4. Alignment and Adjustments

4-1 Preadjustment

4-1-1 Factory Mode

1. Do not attempt these adjustments in the Video Mode.

2. The Factory Mode adjustments are necessary when either the EEPROM (IC902) or the CRT is replaced.

3. Do not tamper with the "Adjustment" screen of the Factory Mode menu. This screen is intended only for factory use.

4-1-2 When EEPROM (IC902) Is Replaced

1. When IC902 is replaced all adjustment data revert to initial values. It is necessary to re-program this data.

2. After IC902 is replaced, warm up the TV for 10 seconds.

4-1-3 When CRT Is Replaced

1. Make the following adjustments AFTER setting up after setting up purity and convergence :

   White Balance
   Sub-Brightness, Sub-Contrast
   Vertical Center
   Vertical Size
   Horizontal Size
   Fail Safe (This adjustment must be the last step).

4-2 Factory/Service Mode

4-2-1 Procedure for the "Adjustment" Mode

1. This mode uses the standard remote control. The Service Mode is activated by entering the following remote-control sequence :

   (1) STAND-BY→ DISPLAY→ MENU→ MUTE →POWER ON.

2. The "SERVICE (FACTORY)" message will be displayed. The Service Mode has three components: Adjustment, Option and Reset.

3. Access the Adjustment Mode by pressing the "VOLUME" keys (Up or Down). The adjustment parameters are listed in the accompanying table, and selected by pressing the CHANNEL keys (▲ ,▼).

4. Selection sequences for the PAL system:

   DOWN or UP key:

   AGC↔VCO↔SBT↔SCT↔SCR↔SC↔RG↔ BG↔CDL↔STT↔LCO↔VOL↔PSL↔PVS↔ PVA↔PHS↔PEW↔PEP↔PEC↔PET↔VSC↔ TSC↔SA↔QEW↔PCT↔PTT↔PHM↔PVP↔ PHP↔NSR↔PDL↔AGC.

5. The VOLUME keys increase or decrease the adjustment values (stored in the non-volatile memory) when Adjustment Mode is cancelled.

6. Cancel the Adjustment Mode by re-pressing the "HIDDEN" or "Power OFF/ON" keys.

7. After adjustments are completed, re-start the TV set.

4-2-2 Main Adjustment Parameters

OSD	FUNCTION	RANGE
AGC	AUTO GAIN CONTROL	0 - 63
VCO	VOLTAGE CONTROLLED OSCILLATOR	0 - 127
SBT	SUB BRIGHTNESS	0 - 23
SCT	SUB CONTRAST	0 - 23
SCR	SUB COLOUR	0 - 23
SC	S-CORRECTION	0 - 63
RG	RED DRIVE GAIN	0 - 63
BG	BLUE DRIVE GAIN	0 - 63
CDL	CATHODE DRIVE LEVEL	0 - 7
STT	SUB TINT (FOR NTSC)	0 - 7
LCO	SECAM-L VOLTAGE CONTROLLED OSCILLATOR	0 - 1
VOL	VOLUME INITIAL LEVEL	0 - 63
PSL	PAL VERTICAL SLOPE	0 - 63
PVS	PAL VERTICAL SHIFT	0 - 63
PVA	PAL VERTICAL AMPLITUDE	0 - 63
PHS	PAL HORIZONTAL SHIFT	0 - 63
PEW	PAL E-W WIDTH	0 - 63
PEP	PAL E-W PALABOLA	0 - 63
PEC	PAL E-W CORNER	0 - 63
PET	PAL E-W TRAPEZIUM	0 - 63
VSC	VERTICAL SCROLL	0 - 63
TSC	TELETEXT SUB CONTRAST	0 - 63
SA	SEPARATION ADJUSTMENT (STEREO)	0 - 15
QEW	Q(12.8:9) MODEL E-W WIDTH	0 - 7
PCT	PIP CONTRAST	0 - 15
PTT	PIP TINT	0 - 63
PHM	PIP HORIZONTAL MOVE	0 - 15
PVP	PIP VERTICAL POSITION	0 - 63
PHP	PIP HORIZONTAL POSITION	0 - 63
NSR	NTSC SUB COLOUR	0 - 23
PDL	PAL DELAYTIME	0 - 15

FACTORY MODE VALUE

OSD	INITIAL	OSD	INITIAL	OSD	INITIAL
2 (CH)		LCO	1 (FIXED)	TSC	20(FIXED)
AGC	10	VOL	25	SA	7
VCO	80(FIXED)	PSL	31(FIXED)	QEW	5
SBT	7	PVS	31	PCT	7(FIXED)
SCT	16	PVA	31	PTT	31(FIXED)
SCR	5(FIXED)	PHS	40	PHM	8(FIXED)
SC	11(FIXED)	PEW	38	PVP	31(FIXED)
RG	31	PEP	22	PHP	31(FIXED)
BG	31	PEC	22	NSR	3 (FIXED)
CDL	5	PET	30	PDL	0 (FIXED)
STT	10(FIXED)	VSC	31(FIXED)		

4-2-3 AGING Mode (Reference Only)

This pattern is used for pre-heating the CRT during manufacturing--it is accessed in the factory by twice pressing the “FACTORY “ key.

Even if the TV power is cut off, the Aging Mode is not cancelled, The AGING mode is cancelled by repressing the “HIDDEN” or any key on the front pannel.

4-2-4 Option Byte Table

Option Byte

1.ZOOM MODE : NORMAL/ZOOM/16:9
2.AUDIO MODE : NICAM STEREO
3.ONE CHIP : TDA8844
4.LED OPTION : NORMAL
5.LANGUAGE : WEST
ENG/GER/FRA/DUT/SPA/ITA/SWE
6.SYSTEM: CX
7.ATS OPTION : ON
8.FIELD POL : FIELD POS

OPTION	OSD	NOTE
ZOOM MODE	PLU/NOR/ZOOM/16:9	12.8 : 9 CRT USED(30",22")
	NORMAL/ZOOM/16:9	NORMAL CRT USED
	NORMAL/ZOOM	
	PLUS/NORMAL	12.8 : 9 CRT USED(26")
AUDIO MODE	NICAM STEREO	NICAM MODULE USED
	STEREO	A2 MODULE USED
	LINE STEREO	MONO MODULE USED (LINE STEREO MODEL)
	MONO	MONO MODULE USED (MONO MODEL)
ONECHIP	TDA8844	CRT(MORE THAN 22-INCH)USED
	TDA8842	CRT(MORE THAN 21-INCH)USED
LED OPTION	NORMAL	DEFAULT
	POLAND	POLAND MODEL ONLY
LANGUAGE	WEST ENG/GER/FRA/DUT/SPA/ ITA/SWE	WEST EUROPE MARKET ENGLISH/GERMANY/FRANCE/ NETHERLANDS/SPAIN/ITALY/SWEDEN
	EAST ENG/CZE/CRO/RUM/HUN/ POL	EAST EUROPE MARKET ENGLISH/CZECH/CROATIA/ROMANIA/ HUNGARY/POLAND
SYSTEM	CF	SECAM-L/L', PAL/SECAM-B/G
	CI	PAL - I (UHF BAND ONLY)
	CK	PAL/SECAM - B/G,D/K
	CX	PAL/SECAM -B/G
	CB	PAL -B/G
ATS OPTION	ON	ATM FUNCTION USED
	OFF	ATM FUNCTION NOT USED
FIELD POL	FIELD POS	PHILIPS CRT USED
	FIELD NEG	OTHER CRT USED

Alignment and Adjustments

4-2-5 RESET

The Reset Mode is used during factory inspection.
Function Reset:

1.	Channels	Add/Erase
2.	Language	Last condition
3.	Station name	Clear

4-3 Other Adjustments

4-3-1 General

1. Usually, a color TV needs only slight touch-up adjustment upon installation. Check the basic characteristics such as height, horizontal and vertical sync and focus.

2. The picture should have good black and white details. There should be no objectionable color shading; if color shading is present, perform the purity and convergence adjustments described below.

3. Use the specified test equipment or its equivalent.

4. Correct impedance matching is essential.

5. Avoid overload. Excessive signal from a sweep generator might overload the front-end of the TV. When inserting signal markers, do not allow the marker generator to distort test results.

6. Connect the TV only to an AC power source with voltage and frequency as specified on the backcover nameplate.

7. Do not attempt to connect or disconnect any wires while the TV is turned on. Make sure that the power cord is disconnected before replacing any parts.

8. To protect against shock hazard, use an isolation transformer.

4-3-2 Automatic Degaussing

A degaussing coil is mounted around the picture tube, so that external degaussing after moving the TV should be unnecessary. But the receiver must be properly degaussed upon installation.

The degaussing coil operates for about 1 second after the power is switched ON. If the set has been moved or turned in a different direction, disconnect its AC power for at least 30 minutes.

If the chassis or parts of the cabinet become magnetized, poor color purity will result. If this happens, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube and the sides and front of the receiver. Slowly withdraw the coil to a distance of about 6 feet before removing power.

Alignment and Adjustments

4-3-3 High Voltage Check

CAUTION: There is no high voltage adjustment on this chassis. The B+ power supply must be set to +155 volts (Full color bar input and normal picture level).

1. Connect a digital voltmeter to the second anode of the picture tube.
2. Turn on the TV. Set the Brightness and Contrast controls to minimum (zero beam current).
3. The high voltage should not exceed 33KV.
4. Adjust the Brightness and contrast controls to both extremes. Ensure that the high voltage does not exceed 33KV under any conditions.

4-3-4 FOCUS Adjustment

1. Input a black and white signal.
2. Adjust the tuning control for the clearest picture.
3. Adjust the FOCUS control for well defined scanning lines in the center area of the screen.

4-3-5 Screen Adjustment

1. Connect CRT socket pin GK, BK, RK to an oscilloscope probe.
2. Input a gray scale pattern. (Use a pattern generator, PM5518)
3. Use the Picture mode for the STANDARD picture.
4. Adjust the Screen VR (on the FBT) so that the voltage on the oscilloscope becomes 140±2.5V (See Fig. 4-1).

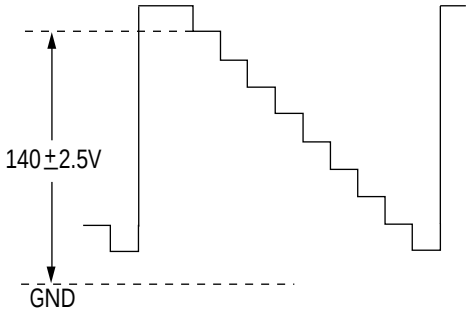


Fig. 4-1

4-3-6 Purity Adjustment

1. Warm up the receiver for at least 20 minutes.
2. Plug in the CRT deflection yoke and tighten the clamp screw.
3. Plug the convergence yoke into the CRT and set in as shown in Fig. 4-2.
4. Input a black and white signal.
5. Fully demagnetize the receiver by applying an external degaussing coil.
6. Turn the CONTRAST and BRIGHTNESS controls to maximum.
7. Loosen the clamp screw holding the yoke. Slide the yoke backward or forward to provide vertical green belt. (Fig. 4-3).
8. Tighten the convergence yoke.
9. Slowly move the deflection yoke forward, and adjust for the best overall green screen.
10. Temporarily tighten the deflection yoke.
11. Produce blue and red rasters by adjusting the low-light controls. Check for good purity in each field.
12. Tighten the deflection yoke.

Alignment and Adjustments

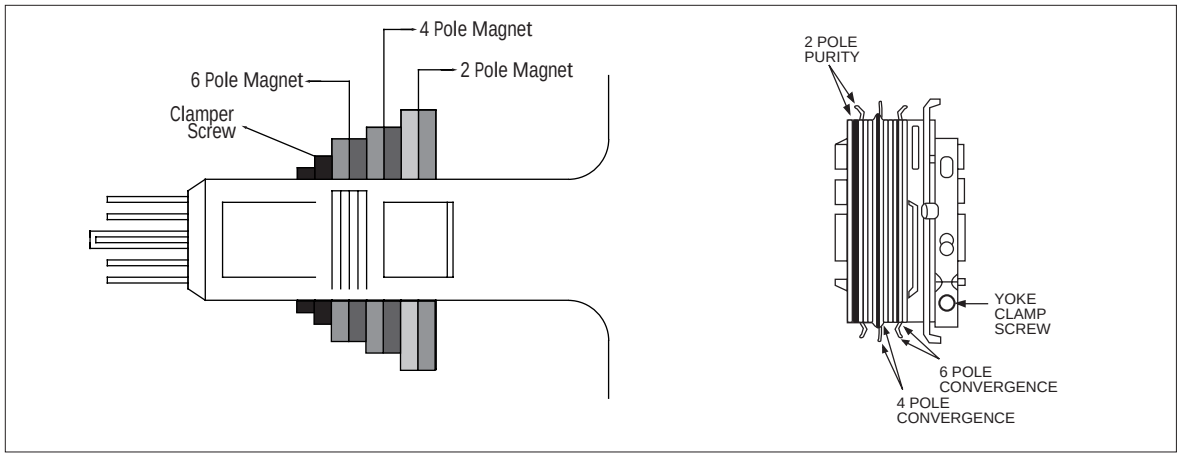


Fig. 4-2 Convergence Magnet Assembly

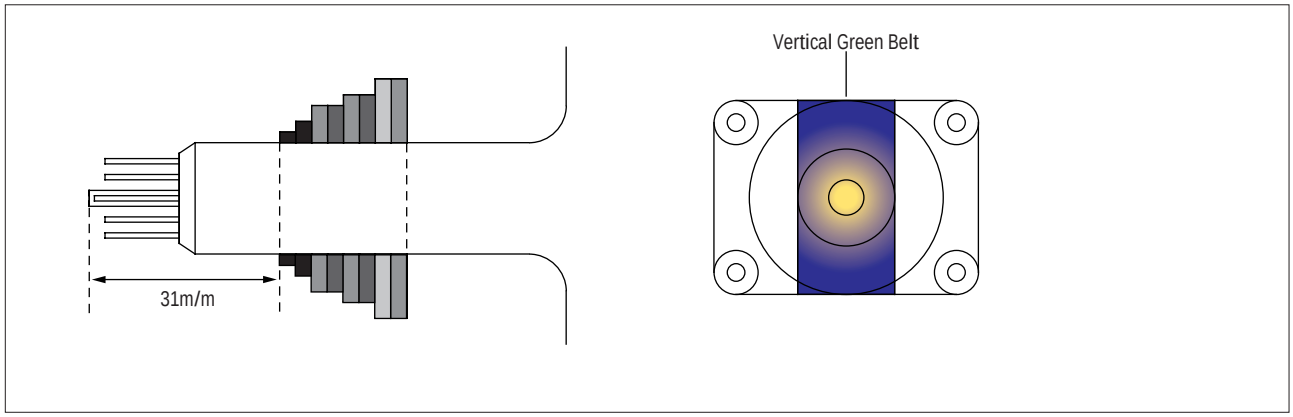


Fig. 4-3 Center Convergence Adjustment

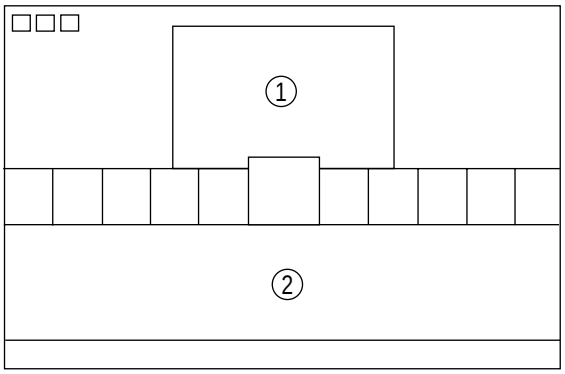


Fig. 4-4

4-3-7 White Balance Adjustment

(a) Set up

1. Warm up the TV for at least 30 minutes in the White Pattern.
2. Input a Toshiba pattern.

(b) High-Light Adjustment

Set SCT to 40 ± 5 fL in the Factory Service Mode with using CA100. (See Fig. 4-4 ①)

(c) Low-Light Adjustment

Set SBT to 1.5 ± 0.2 fL in the Factory Service Mode with using CA100. (See Fig. 4-4 ②)

Alignment and Adjustments

4-3-8 Center Convergence Adjustment

1. Warm up the receiver for at least 20 minutes.
2. Adjust the two tabs of the 4 pole magnets to change the angle between them. Superimpose the red and blue vertical lines in the center area of the screen.
3. Adjust the Brightness and Contrast controls for a well defined picture.
4. Adjust the two-tab pairs of the 4 pole magnets, and change the angle between them. Superimpose the red and the blue vertical lines in the center area of the screen.
5. Turn the both tabs at the same time, keeping the angle constant, and superimpose the red and blue horizontal line in the center of the screen.
6. Adjust the two-tab pairs of the 6-pole magnets to superimpose the red and blue line onto the green. (Changing the angle affects the vertical lines, and rotating both magnets affects the horizontal lines.)
7. Repeat adjustments 2~6, if necessary.
8. Since the 4-pole magnets and 6-pole magnets interact, the dot movement is complex (Fig. 4-5).

Fig. 4-5 Center Convergence Adjustment

4-3-9 RF AGC Adjustment

1. Tune to the strongest local station.

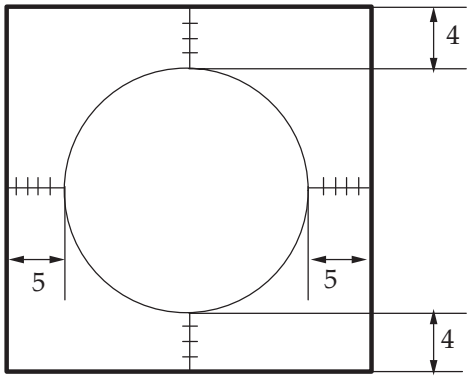
2. Enter the Factory Service Mode to make adjustments.

3. Adjust the AGC control untill noise(snow) disappears from the screen.

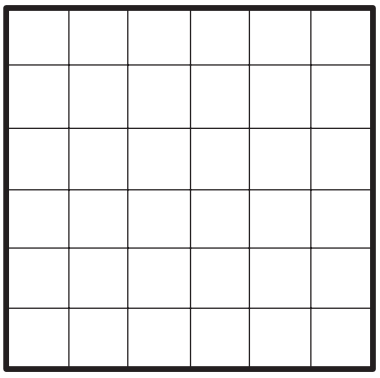
Alignment and Adjustments

4-3-10 Geometry Adjustment

1. Input a lion head pattern.
2. Adjust PVS so that the picture is vertically centered.
3. Adjust with PVA so that the top and bottom margins of the picture are 4.
4. Adjust PHS so that the picture is horizontally centered.
5. Adjust with PEW so that the left and right margins of the picture are 5.

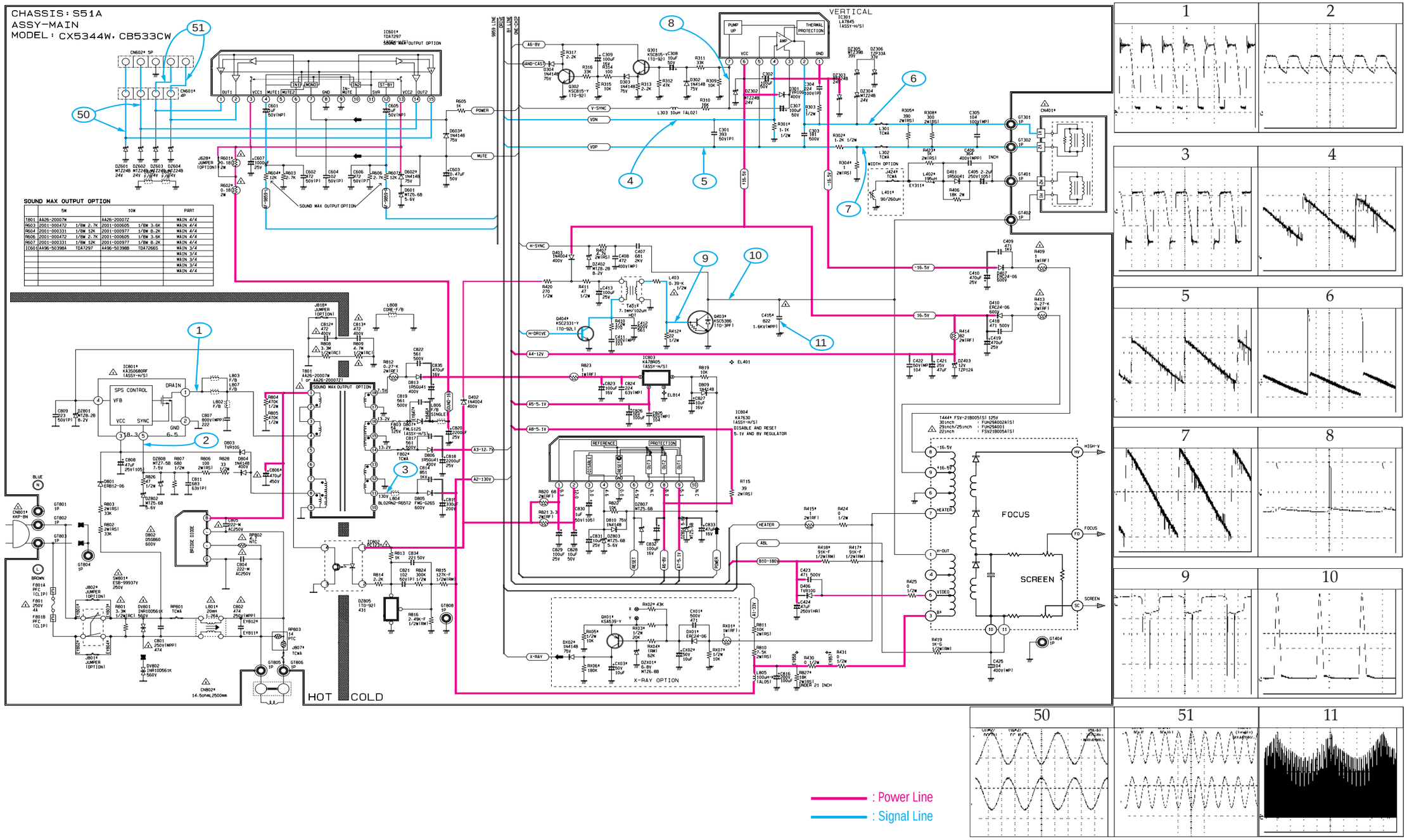


6. Input a crosshatch pattern.
7. Adjust PEP, PEC , PET for vertical linearity.

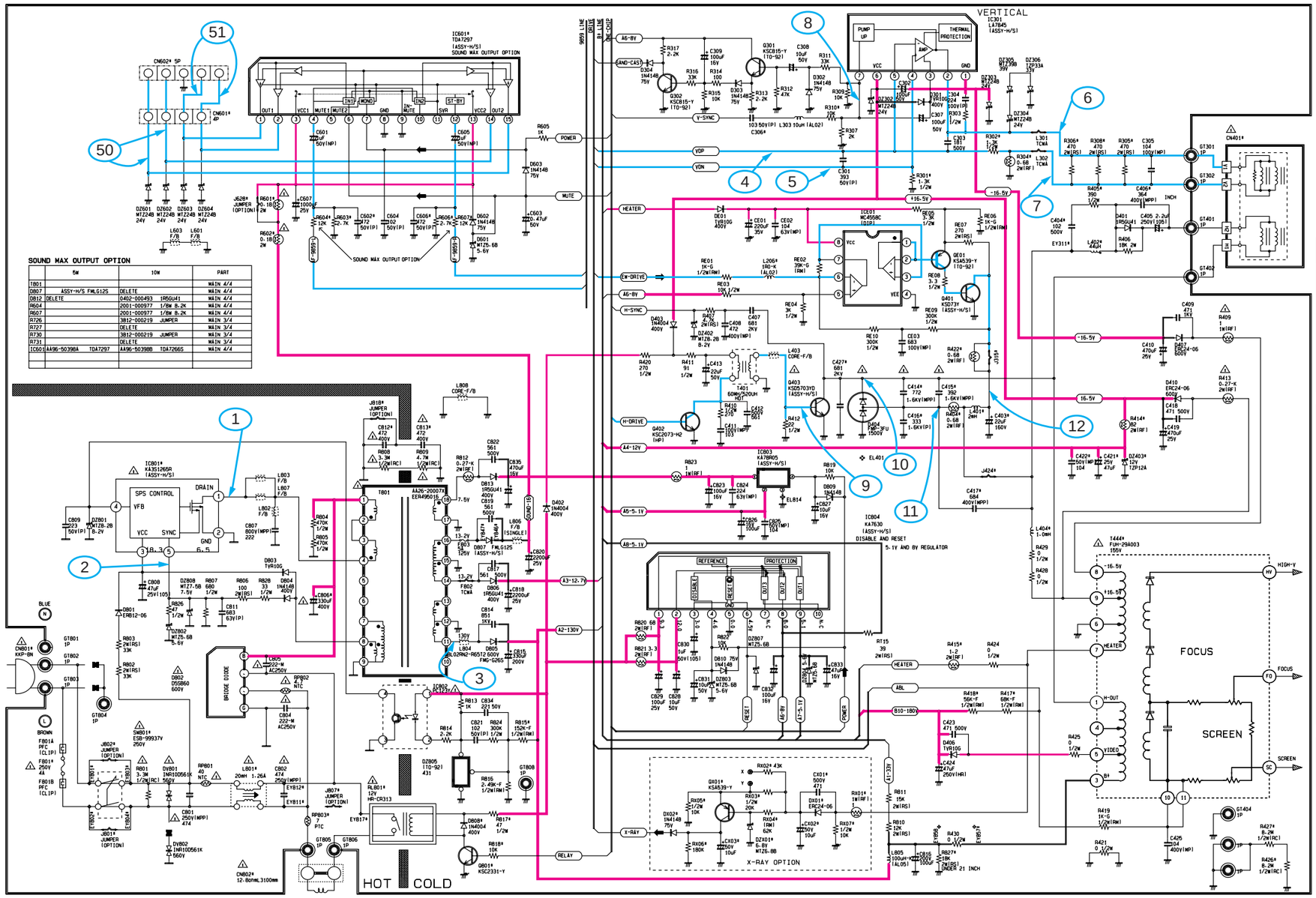


11. Schematic Diagrams

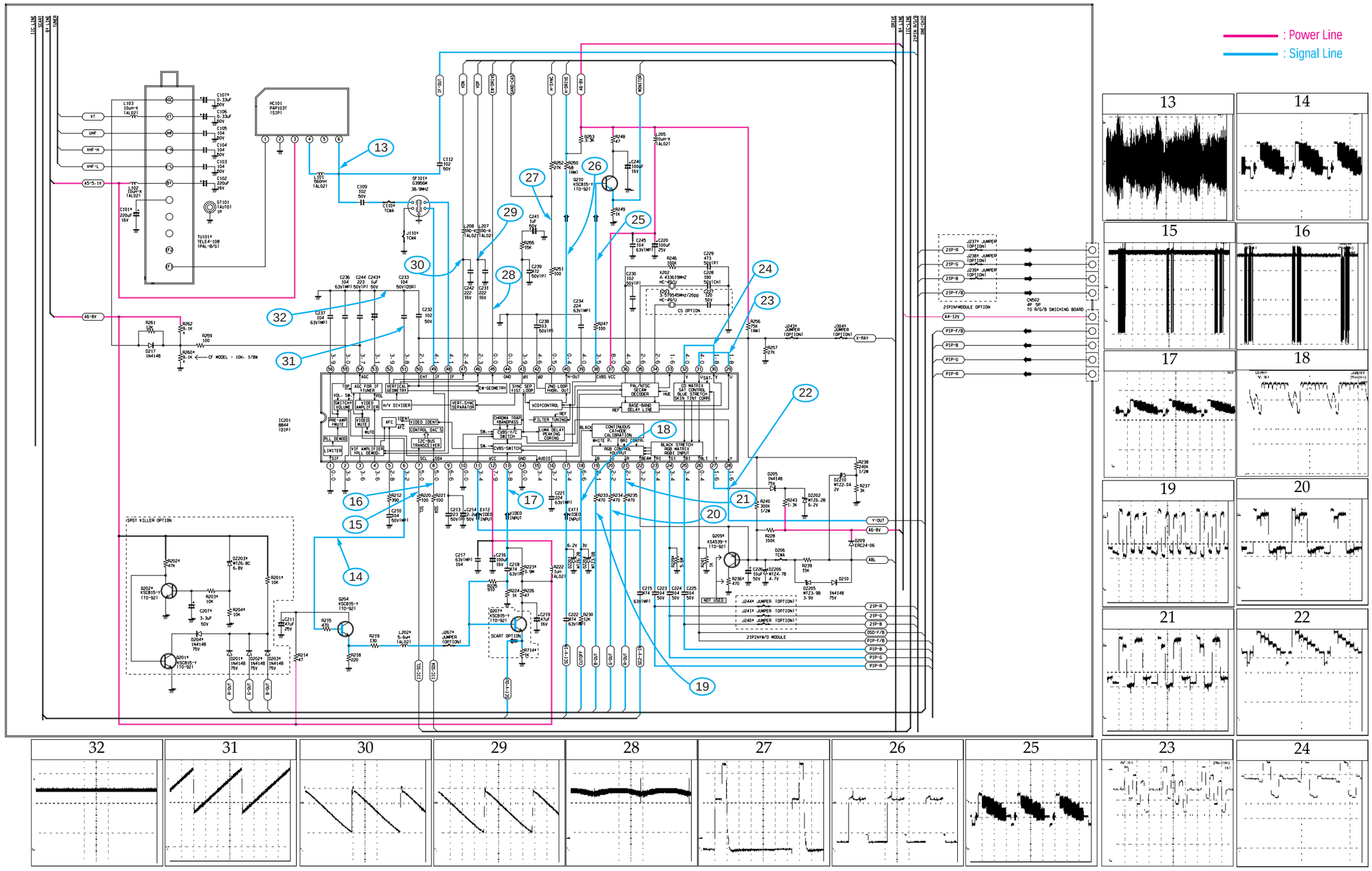
11-1 MAIN (Power 21")



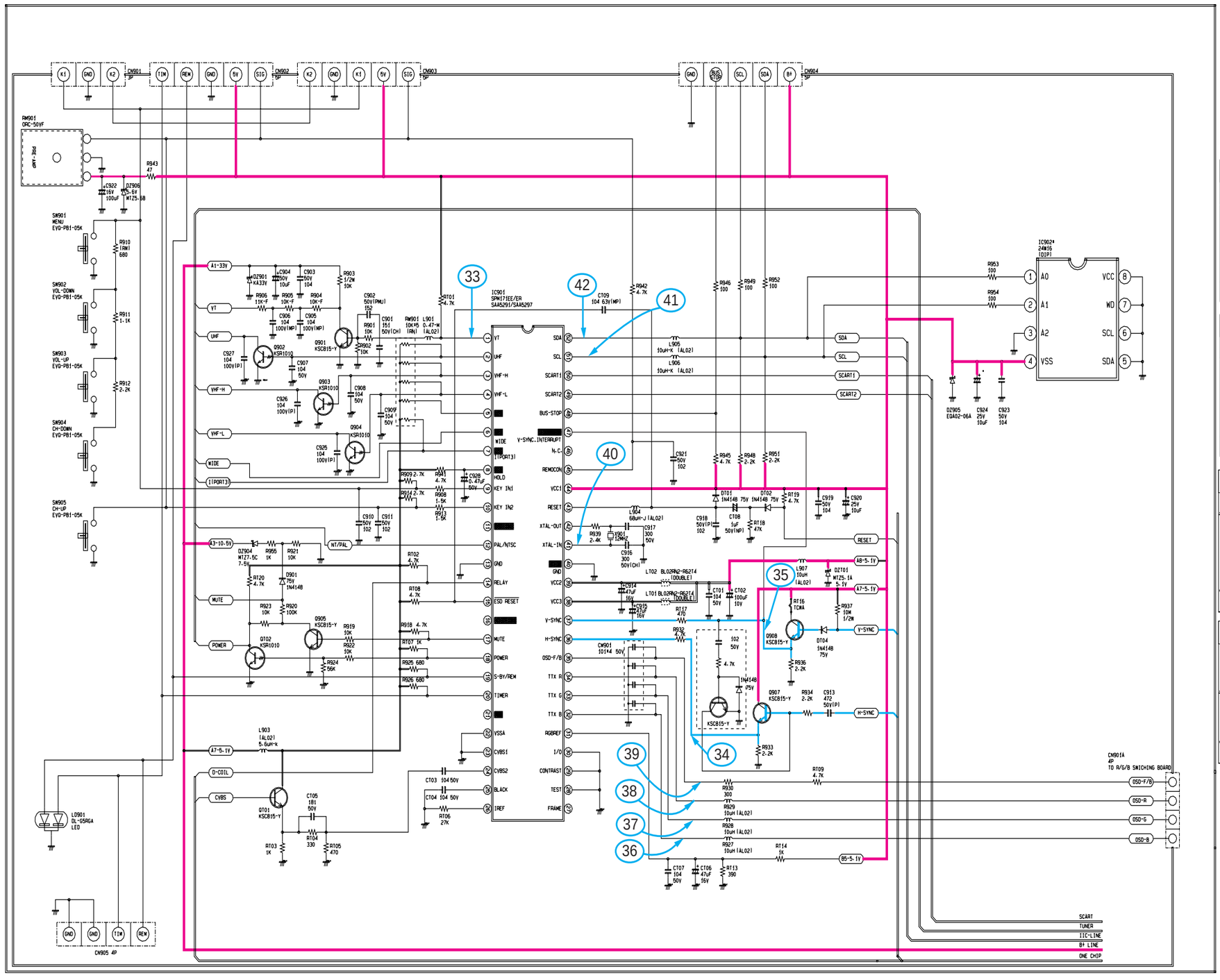
11-2 MAIN (Power 25” - 30”)

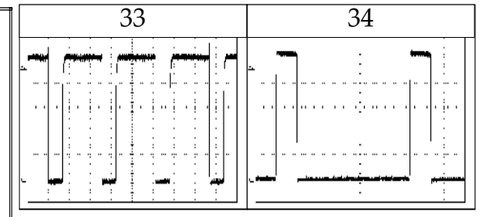


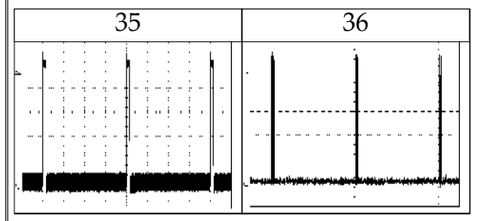
11-3 PWB MAIN (One-Chip)

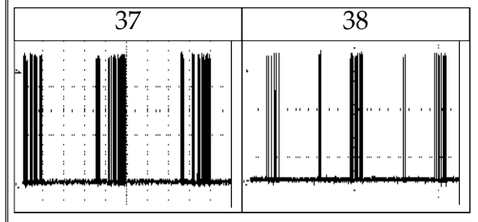


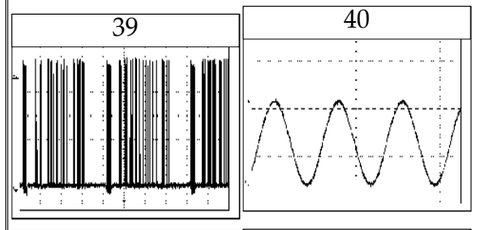
11-4 PWB MAIN (u-COM)

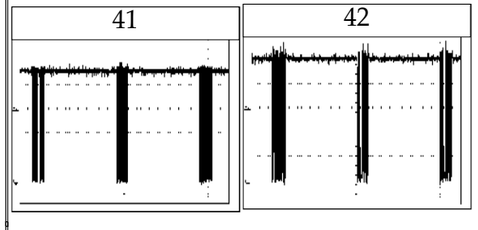




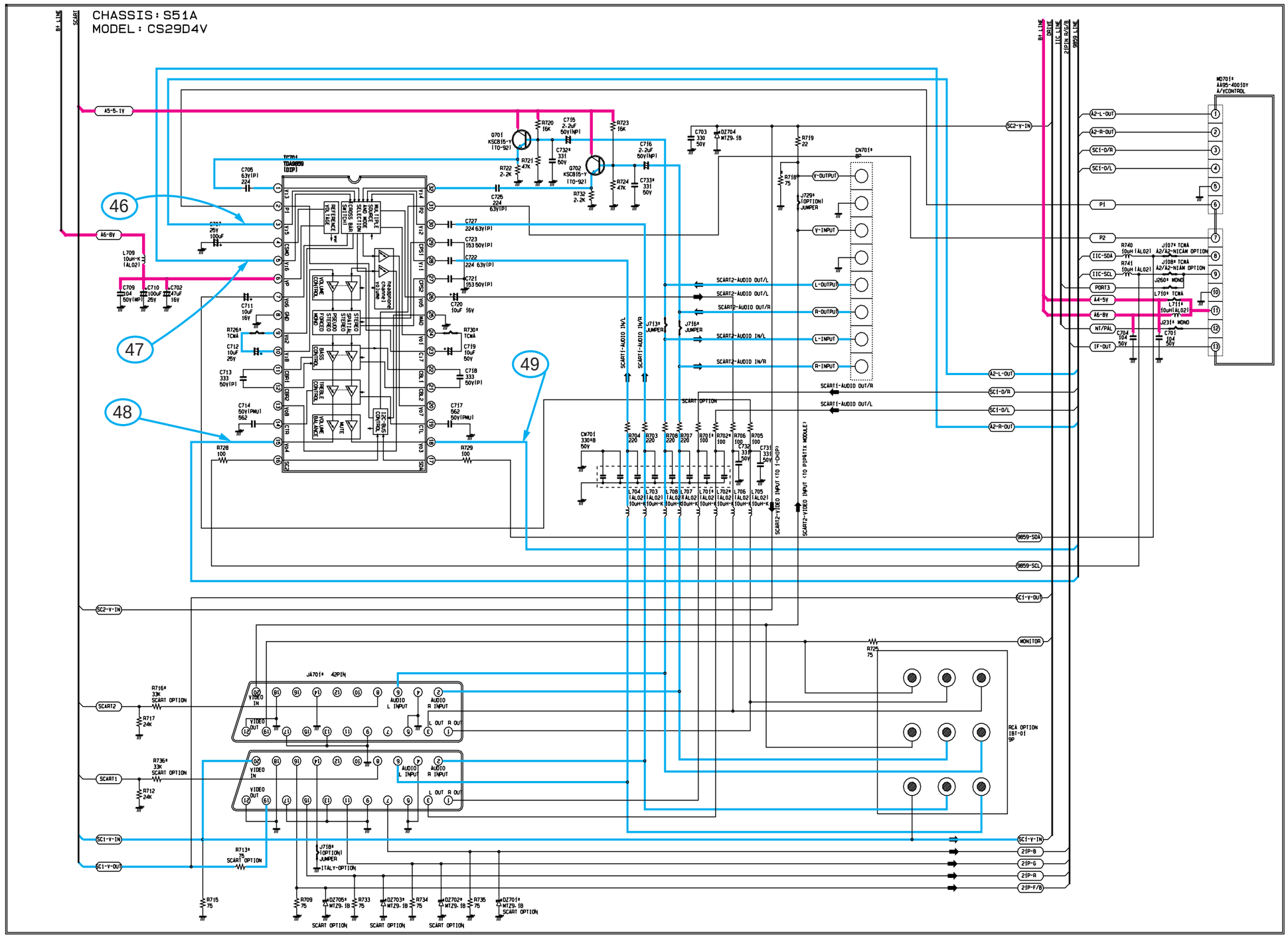


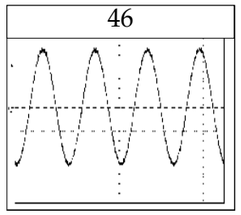


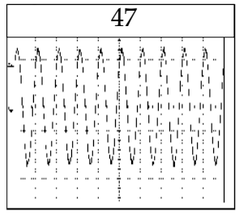


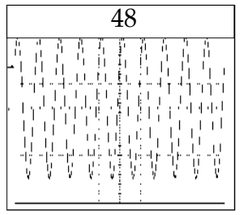


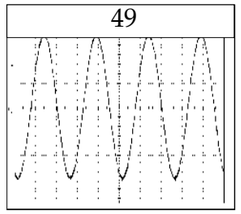
11-5 PWB MAIN (SUB)





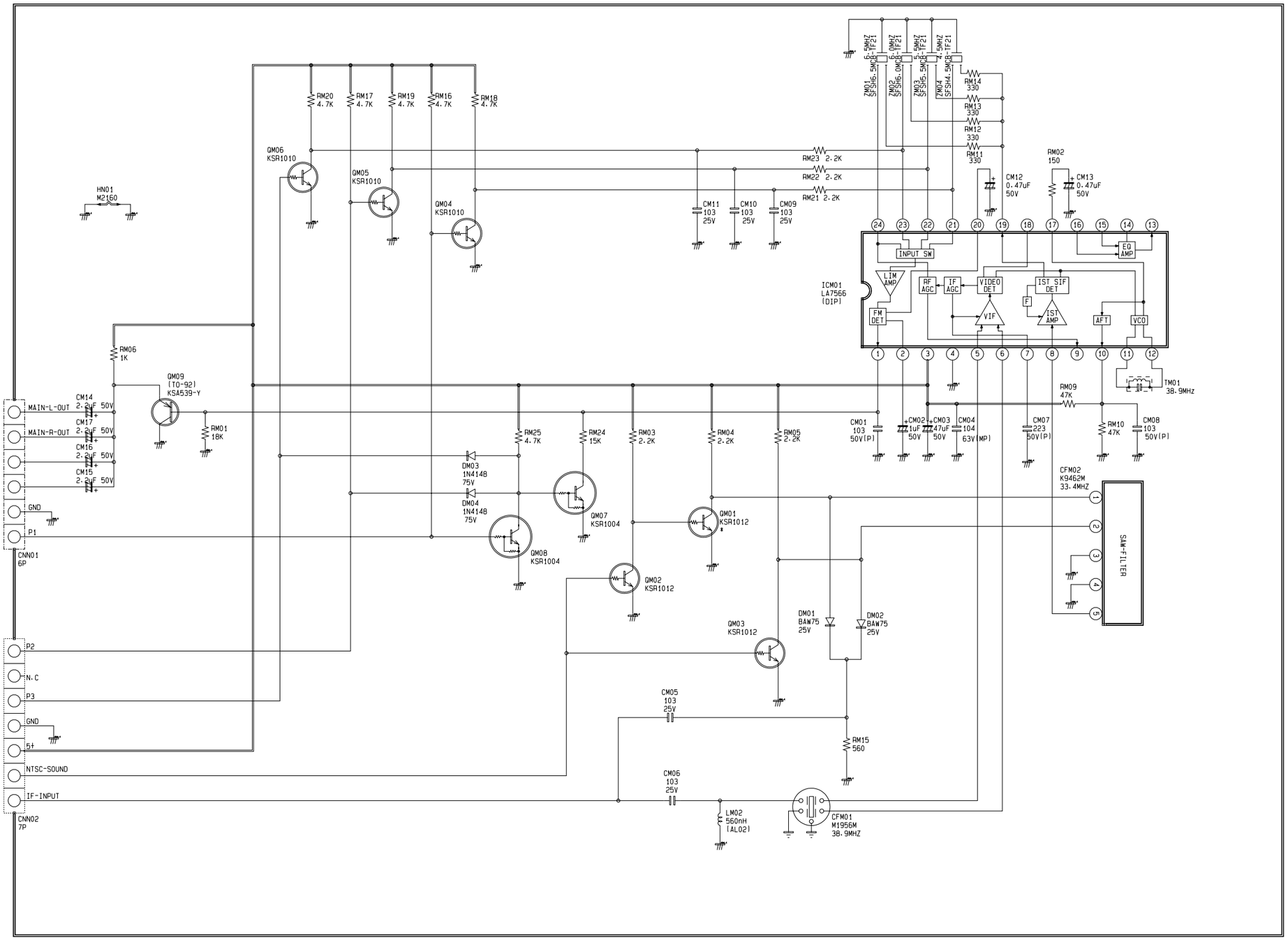






: Power Line
: Signal Line

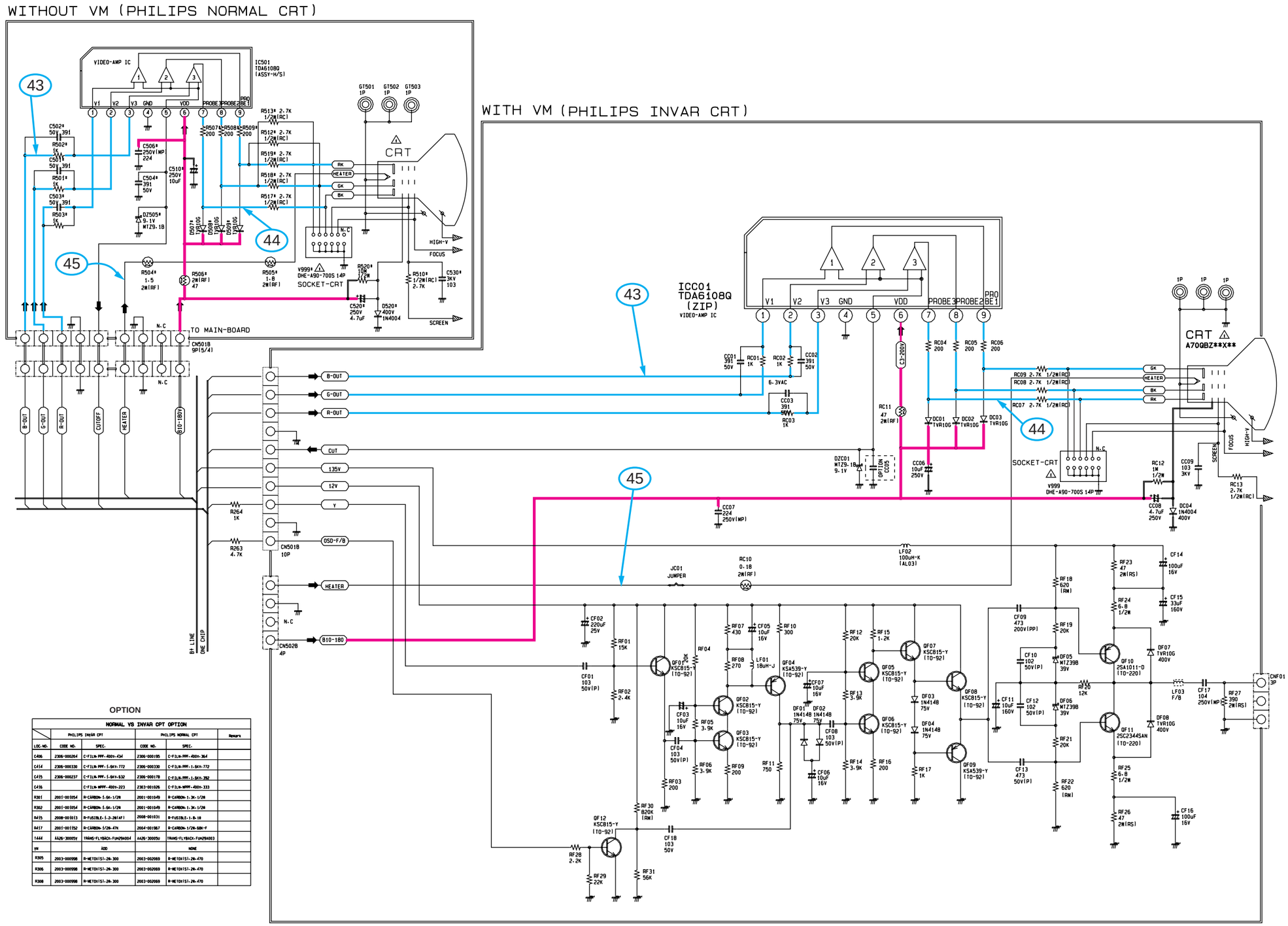
11-6 PWB MAIN (Sound Module Mono)

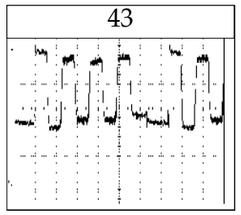


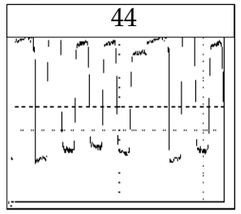
11-7 PWB MAIN (CRT)

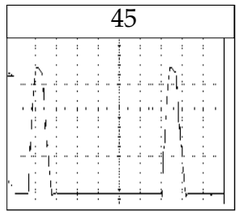
WITHOUT VM (PHILIPS NORMAL CRT)

WITH VM (PHILIPS INVAR CRT)

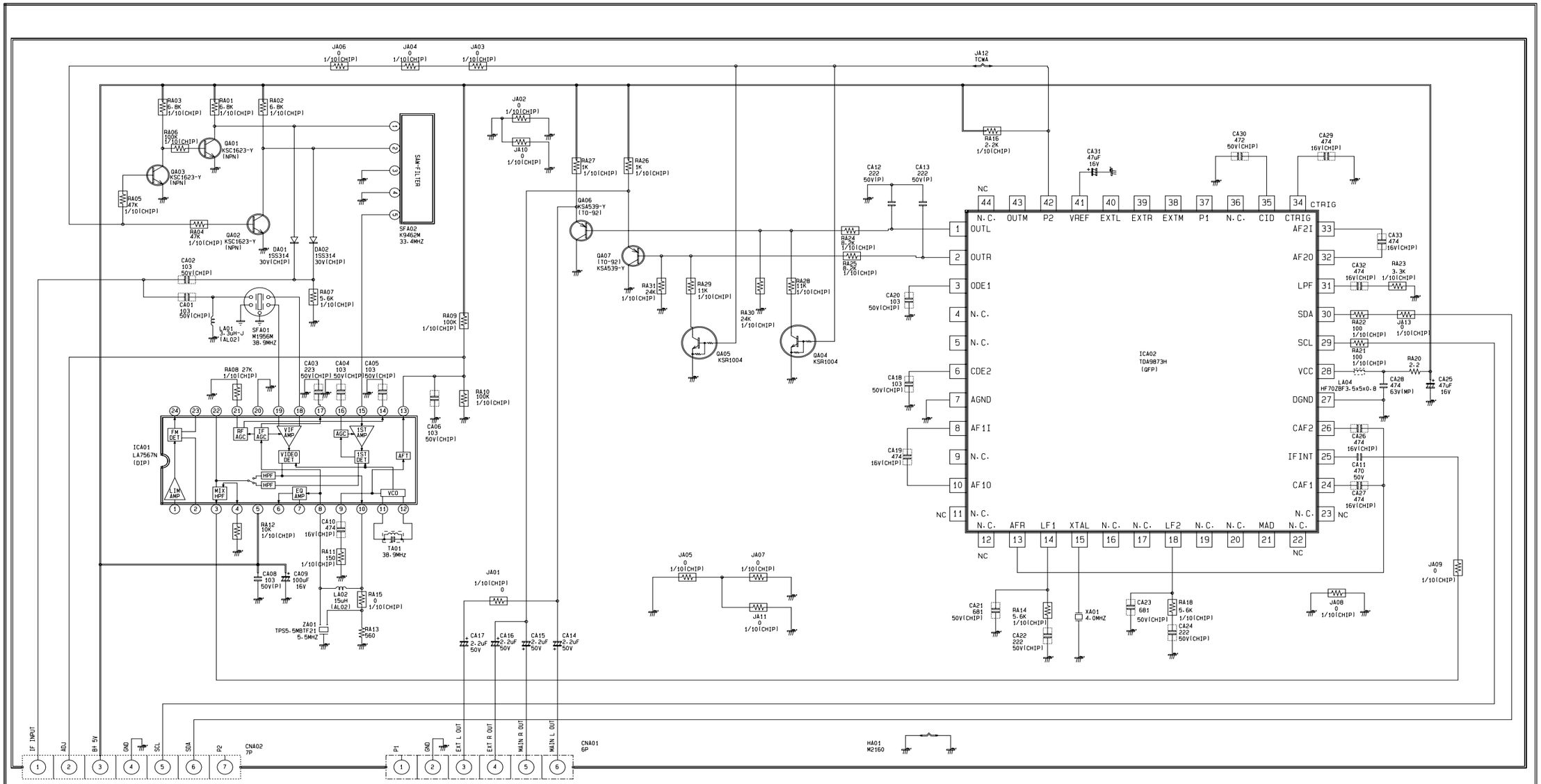








11-8 PWB MAIN (SOUND MODULE STEREO)



CAPACITOR	
Ceramic - SL	No Mark
Ceramic - RH	(RH)
Ceramic - CH	(CH)
Polyester(Induct)	(P)
Polyester(Noninduct)	(PMU)
Polypropylene	(PP)
Metal Polyester	(MP)
M.P.Polypropylene	(MPP)
Tantalium	(T)
Non Polar	(NP)

RESISTOR	
Carbon	No Mark
Composition	(RC)
Metal Oxide	(RS)
Metal Film	(RM)
Fusible	(RF)
Cement-Wire	(RW)
Network	(RN)

EXPRESSION
1 Resistance is shown ohm K=1.000 M=1.000.000
2 Unless otherwise noted in schematic all capacitor values less than 1 are expressed in ufd. the values more than 1 in pF.
3 Unless otherwise noted in schematic all inductor values areexpressed in uH.and the values less than 1 in mH.

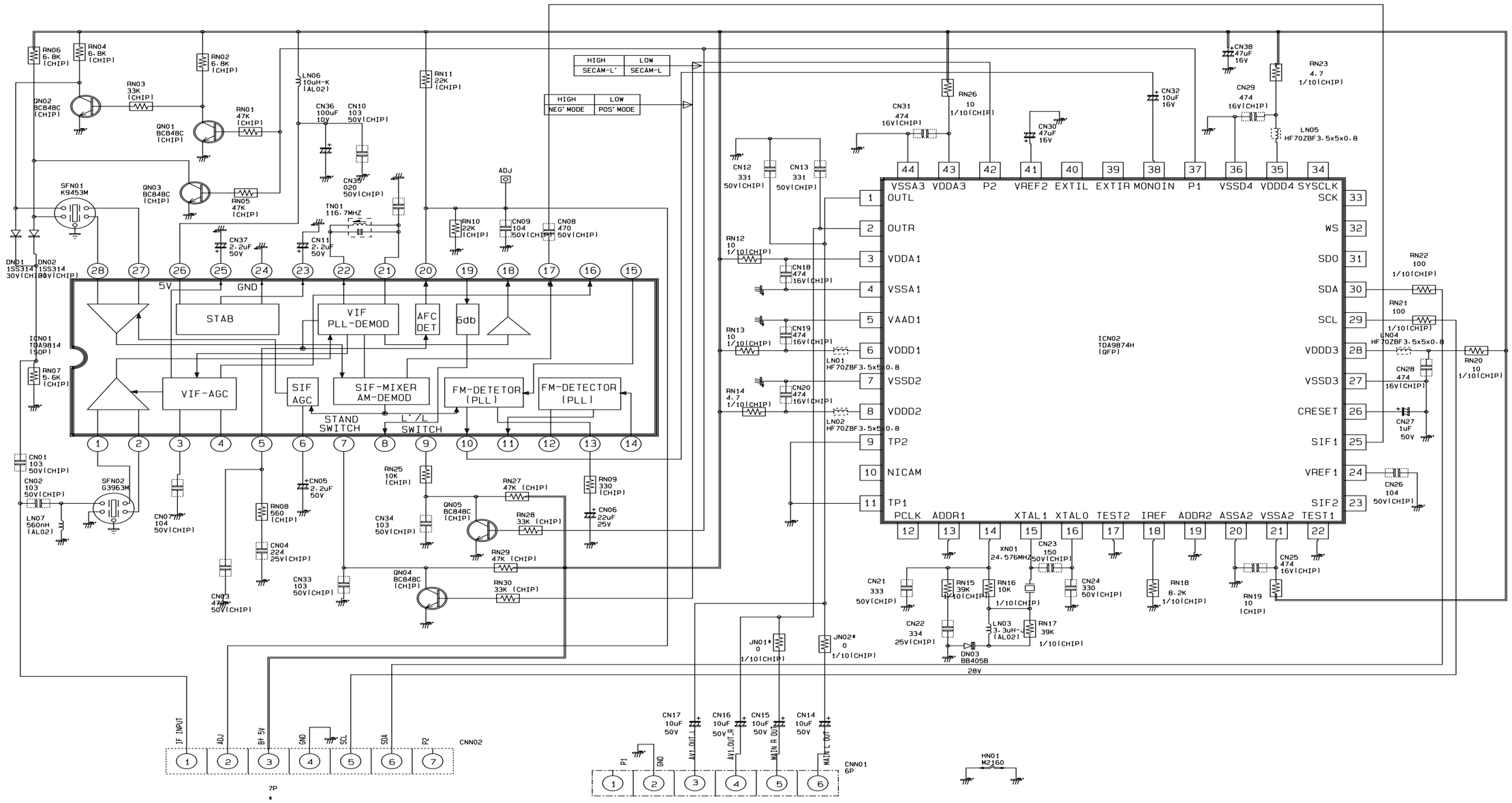
NOTE
The circuits are subject to change without notice to improve the picture quality.

SCHEMATIC DIAGRAM
CHASSIS: S51A
MODEL: CS29D9
BOARD NAME: SOUND MODULE A2 STEREO

FILE NAME : A2

JOB-NO	TEAM	NODE	DESIGN	OPE	EDIT
	T.V.I.	NC20	J.S.RA		1998.08.27

11-9 PWB MAIN (SOUND MODULE NICAM)



C A P A C I T O R	
Ceramic - SL	No Mark
Ceramic - RH	(RH)
Ceramic - CH	(CH)
Polyester(Induct)	(P)
Polyester(Noninduct)	(PMU)
Polypropylene	(PP)
Metal Polyester	(MP)
M.P.Polypropylene	(MPP)
Tantalium	(T)
Non Polar	(NP)

R E S I S T O R	
Carbon	No Mark
Composition	(RC)
Metal Oxide	(RS)
Metal Film	(RM)
Fusible	(RF)
Cement. Wire	(RW)
Network	(RN)

EXPRESSION

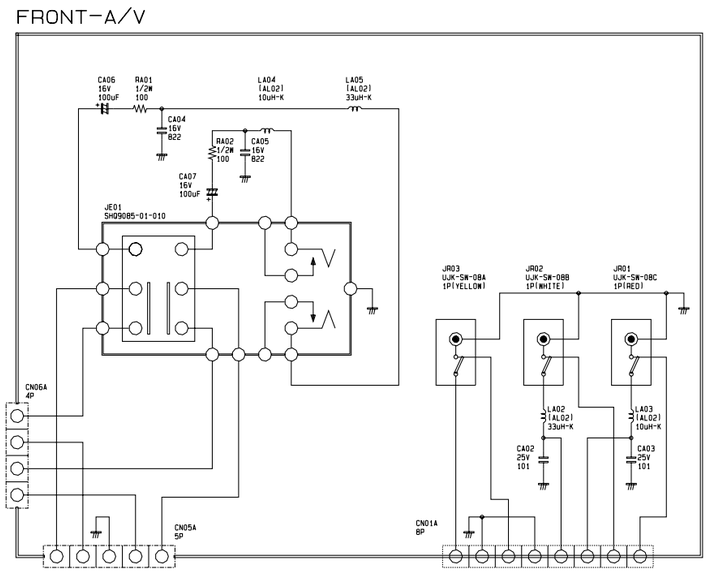
1 Resistance is shown ohm K=1.000 M=1.000.000
2 Unless otherwise noted in schematic all capacitor values less than 1 are expressed in ufd. the values more than 1 in pF.
3 Unless otherwise noted in schematic all inductor values areexpressed in uH.and the values less than 1 in mH.

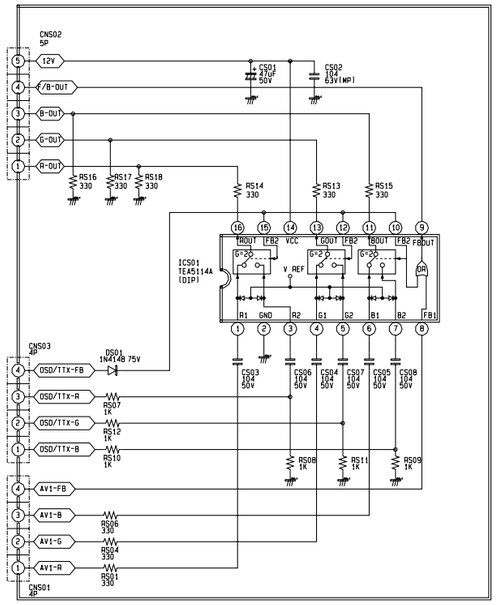
NOTE

The circuits are subject to change without notice to improve the picture quality.

SCHEMATIC DIAGRAM
CHASSIS: S51A
MODEL:
BOARD NAME: SECAN-L, L' NICAM

11-10 PWB MAIN (A/V FRONT / VIDEO SWITCH)





RGB - S/W MODULE

CAPACITOR	
Ceramic - SL	No Mark
Ceramic - RH	(RH)
Ceramic - CH	(CH)
Polyester(Induct)	(P)
Polyester(Noninduct)	(PNU)
Polypropylene	(PP)
Metal Polyester	(MP)
M.P.Polypropylene	(MPP)
Tantalium	(T)
Non Polar	(NP)

RESISTOR	
Carbon	No Mark
Composition	(RC)
Metal Oxide	(RS)
Metal Film	(RM)
Fusible	(RF)
Cement-Wire	(RW)
Network	(RN)

NOTE
1. Resistance is shown in ohm K=1,000 M=1,000,000
2. Unless otherwise noted in schematic all capacitor values less than 1 are expressed in uF. and the values more than 1 in pF.
3. Unless otherwise noted in schematic all inductor values more than 1 are expressed in uH.
4. Voltage read with V.T.V.M (input impedance 21 MΩ/all range) from point indicated to chassis ground using a color bar signal with all control at normal line voltage 120 volts.
5. Waveforms in chrominance circuit are taken receiving a color bar signal with enough sensitivity.
6. Waveforms in other circuit are taken using an signal under normal receiving conditions.
7. Voltage readings shown are normal values and may vary 20% except H.V.
8. This is fundamental circuit diagram some production changes may be made without revision of the diagram.
9. The circuits enclose in dotted lines are optional parts. (*)

WARNING : BEFORE SERVICING THIS CHASSIS READ THE 'X-RAY RADIATION PRECAUTION' 'SAFETY PRECAUTION' AND PRODUCT SAFETY NOTICE' IN MANUAL.

CAUTION : The shaded area in the schematic diagram and the parts list designate components which have special character istics important for safety and should be replaced only with types identical to those in the orignal circuit of specifed in the parts list. Before replancing and of these components. Read carefully the PRODUCT SAFETY NOTICE. In this manual. Do not degrade the safety of the receiver through improper servicing.