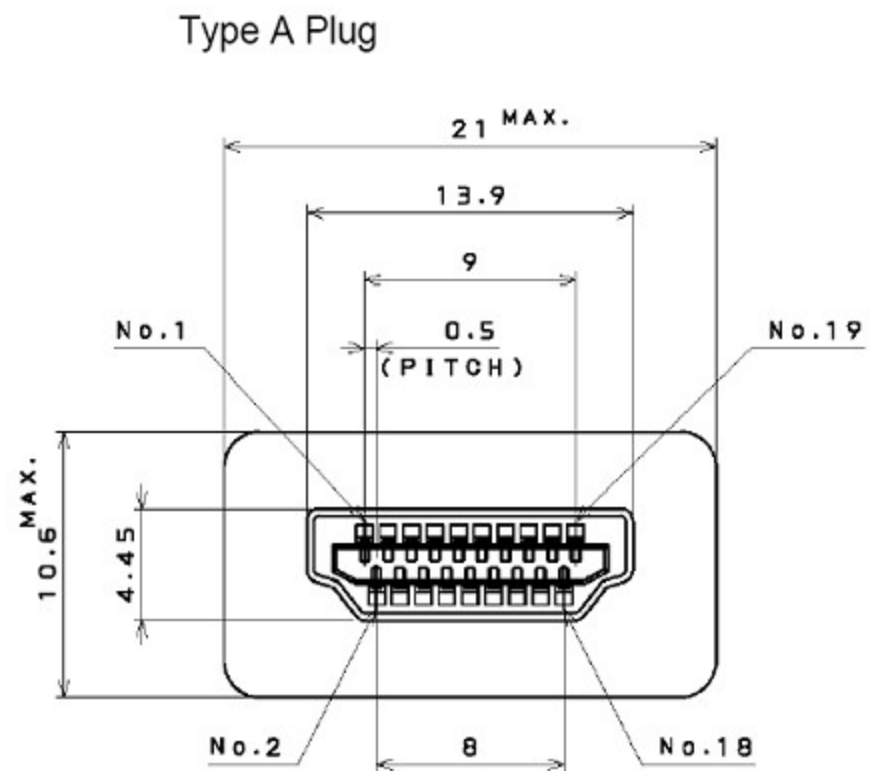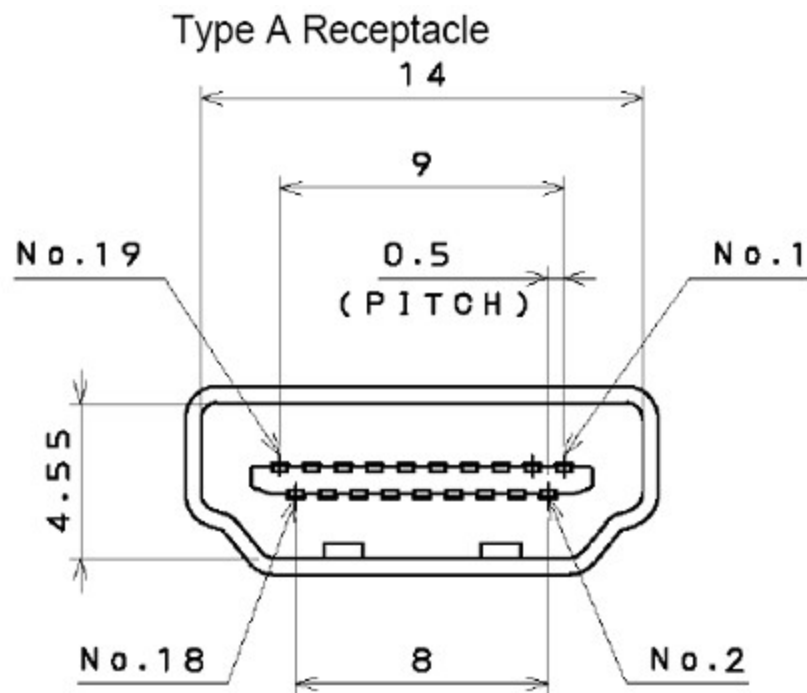
HDMI Connector pin configuration			
NO	Function	NO	Function
1	D2_RX2+	11	D2_RXCLK GND
2	D2_RX2 GND	12	D2_RXCLK
3	D2_RX2-	13	No connection
4	D2_RX1+	14	No connection
5	D2_RX1 GND	15	HDMI_DDC_SCL
6	D2_RX1-	16	HDMI_DDC_SDA
7	D2_RX0+	17	HDMI_DDC_GND
8	D2_RX0 GND	18	HDMI VCC (5V)
9	D2_RX0-	19	Ident_HDMI
10	D2_RXCLK+	20	Common GND
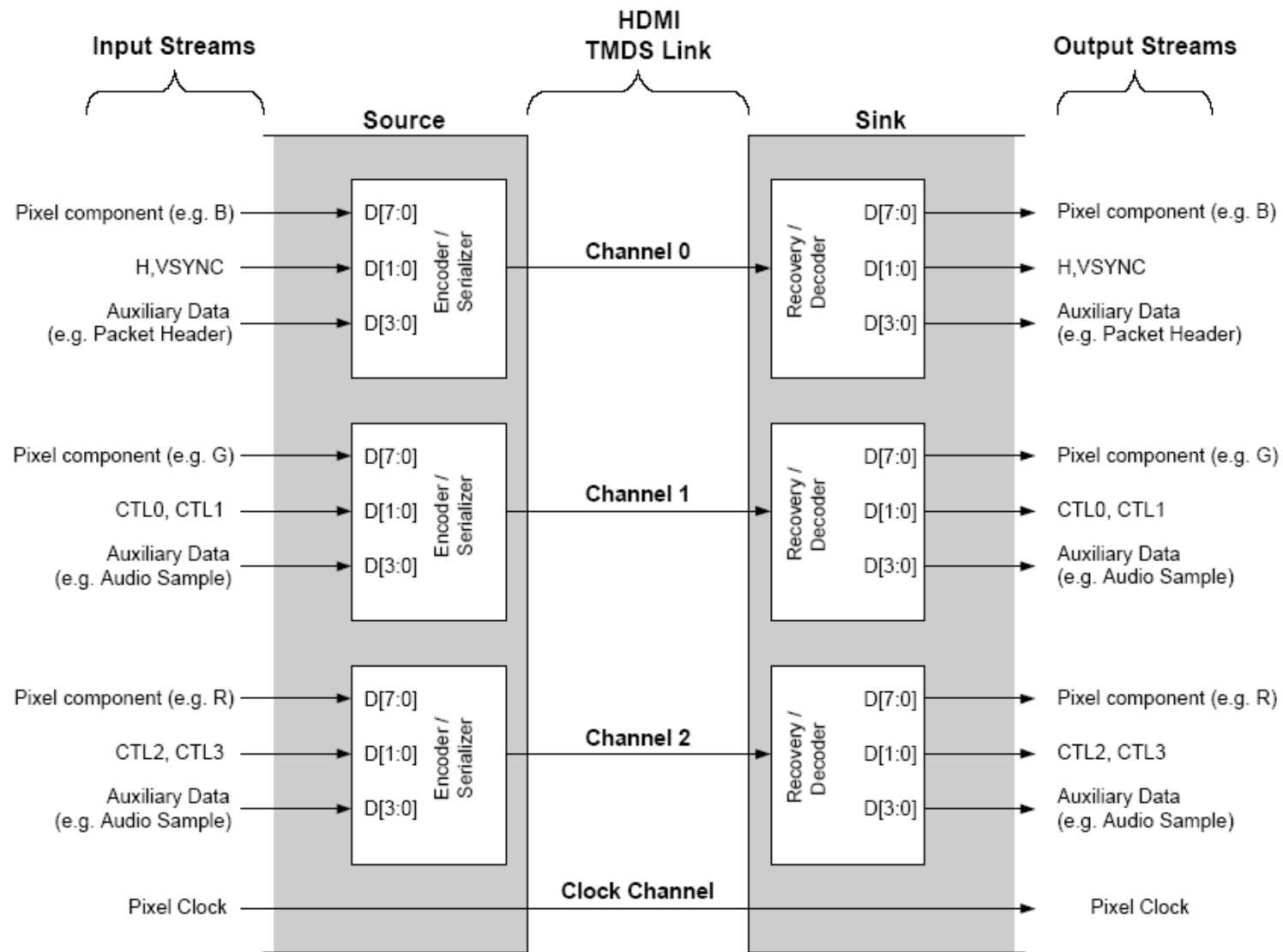
HDMI Encoder/Decoder Overview

Link Architecture

As shown in an HDMI link includes three TMDS Data channels and a single TMDS Clock channel. The TMDS Clock channel constantly runs at the pixel rate of the transmitted video. During every cycle of the TMDS Clock channel, each of the three TMDS data channels transmits a 10-bit character. This 10-bit word is encoded using one of several different coding techniques.

The input stream to the Source's encoding logic will contain video pixel, packet and control data. The packet data consists of audio and auxiliary data and associated error correction codes.

These data items are processed in a variety of ways and are presented to the TMDS encoder as either 2 bits of control data, 4 bits of packet data or 8 bits of video data per TMDS channel. The Source encodes one of these data types or encodes a Guard Band character on any given clock cycle.

Example: TMDS periods in 720x480p video frame
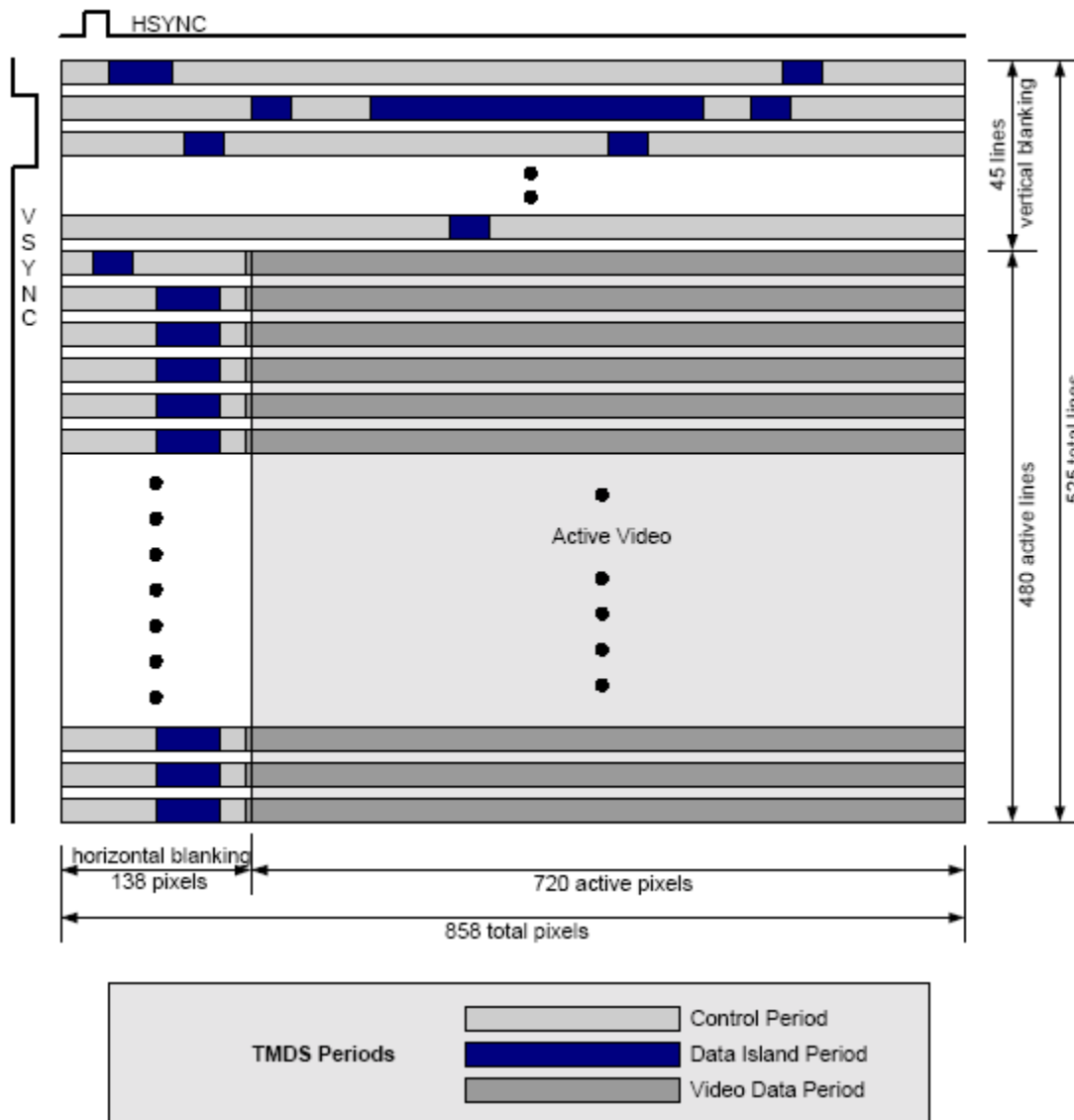
Operating Modes Overview

The HDMI link operates in one of three modes: Video Data Period, Data Island period, and Control period. During the Video Data Period, the active pixels of an active video line are transmitted. During the Data Island period, audio and auxiliary data are transmitted using a series of packets. The Control period is used when no video, audio, or auxiliary data needs to be transmitted.
A Control Period is required between any other two periods.

Video Data Periods use transition minimized coding to encode 8 bits per channel, or 24 bits total per pixel.
Data Island Periods are encoded using a similar transition minimized coding, TMDS Error Reduction Coding (TERC4), which transmits 4 bits per channel, or 12 bits total per pixel clock period.
During Control Periods, 2 bits per channel, or 6 bits total are encoded per pixel clock using a transition maximized encoding. These 6 bits are HSYNC, VSYNC, CTL0, CTL1, CTL2 and CTL3. Near the end of every Control Period, a Preamble, using the CTLx bits, indicates whether the next Data Period is a Video Data Period or a Data Island Period.

Video Format Support

In order to provide maximum compatibility between video Sources and Sinks,

specific minimum requirements have been specified for Sources and Sinks

Primary Video Format Timings

- 640x480p @ 59.94/60Hz
- 1280x720p @ 59.94/60Hz
- 1920x1080i @ 59.94/60Hz
- 720x480p @ 59.94/60Hz
- 720(1440)x480i @ 59.94/60Hz
- 1280x720p @ 50Hz
- 1920x1080i @ 50Hz
- 720x576p @ 50Hz
- 720(1440)x576i @ 50Hz

Audio Sample Rates and Support Requirements

If an HDMI Source supports audio transmission across any output, then it shall support HDMI audio transmission. If an HDMI Source supports any HDMI audio transmission, then it shall support 2 channel L-PCM using an IEC 60958 Subpacket structure, with either 32kHz, 44.1kHz or 48kHz sampling rate and a sample size of 16 bits or more.

An HDMI Source is permitted to transmit L-PCM or encoded audio data at sample rates of 32kHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz and 192kHz using either IEC 60958 format or IEC 61937 format. If an HDMI Sink supports audio reception across any input, then it shall support audio reception from all HDMI inputs.

Basic Audio. is defined as two channel L-PCM audio at sample rates of 32kHz, 44.1kHz, *or* 48kHz, with a sample size of at least 16 bits. For EIA/CEA-861B references to DTV devices, .Basic Audio. is defined as two channel L-PCM audio at sample rates of 32kHz, 44.1kHz, *and* 48kHz.

There is no sample size usage restriction for DTV devices. An HDMI Sink may optionally accept audio at sample rates of 88.2kHz, 96kHz, 176.4kHz and/or 192kHz using either IEC 60958 format or IEC 61937 format, and should indicate these capabilities in the E-EDID data structure.

Compatibility With DVI

All HDMI Sources shall be compatible with DVI 1.0 compliant sink devices (i.e. "monitors" or "displays") through the use of a passive cable converter. Likewise, all HDMI Sinks shall be compatible with DVI 1.0 compliant sources (i.e. "systems" or "hosts") through the use of a similar cable converter.

When communicating with a DVI device, an HDMI device shall operate according to the DVI 1.0 specification, with the following exception - these devices are not required to comply with DVI 1.0 rules regarding:
- Monitor scaling requirements
- Physical Interconnect specifications
- System Low Pixel Format Support Requirements

Furthermore, for HDMI devices which do not have a "BIOS" or "operating system",
there are the following additional exceptions:
- "BIOS" requirements
- "Operating system" requirements
- "System level event" requirements
- Power management requirements

TruSurround XT for Virtual Surround Sound

DVD players have transformed the
household into an entertainment center.
While DVD owners can now enjoy 5.1
multichannel soundtracks for movies and
music in the comfort of their living room or
at their computer, most televisions and
computer playback systems
have only two speakers.
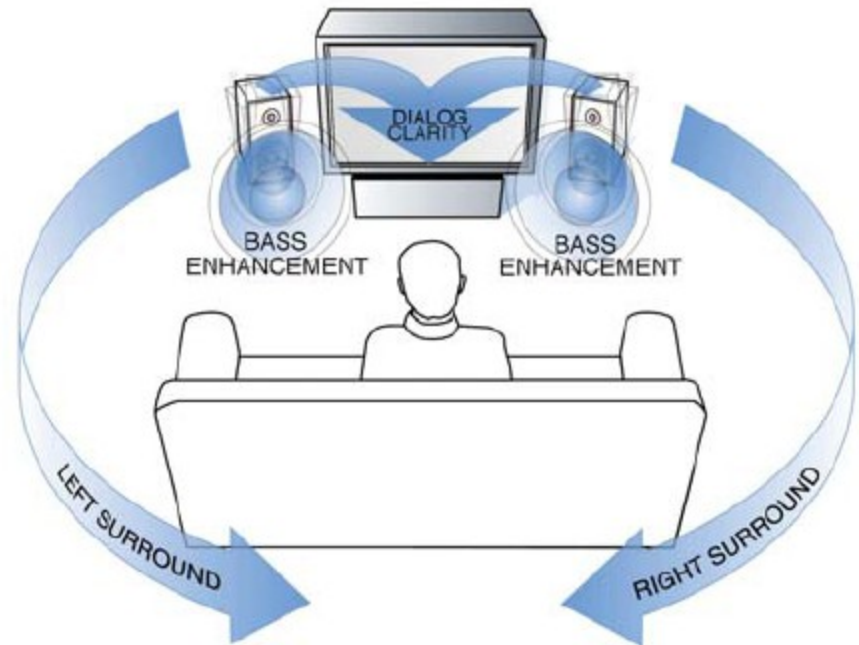
TruSurround XT□ bridges this gap. It processes any multichannel audio source, as is
usually found on DVDs, and transforms the material into breathtaking virtual surround
sound from just two speakers or headphones.

Based upon the patented TruSurround® technology from SRS Labs, which is the
established standard for virtual surround sound, TruSurround XT also includes the unique
features of SRS Dialog Clarity and TruBass and creates a stunning 3D sound image from
standard stereo material.

TruSurround XT features

TruSurround: TruSurround is a patented SRS technology that solves the problem of playing 5.1 multichannel content over two speakers. TruSurround delivers a compelling, virtual surround sound experience through any two-speaker playback system, including internal television speakers and headphones. It is fully compatible with all multichannel formats up to 6.1 channels.

SRS Dialog Clarity Enhancement: Playback of dialog often suffers due to competing signals from other speakers. In addition, feature film soundtracks are mixed specifically for cinema playback and are loaded with the latest advancements in special audio effects. When translated over home theatre or computers systems, dialog may become unintelligible. This patented SRS algorithm enhances signal clarity to address these problems, thus improving dialog intelligibility from all such source material.

TruSurround XT features

TruBass: TruBass is a patented SRS technology that enhances bass performance utilizing proprietary psychoacoustic techniques. These techniques restore the perception of fundamental low frequency tones by dynamically augmenting harmonics, which are more easily reproduced by contemporary loudspeakers.

Using TruBass, TruSurround XT takes the bass information contained within the original audio track and helps the speakers or headphones re-create it – even if it is below the speaker's low frequency limitations.

WOW: WOW™ is an award winning stereo enhancement technology that significantly improves the performance of stereo (non-surround sound encoded material) signals through any two-speaker system, including headphones. It extends the sound image in both the horizontal and vertical planes well beyond the speakers themselves. In addition, WOW incorporates TruBass and SRS Dialog Clarity Enhancement.

When TruSurround XT accepts a stereo signal, WOW is enabled for a better listening experience. Wow is also used by Microsoft in their new Media Player for Windows XP and Windows Media Player 7.