

LCD TV Technical Training Manual

※ ML-038C Chassis 37,42 inch LCD TV

- RZ-37LZ30
(Market:EU)

- RZ-42LZ30
(Market:EU)



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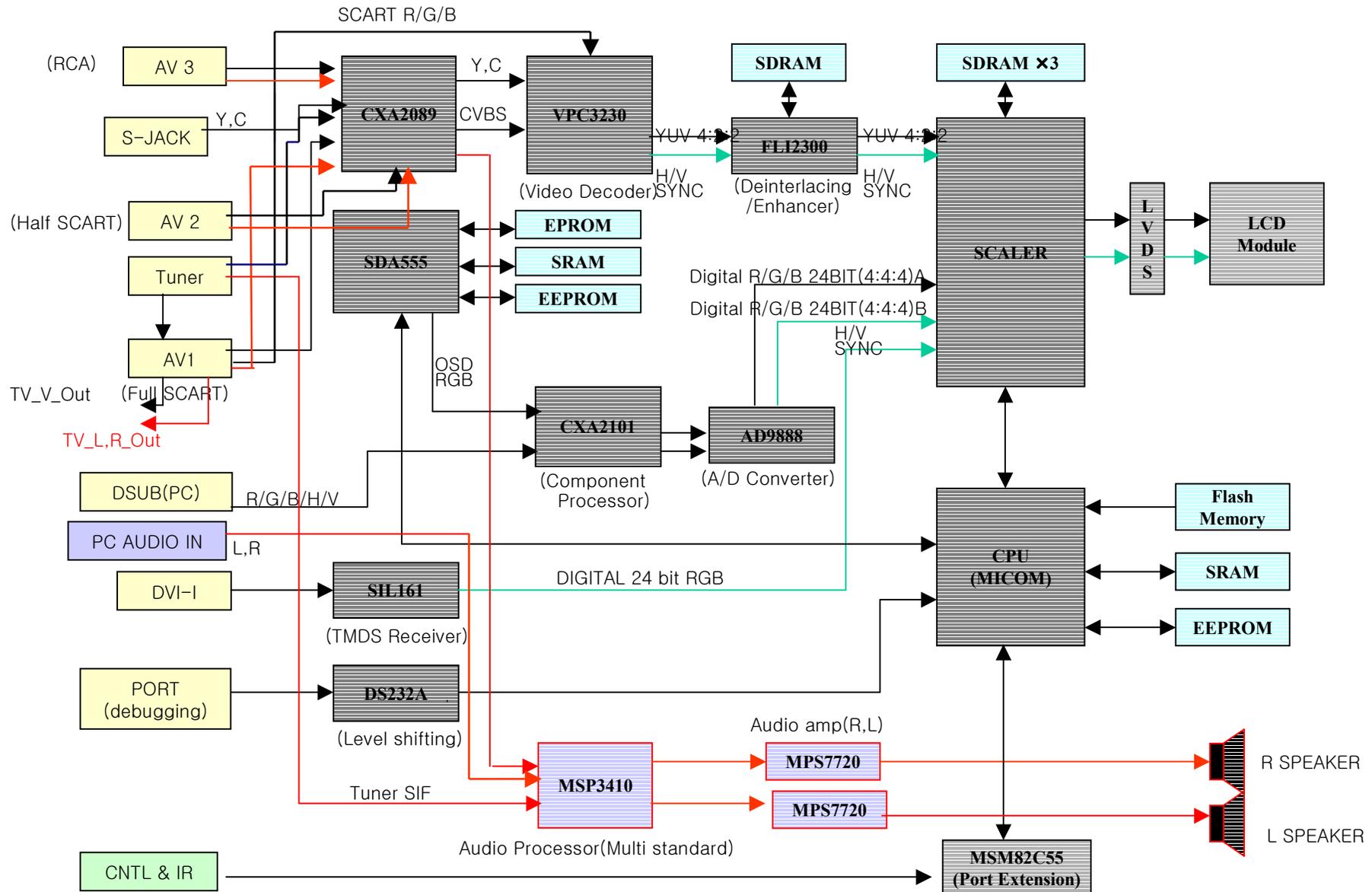
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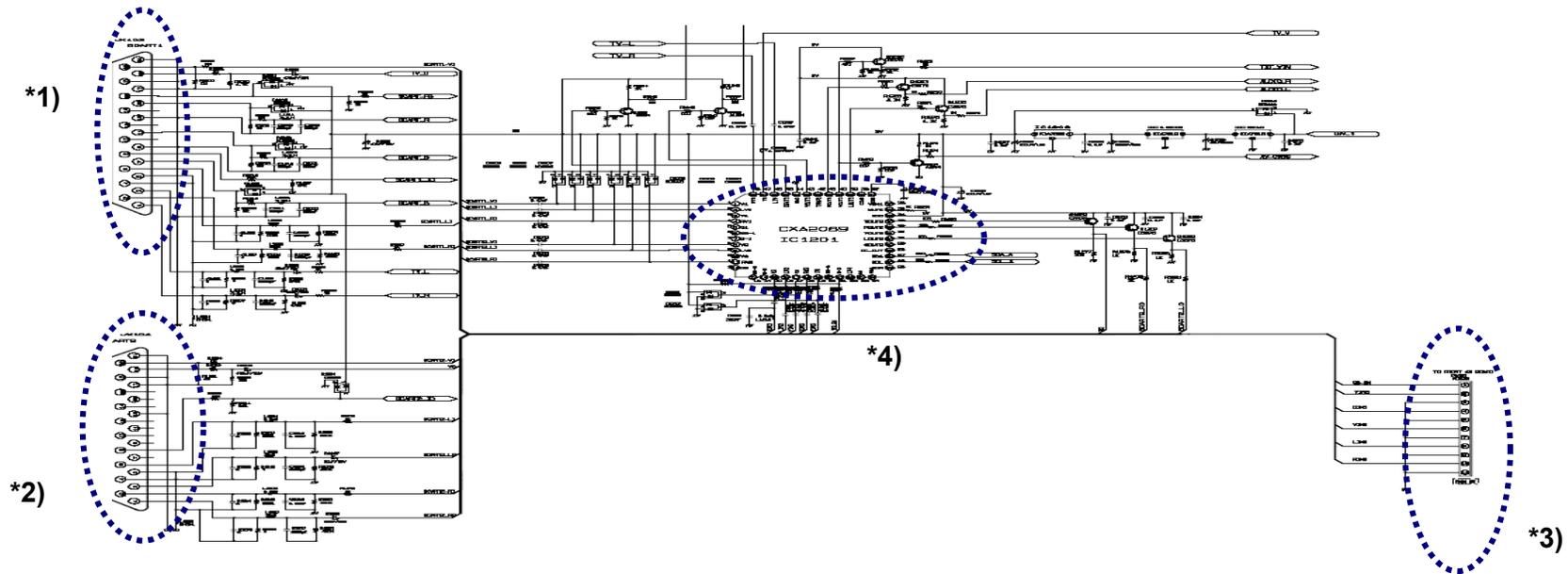
1. Circuit operation Description

1.1 Block diagram: The following diagram illustrates basic schematic of the chassis:



1. Circuit operation Description

1.2 Signal input Block



This is a analog signal input circuit diagram:

This block consist of three SCART and one S-Video inputs.

*1) This is SCART Jack. Output signals from this jack are CVBS and R,G,B,FB.

Inputs are CVBS signal from tuner and audio inputs for R and L channels.

*2) This is also SCART Jack. Input signal from this jack is CVBS only. And output signal is video signal that currently is displayed on our LCD TV.

*3) This is S-Video signal input port,the input to this port comes from Av board through S-jack.

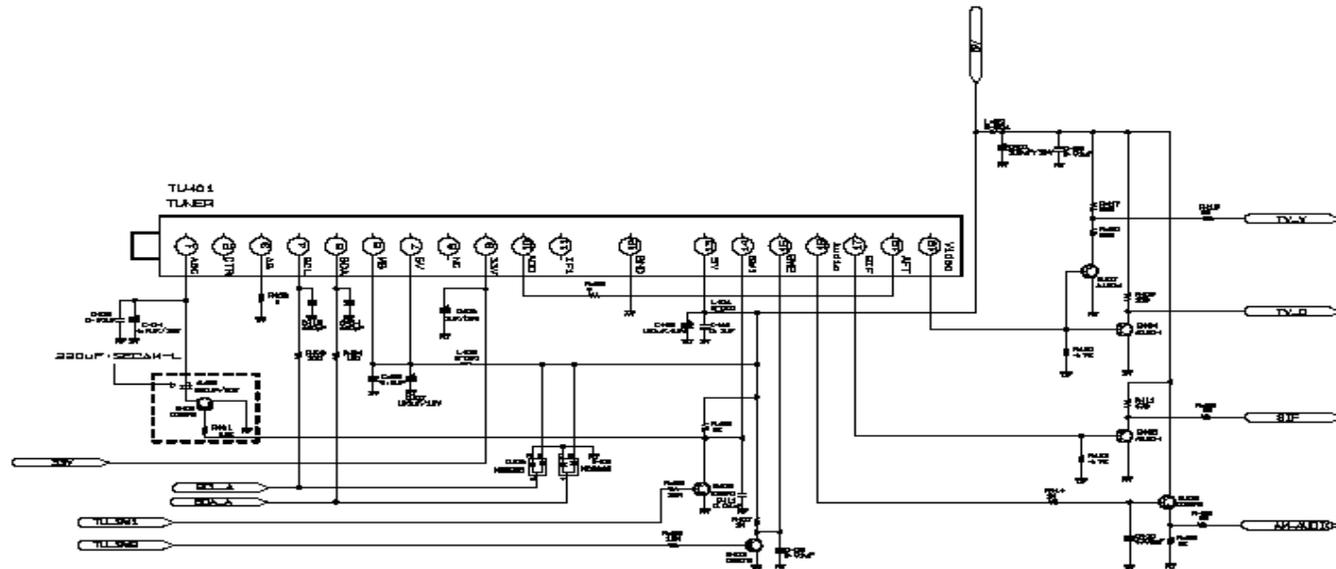
82 ohm resistors on the Video Signal line are used for impedance matching.

*4) This is analog video Switching IC. Five video input signals(Three SCART , one S-Video, one CVBS from Tuner) are switched by this IC.

1. Circuit operation Description

1.2 Signal input Block

*1)

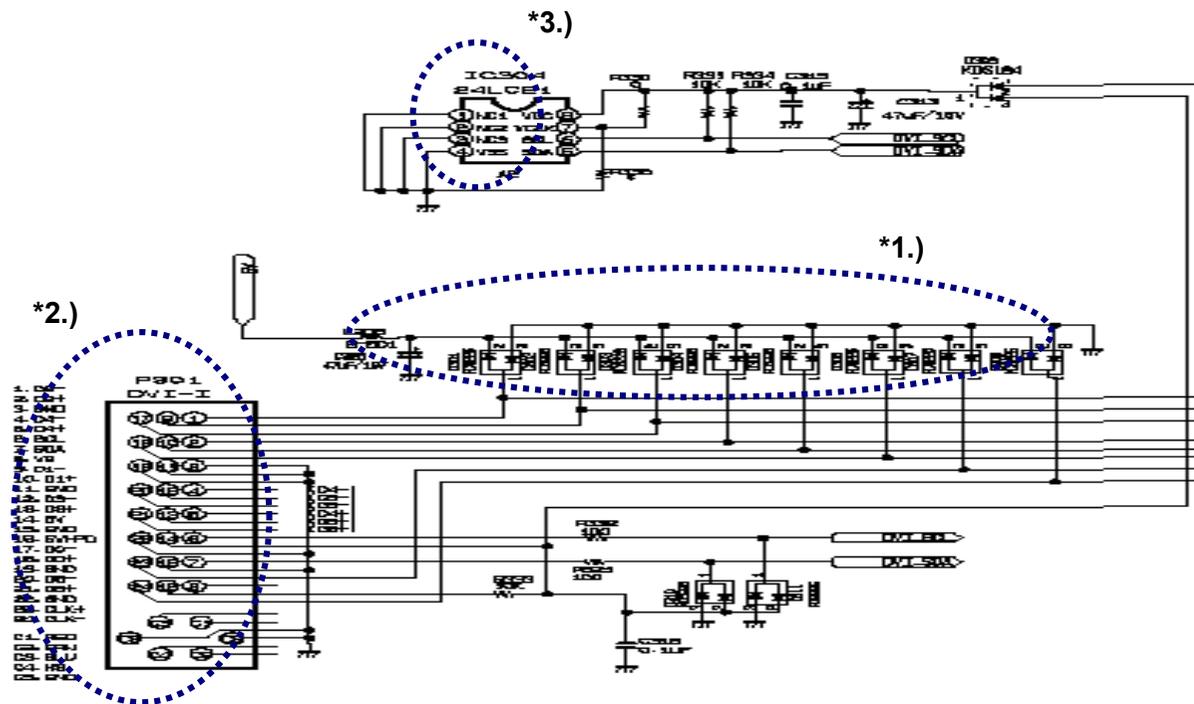


This is a analog Tuner and associated circuit diagram:

This Tuner takes the input as the RF signal from cable or antenna and converts it into IF signal using Superheterodyning process.

- 1) This Tuner can tune for PAL and SECAM RF signal
- 2) Power supply voltage for this tuner is 5V, 33V.
- 3) The inputs to the tuner is TV RF signal from coaxial cable and output is TV video signal which processed by video decoder to be displayed on screen.
- 4) The most important functions associated are AGC(Automatic Gain Control) and AFT(Auto Frequency Tuning).
- 5) The SIF i.e.Sound IF is also given out by tuner which is then fed to audio section.

1. Circuit operation Description



This is a DVI signal input circuit diagram.

The jack is **DVI-I** Digital and Analog [RGB]; 29 pins.(For Its details and Pin out see Appendices at the end)

This block consist of TMDS input, SCL and SDA signals.

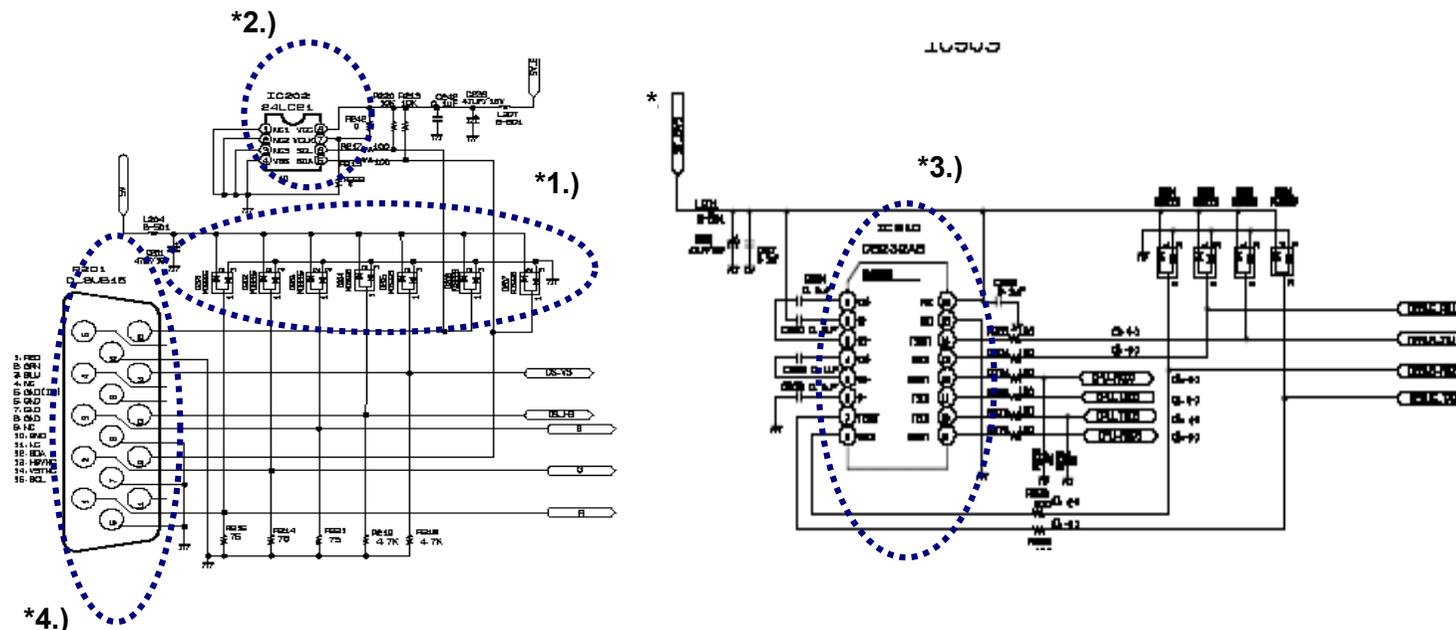
*1) This is a circuit for protection against the ESD.

*2) This is a TMDS signal input which are consist of 4 channels. 3 channel is for data and 1 is for clock.

*3) This is EEPROM which DVI EDID data is stored in.

The EDID should be stored in this EEPROM to boot up with the DVI signal input.

1. Circuit operation Description



This is Analog R,G,B signal and RS-232C port input Block.
 This block consist of 3.3V regulator, 2.5V regulator, panel Vcc voltage switching circuit.

*1) This is a circuit for protection against the ESD.

*2) This is EEPROM which RGB EDID data is stored in.

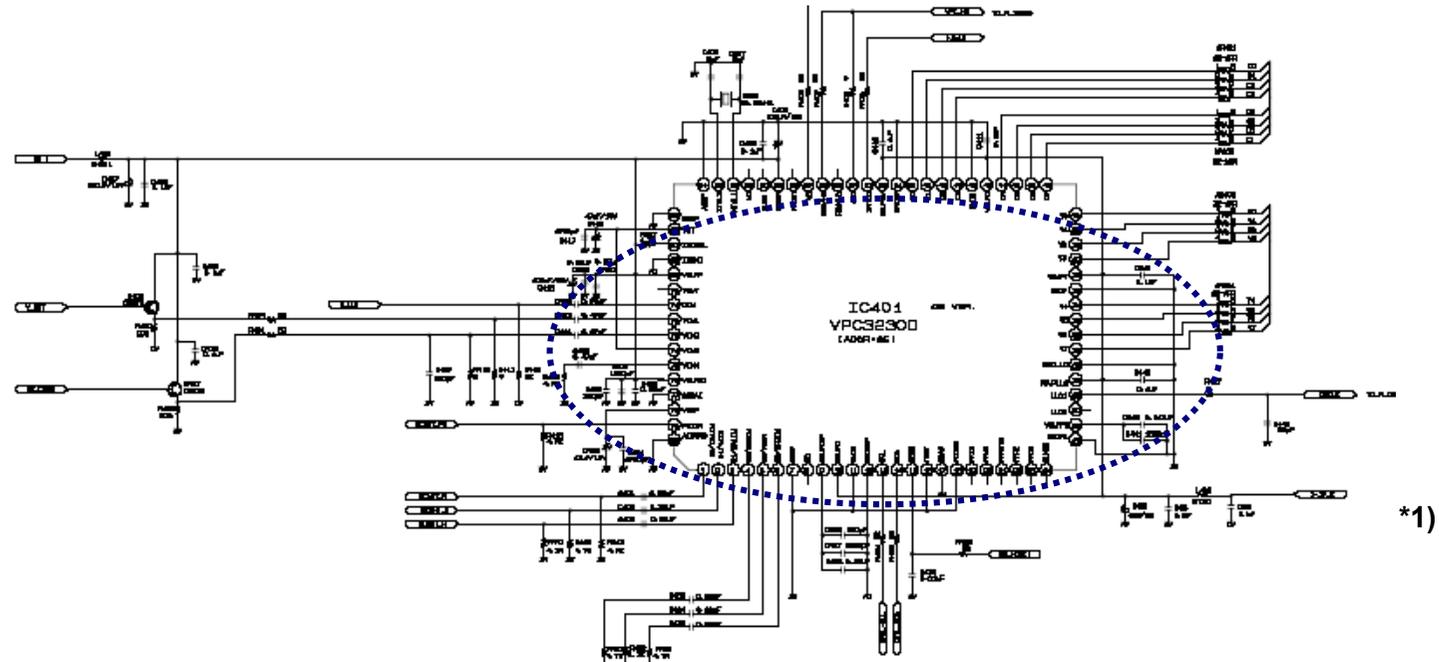
The EDID should be stored in this EEPROM to boot up with the DVI signal input.

*3) This is Level shifting IC. It is used to communicate between PC and our chassis's CPU for debugging.

*4) This is D-SUB jack.(For Its details and Pin out see Appendices at the end)

1. Circuit operation Description

1.3 Video decoder Block



The main Features of *1) VPC3230 are have functions are

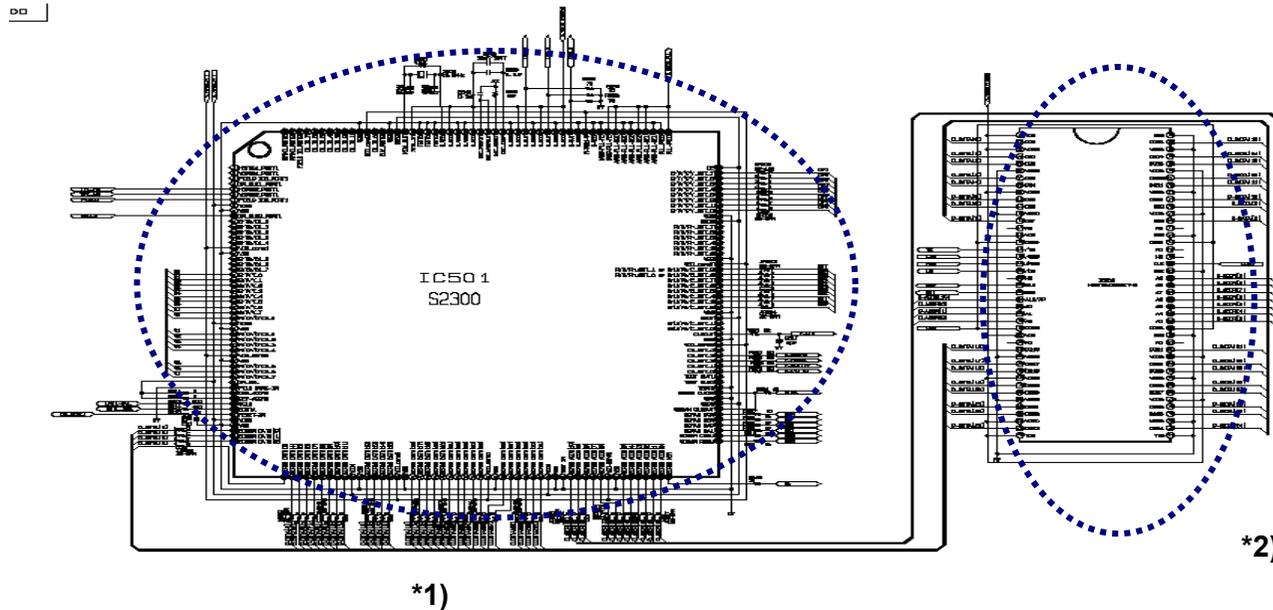
- high performance adaptive 4H Comb-Filter Y/C separator with adjustable vertical peaking.
- multi-standard color decoder PAL/NTSC/SECAM including all sub standards.
- four CVBS, one S-Video input and one CVBS output
- two RGB/YPbPr Component input, one Fast Blank input
- peaking, contrast, brightness, color saturation, tint for RGB/YPbPr and CVBS, S-Video
- IC Bus interface
- one 20.25Mhz Crystal, few external components.
- YUV 4:2:2 output format.

* Input signal Format

- *1) CVBS Signal
(Y Signal+C Signal+H,V Sync)
- *2) S-Video Signal
(Separated Y,C Signal)
- *3) Component Signal ,Only 480i
(Y, Pb, Pr)

1. Circuit operation Description

1.4 Deinterlacer Block



This block consists of

*1) FLI2200 (Deinterlacer/Line doubler).

*1) Removes artifacts produced by improper Y/C separation.

Supports 525/60 (NTSC), 625/50 (PAL/SECAM).

Accept up to 1100 pixels/line

YUV, RGB or YCbCr progressive output options.

Supports 8 or 10 bit inputs and outputs.

Our chassis uses 10 bit YUV output format.

*2) 64M SDRAM,

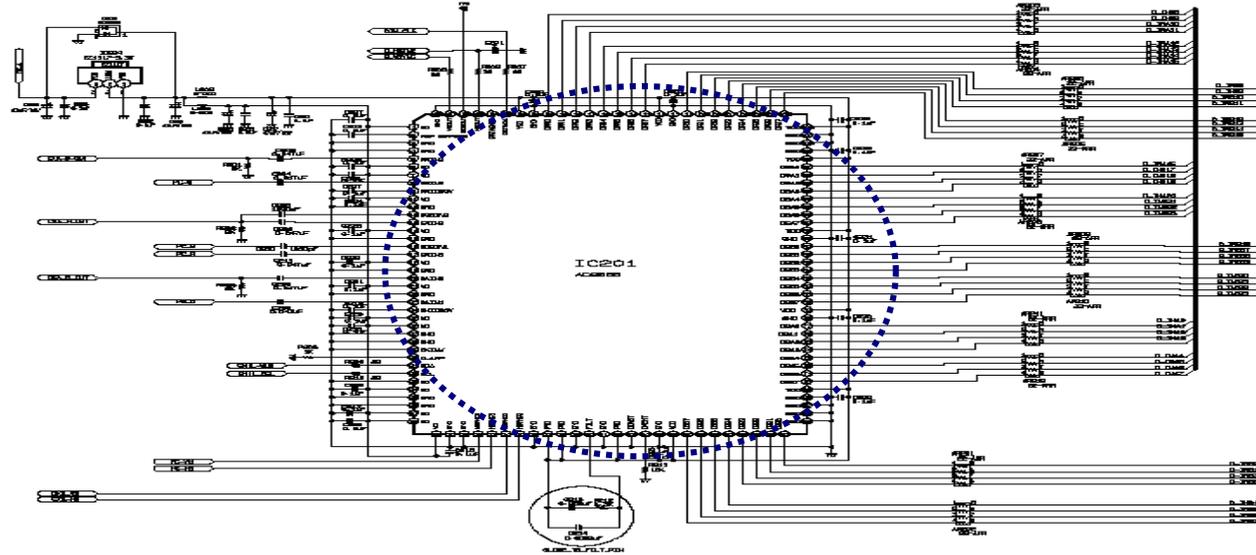
is field memory which has 4MB capacity.

This IC's feature is a little different according to makers.

160Mhz Memory clock is used.

1. Circuit operation Description

1.5 AD converter Block



*1)

This block consists of AD Converter,.

*1) 140M MSPS Maximum conversion rate.

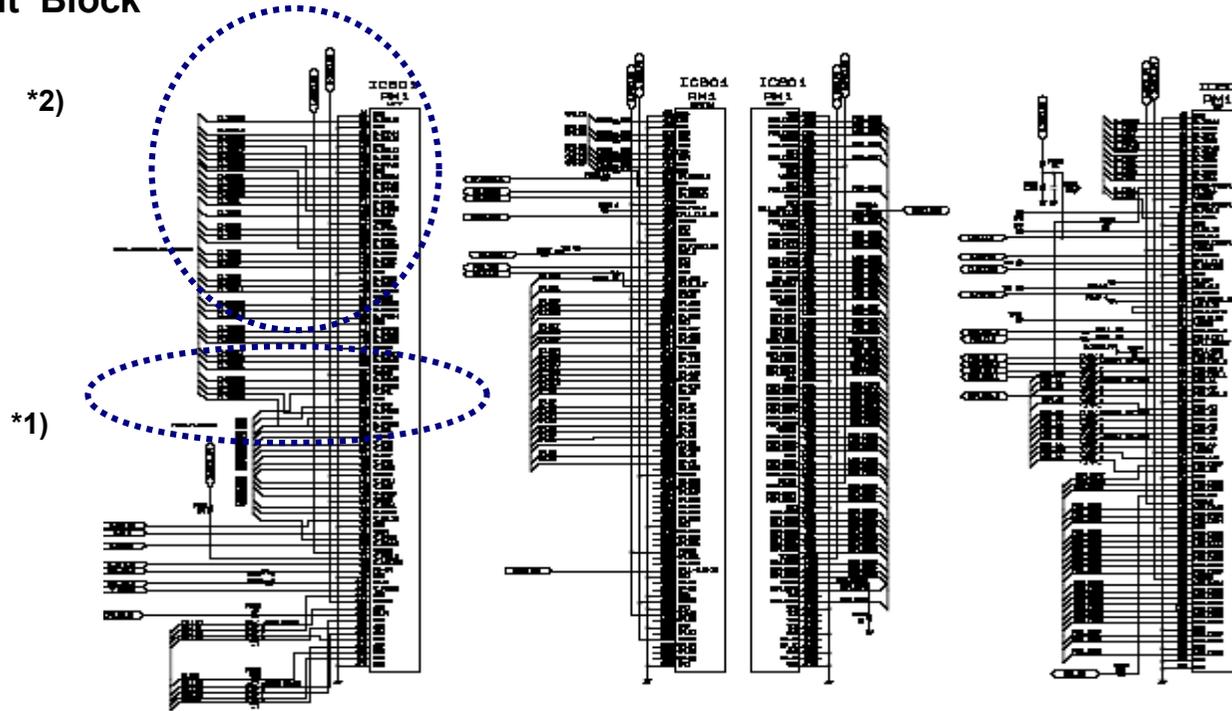
0.5 to 1V Analog input range.

Component(480p,720p,1080i) /R,G,B signal pass through this IC.

Output format is R,G,B 8:8:8 format .

1. Circuit operation Description

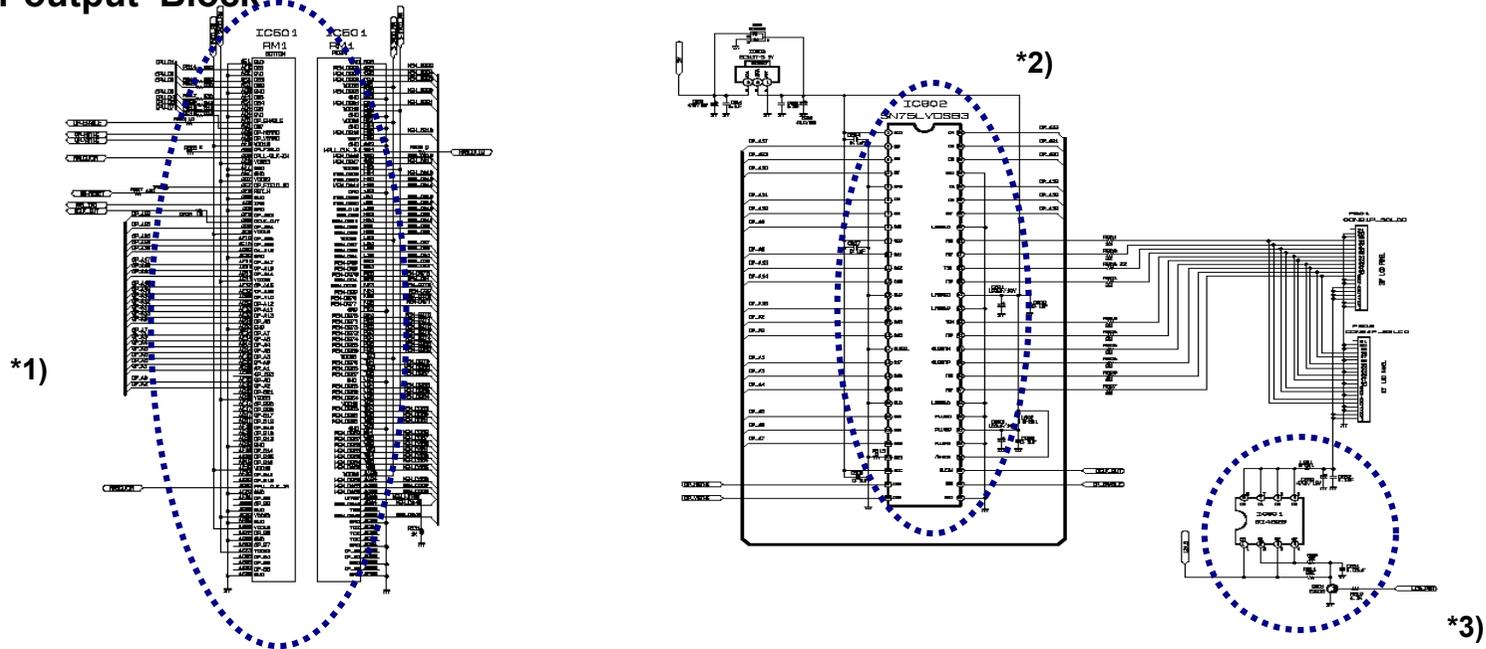
1.6 Scalar input Block



- *1) Video port input Block.
Input data format is YUV 4:2:2 plus H,V sync and data clock .
Deinterlacer IC's output pass through this.
- *2) Graphic port input Block.
AD Converter's output and TMSD receiver IC 's output pass through this.
AD Converter IC:AD9888, TMSD receiver:Sil161B.
Input data format is RGB 8:8:8 digital data signal plus H,V sync and data clock.

1. Circuit operation Description

1.7 Scalar output Block



*1) is data output.

Data output format is composed of RGB 8:8:8, H,V sync, data clock,data enable.
Output sync and clock corresponds to LCD Module's timing.

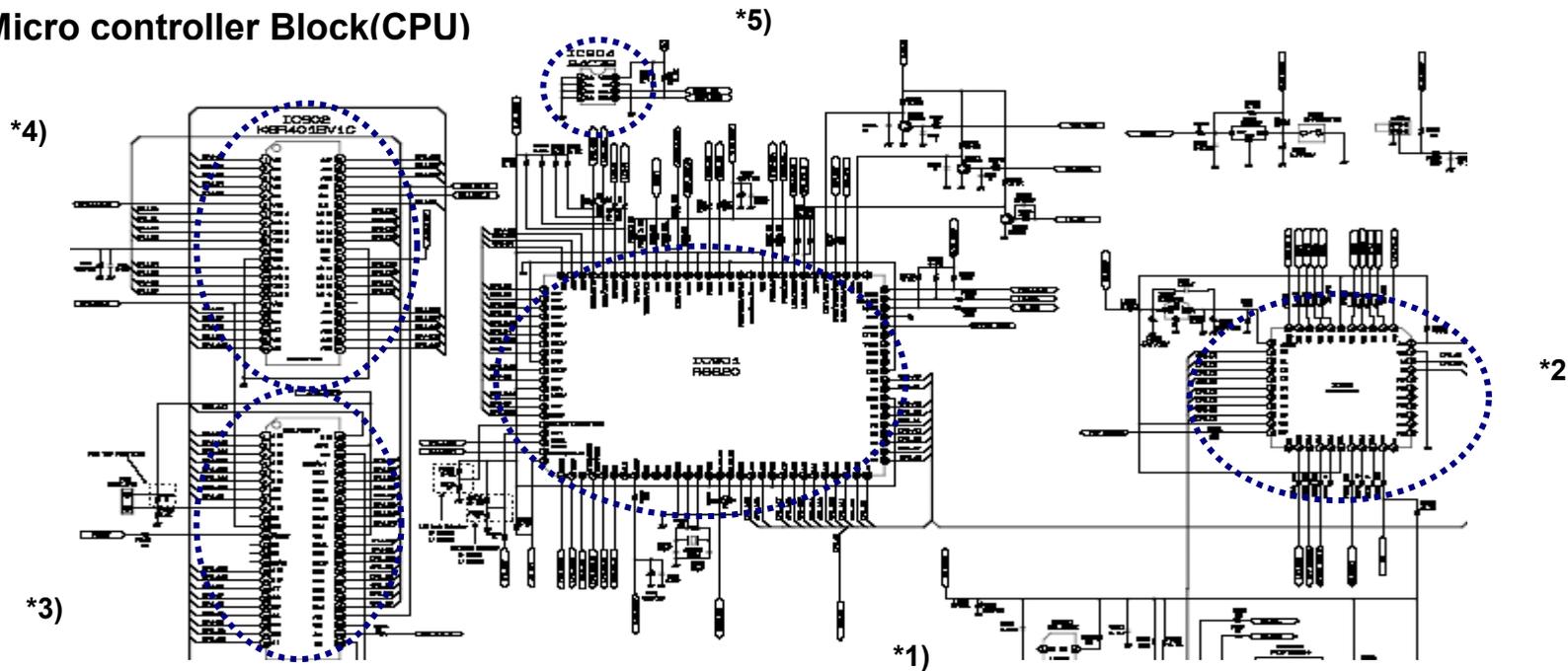
*2) is LVDS transmitter IC.

Five pair signal data is transmitted to LCD Module's T-con Board.

*3) is FET IC for 12V power supply.

1. Circuit operation Description

1.8 Micro controller Block(CPU)



This block consists of CPU, Flash memory, SRAM, Port Expansion, etc ,.

*1) is CPU IC.

Use 3.3V-standby Power and 25Mhz clock.

It keep in communication with Flash memory,SRAM by 16bit parallel /

Scaler IC by 8bit parallel.

It keep in communication with EEPROM by I2C.

*2) is Port Expansion.

It receive local key input. Output control signal is inv_on, sound_mute and lvds_enable,etc.

*3) is Flash memory that stored in System file and OSD file.

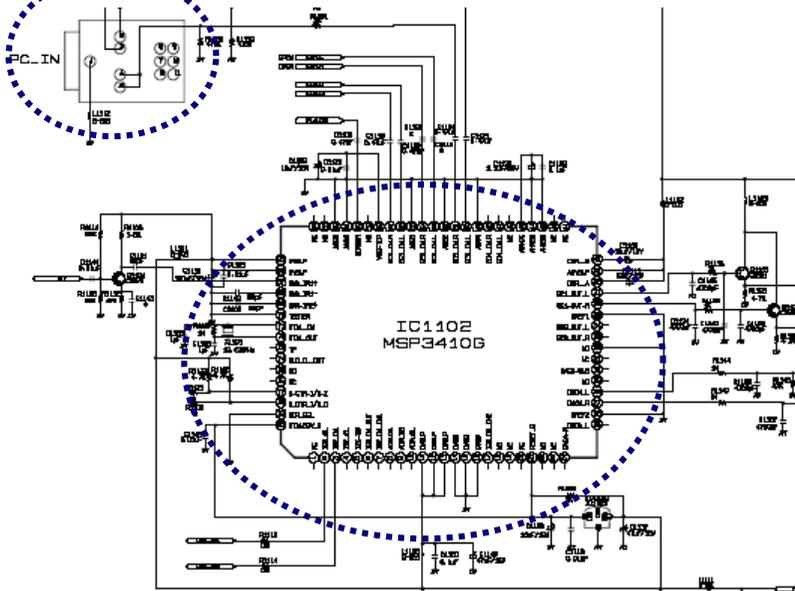
*4) is SRAM that is loaded all kinds of variables.

*5) is EEPROM that stored in adjustment data and user control data.

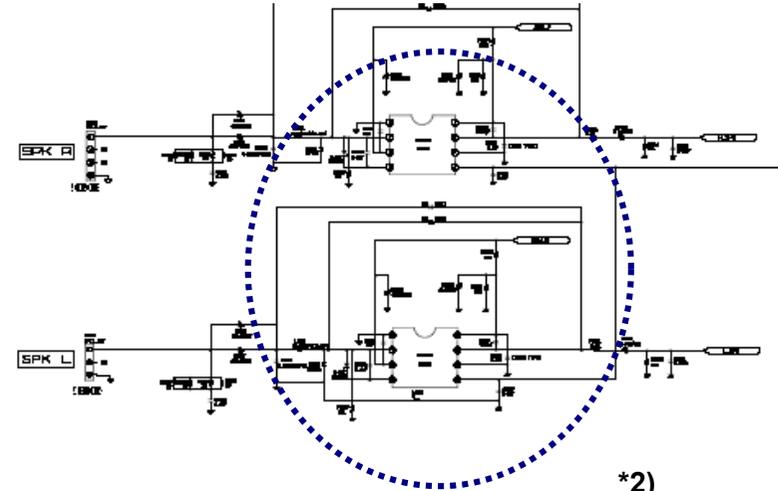
1. Circuit operation Description

1.9 Audio Block

*3)



*1)



*2)

This block consists of Multi Standard Audio Processor and Audio amplifier .

*1) This is the MSP audio processing IC, This IC performs processing of different standards.

It performs ASS (Automatic Standard Selection).

*2) They are Audio Amplifiers IC for Right and Left Audio Channels. It is a 20W class-D amplifier IC which operates on 7.5 to 24 V Vcc. The efficiency is very high.

*3) The PC input jack is used to give Audio Inputs

1. Software Upgrade Method

2. Composite Signal Description

2.1 NTSC Composite Signal

2.2 PAL Composite Signal

2.3 SECAM Composite Signal

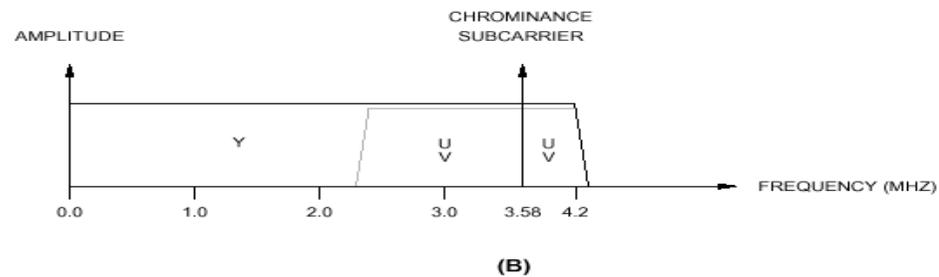
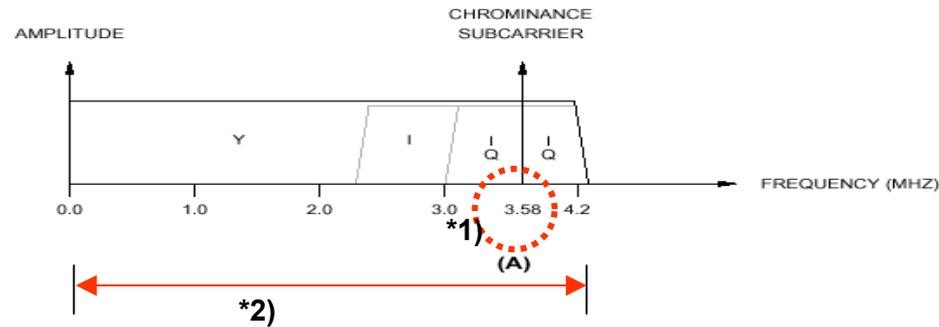
1. Software Upgrade Method

Software Upgrade Method for ML-038C(Model:RZ-37/42LZ30) Chassis

- 1) Connect Power Board(P/N:6871TPT283A) and Main Board(P/N:3313TP3001B)
- 2) Press the pin(SW001) that is located beside DVI Jack with sharp pin.
- 3) Connect RS-232C cable between PC and our set.
The cable must be crossed Pin2 and Pin3.
- 4) Execute Flash Loader program. The program version must be 2.0
- 5) Supply AC power. Our set's power input range is Wide Range(100~240V).
Then, the Flash memory is identified.
- 6) Press "Browse" menu and find the file that must be upgraded.
- 7) Press "Program" in operation window. And Press "Start" button.
Then, Software upgrade is executed.
- 8) Press the pin(SW001) that is located beside DVI Jack Originally. Must not be missed.
If you miss this job, there is no image and no sound. Also, fail to power on.

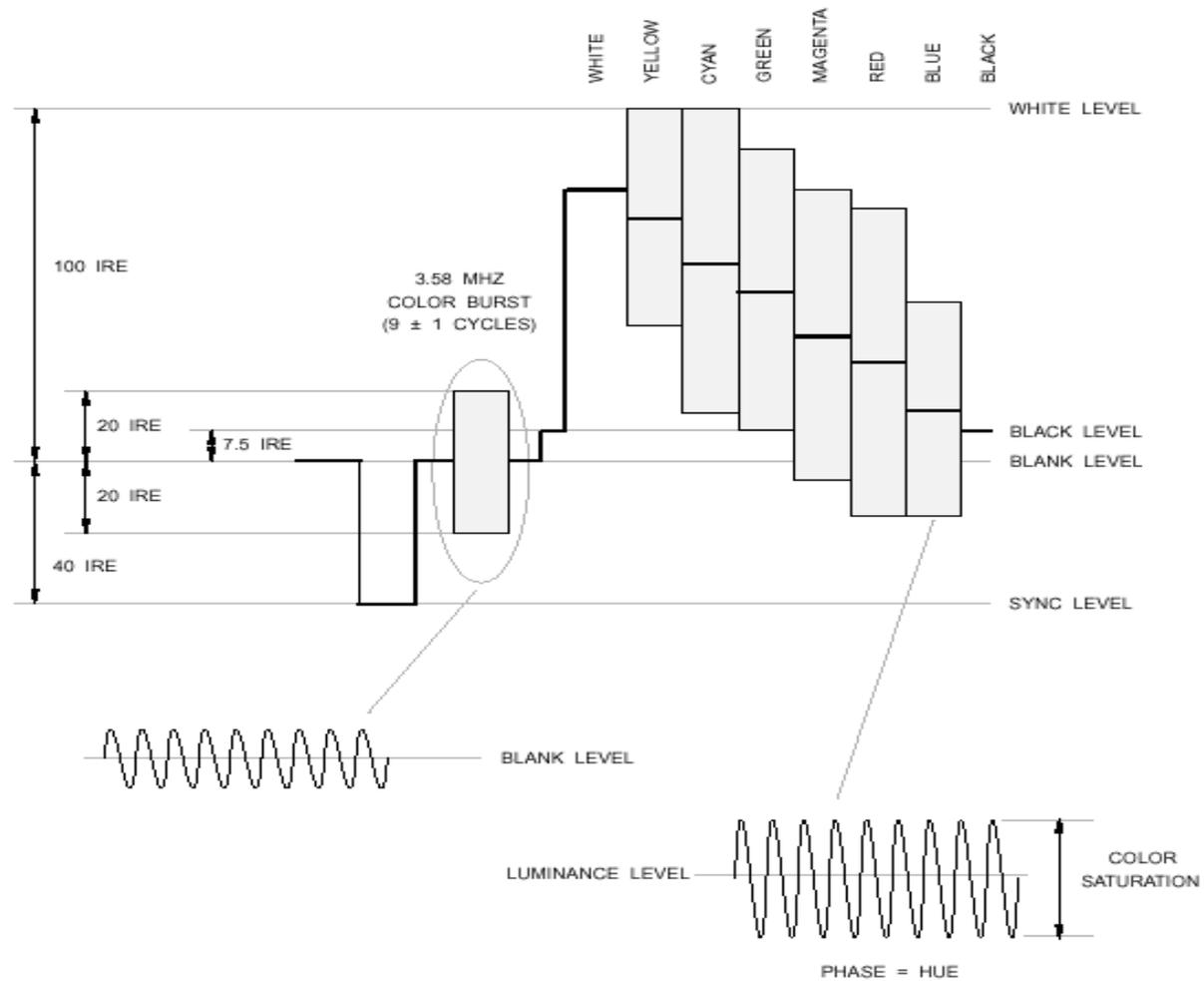
2. Composite Signal Description

2.1 NTSC Composite Signal



SYSTEM	NTSC M
Lines/Field	525/60
Horizontal Frequency	15.734kHz
Vertical Frequency	60 Hz
Colorur Subcarrier Frequency	*1) 3.579545 MHz
Video Bandwidth	*2) 4.2 MHz
Sound Carrier	4.5MHz

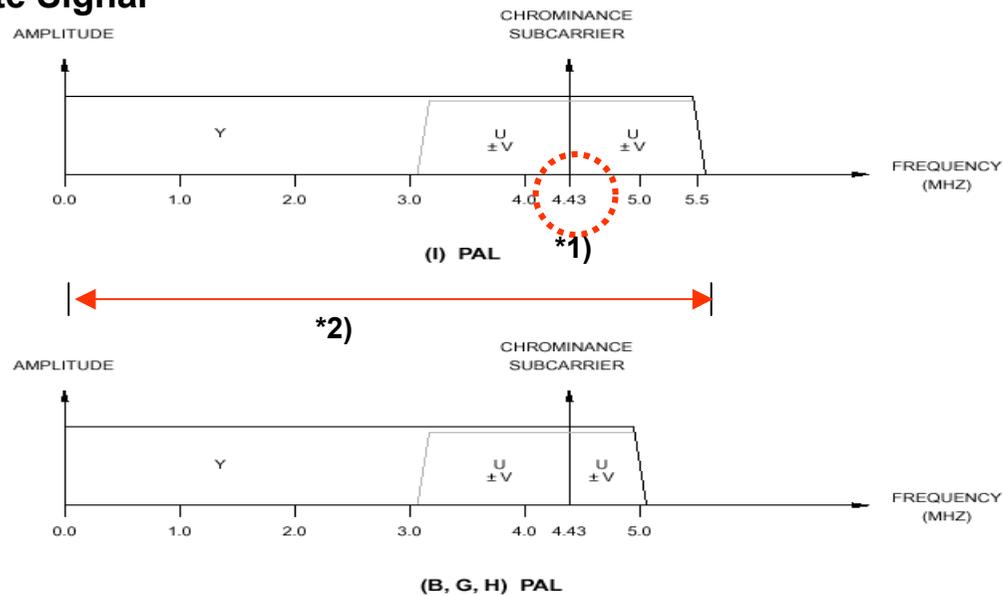
2. Composite Signal Description



NTSC(M) Composite Video Signal for 75% Color Bar

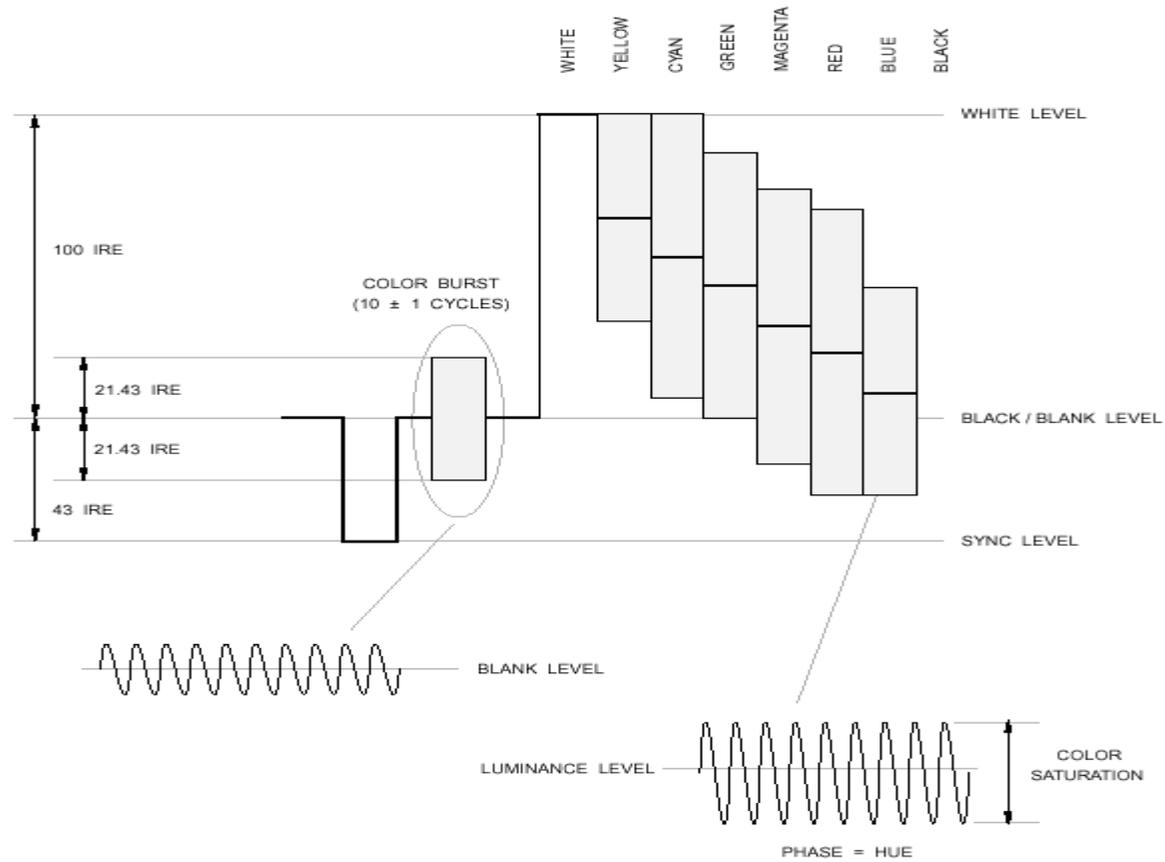
2. Composite Signal Description

2.2 PAL Composite Signal



SYSTEM	UNIT	PAL B,G,H	PAL I	PAL D	PAL N	PAL M
Line/field	Line	625/50	625/50	625/50	625/50	525/50
Horizontal Frequency	kHz	15.625	15.625	15.625	15.625	15.75
Vertical Frequency	Hz	50Hz	50Hz	50Hz	50Hz	50Hz
*1) Colorur Subcarrier Frequency	MHz	4.433618	4.433618	4.433618	3.582056	3.575611
*2) Video Bandwidth	MHz	5.0MHz	5.5MHz	6.0MHz	4.2MHz	4.2MHz
Sound Carrier	MHz	5.5MHz	6.0MHz	6.5MHz	4.5MHz	4.5MHz

2. Composite Signal Description



PAL(B,D,B,H,I) Composite Video Signal for 75% Color Bar

2. Composite Signal Description

2.3 SECAM Composite Signal

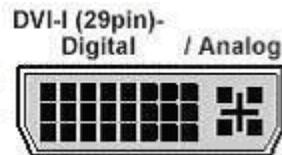
SYSTEM	UNIT	SECAM B,G,H	SECAM D,K,K1,L
Line/field	Line	625/50	625/50
Horizontal Frequency	kHz	15.625	15.625
Vertical Frequency	Hz	50Hz	50Hz
Color Subcarrier Frequency	MHz	4.25 4.4	4.25 4.4
Video Bandwidth	MHz	5.0MHz	6.0MHz
Sound Car	MHz	5.5MHz	6.5MHz

- 1) Like PAL, SECAM is a 625-line, 50 field-per-second, 2:1 interlaced system.
- 2) As with NTSC and PAL, the luminance signal occupies the entire video bandwidth.
- 3) The video signal has a bandwidth of 5.0 or 6.0 MHz, depending on specific SECAM standards.
- 4) SECAM uses FM modulation to transmit color difference information, with each component having its own subcarrier.

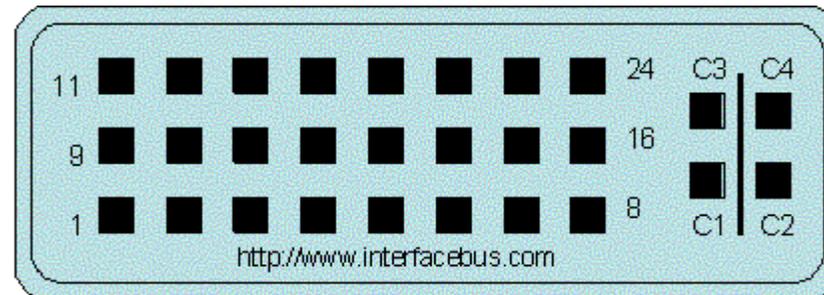
- 1. Pin Outs:**
 - 1.1 DVI connector**
 - 1.2 DSUB connector**
 - 1.3 SCART connector**
 - 1.4 S-video**

2. Composite Signal Description

DVI Connector:



1.connector

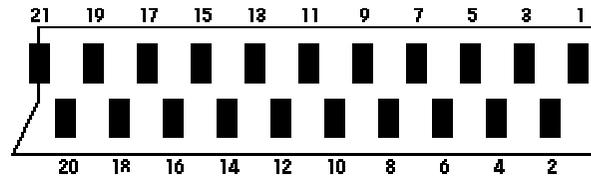


29 pin DVI Connector PinOut and Signal Names					
Pin	Name	Pin	Name	Pin	Name
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-
2	TMDS Data2+	10	TMDS Data1+	18	TMDSData0+
3	TMDS Data2 Shield	11	TMDS Data1 Shield	19	TMDS Data0Shield
4	No Connection	12	No Connection	20	No Connection
5	No Connection	13	No Connection	21	No Connection
6	DDC Clock [SCL]	14	+5 V Power	22	TMDS Clock Shield
7	DDC Data [SDA]	15	Ground (for +5 V)	23	TMDS Clock +
8	Analog vertical sync	16	Hot Plug Detect	24	TMDS Clock -
C1	Analog Red	--	--	--	--
C2	Analog Green	--	--	--	--
C3	Analog Blue	--	--	--	--
C4	Analog Horizontal Sync	--	--	--	--
C5	Analog GND Return: (analog R, G, B)	--	--	--	--

2.Pin Description

2. Composite Signal Description

2.3 SCART Connector:



1.connector

Pin	Name	Description	Pin	Name	Description
1	AOR	Audio Out Right	2	AIR	Audio In Right
3	AOL	Audio Out Left + Mono	4	AGND	Audio Ground
5	BGND	RGB Blue Ground	6	AIL	Audio In Left + Mono
7	B	RGB Blue	8	SWTCH	Audio, RGB switch, 16:9
9	GGND	RGB Green Ground	10	CLKOUT	Clock Out
11	G	RGB Green	12	DATA	Data Out
13	RGND	RGB Red Ground	14	DATAGND	Data Ground
15	R	RGB Red / Chrominance	16	BLNK	Blanking Signal
17	VGND	Composite Video Ground	18	BLNKGND	Blanking Signal Ground
19	YOUT	Composite Video Out	20	YIN	Composite Video In, Luminance
21	SHIELD	Chassis Ground, cable Shield	-	-	-

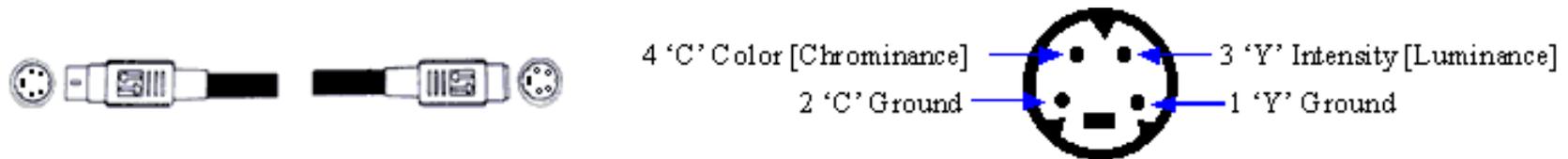
2.Pin Description

2. Composite Signal Description

2.3 S-Video

s-Video [Super-video] Sends video signals over a multi-wire cable, dividing the video information into two separate [75 ohm coax or twisted pair cables] signals: one for luminance (Light) 'Y' and one for chrominance (Color) 'C'. Each signal is sent shielded, inclosed in a 4-pin Mini-DIN. S-Video is synonymous with Y/C "Component" video.

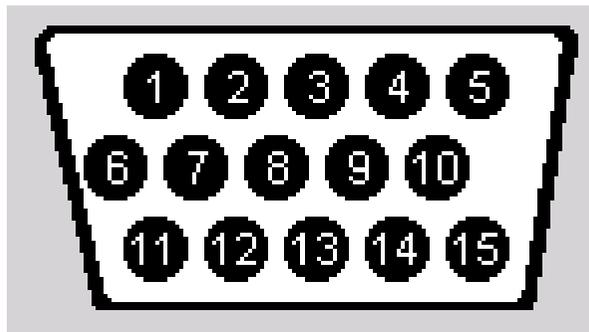
"S-video is a consumer form of component video used primarily with Hi8 and S-VHS".



S-Video Cable and Connector Pinout

2. Composite Signal Description

2.3 DSUB 15p connector pin out



1.connector

1	red
2	green
3	blue
4	ID bit
5	n/c
6	red ground
7	green ground
8	blue ground
9	n/c
10	ground
11	ID bit
12	ID bit
13	H sync / Composite
14	V sync
15	n/c

2.Pin Description