

LCD MonitorTV Technical Training Manual

Model : M1510A / M1710A / M1910A

Chassis : CL-78

Display research lab



1. Product Spec.

SPECIFICATIONS

1. LCD CHARACTERISTICS

Type	: TFT Color LCD Module
Active Video Area	: 15.0 inch- M1510A : 17.0 inch- M1710A : 19.0 inch- M1910A
Size	: 253.5(V) x 326.5(H) x 11.2(D)- M1510A : 298.5(V) x 358.5(H) x 17.0(D)- M1710A : 330.0(V) x 404.2(H) x 20.0(D)- M1910A
Pixel Pitch	: 0.297mm x 0.297mm- M1510A : 0.264mm x 0.264mm- M1710A : 0.294mm x 0.294mm- M1910A
Color Depth	: 6Bits with FRC, 16.2M colors
Surface Treatment	: Anti-Glare, Hard Coating (3H)
Operating Mode	: Transmissive mode, Normally white
Backlight Unit	: 2CCFL- M1510A : 4CCFL- M1710A, M1910A
Electrical Interface	: LVDS

2. OPTICAL CHARACTERISTICS

2-1. Viewing Angle by Contrast Ratio ≥ 10

M1510A

Left : -55° min., -65° typ / Right : +55° min., +65° typ
Top : +40° min., +45° typ / Bottom : -50° min., -55° typ

M1710A, M1910A

Left : -60° min., -70° typ / Right : +60° min., +70° typ
Top : +65° min., +75° typ / Bottom : -55° min., -65° typ

2-2. Luminance : 200(min.), 250(typ.)

2-3 Contrast Ratio : 300(min.), 400(typ.)-**M1510A**
: 300(min.), 550(typ.)-**M1710A**
: 300(min.), 500(typ.)-**M1910A**

3. SIGNAL (Refer to the Timing Chart)

3-1. Analog Video Input

- 1) Video Input Range : 0~0.7V $\pm$ 5%
- 2) Video Termination Impedance : 75 Ω $\pm$ 5%
- 3) Sync Type : Separate Sync.
- 4) Sync Level : TTL Low $\leq$ 0.8V, High $\geq$ 2.0V

3-2. Operating Frequency

Horizontal : 30 ~ 63kHz-**M1510A**
: 30 ~ 83kHz-**M1710A, M1910A**
Vertical : 56 ~ 75Hz

4. RESOLUTION

Analog Max : 1024 x 768@75Hz-**M1510A**
: 1280 x 1024@75Hz-**M1710A, M1910A**

5. POWER SUPPLY

5-1. Power

AC 100-240Vac, 50/60Hz

5-2. Power Consumption

MODE	H/V SYNC	VIDEO	POWER CONSUMPTION	LED COLOR
POWER ON (NORMAL)	ON/ON	ACTIVE	less than 40 W- M1510A	BLUE
			less than 50 W- M1710A	
			less than 55 W- M1910A	
SLEEP MODE	OFF/ON	OFF	less than 4 W	AMBER
	ON/OFF			
	OFF/OFF			
POWER S/W OFF	-	OFF	less than 2 W	OFF

6. ENVIRONMENT

5-1. Operating Temperature : 10°C ~ 35°C

5-2. Operating Humidity : 20% ~ 80%

5-3. MTBF : 50,000 Hours (Min)

7. DIMENSIONS (with TILT/SWIVEL)

M1510A

Width : 375.4mm (14.78")
Depth : 220mm (8.66")
Height : 370.3mm (14.58")

M1710A

Width : 419.5mm (16.52")
Depth : 240mm (9.45")
Height : 423.1mm (16.66")

M1910A

Width : 458.3mm (18.04")
Depth : 242mm (9.53")
Height : 457.7mm (18.02")

8. WEIGHT (with TILT/SWIVEL)

M1510A

Net. Weight : 4.4kg (9.70 lbs)
Gross Weight : 6.6kg (14.55 lbs)

M1710A

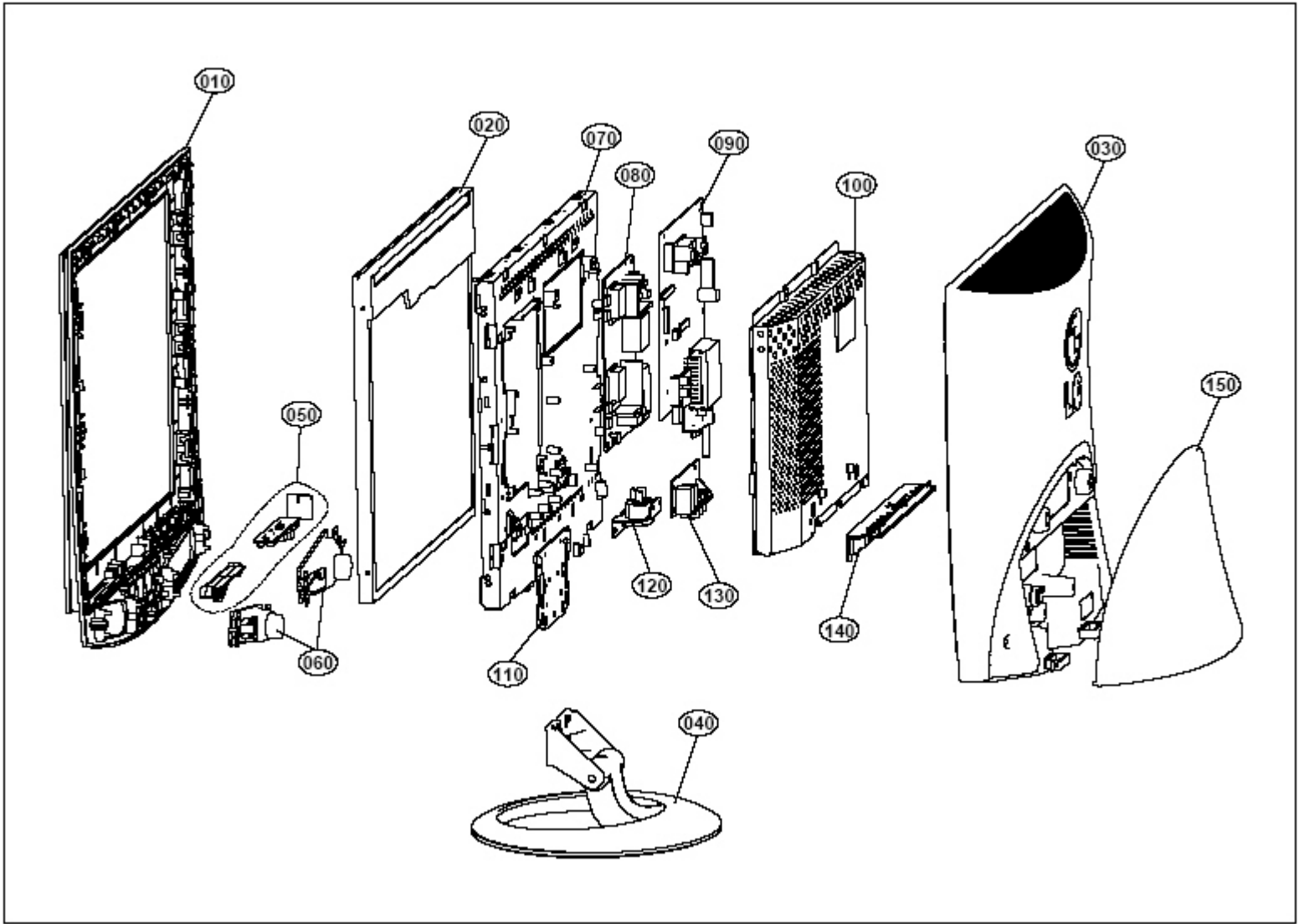
Net. Weight : 5.9kg (13.01 lbs)
Gross Weight : 8.3kg (18.30 lbs)

M1910A

Net. Weight : 7.0kg (15.43 lbs)
Gross Weight : 9.5kg (20.95 lbs)



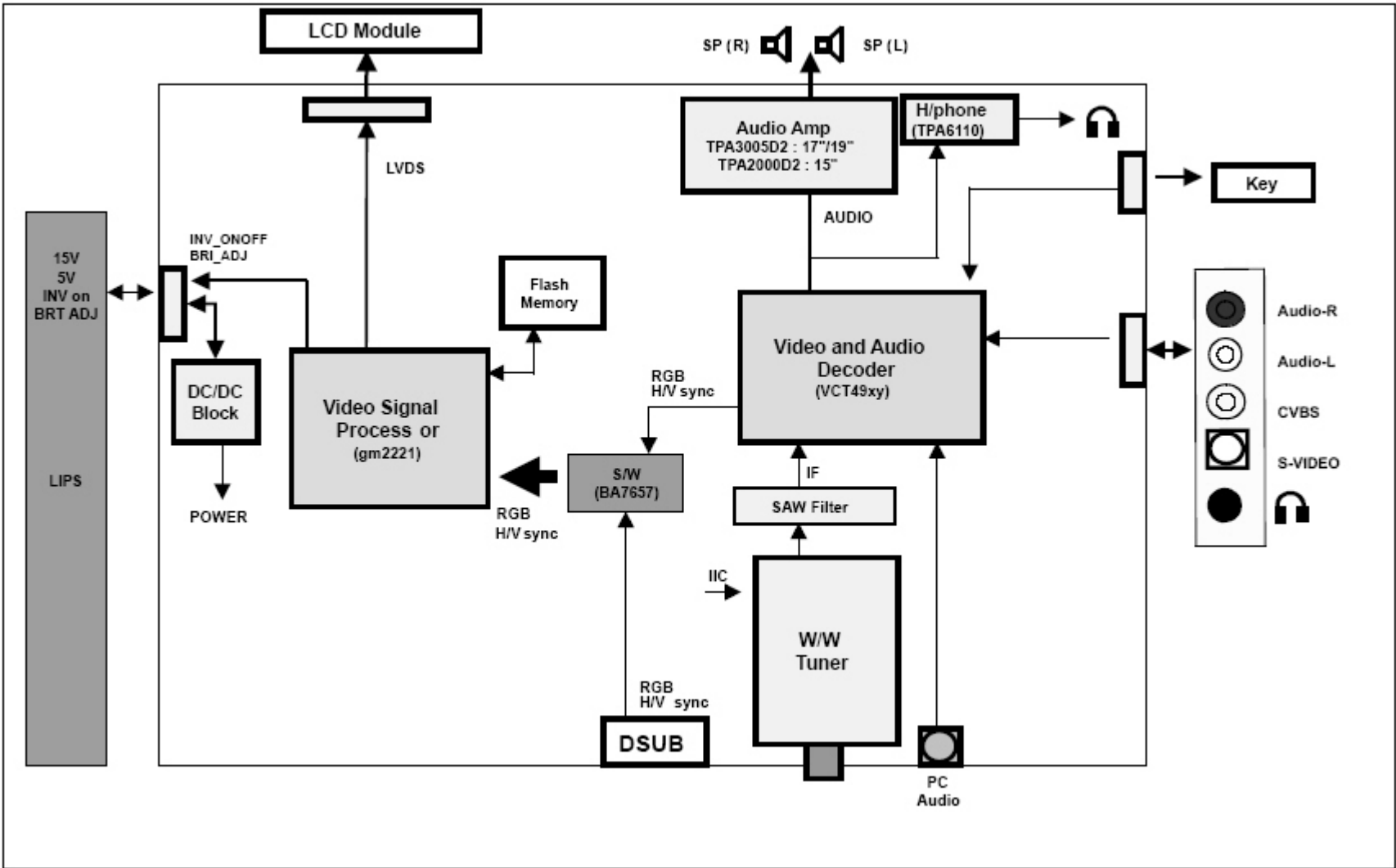
EXPLODED VIEW



EXPLODED VIEW PARTS LIST

Ref. No.	Part No.	Description
010	3091TKL136C	CABINET ASSEMBLY, M1510 BRAND - CABINET ASSY (MFT-PAL)
	3091TKL139C	CABINET ASSEMBLY, M1710A BRAND - CABINET ASSY (MFT - PAL)
	3091TKL139M	CABINET ASSEMBLY, M1710A-BTB BRAND , MAADIRAN LOCAL
	3091TKL140C	CABINET ASSEMBLY, M1910T BRAND - CABINET ASSY (MFT - PAL)
020	6304FLP226A	LCD(LIQUID CRYSTAL DISPLAY), LM150X08-A4NH LG PHILIPS TFT COLOR PB FREE OF A4NA,PSWG,LVDS,16MS,SS S D-IC LPL NJ,250NITS
	or 6304FLP225A	LCD(LIQUID CRYSTAL DISPLAY), LM150X08-A4KF LG PHILIPS TFT COLOR PB FREE OF A4K8,PSWG,LVDS,16MS,SS S D-IC
	6304FLP199A	LCD(LIQUID CRYSTAL DISPLAY), LM170E01-A6K3 LG PHILIPS TFT COLOR 8MS,LPL NJ,KUM/PB FREE,EG1SS S D-IC,EG1(250NITS),SXGA,LVDS
	6304FLP210A	LCD(LIQUID CRYSTAL DISPLAY), LM190E03-B4N9 LG PHILIPS TFT COLOR PB FREE OF B4N2,NJ,20T,TN,250NITS,SXGA,LVDS
030	3809TKL095C	BACK COVER ASSEMBLY, M1510 - BACK COVER ASSY (MFT-FOREIGN)
	3809TKL096C	BACK COVER ASSEMBLY, M1710A - BACK COVER ASSY (MFT-PAL)
	3809TKL096L	BACK COVER ASSEMBLY, M1710A-BTB , MAADIRAN LOCAL
	3809TKL097C	BACK COVER ASSEMBLY, M1910A - BACK COVER ASSY (MFT-PAL)
040	3043TKK219J	TILT SWIVEL ASSEMBLY, M1510 / M1710 . 219A+LABEL
	3043TKK219S	TILT SWIVEL ASSEMBLY, M1710A-BTB . MAADIRAN LOCAL
	3043TKK226B	TILT SWIVEL ASSEMBLY, M1910T .. PHI242
050	6871TST927D	PWB(PCB) ASSEMBLY,SUB, M1510A SUB TOTAL BRAND ETC BOARD
	6871TST927A	PWB(PCB) ASSEMBLY,SUB, M17/1910A SUB TOTAL BRAND ETC BOARD
	6871TST927G	PWB(PCB) ASSEMBLY,SUB, M17/1910A SUB TOTAL BRAND ETC BOARD (C/SKD)
060	6401TZZ031B	SPEAKER ASSEMBLY, K403B033 1W 8OHM SONY MODEL MOTORJOY
070	4951TKS188E	METAL ASSEMBLY, FRAME MAIN ASSY M1510A (WITHOUT SUPPORT)
	4951TKS189G	METAL ASSEMBLY, FRAME MAIN ASSY M1710A (WITHOUT SUPPORT)
	4951TKS189H	METAL ASSEMBLY, FRAME MAIN ASSY M1710A G-C/SKD
	4951TKS190G	METAL ASSEMBLY, FRAME MAIN ASSY M1910A (WITHOUT SUPPORT)
080	6871TPT308A	PWB(PCB) ASSEMBLY,POWER, L1510T POWER TOTAL BRAND LIPS(YUYANG) FOR LPL MODULE
	6871TPT261E	PWB(PCB) ASSEMBLY,POWER, AUTO8AHN 1S(LPL,CMD,HYDIS) & L173SAB(MFM) LPL POWER TOTAL SPLIPS-M1710A,M1910A
090	3313TL5118C	MAIN TOTAL ASSEMBLY, M1510A-BTB BRAND CL-78
	3313TL7091C	MAIN TOTAL ASSEMBLY, M1710A-BTB BRAND CL-78
	3313TL7091E	MAIN TOTAL ASSEMBLY, M1710A-BTB.KNIOLEF BRAND CL-78-MAADIRAN LOCAL
100	3313TL9082D	MAIN TOTAL ASSEMBLY, M1910A-BTB BRAND CL-78
	4950TKA093A	METAL, SHIELD ,REAR BRAND(15INCH) MFM-M1510A
	4950TKA094A	METAL, SHIELD REAR BRAND(M1710T) MFM
	4950TKA094C	METAL, SHIELD REAR BRAND(M1710) MFT/ A-C/SKD
110	4950TKA094B	METAL, SHIELD REAR BRAND(M1910T) MFM
	4950TKA095A	METAL, SUPPORT , METAL BRAND(M15/17/1910T) MFM
120	6620K00002J	SOCKET(CIRC),POWER, BCP-035-011(110MM),BM LOS73L AC UNIVERSAL NO PIN BLACK
130	6871TVT381B	PWB(PCB) ASSEMBLY,VIDEO, M1710A FOR EMS VIDEO TOTAL BRAND CL-78-M1510A,M1910A
	6871TVT381C	PWB(PCB) ASSEMBLY,VIDEO, M1710A VIDEO TOTAL BRAND CL-78 (C/SKD)
140	3551TKK559A	COVER ASSEMBLY, M15/17/1910T REAR AV COVER
	3551TKK559G	COVER ASSEMBLY, M1710A-BTB REAR , MAADIRAN LOCAL
150	3550TKK737A	COVER, M1510T BACK DOOR BRAND(15INCH) MFM
	3550TKK738A	COVER, M1710T BACK DOOR BRAND(17INCH) MFM
	3550TKK738C	COVER, M1710A-BTB BACK DOOR, MAADIRAN LOCAL
	3550TKK739A	COVER, M1910T BACK DOOR BRAND(19INCH) MFM





2. System Configuration

DESCRIPTION OF BLOCK DIAGRAM

1. Power Supply Block (LIPS)

1) M1710A / 1910A

This Block Generates DC Voltage (5V, 15V) to Main Control system from AC Power (100-240 V, 50/60 Hz, 1.0A).

Also it has the inverter function that converts input voltage to AC Rms value for the LCD lamp.

2) M1510A

This Block Generates DC Voltage (5V, 12V) to Main Control system from AC Power (100-240 V, 50/60 Hz, 1.0A).

Also it has the inverter function that converts input voltage to AC Rms value for the LCD lamp.

2. DC/DC Converter block

1) M1710A / 1910A

DC/DC Converter convert the input 5V, 15V to proper 3.3V, 5V, 12V for Main control system.

For shooting heat trouble, we use the DC/DC converting IC.

2) M1510A

DC/DC Converter convert the input 5V, 12V to proper 3.3V, 5V, 12V for Main control system.

For shooting heat trouble, we use the DC/DC converting IC.

3. Audio Amplifier

1) M1710A / 1910A

This block is composed of TPA3005D2 and peripheral device.

The function of the audio amplifier is that to amplify audio L / R signal transmitted from audio decoder. The audio

signal is amplified according to pre-defined DC volume control curve.

2) M1510A

This block is composed of TPA2000D2 and peripheral device.

The function of the audio amplifier is that to amplify audio L / R signal transmitted from audio decoder. The audio

signal is amplified according to pre-defined DC volume control curve.

4. Audio / Video / IF Decoder (VCT49xy)

This block is composed of VCT49xy and peripheral devices.

1) Video Decoder

This Block Selects input Video signals (like CVBS, Y/C, SCART RGB) and output RGB signal.

On decoding, We can control signal like Contrast, Brightness, Sharpness, Color, tint signals including Adaptive.

Comb Filter

2) Audio Decoder

..

..

This block analyzes audio input signal through A/V Jack and PC audio and Tuner IF.

The analyzed signals transmitted to audio amplifier.

On decoding, We can control signal like Bass, treble.

3) IF Decoder

This block can change IF signal to audio and video signal that transmitted to Video/audio decoder.

4) Micom

This block controls each IC through IIC communication line.

5. Video signal processor (Scaler IC)

It is composed of gm2221.

This IC includes A/D Converter and LVDS Transmitter.

This IC is directly Inputted Analog Signal and transmits it to LCD Module.

6. Switch IC (BA7657)

It is composed of BA7657.

This IC selects between D-sub RGB signal and VCTi RGB signal, and it transmits the selected signal to video signal

processor (gm2221).

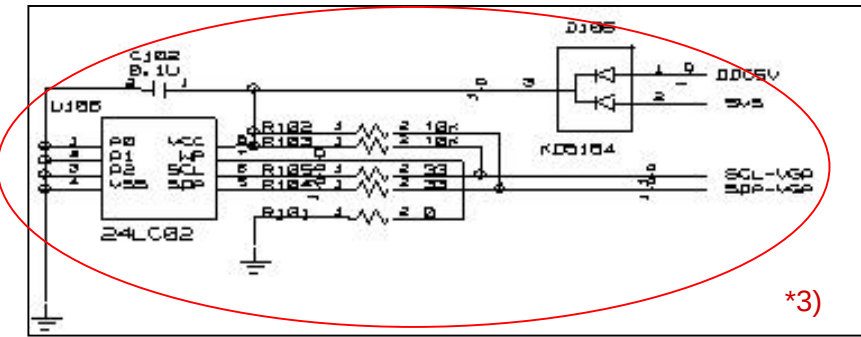
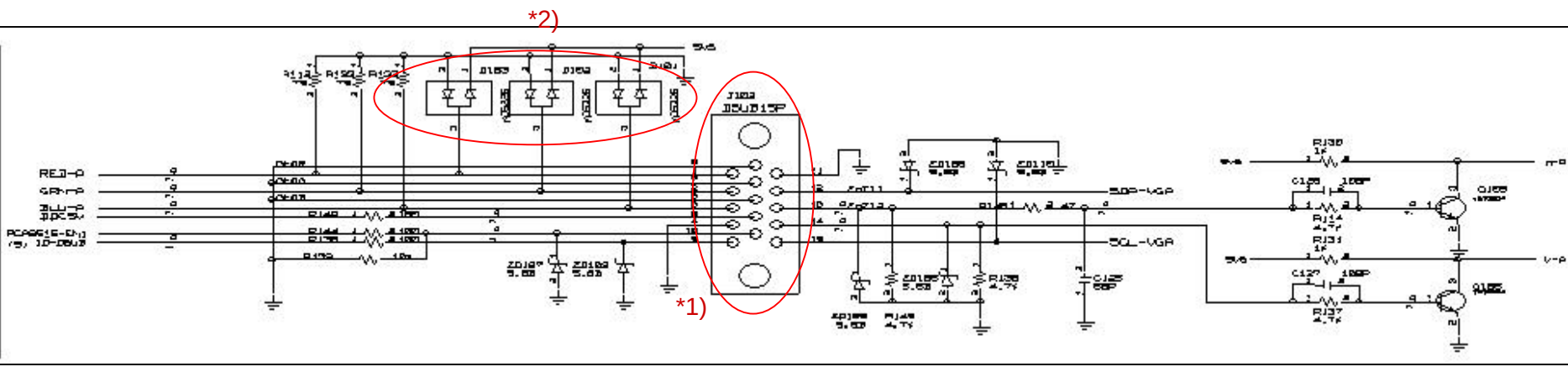
7. TUNER

Micom controls this through IIC Line.

TUNER makes IF and transmits IF signal to VCT49xy.



3. Input Section



DSUB connector PIN Assignment



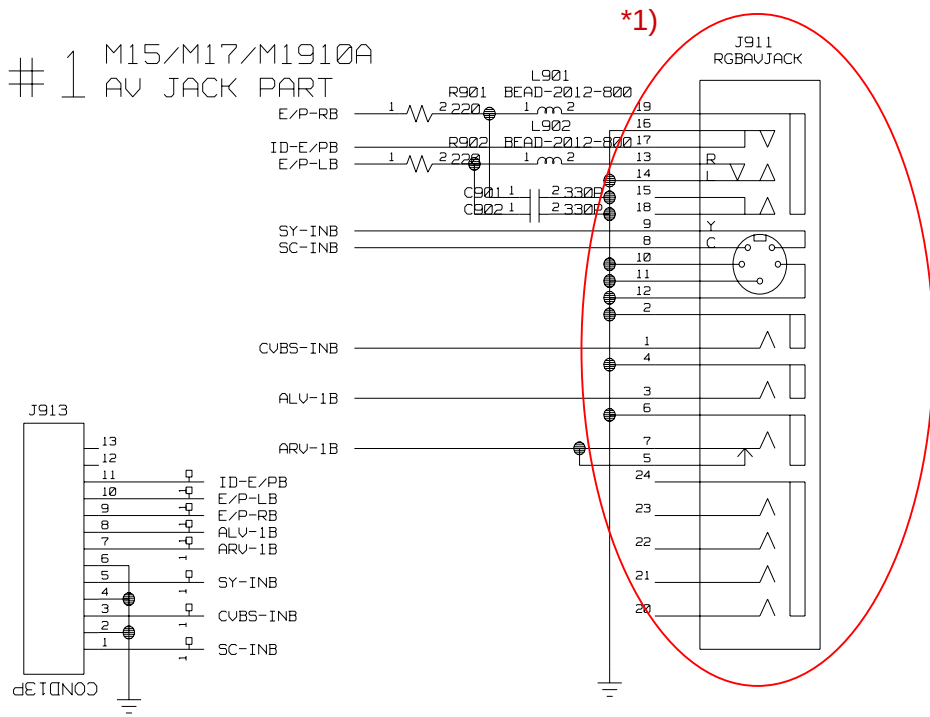
Pin Assignments for D-SUB Connector (In/Loop Out)					
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	RED	6	RED GND	11	GND
2	GREEN	7	GREEN GND	12	SDA
3	BLUE	8	BLUE GND	13	H-SYNC
4	GND	9	+5 V for DDC	14	V-SYNC
5	GND	10	GND	15	SCL

- *1) This is the DSUB connector, it is 15 pin, connector for analog RGB video input(PC)
The PIN assignments given.
- *2) This is a circuit comprising of ESD diodes..used for ESD protection.
- *3) This is EEPROM which DSUB EDID data is stored in.
The EDID should be stored in this EEPROM to boot up with the DSUB signal input

3. Input Section

AV input Block

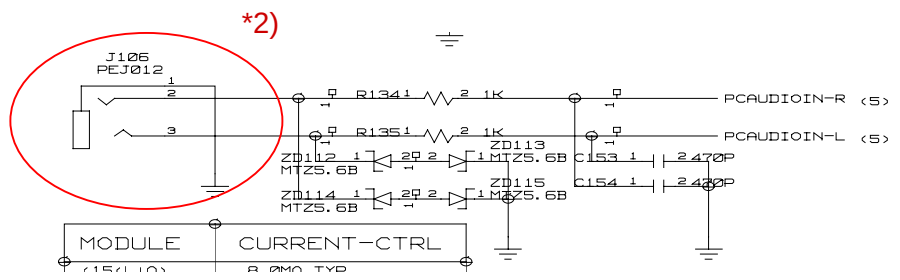
1 M15/M17/M1910A AV JACK PART



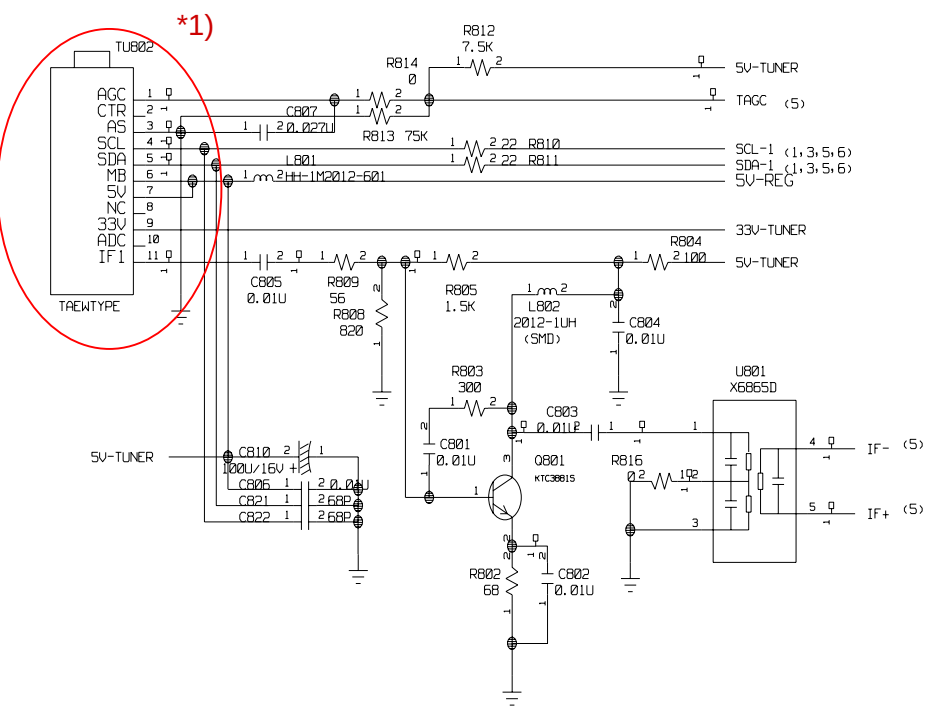
This section have Jacks and associated circuitry for AV IN and AV OUT, The S-video input is also a part of this:

*1) AV jack for CVBS, S-Video, Audio jack.
The CVBS input is fed through this port/jack. The CVBS in, CVBS Audio signal for R,L channels, and S-Video signal input. The input is S-video input and corresponding Y,C video signals .

*2) Audio in jack:
This jack is used to give Audio input (called PC audio input).



3. Input Section



*1) Tuner
This is supported to PAL and SECAM signal

This section consists of following major blocks:

1) **Video / Audio Processor IC, VCT49xyi**

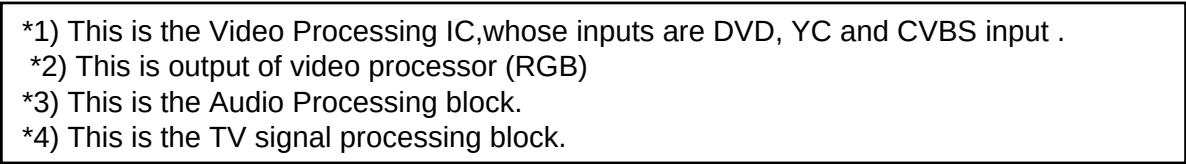
Video input needs to be processed, this task is handled by this IC. However some of the inputs like D-sub are directly given to scalar.

2) **Scalar gm2221:**

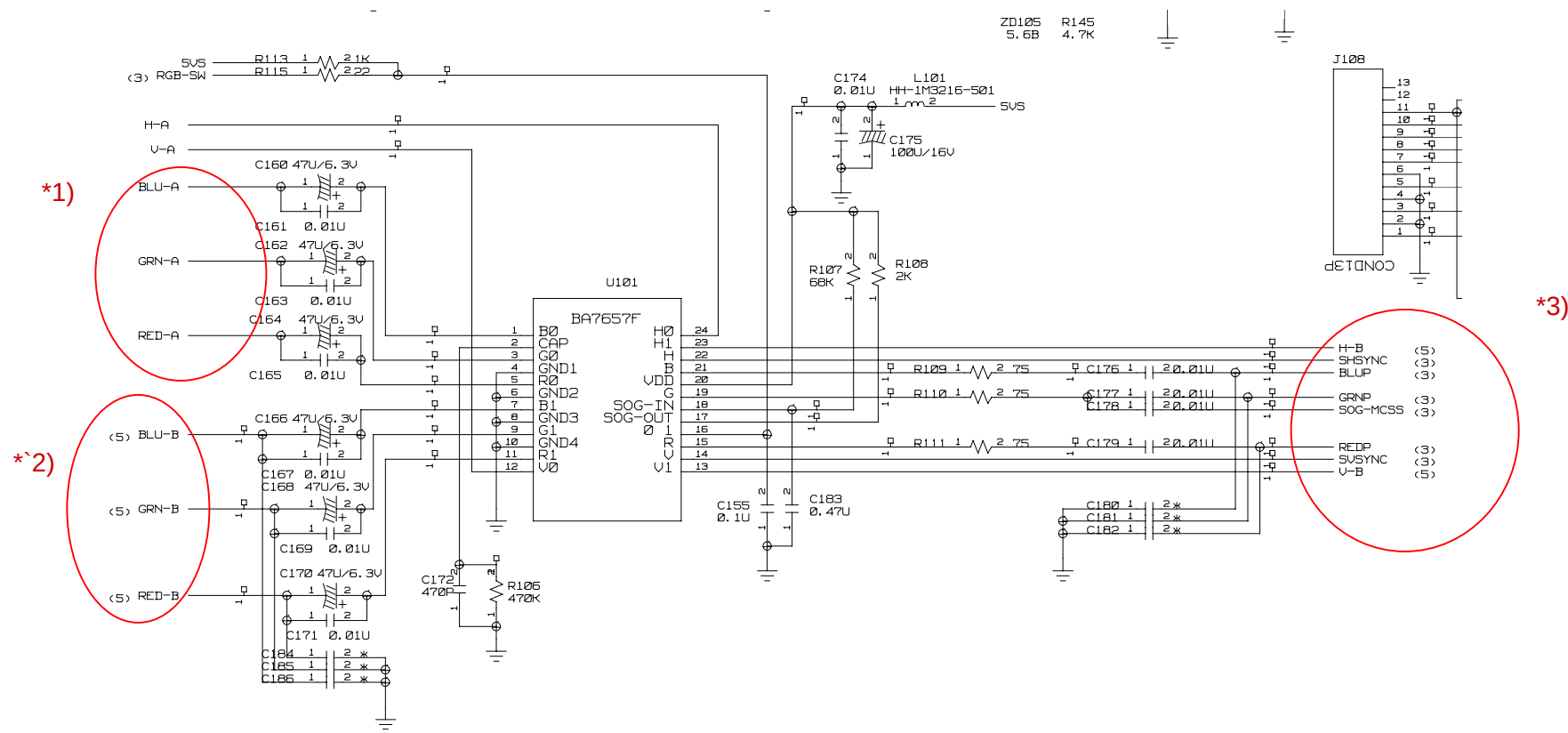
This is scalar IC, the scaling is done here.

3) **TPA3004**

This is Audio amp IC, amplify the audio signal from VCT49xyi.

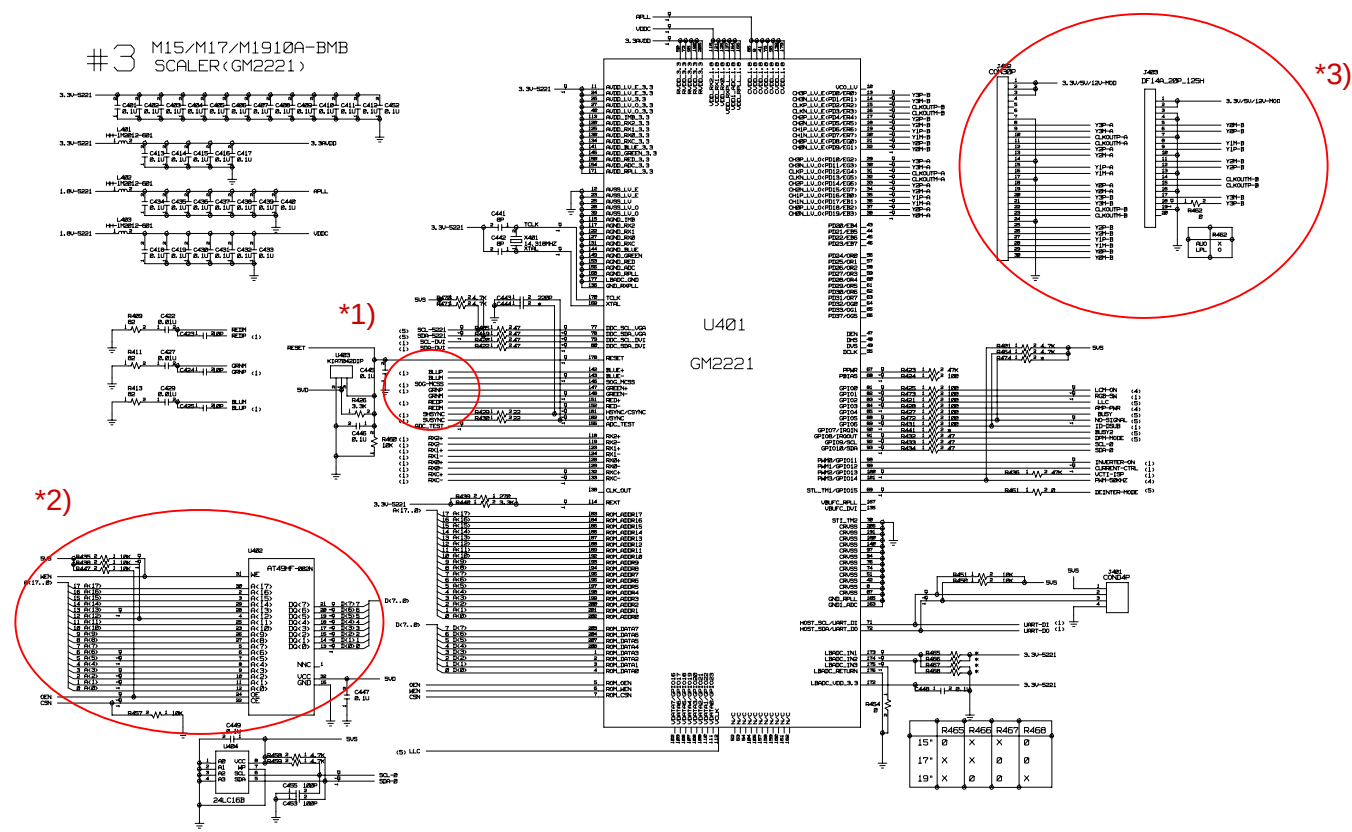


4.2 RGB switching Block



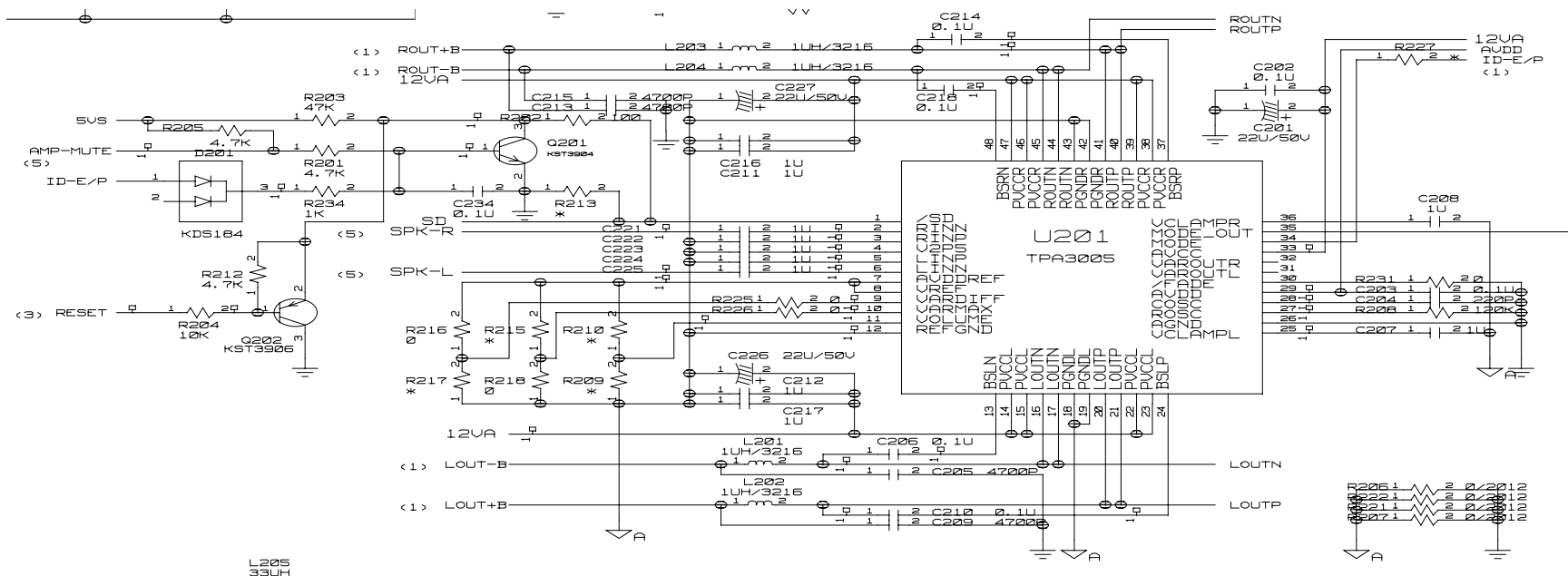
- *1) This is the D-sub RGB from PC.
- *2) This is the RGB signal from VCT49xy
- *3) This is RGB output to the scaler(gm2221).

4.3 Scaler Block



- *1) This the SCALER IC, gm2221 whose inputs are D-sub RGB signal from Pc and RGB signal from VCT49xyi.
- *2) This is memory IC used by the scalar, it is 2 MB Flash memory for storage
- *3) This is the Output signal lines, it is LVDS data for the module. (J403 : M1510A, J402 : M1710A / M1910A)

After the Audio processing and amplification this Power Amplifier raises the O/P level of audio signal so that it can drive speaker.

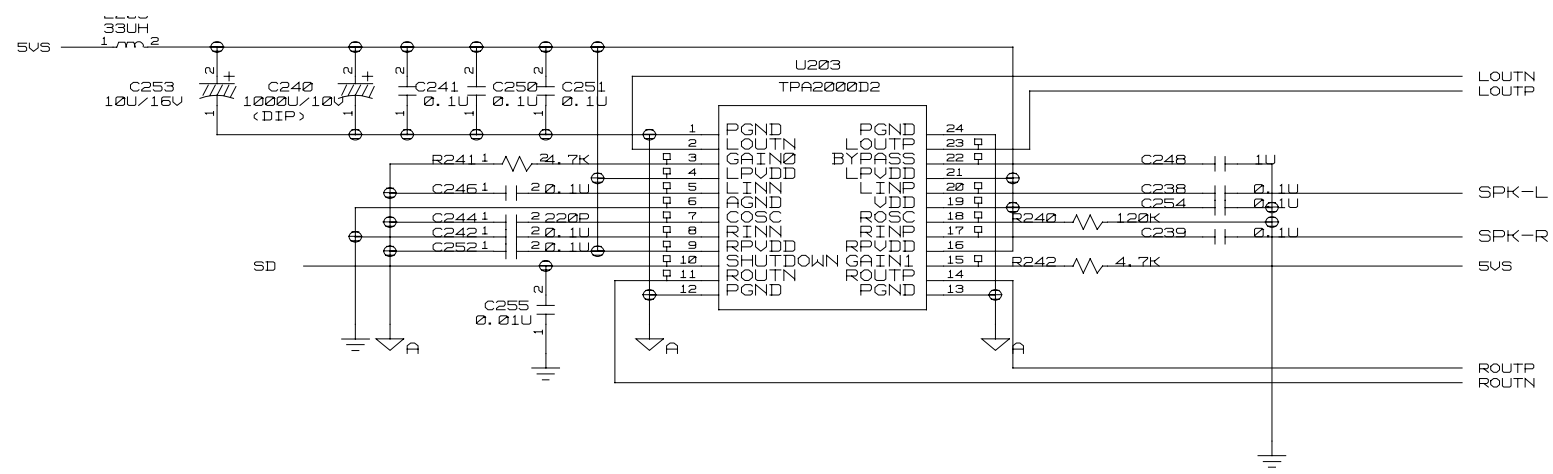


*1) This is the main Amplifier IC,
This amplifies the output of Audio Processor,
It is a Class-D 3 watt audio power Amplifier

4.4 Audio amplifier Block (M1510A)

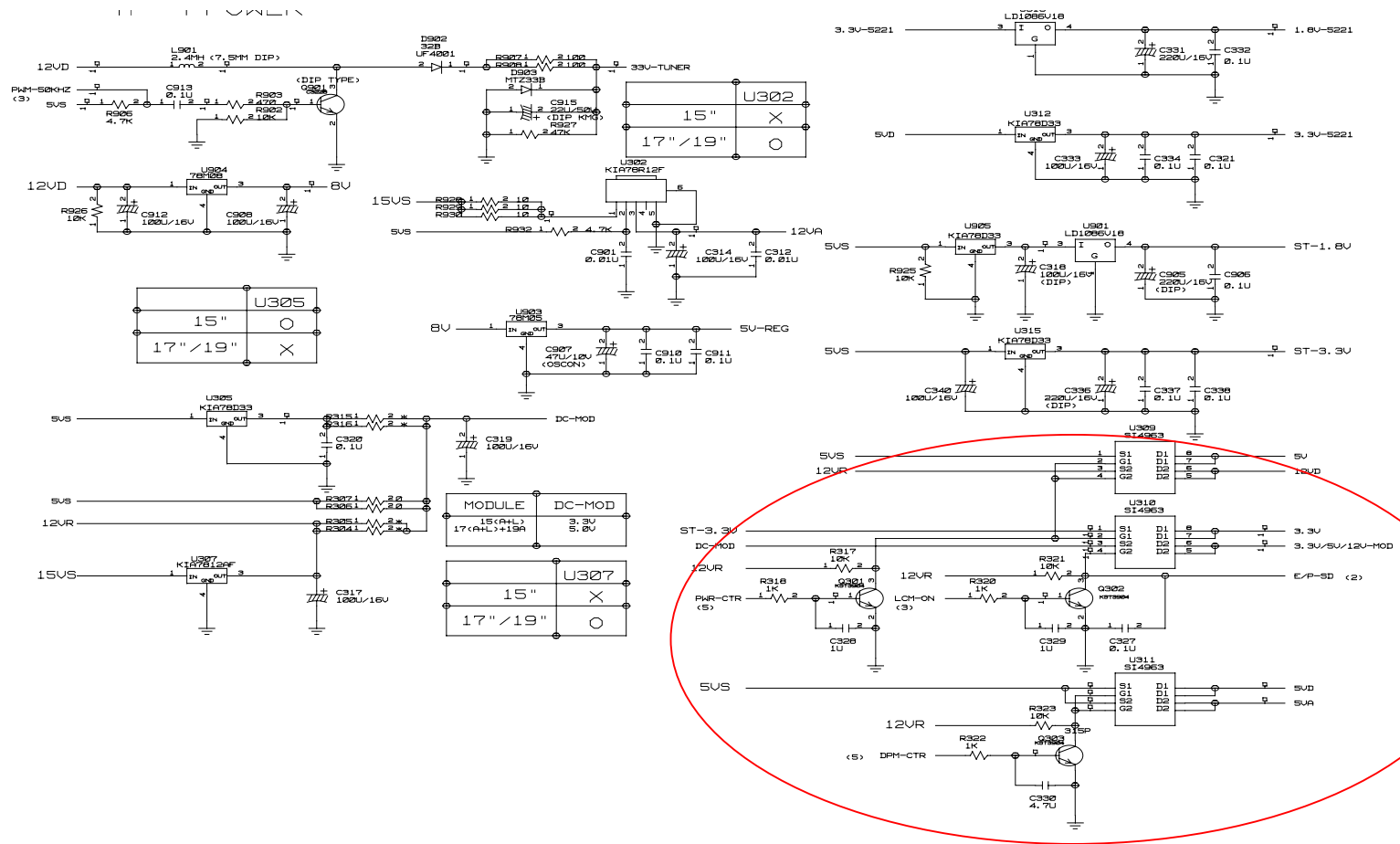
FUNCTION OF THIS BLOCK:

After the Audio processing and amplification this Power Amplifier raises the O/P level of audio signal so that it can drive speaker.



*1) This is the main Amplifier IC,
This amplifies the output of Audio Processor,
It is a Class-D 1 watt audio power Amplifier

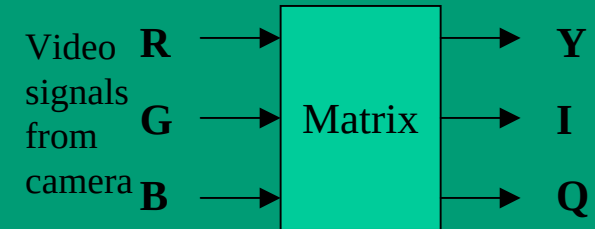
5. DC-DC converter



*1) This is the 5V, 12V, module power switching circuit for DPM wattage saving

NTSC(National Television System Committee)

- ▶ Developed in USA, on 1953
- ▶ Video signal(R,G,B) from Camera is converted to Y,I,Q signal.
- ▶ Y Signal : Luminance signal
 $Y=0.30R+0.59G+0.11B$
- ▶ I Signal: Chrominance Signal($I=0.60R-0.28G-0.32B$)
- ▶ Q Signal: 90° (Phase difference) compare with I Signal.
($Q=0.21R-0.52G+0.31B$)
- ▶ Color sub-carrier 3.58MHz
- ▶ Frame rate : 30/sec (60 Field)
- ▶ Horizontal line : 525 Line
- ▶ Nation : USA.Canada,Mexico,Korea,Japan etc..



PAL(phase alternation by line)

- ▶ Developed in Germany ,on 1967
- ▶ In every other line the R-Y signal is transmitted by inverting phase(180 degree).
- ▶ By combining two horizontal lines, using a delay line in the TV set,
two lines can be combined and any phase error can be cancelled.
→ Phase(Chroma) distortion is reduced. (Automatic hue control)
- ▶ Color sub-carrier 4.43MHz
- ▶ Frame rate : 25/sec (50 Field)
- ▶ Horizontal line : 625 Line
- ▶ Nation : West Europe (except France),China,Brazil etc..

SECAM(sequential chrominance and memory)

- ▶ Developed in France, on 1967
- ▶ One color signal at a time, transmitting chrominance signal (the R-Y signal and the B-Y signal) alternately by delay one line.
- ▶ FM modulation for color which is not effected by phase shift removes the problem during transmission that will effect the color hue nor saturation.
- ▶ Color sub-carrier 4.4MHz and 4.25MHz is used for R-Y and B-Y
- ▶ Frame rate : 25/sec (50 Field)
- ▶ Horizontal line : 625 Line
- ▶ Nation : France,CIS,East Europe etc..

👉 Comparison of Feature

SYSTEM	NTSC	PAL	SECAM
FLICKER	○	△	△
RESOLUTION	△	○	○
COLOR ERROR	△	○	○
NOISE SENSITIVITY (Picture Image)	⊙	○	○

SYSTEM	UNIT	NTSC M	PAL B,G,H	PAL I	PAL D	PAL N	PAL M	SECAM B,G,H	SECAM D,K,K1,L
Line/field	Line	525/60	625/50	625/50	625/50	625/50	525/50	625/50	625/50
Horizontal Frequency	kHz	15.734	15.625	15.625	15.625	15.625	15.75	15.625	15.625
Vertical Frequency	Hz	60 Hz	50Hz	50Hz	50Hz	50Hz	50Hz	50Hz	50Hz
Color Subcarrier Frequency	MHz	3.579545	4.433618	4.433618	4.433618	3.582056	3.575611	4.25 4.4	4.25 4.4
Video Bandwidth	MHz	4.2 MHz	5.0MHz	5.5MHz	6.0MHz	4.2MHz	4.2MHz	5.0MHz	6.0MHz
Sound Car	MHz	4.5MHz	5.5MHz	6.0MHz	6.5MHz	4.5MHz	4.5MHz	5.5MHz	6.5MHz

TV Broadcasting System Specifications

Code	Popular Name of Broadcasting System	Frames	Scan Lines	Freq Band	Sound Offset	Vision Modulation	Channel Band Width	In Use
Terrestrial Transmission Standards								
A	UK ch	25	405	VHF	-3.5MHz	Pos	5.0MHz	No
B	CCIR ch(1)	25	625	VHF	+5.5MHz	Neg	7.0MHz	Yes
C	Luxembourg	25	625	VHF	+5.5MHz	Pos	5.5MHz	Yes
D	OIRT ch(1)	25	625	VHF	+6.5MHz	Neg	8.0MHz	Yes
E	Old France ch	25	819	VHF	+11MHz	Neg	14.0MHz	No
F	Old Luxembourg ch	25	819	VHF	+5.5MHz	Pos	7.0MHz	No
G	CCIR ch(2)	25	625	UHF	+5.5MHz	Neg	8.0MHz	Yes
H	CCIR ch(2)	25	625	UHF	+5.5MHz	Neg	8.0MHz	Yes
I	Ireland ch	25	625	UHF	+6.0MHz	Neg	8.0MHz	Yes
K	OIRT ch(2)	25	625	UHF	+6.5MHz	Neg	8.0MHz	Yes
K1	OIRT ch(2)	25	625	UHF	+6.5MHz	Neg	8.0MHz	Yes
L	France ch	25	625	UHF	+6.5MHz	Pos	8.0MHz	Yes
M	US or JAP ch	30 (29.97)	525	VHF/UHF	+4.5MHz	Neg	6.0MHz	Yes
N	Argentina ch	25	625	VHF/UHF	+4.5MHz	Neg	6.0MHz	Yes
Satellite Transmission Standards								
Ku-Band		Any	Any	~11GHz	+6.50MHz	Neg		Yes
C-Band		Any	Any	~4GHz	+6.50MHz	Pos		Yes



Summary

- 1) Image is transmitted by AM modulation, Sound is FM modulation.
- 2) Separation & detection of Vision, Sound signal in TV system.

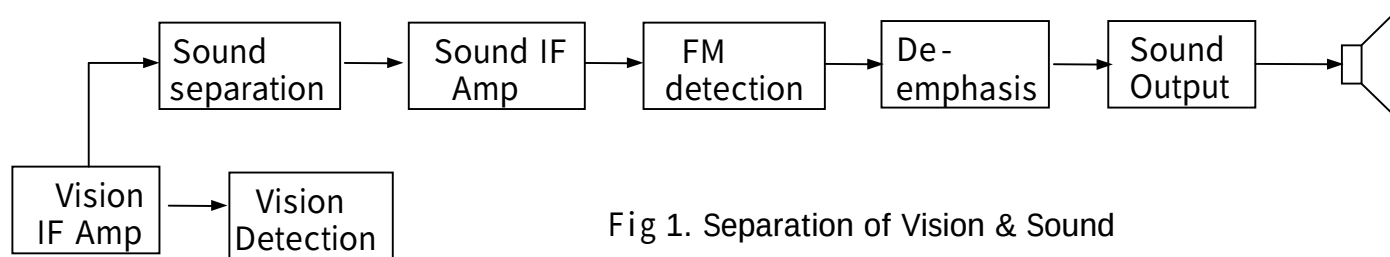


Fig 1. Separation of Vision & Sound

- 3) De-emphasis Circuit (For improving S/N ratio)

; Noise sensitivity of high frequency is poor

To compensate this problem, transmitter amplifies high frequency part with high-pass AMP (Pre-emphasis)

► Receiver needs De-emphasis circuit(low pass filter) for decreasing high frequency.

- 4) To avoid interference with color signal, use FM modulation & transmit by decreasing amplitude.
- 5) Mono : same sound pressure in two speaker.

Stereo : different sound pressure in two speaker. sound form is moved.

Surround : different sound pressure & Phase. user can feel the sound form in the outside of speaker .

Sound system of broadcasting

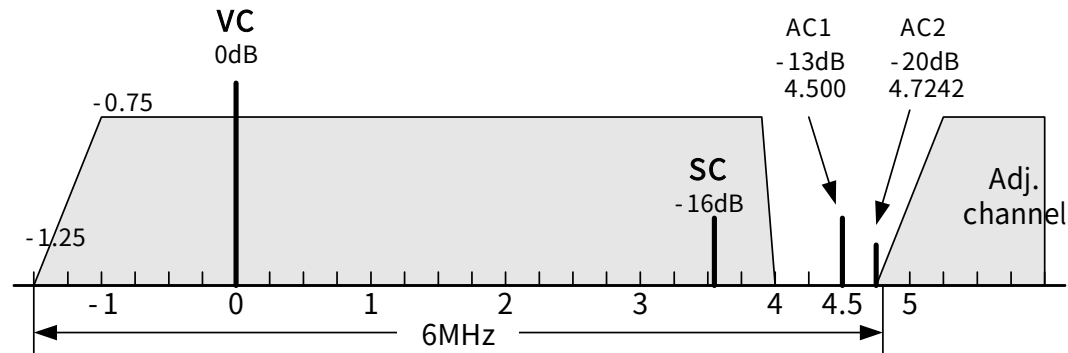


Fig 2. M(NTSC) System

- Sound Frequency & Stereo carrier frequency of Broadcasting System

TV system	Position of Sound Carrier /MHz	Sound Modulation	Color System	Country
B/G	5.5/5.7421875	FM-Stereo	PAL	Germany
B/G	5.5/5.85	FM-Mono /NICAM	PAL	Scandinavia, Spain
L	6.5/5.85	FM-Mono /NICAM	SECAM-L	France
I	6.0/6.552	FM-Mono /NICAM	PAL	UK
D/K	6.5/6.2578125 D/K1 6.5/6.7421875 D/K2 6.5/5.85 D/K-NICAM	FM-Mono /NICAM	SECAM-East	USSR Hungary
M M-Korea	4.5 4.5/4.724212		NTSC	USA Korea

Sound system of broadcasting

- Major parameter of broadcasting system when transmit sound signal

Sound Carriers	Carrier FM1			Carrier FM2		
TV-Sound Standard	B/G	D/K	M	B/G	D/K	M
Carrier frequency in MHz	5.5	6.5	4.5	5.7421875	6.2578126.7421875.742187	4.724212
Vision/sound power ratio	13dB					
Sound bandwidth	40Hz to 15kHz					
Preemphasis	50us		75us ±17/	50us		75us
Frequency deviation(nom/max)	±27 / ± 50kHz		±25kH	±25 / ±50kHz		±25kHz
z Sound Signal Components						
Mono transmission	mono			Mono		
Stereo transmission	(L+R)/2		(L+R)/2	R		(L - R)/2
Dual-sound transmission	Language A			Language B		

Multi Carrier sound broadcasting

1) KOREA : transmit L+R, L-R signal only (2 carrier method)

2 Language broadcasting: L+R(A Language),L-R(B Language)

2) USA ; transmit L+R,L-R, Pilot, SAP carrier individually .

	Aural Carrier	BTSC – MPX - Components			
		(L + R)	Pilot	(L – R)	SAP
Carrier frequency ($f_{hNTSC} = 15.734\text{kHz}$) ($f_{hPAL} = 15.625\text{kHz}$)	4.5MHz	Base-band	f_h	$2f_h$	$5f_h$
Sound bandwidth in kHz		0.05 ~15kHz		0.05 ~15	0.05 ~12kHz
Max. deviation to Aural Carrier	73kHz	25kHz	5kHz	50kHz	15kHz
Max. Freq. Deviation of Sub-carrier Modulation Type				AM	10kHz FM

3) JAPAN : transmit L+R, L-R, pilot carrier (3 carrier method)

Main sound : R+L, Sub sound : R-L, control carrier($3.5f_h$).

2 Language broadcasting: main sound(A Language),Sub sound(B Language)

NICAM 728

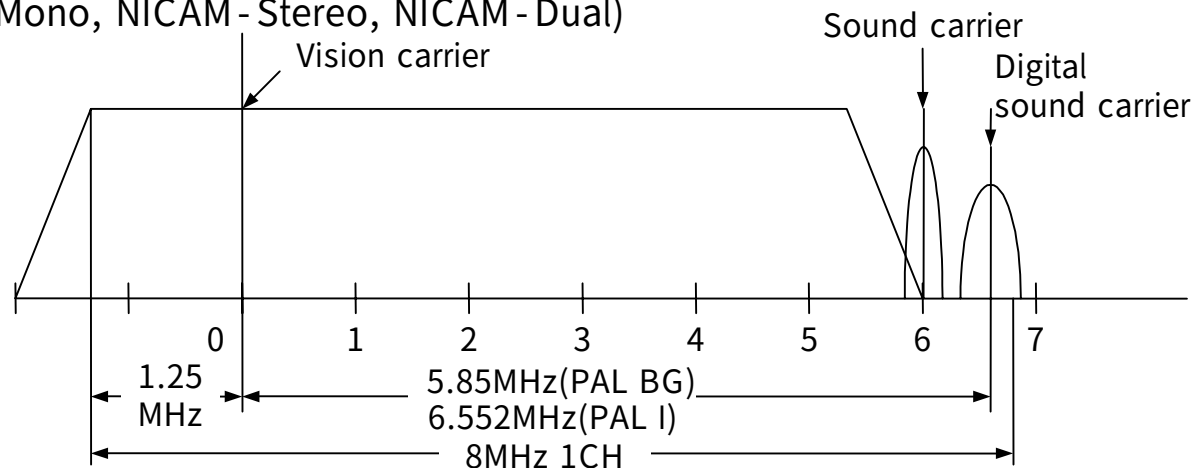
1) NICAM (Near-Instantaneous Companding Audio Multiplex)

; Transmit Digital Sound .

A high frequency sub-carrier (5.85MHz or 6.552MHz) is digitally modulated with a 728Kbits/sec data-stream.

The data-stream consists of 728bit NICAM packets transmitted continuously, one packet every millisecond.

(NICAM - Mono, NICAM - Stereo, NICAM - Dual)



* QPSK(Quadrature Phase Shift Keying) Modulation

; Phase of carrier is shifted 90 degree every 2-bit period from original point.

0°	90°	180°	270°
00	10	11	01

-Summary of Teletext

- transmit latest information(real time)
- consisted with character and figure.

vision information is multiplexed in TV signal with digital data format.

receiver reproduce with TV Vision signal form by using Teletext decoder.

Teletext Signal

- Field fly-back mode :transmit text data in the VBI(vertical blanking interval) of Video signal) interval.
use horizon. Line 6~22, 318~335 . (transmit data of 45byte in every Line)

- Page format

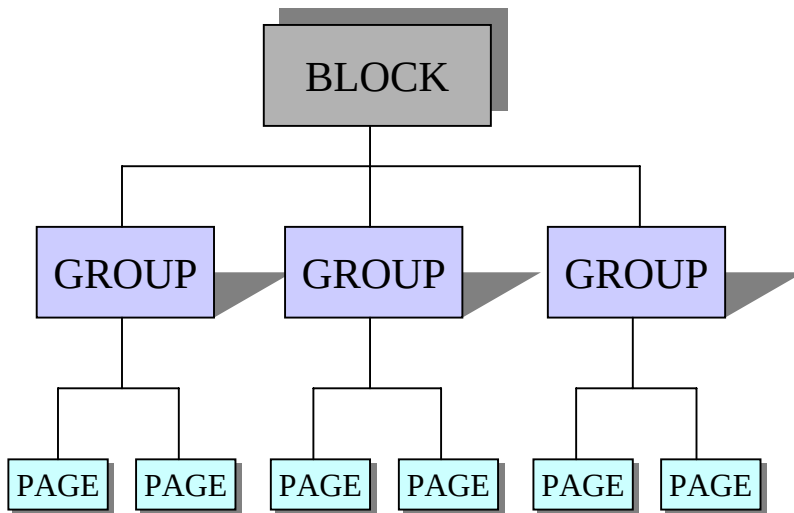
- every Page is consist with Packet. 1 Page have 32 Packet .
- possible total Page : 800Page(100 Page ~ 899 Page)

- Teletext form

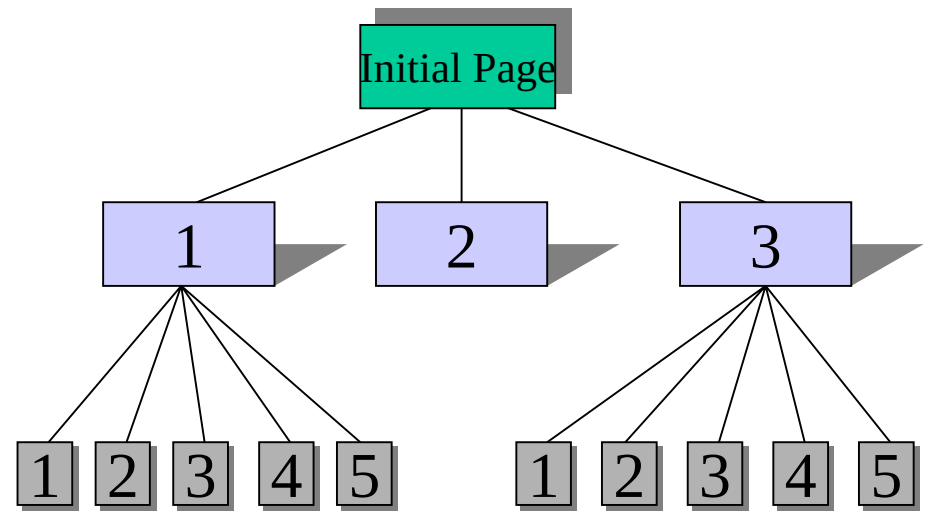
- TOP** : TXT contents is consisted with table form of total page,in designated pages.
(Germany,sweden,swiss etc..)
- FLOF** : use 3 Page no. and 5 additional key of Remocon.(Red, Green, Yellow, Blue, Index)
(UK,france, etc..)

Teletext Structure

TOP



FLOF



1. Teletext Related Function in TV.

기능	리모콘	설명
TEXT		Teletext On/Off
SIZE		Double Height for Teletext Data
HOLD		Maintaining current Display Page contents even if the Page contents is changed
UPDATE		Inform user when current Display Page contents are Updated
MIX		Mixing current Display Page to show up with Video at the same time
TIME		When TXT OFF, display current time information and when TXT ON ,select Sub-page Mode
REVEAL		Let the text which is concealed in Current Display Page to be shown
MODE		Memorize 4 pages that user wants per program at current program
RED		Change to the page linked to TXT RED key
GREEN		Change to the page linked to TXT GREEN key
YELLOW		Change to the page linked to TXT YELLOW key
CYAN		Change to the page linked to TXT CYAN key
INDEX		Change current page to index page
ACMS	---	After Auto search, detect broadcasting name per country and memorize channel automatically as wanted
WSS	ARC	With using WSS signal from teletext signal , change to wide picture ratio