

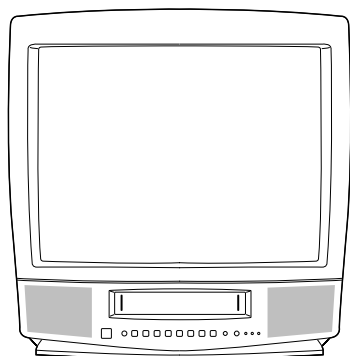


LG

SECTION 3

ELECTRICAL PART

TVCR SERVICE MANUAL



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CHASSIS : MV-031A

**MODEL : KE/KL-20/21P32X
KF-20/21P32**

ADJUSTMENT INSTRUCTIONS

1. APPLICATION RANGE

This specification is applicable to tvcr's (MV-031Achassis) manufactured in the tv factory or the approved site.

1.1 MAIN PRDUCTION FORM

- SET (O)
- SKD (O)
- CKD (0)

2. DESIGNATION

2.1. Hot GND & Cold GND must be connected separately to prevent electric shock and to protect equipments because this chassis is an insulation chassis.

2.2. The adjustment must be done by the exact sequence.
But, it can be changeable within the allowable margin of error.

2.3. Adjust surrounding condition: unless otherwise noted, adjust to the following condition.

Surrounding Temperature: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$
Reality Humidity : $60\% \pm 20\%$
Embedded Component Body Temperature In PCB: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$

2.4. The AC line voltage of TV must be maintained at 110-230V @50/60 Hz.(NEU AC 110V-240V)

2.5. Before any adjustment, TV set must have warming time for 15 minutes.

2.6. Necessary instrument

- Multimeter (ADJUSTMENT/ASSEMBLY Line)
Max Input Current : over 1A / Max Input Voltage : 500Vdc
Measurement Range : 10Vdc ~ 100Vdc / Accuracy : 0.03%
- Oscilloscope : (ADJUSTMENT/ASSEMBLY Line)
Frequency Band: over 20MHz /Input Impedance: over 1M Ω
Input Capacitance : below 30pF / Max Input Voltage : 250V
- 10:1 PROBE

2.7. SIGNAL

Unless otherwise noted,input the STANDARD COLOR SIGNAL 60~80 dBu.

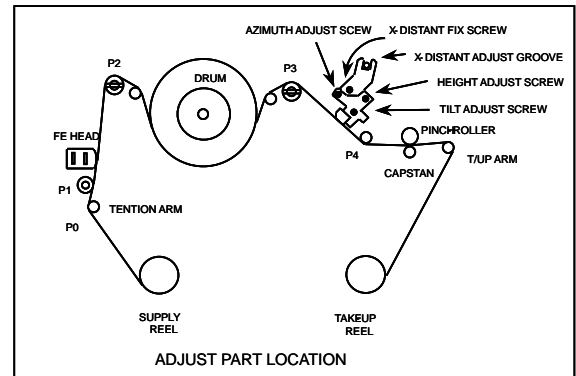
The standard color signal is LG's standard digital signal.

It refers the standard color signal to LG standard signal.

If LG standard signal is a criterion,PAL standard signal is PAL-B/G 05 CH and SECAM standard signal is SECAM 04CH or 40CH.

LG standard color signal has priority to others and other vendors which use different equipment from LG can use the PHILIPS DIGITAL PATTERN or COLOR BAR PATTERN or CIRCLE PATTERN depend on itmes.

3. DECK LINE ADJ.(VCR DECK/CIRCUIT ADJ.)



3.1. P2/P3 TEMPORARY ADJUSTMENT

3.1.1. NECESSARY INSTRUMENT

1. PAL SP Normal TAPE
2. OSCILLOSCOPE
3. 10:1 PROBE : 2 PIECES
4. SPECIAL NUT DRIVER (P2/P3 for Adjustment)

3.1.2. ADJUSTMENT

1. Play the PAL SP NORMAL TAPE.
2. Connect the oscilloscope(CH-1) to J123(H/SW) of main PCB.
3. Connect the oscilloscope(CH-2) to J158(RF) of main PCB.
4. With observing the RF envelope waveform, adjust P2, P3 until it becomes the waveform C.
5. Check the envelope waveform is in the maximum size by pressing the TRK UP(+), down(-) button.

3.2. CTL/AUDIO LEVEL ADJUSTMENT

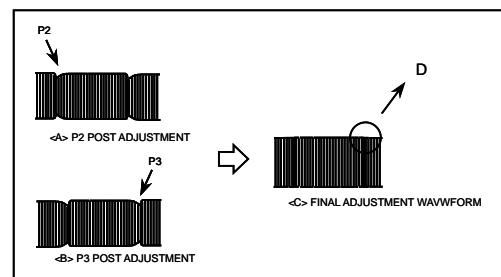


FIGURE 2> P2/P3 ADJUSTMENT WAVEFORM

3.2.1. NECESSARY INSTRUMENT

1. CTL TAPE
2. PAL SP Normal TAPE(AUDIO LEVEL for Adjustment)
3. OSCILLOSCOPE
4. 10:1 PROBE : 2 PIECES
5. RMS METER(AUDIO LEVEL for Adjustment)

3.2.2. CTL ADJUSTMENT

THIS ADJUSTMENT MUST BE DONE WHEN THE UNCONTROLLED DECK IS WAREHOUSED.

1. Connect the oscilloscope to J101(CTL).
2. After playing the CTL control tape, make sure the CTL waveform range is from 1.5 : 1 to 2.5 : 1. If it is out of range ,

adjust CTL waveform to the following procedures.

A. If is over 2.5 :1, lower the head height.

After turning the height adjust screw counter-clockwise to adjust its level from 1.5 : 1 to 2 : 1.

Check the tape location at P4. Readjust the TILT.(2:1)

B. If is under 1.5:1, heighten the head height.

After turning the height, adjust the screw clockwise to adjust its level from 2 : 1 to 2.5 : 1.

Check the tape location of P4. Readjust the TILT.(2:1)

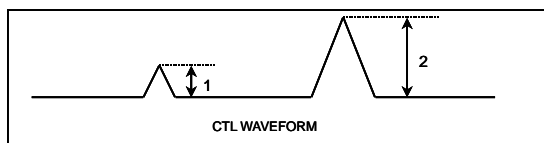
3. Play the standard tape and adjust very carefully the azimuth screw right and left by using the oscilloscope and level-meter to maximize the audio sound.

Adjust the azimuth screw & the height adjust screw at the same time because they have mutual relationship. (Check CTL again after the adjustment)

*A/C head adjustment order

Height adjust screw->check the TILT->azimuth screw

->check CTL



3.2.3 AUDIO LEVEL CHECKING AND ADJUSTMENT

1. Connect "+" terminal of RMS meter (auto level meter) to J108 on the main PCB Audio output and "-" terminal to GND.
2. Check that if audio level of RMS meter satisfies with the spec, If audio sound is weak, adjust the A/C head azimuth screw.
3. Audio level spec
1K : 0.5 ± 0.1Vrms
6K : 1KHz ± 1.5dB

3.3. X-DISTANT/P2,P3 ADJUSTMENT

3.3.1. NECESSARY INSTRUMENT

1. SP PAL TAPE
2. OSCILLOSCOPE
3. 10:1 PROBE : 2 PIECES
4. SPECIAL DRIVER FOR ADJUSTMENT(P2,P3,X-DISTANT(NUT),AUDIO(NUT))
5. RMS METER(AUDIO LEVEL METER)

3.3.2. ADJUSTMENT PREPARATION

1. Connect oscilloscope(CH-1) to J123(H/SW) on main PCB. (Use for trigger of CH-2)
2. Connect oscilloscope(CH-2) to J158(RF) on main PCB. (Use waveform of CH-2)
3. Play by inserting SP PAL TAPE. (2hd:normal tape)
4. After the picture is appeared, make initial condition by pressing the tracking adjustment up(+) button of the remote controller.

3.3.3. X-DISTANCE ADJUSTMENT

1. Turn the X-distant adjust groove of the deck right and left to maximize the scope waveform.
2. Check that if waveform satisfies with the linearity by pressing TRK Up(+) and Down(-) button.
3. Tighten the X-distant adjust screw.

3.3.4. P2/P3(RF LINEARITY) CHECK & ADJUSTMENT

1. Adjust p2 & p3 so that the the RF envelope waveform of the oscilloscope becomes C in figure 2.
2. Check if the envelope waveform becomes maximum by pressing TRK Up(+),Down(-) button onestep.

3.4. PG ADJUSTMENT

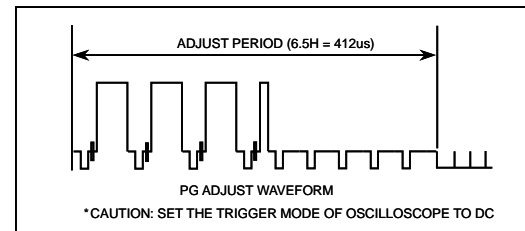
Adjust it after finishing controlling the Deck.

3.4.1.NECESSARY INSTRUMENT

1. SP PAL TAPE
2. OSCILLOSCOPE
3. 10 : 1 PROBE : 2 PIECES

3.4.2. ADJUSTMENT

1. Insert and play the SP PAL TAPE.
2. Connect the oscilloscope(CH-1) to H/SW(J123) on the main PCB and trigger in setting the VOL/DIV to 1V range.
3. Connect the oscilloscope(CH-2) to video out(J173) on the main PCB and set the VOL/DIV to 500mV range.
4. Set the TIME/DIV of oscilloscope to 50us range.
5. Adjust the falling edge(412us ± 20us) of vertical sync in the video signal by varying VR01.



4.ASSEMBLY LINE ADJUSTMENT

4.1. RF AGC ADJ.(APPLYING THE W/S TUNER)

4.1.1. NECESSARY INSTRUMENT : DIGITAL MULTIMETER

4.1.2. ADJUSTMENT PREPARATION

1. HEAT-RUN at least 15 minutes before adjustment.
2. Input the PAL DIGITAL PATTERN(EU05); The intensity of electric field for the applied tuner refers to the below data.
3. Connect the DIGITAL MULTIMETER to TP-AGC(J335) of MAIN1.

4.1.3. ADJUSTMENT

1. Press the SVC key of the transmitter and select AGC of the SVC MENU using PR+/- key.
2. Adjust it by the below data varying VOL+/- key.

TUNER	Setting & Adjustment	
6700VPF009V	Electric fields strenth	70dBu ± 1dBu
	AGC Voltage	2.7 ± 0.05Vdc
6700VMF001H 6700VPF009Q	AGC Voltage	AGC not adjust.

4.2. FOCUS ADJUSTMENT

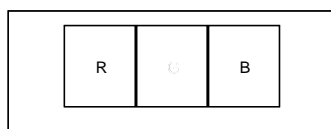
- 4.2.1. Receive the standard color signal.
- 4.2.2. Let the picture be the most clear by the criterion of the vertical line of it, varying the focus V/R of FBT.

4.3. PURITY AND CONVERGENCE ADJUSTMENT

: Warm up the TV set at least 15 minutes before adjustment.

4.3.1. PURITY ADJUSTMENT

1. After degaussing the CPT with using the degaussing coil, set the picture at Standard ON.
2. Receive the raster signal or E50CH(red pattern) from a pattern generator.
3. Move the DY toward CPT PANEL to put the picture like the figure 5.
4. Turn the purity magnet(the second pole magnet) to let red color located at the center of picture. At the same time let color-line located at the center vertically.
5. After finishing the second pole magnet adjustment, fix it temporarily by the lock ring.
6. Let the picture became uniform red color by moving the DY slowly backward and then tighten the fixing screw. (Check the slope)

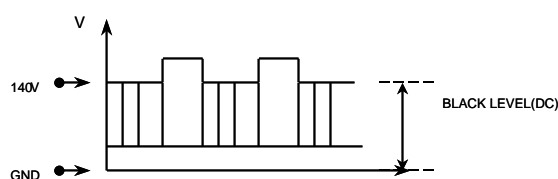


< figure 5 >

PICTURE STANDARD ON	
CONTRAST	: 85%
BRIGHTNESS	: 70%
COLOUR	: 50%

4.4. SCREEN ELECTRIC VOLTAGE

1. Input PAL DIGITAL PATTERN(EU05 CH).
2. Select CHANNEL 0.
3. Connect the probe of oscilloscope to the RK of CPT PCB.
4. Set the oscilloscope to 50V/DIV, 20us/DIV(using 10:1 Probe) and after putting the GND ling upon the lowest grid line of the scope by pushing the GND button, enter into DC mode.



* Adjust screen volume of FBT so that the waveform is the same as below figure.

No	Adjust Voltage	Remark Note
1	140V \pm 3V	21/20/15" CPT
2	130V \pm 3V	14" CPT

4.5 WHITE BALANCE

4.5.1 NECESSARY INSTRUMENT

: WHITE BALANCE METER

4.5.2 ADJUST PREPARATION

1. Adjust it after warming up the meter over 20 minutes.
2. Input the picture with the white signal and black signal at upper and lower side each in a standard of the CPT's horizontal center.
3. Set this picture in the status of standard ON.

4.5.3 ADJUSTMENT

: Press the SVC key of a transmitter which is possible to control the SVC and adjust the RG and BG varying the VOL +/-, in the status of the initial data 32 of the CG in SVC MENU on the screen. (This chassis adjusts only the high light.)

Model(14/20/21)	X	Y	Color Temperature
EU	288	295	9000K
NON-EU	281	288	10000K

Model(15 FLAT)	X	Y	Color Temperature
EU	288	295	9000K
NON-EU	272	288	12000K

4.6. DEFLECTION DATA ADJUSTMENT

- 4.6.1. Input PAL DIGITAL PATTERN(EU05CH).
- 4.6.2. Press SVC key on the service remote controller and select LINE SERVICE 2 mode.Adjustable item is selected by CH+/- key,variable item is selected by VOL +/- key.

4.6.3. Deflection Early Establishment Data

Status	Adjust Cintents	21"	20"	14"	15"
V-SLP	Vertical Slope	25	25	25	25
V-AMP	Vertical Amplitude	31	31	31	31
V-SFT	Vertical Shift	32	32	32	32
H-SFT	Horizontal Shift	32	32	32	32
S-COL	Vertical S-correction	15	15	15	15

4.6.4.VERTICAL SLOPE, V-SLP ADJUSTMENT

Select V-SLP mode and adjust until horizontal center line of the large circle coincides with blanking line

4.6.5. VERTICAL AMPLITUDE, V-AMP ADJUSTMENT

Select V-AMP mode , and adjust until the upper and lower end of the large circle reach 5mm inside from the effective area of CPT.

4.6.6. VERTIVAL SHIFT, V-SFT ADJUSTMENT

Select V-SFT mode and adjust until the horizontal center coincides with the vertical sign Slot mark of CPT.

4.6.7. HORIZONTAL SHIFT, H-SFT ADJUSTMENT

Select H-SFT mode and adjust until the vertical center coincides with horizontal sign slot mark of CPT.

4.6.8. VERTICAL S-CORRECTION, S-COL ADJUSTMENT

Select S-COL mode and adjust until the grid of cross hatch pattern is even all over the screen.

4.7. CDL DATA ADJUSTMENT

1. Input PAL DIGITAL PATTERN(EU05CH).
2. Press SVC key on the service remote controller and select LINE SERVICE 1 mode.
Adjustable item is selected by CH+/- key,variable item is selected by VOL +/- key
3. Initial Establishment Data

Status	Ccntents	21"	20"	14"	15"
AGC	RF Gain	15	15	15	15
GG	Green Drive Gain	32	32	32	32
RG	Red Drive Gain	32	32	32	32
BG	Blue Drive Gain	32	32	32	32
PEAK	Peaking Control	25	25	25	25
CDL	Cathode Drive Level	12	12	08	10
2nd SIF	2nd SIF	0	0	0	0

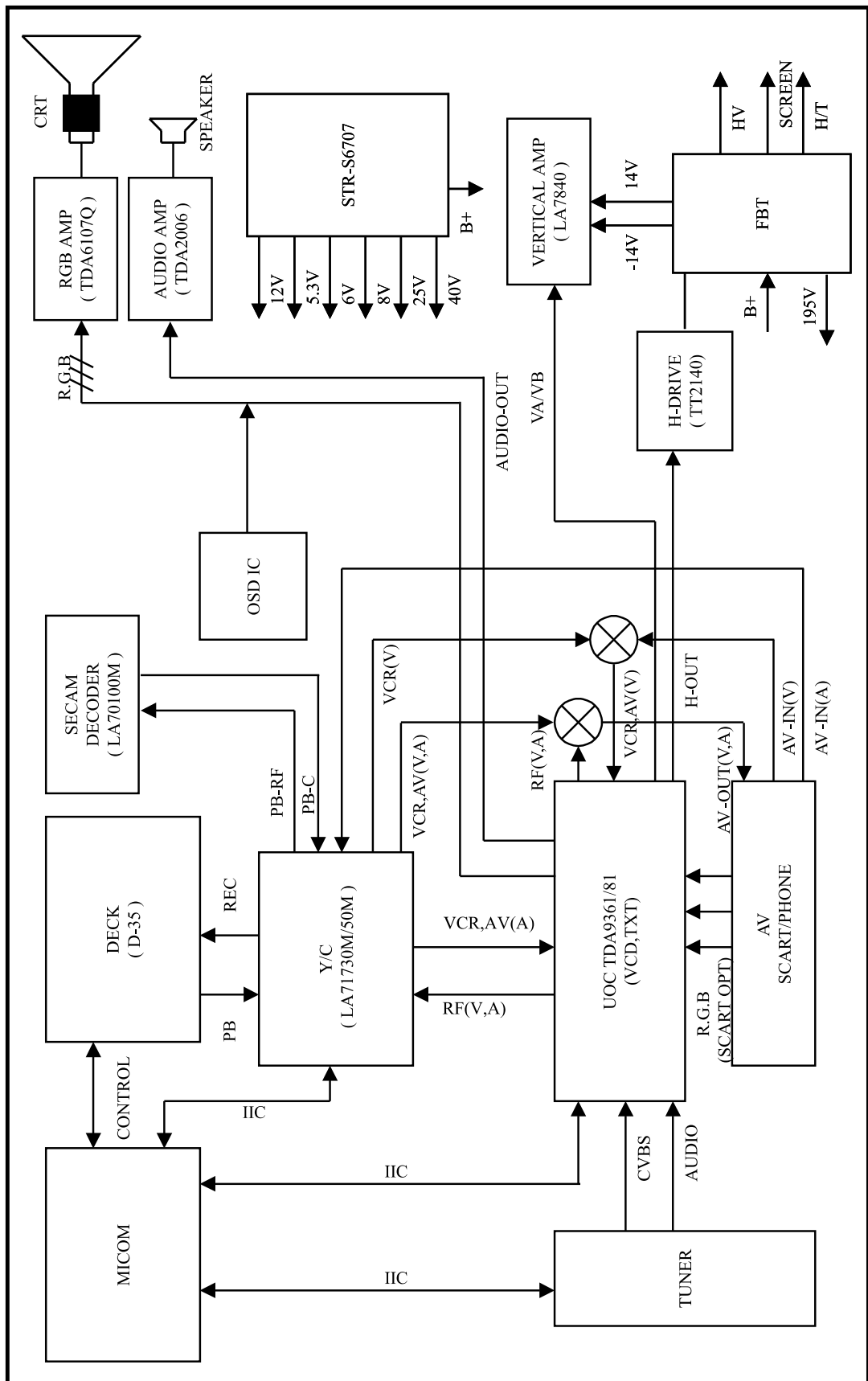
* 2nd SIF OPTION

Mode	Funtion	Remark Note
0	OFF	Internal BPF
1	BG	BG : EXTERNAL DK/I:INTERNAL BPF
2	DK	DK: EXTERNAL BG/I:INTERNAL BPF

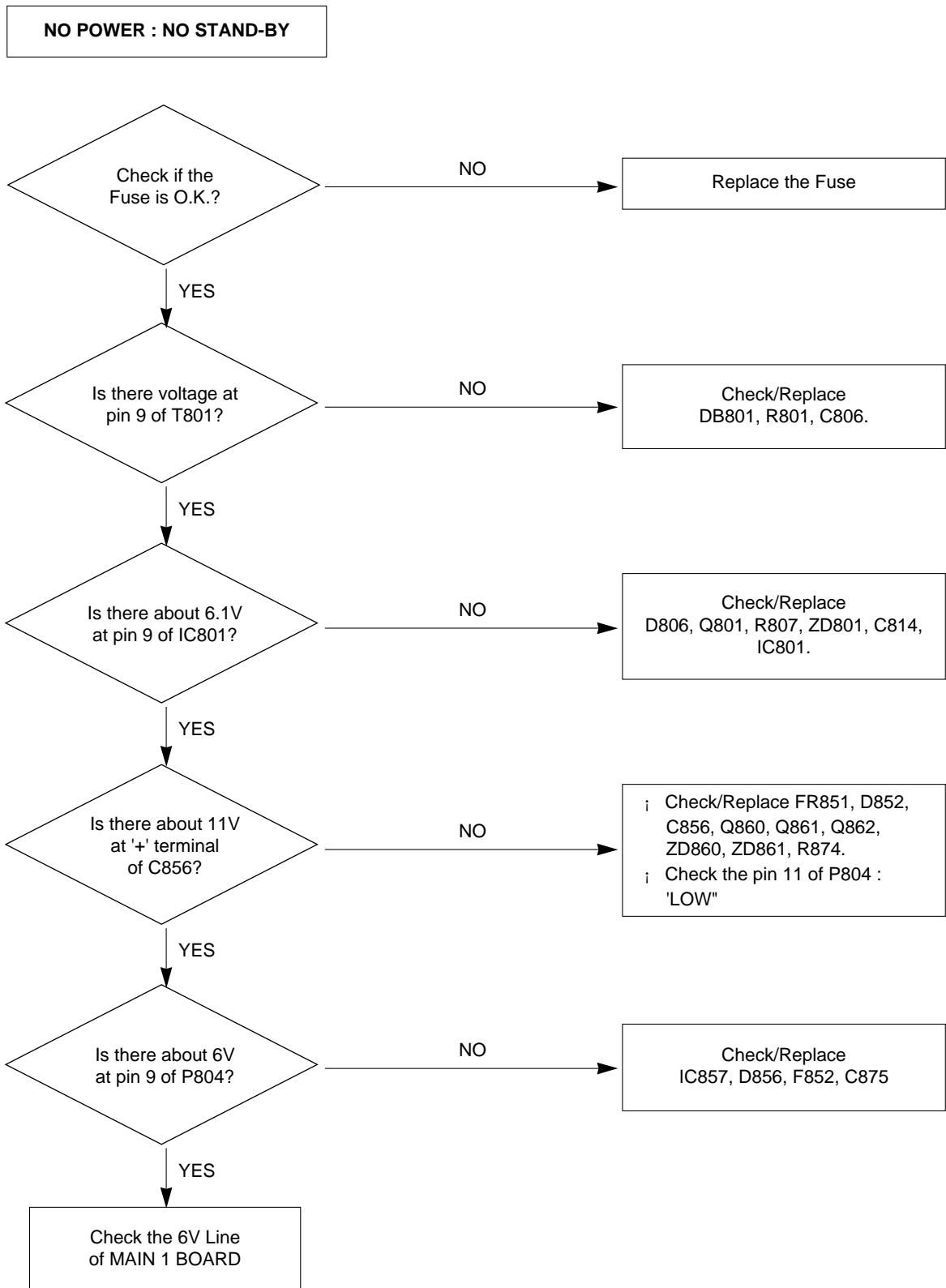
4.8. LANGUAGE

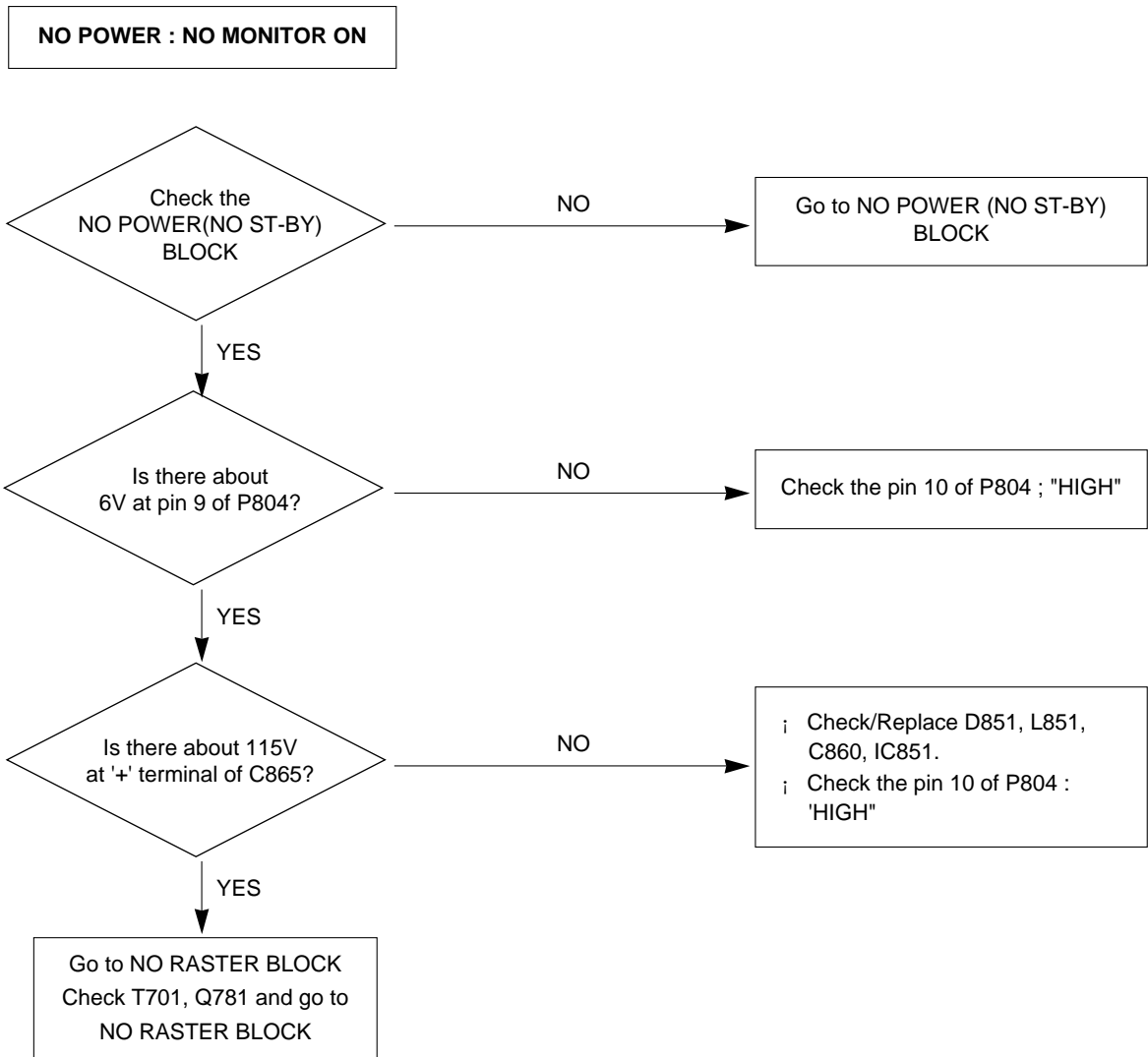
No	Country	Language	Remark Note
1	FRANCE	FRENCH	If buyer request special language we can accept it.
2	GERMANY	GERMAN	
3	Other EU	ENGLISH	
4	Except EU	ENGLISH	

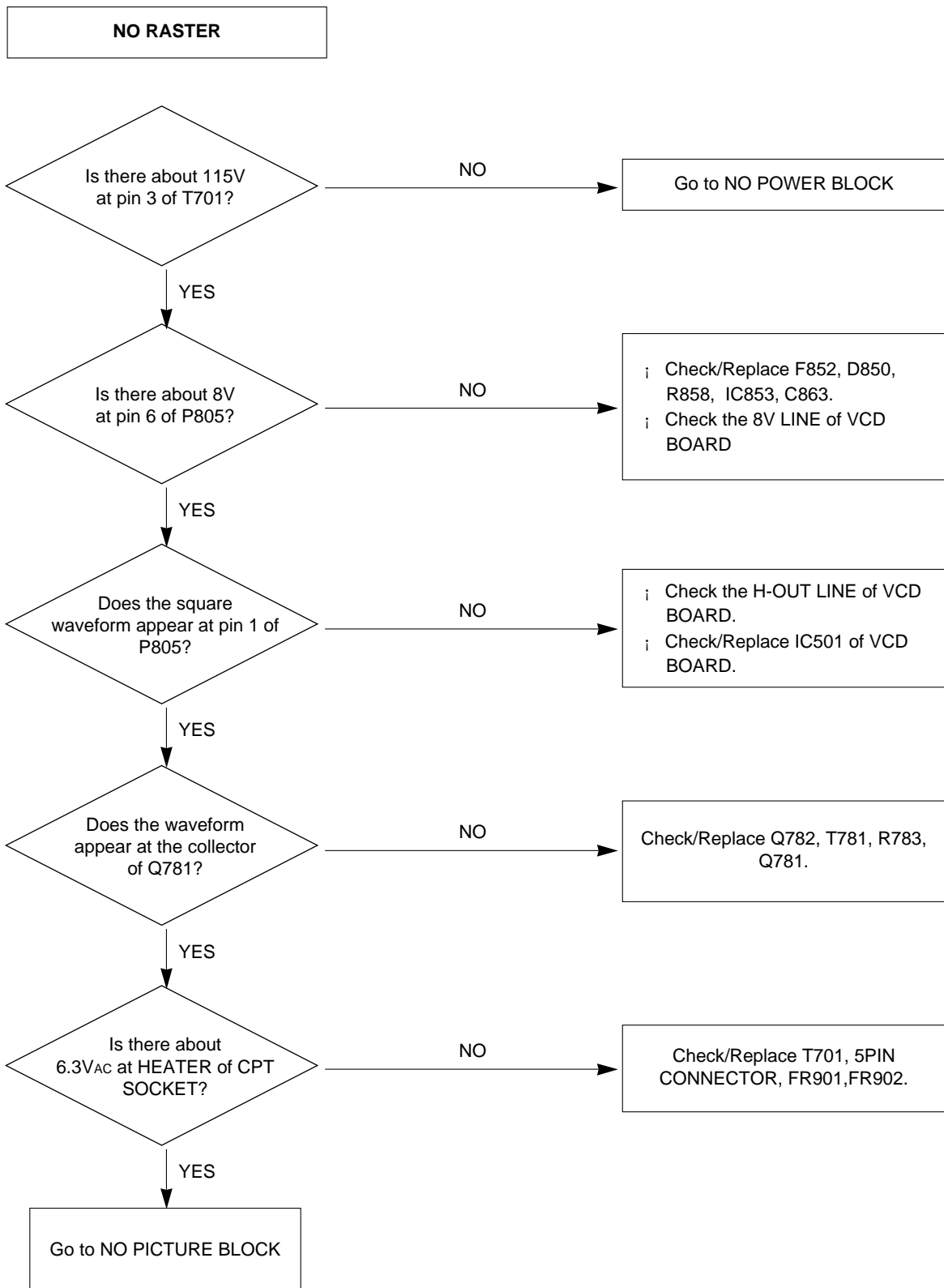
BLOCK DIAGRAM



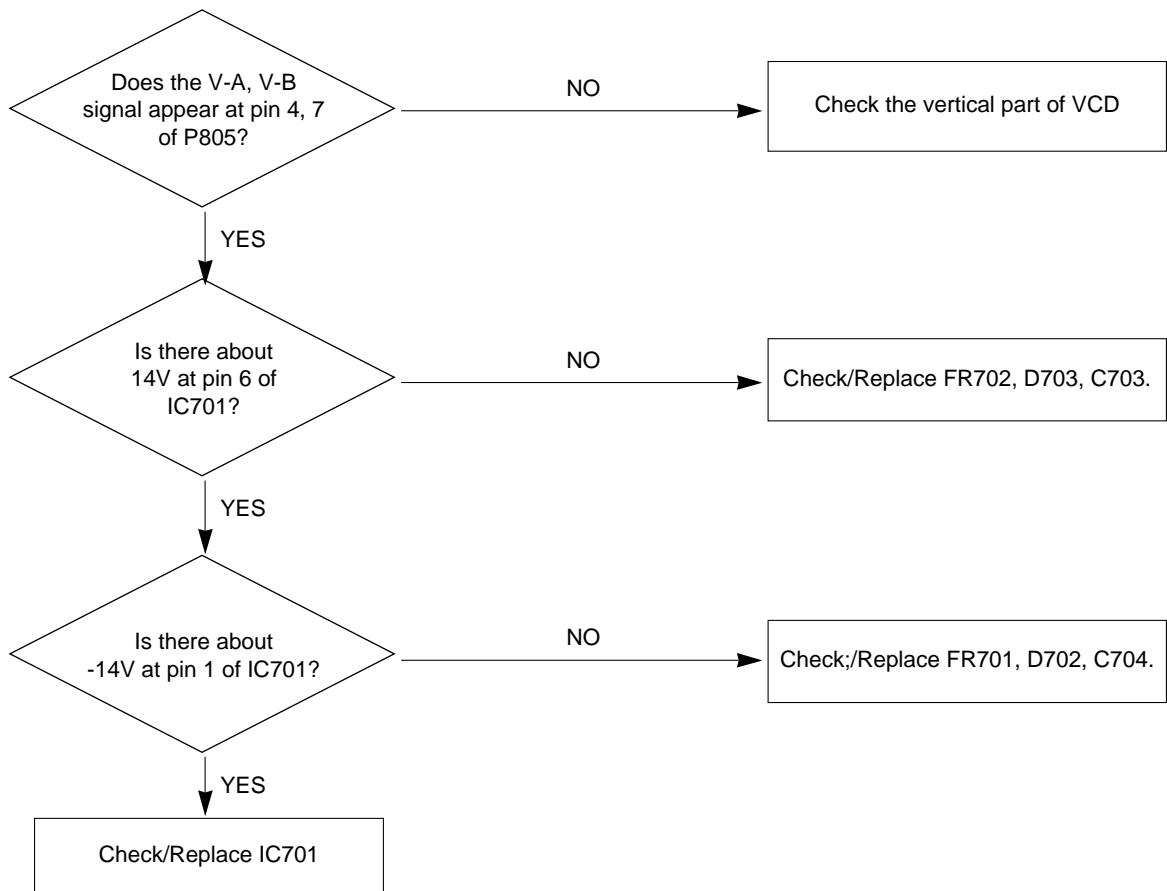
TROUBLE SHOOTING



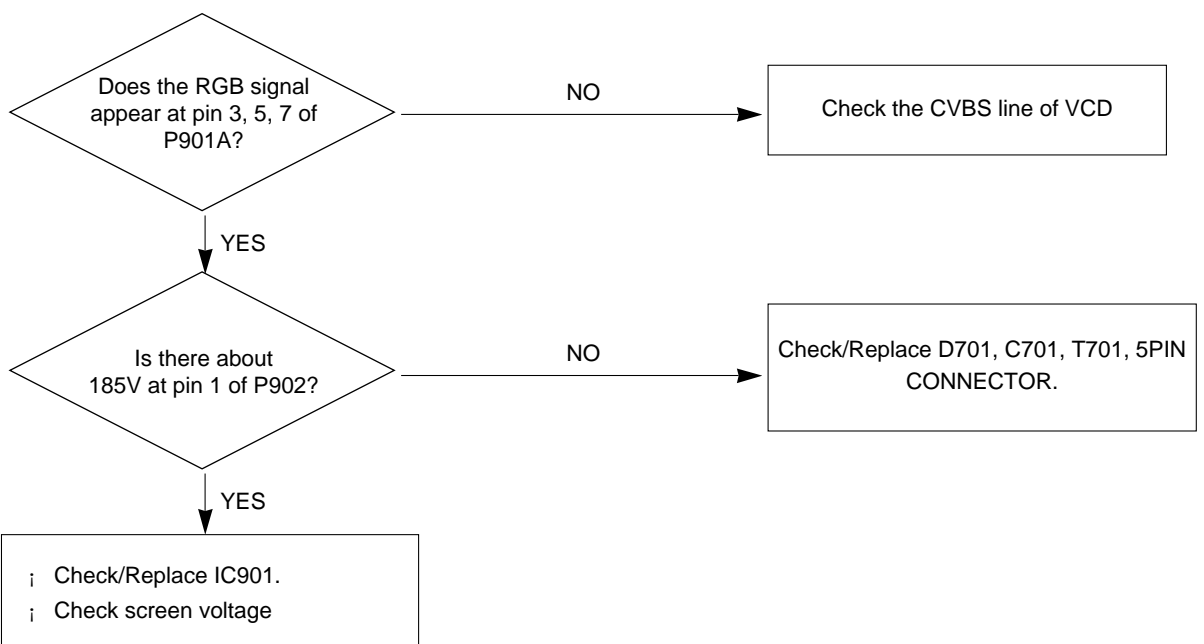


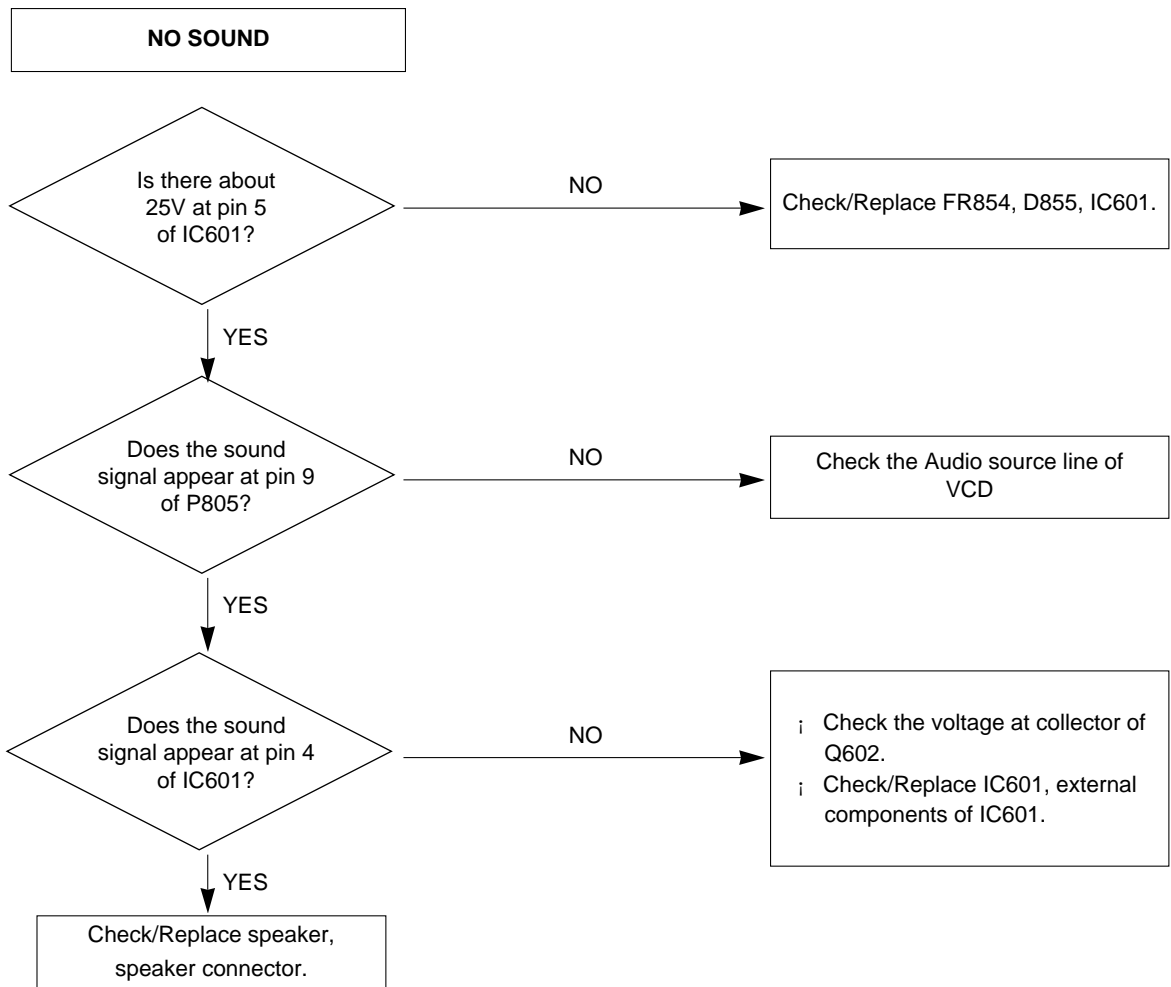


V. Deflection ERROR

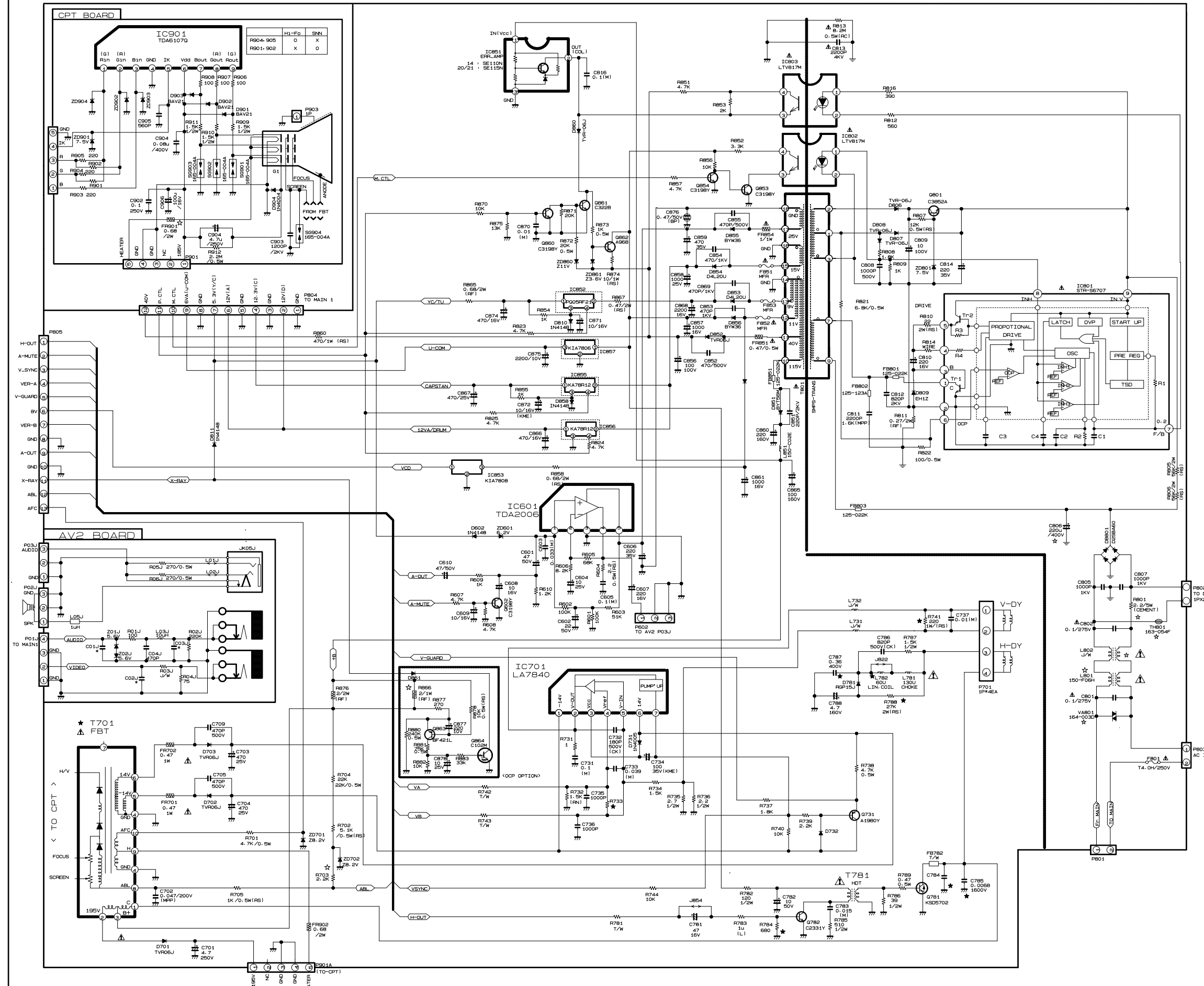


NO PICTURE





MV-031A MAIN2 SCHEMATIC DIAGRAM



NOTICE
Since this is a basic schematic diagram,
The value of components and some partical
connection are subject to change for improvement.

The components marked Δ conform to VDE or IEC guidelines
and are essential for safe operation of the set, while those
marked Δ are required for correct operation. Use specified
parts only when replacing.

VALUE OF RESISTER, CAPACITOR AND INDUCTOR

1. Resistances are 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 mfd and the values more than 1 in pF
3. Unless otherwise noted in schematic, all coil values more than 1 are expressed in uH and the values less than 1 in H.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chassis ground, line voltages 220 Volts, colour bar signal
2. Voltages reading may vary $\pm 20\%$
3. The schematic shown is representative only.
4. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
5. Check FINE TUNING, AGC, BRIGHTNESS, CONTRAST and COLOUR controls for best picture, make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS controls is almost in maximum position.
6. Waveforms are taken using a standard colour bar signal.

RANGE OPTION

NO.	LOC. NO.	WIDE	NARROW
1	C806	330u/400V	220u/400V
2	R801	1.0-10W CEMENT	2.2-5W CEMENT
3	L802	150-F06H	X
4	VA801	164-003K	X
5	L801	150-F06H	150-F06H

INCH OPTION

NO.	LOC. NO.	14"	15"	20"	21"
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

P/No : 3854VA0110A-S(2/2)
2003.03.14

SCHEMATIC DIAGRAM
MV-031A MAIN2