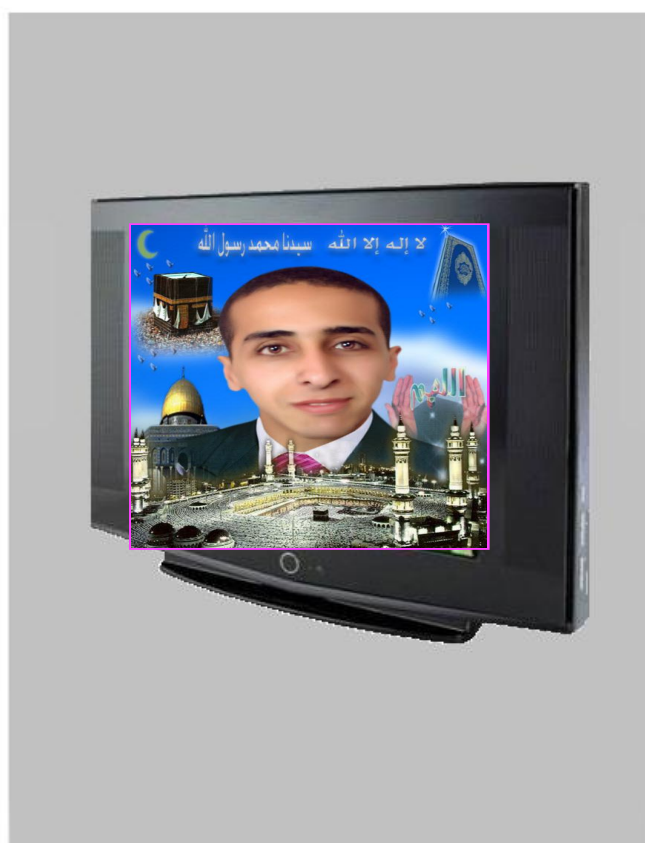


COLOR TELEVISION RECEIVER

Chassis : CALYPSO
Model : 21US

SERVICE MANUAL

COLOR TELEVISION RECEIVER



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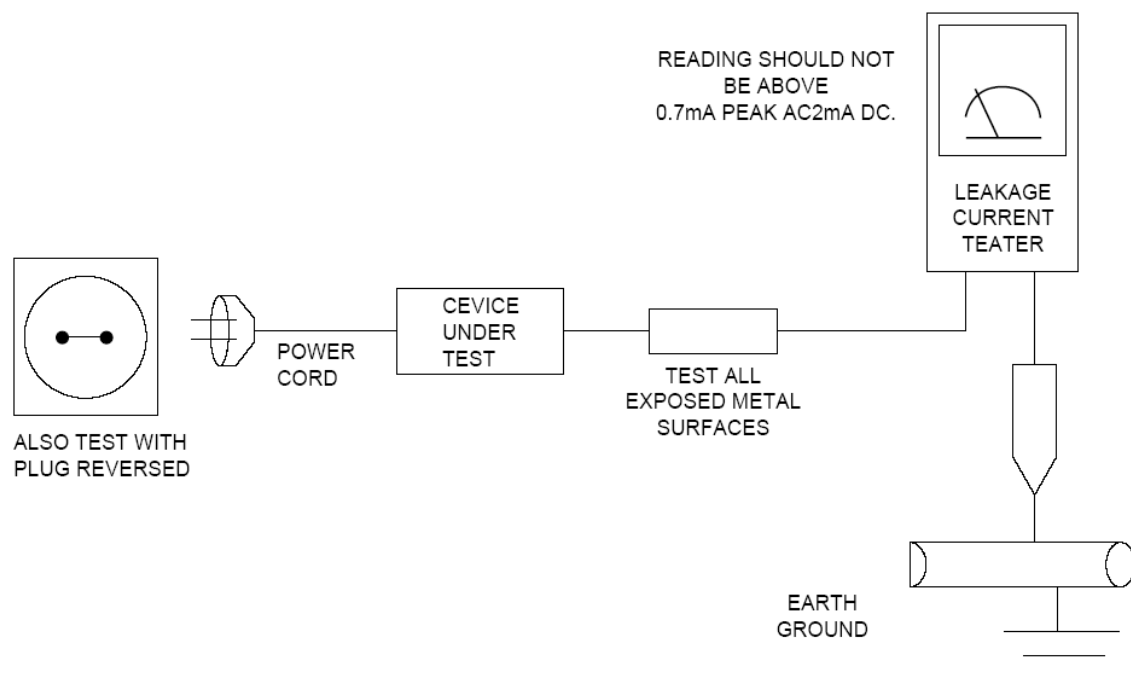
1. Precautions
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8. PCB LAYOUT(MAIN)
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1. Precautions

Follow these safety, servicing and ESD precautions to prevent damage and protect against potential hazards, such as electrical shock and X-rays.

1-1 Safety Precautions

1. Be sure that all of the built-in protective devices are replaced.
Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including : nonmetallic control knobs and compartment covers.
3. Make sure that there no cabinet openings through which people-particularly children might insert fingers and contact dangerous voltages. Such opening include the spacing between the picture tube and the cabinet mask, excessively wide cabinet ventilation slots, and improperly fitted back covers.
If the measured resistance is less than 1.0 megohm or greater than 5.2 megohms, an abnormality exists that must be corrected before the unit is returned to the customer.
4. Leakage Current Hot Check (Figure 1-1) :
Warning : Do not use an isolation transformer during this test. Use a leakage current tester or a metering system that complies with International Electrotechnical Commission 65.(IEC 65)




**FIGURE 1-1
AC LEAKAGE TEST**

-
- 5. With the unit completely reassembled, plug the AC line cord directly the power outlet.** With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc) and all exposed metal parts, including: antennas, handle brackets, metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.
6. **Antenna Cold Check:**
With the unit's AC plug disconnected from the AC source, connect an electrical jumper across the two AC prongs. Connect one lead of the ohmmeter to an AC prong. Connect the other lead to the coaxial connector.
7. **X-ray Limits:**
The picture tube is especially designed to prohibit X-ray emissions.
To ensure continued X-ray protection, replace the picture tube only with one that is the same type as the original. Carefully reinstall the picture tube shields and mounting hardware: these also provide X-ray protection.
8. **High Voltage Limits:**
High voltage must be measured each time servicing is done on the +B, horizontal deflection or high voltage circuits.
9. High voltage is maintained within specified limits by close-tolerance, safety-related components and adjustments. If the high voltage exceeds the specified limits, check each of the special components.
10. **Design Alteration Warning:**
Never alter or add to the mechanical or electrical design of this unit.
Example: Do not add auxiliary audio or video connectors. Such alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
11. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or overheating, and correct any potential hazards.
12. Observe the original lead dress, especially near the following areas:
Antenna wiring, sharp edges, and especially the AC and high voltage power supplies. Always inspect for pinched, out-of place, or frayed wiring.
Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.
13. **Picture Tube Implosion Warning:**
The picture tube in this receiver employs "integral implosion" protection.
To ensure continued implosion protection, make sure that the replacement picture tube is the same as the original.
14. Do not remove, install or handle the picture tube without first putting on shatterproof goggles equipped with side shields.
Never handle the picture tube by its neck. Some "in-line" picture tubes are equipped with permanently attached deflection yoke: do not try to remove such "permanently attached" yokes from the picture tube.

15. Product Safety Notice:

Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection.

These safety features and the protection they give might be lost if the replacement component differs from the original—even if the replacement is rated for higher voltage, wattage, etc.

Components that are critical for safety are indicated in the circuit diagram by shading()

Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

1-2 Servicing Precautions

Warning 1: First read the "Safety Precaution" section of the manual.

If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precaution.

Warning 2: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing Precautions are printed on the cabinet. Follow them.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) Remove or reinstall any component or assembly, (b) Disconnect an electrical plug or connector, (c) Connect a test component in parallel with an electrolytic capacitor.
3. Some components are raised above the printed circuit board for safety.
An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components.
Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of the AC plug.
The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead: always remove the instrument's ground lead list.

1-3 Precautions for Electrostatically Sensitive Devices (ESDs)

1. Some semiconductor ("solid state") devices are easily damaged by static electricity. Such some components are called Electrostatically Sensitive devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by, touching a known earth ground. Alternatively, wear the discharging wrist-strap device. (Be sure to remove it prior to applying power- this is an electric shock precaution.
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as "anti-static"; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when unpackaged replacement ESDs. Motion, such as brushing clothes together, or lifting a foot from a carpeted floor can generate, enough static electricity to damage an ESD.

2. Specifications

Reception System	PAL,SECAM
Power Requirements	AC90 ~ 260V 50/60Hz(Auto)
Stereo	SIMPLE A/V STEREO
Sound Output Power	4.5W(R) + 4.5W(L)
Antenna Impedance	75 OHM UNBALANCED TYPE
Intermediate Frequency	VIDEO IF_ 38.9 MHz(B/G, D/K, I)
	SOUND IF . 32.4MHz: 6.5MHz-L,D/K . 32.9MHz: 6.0MHz-I . 33.4MHz: 5.5MHz-b/g
Receiving Frequency	VHF: 47MHz to 470MHz UHF: 470MHz to 862MHz CATV: 116MHz to 172MHz / 220MHz to 469MHz
Color Sub Carrier Frequency	PAL: 4.443MHz SECAM: 4.40625MHz / 4.25MHz
Channel Indication	ON-SCREEN DISPLAY
Remote Control Unit	REQUIRES TWO 1.5V BATTERIES TYPE AA SIZE

3. Alignment and Adjustment

1. Pre-Adjustment

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 (IC901) or the CRT is replaced.

1-2 When EEPROM (IC901) Is Replaced

1. When IC901 is replaced all adjustment data revert to initial values.
It is necessary to re-program this data.
2. After IC901 is replaced, warm up the TV for 10 seconds.

1-3 When CRT Is Replaced

1. Make the following adjustments after setting up purity and convergence :
White Balance: GDRV, BDRV, RDC, GDC, BDC
Sub-Brightness: SBRT
S correction: SC
Vertical Center: VSH
Vertical Centering: VRS (EW mode)
Vertical Size: VA
Vertical linearity: VL
Horizontal Bow: HBOW
Horizontal Parabola: HPAR
Horizontal Shift: HSH
Horizontal Size: HSI (EW mode)
Parabola: PAR (EW mode)
Trapezium: TRA (EW mode)
EW Collection Top: EWT (EW mode)
EW Collection Bottom: EWB (EW mode)
-

2. Factory(SERVICE) Mode

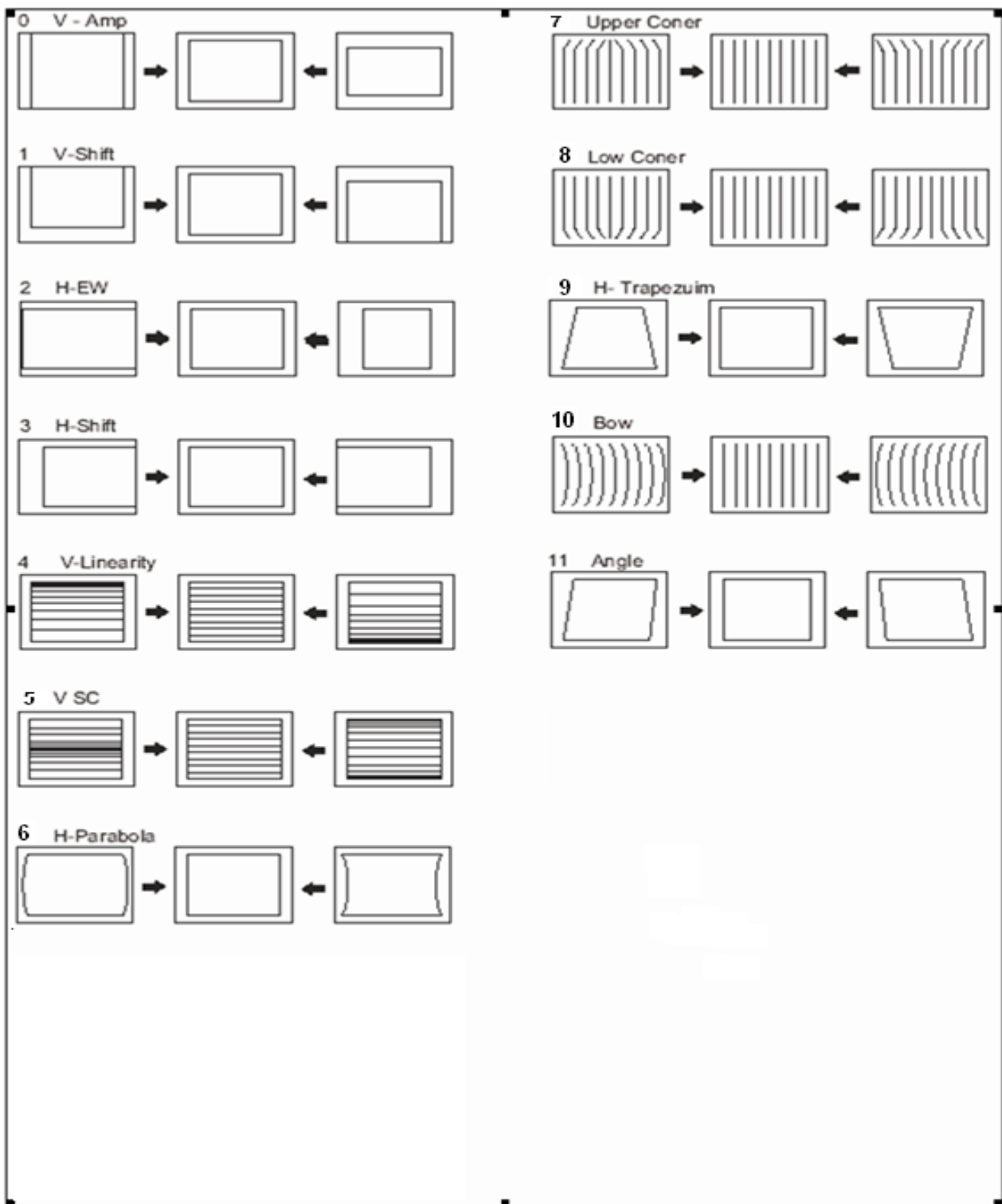
2-1 Procedure for the Factory adjustment mode

1. This mode uses the special remote control. The Service Mode is activated by entering "Service" key.
If you don't have a "Service" key then turn off the TV at first
and press follow keys within 2 seconds in regular sequence
" MUTE + 2 + 7 + 9 + POWER "
(If keys are wrongly pressed, then re-do from the beginning.)
2. The SERVICE menu will be displayed. The Service Mode has five components:
Service mode, Design mode, Shipping mode, Manufacturing mode, Test pattern, Heat run mode.
3. Access Service mode by pressing "1" keys. The adjustment parameters are displayed in sequence,
and selected by pressing the CHANNEL keys(▲▼).
4. The VOLUME keys (◀▶) increase or decrease the adjustment values
(stored in the non-volatile memory).
5. Repeat above sequence to adjust CRT Adjustment and Picture Adjustment and etc.
6. Cancel the Service mode by re-pressing the "Service" keys, and returns to Factory Menu.
If you don't have a "Service" key you have to turn off the TV to exit from service mode.

2-2 Factory Adjustment Parameter in Adjust mode

MENU	FUNCTION	OSD DISPLAY	RANGE	INITIAL DATA
D E F & E / W	HORIZONTAL SHIFT [3_H-SHIFT]	HSH(HRS)	0 ~ 31 STEP	13
	HORIZONTAL SIZE [2_H-EW] =>EW MODE	HSI	0 ~ 63 STEP	47
	HORIZONTAL EHT =>EW MODE	HEH	0 ~ 7 STEP	4
	HORIZONTAL BOW [10_BOW]	HBOW	0 ~ 7 STEP	4
	HORIZONTAL PARABOLA [11_Angle]	HPAR	0 ~ 7 STEP	4
	VERTICAL CENTERING [1_V-SHIFT] =>EW MODE	VCE(VRS)	0 ~ 63 STEP	18
	VERTICAL AMPLITUDE [0_V-AMP]	VA	0 ~ 63 STEP	37
	VERTICAL EHT =>EW MODE	VEH	0 ~ 7 STEP	6
	VERTICAL LINEARITY [4_V-Linearity]	VL	0 ~ 15 STEP	20
	VERTICAL SHIFT	VSH	0 ~ 7 STEP	6
	S-CORRECTION [5_V-SC]	SC	0 ~ 15 STEP	25
	PARABOLA [6_H-Parabola] =>EW MODE	PAR	0 ~ 63 STEP	45
	TRAPEZIUM [9_H-Trapezium] =>EW MODE	TRA	0 ~ 63 STEP	30
	EW-CORNER TOP [7_Upper-Coner] =>EW MODE	EWT	0 ~ 31 STEP	10
	EW-CORNER BOTTOM [8_Low-Coner] =>EW MODE	EWB	0 ~ 31 STEP	10
	ZOOM CONTROL	ZOOM	0 ~ 31 STEP	8
	ZOOM PARABOLA =>EW MODE	ZPAR	0 ~ 63 STEP	56
	ZOOM TRAPEZIUM =>EW MODE	ZTRA	0 ~ 63 STEP	30
	ZOOM EW-CORNER TOP =>EW MODE	ZEWT	0 ~ 31 STEP	12
	ZOOM EW-CORNER BOTTOM =>EW MODE	ZEWB	0 ~ 31 STEP	11
	VERTICAL BLANKING =>EW MODE	ZBLK	0 ~ 3 STEP	3
	WIDE (16:9) CONTROL	WIDE	0 ~ 31 STEP	18
	WIDE PARABOLA =>EW MODE	WPAR	0 ~ 63 STEP	25
	WIDE TRAPEZIUM =>EW MODE	WTRA	0 ~ 63 STEP	35
	WIDE EW-CORNER TOP =>EW MODE	WEWT	0 ~ 31 STEP	11
	WIDE EW-CORNER BOTTOM =>EW MODE	WEWB	0 ~ 31 STEP	11
C R T	GREEN DRIVE GAIN	GDRV	0 ~ 127 STEP	55
	BLUE DRIVE GAIN	BDRV	0 ~ 127 STEP	60
	BLUE CUT-OFF	BDC	0 ~ 255 STEP	70
	RED CUT-OFF	RDC	0 ~ 255 STEP	70
	GREEN CUT-OFF	GDC	0 ~ 255 STEP	70
	DISABLE VERTICAL OUTPUT	VSD	Off-On	Off (0)
P I C T U R E	AUTO GAIN CONTROL	AGC	0 ~ 63 STEP	35
	SUB CONTRAST	SCON	0 ~ 15 STEP	7
	SUB BRIGHT	SBRT	0 ~ 31 STEP	5
	SUB COLOR	SCOL	0 ~ 31 STEP	5
	SUB TINT	STIN	0 ~ 31 STEP	0
	NTSC SUB COLOR	SNCL	0 ~ 31 STEP	5
	SUB SHARPNESS	SSHR	0 ~ 31 STEP	5

■ Deflection Adjustment Procedure



2-3 Factory Adjustment Parameter in SERVICE mode

MENU	FUNCTION		OSD DISPLAY	RANGE	INITIAL DATA
P I C T U R E	IF FREQUENCY SELECTION		TIF	0 ~ 3 STEP	1
	0	38.00 MHz			
	1	38.90 MHz			
	2	45.75 MHz			
	PEAK WHITE LIMIT		YPL	Off-On	OFF (0)
	ABL GAIN		ABL	0~3	2
	SHOOT SYMETRIC		ASSH	0 ~ 7 STEP	2
	U BLACK ADJUST		UBLK	0 ~ 15 STEP	0
	Y GAMMA		Y GA	0 ~ 3 STEP	1
	BLACK STRETCH		B ST	0 ~ 3 STEP	2
	Y DELAY		Y DL	0 ~ 7 STEP	7
	S.V.M DELAY		SVMD	0 ~ 3 STEP	3
	S.V.M GAIN		SVMG	0 ~ 3 STEP	3
	SPOT KILLER		SPKL	Off-On	Off (0)
	CORING		CORI	Off-On	Off (0)
O S D	ON SCREEN H POSITION		OSDH	0 ~ 31 STEP	10
	ON SCREEN V-POSITION		OSDV	0 ~ 31 STEP	21
	ON SCREEN LEVEL		OSDL	0 ~ 3 STEP	0
	ON SCREEN ABCL		OSDA	Off-On	On (0)
	ON SCREEN H-SIZE		OSDF	0 ~ 105 STEP	75
	HALF TONE GAIN		HTGA	0 ~ 1 STEP	1
BUS	BUS STOP		BUS	Off-On	Off (0)
S O U N D	Audio Level Control		ALSS	0 ~ 1	1
	VOLUME CURVE		V01	0 ~ 127	15
	VOLUME CURVE		V15	0 ~ 127	55
	VOLUME CURVE		V30	0 ~ 127	68
	VOLUME CURVE		V50	0 ~ 127	80
	VOLUME CURVE		V75	0 ~ 127	115
	BAND PASS FILTER		BPF	0 ~ 1	0
S Y N C	Sync Low Pass Filter		SLPF	0 ~ 1	1
	Synv Seperate		SSEP	0 ~ 1	1
	Sync Slic Level		SSLI	0 ~ 1	0
	Sync Detection		HLOC	0 ~ 1	0
SECA M	SECAM-RED		S-R		8
	SECAM-BLUE		S-B		5

2-4 Factory Adjustment Parameter in Design mode

In the Factory mode, various options can be selected via the Design mode.

Brand name feature (BRN) initial data : 1

Selection bar Icon Menu , whatever manufacturers want Icon bar select,

BRN	Power on action
0	Osd bar & volume bar design 1
1	Osd bar & volume bar design 2

Programmable Brand Name (NAM)

Input Customer's brand name whatever manufacturers want.

1	2	3
A B C 1	D E F 2	G H I 3
4	5	6
S T U 4	M N O 5	P Q R 6
7	8	9
S T U 7	V W X 8	Y Z 9
-/--/---	0	
/ ? & :	- , .	

Osd Color Table (FON , OSD) initial data : 0

FON	OSD	AREA	CHAR	CURSOR
0	0	BLUE	CYAN	YELLOW
0	1	BLUE	CYAN	YELLOW
0	2	CYAN	GREEN	RED
0	3	YELLOW	GREEN	WHITE
1	0	MAGENDA	WHITE	MAGENDA
1	1	YELLOW	GREEN	WHITE
1	2	CYAN	CYAN	GREEN
1	3	GREEN	MAGENDA	GREEN
2	0	GREEN	CYAN	MAGENDA
2	1	CYAN	MAHENDA	GREEN
2	2	MAGENDA	YELLOW	MAGENDA
2	3	YELLOW	GREEN	YELLOW

Remocon Custom code (REM)) initial data : 0

REM	Status
0 (N)	NEC

Switch On mode (SW) [initial data : 2](#)

This setting is to configure st-by action when set is made on from Ac mains.

SW	Power on action
0	Set will be forced to last power status at each mains power on
1	Set will be forced to st-by on at each mains power on
2	Set will be forced to st-by off at each mains power on
3	Not allowed but if configured will act similar to (SW=1)

AV mode (AV) [initial data : 2](#)

AV	Mode	Switching Circuit
0	TV-VIDEO1	
1	TV-VIDEO1-S VHS	
2	TV-VIDEO1-DVD	
3	TV-VIDEO1 -S VHS -DVD	
4	TV-VIDEO1-VIDEO2	
5	TV-VIDEO1-AV2 - S VHS -DVD	
6	TV-VIDEO1-VIDEO2-DVD	

Channel switch over delay (CDL) [initial data : 3](#)

This parameter will set the video mute time delay during channel change over and TV/AV switching. CDL can be set to 0 through 7.

Channel delay time = CDL * 320 milliseconds.

Zoom feature (ZOO) [initial data : 2](#)

No of zooms can be configured by this parameter

ZOO	Power on action
0	Zoom feature will be disabled
1	Normal + Zoom
2	Normal + Wide + Zoom
3	Normal + Wide

Over modulation (OMO) [initial data : 1](#)

Over modulation switch (120%) will be activated if OMO = 1

Noise reducer feature (NR) [initial data : 1](#)

Noise reducer feature in the picture menu will be disabled if NRF = 0

Curtain (CUR) [initial data : 1](#)

Power off only , 0=Disabled, 1=Activated

AV Start (AVS) [initial data : 1](#)

AV Start	Status
0	Last status
1	Force RF
2	Force AV
3	Not available

Plug and Play (PLU) [initial data : 1](#)

Plug and Play feature will be disabled if the value is set to 0.
It is enabled when the value is set to 1.

Color System (COL) [initial data : 1](#)

	AUTO	PAL	SECAM	NTSC4.43	NTSC3.58
0		O			
1	O	O		O	
2	O	O			O
3	O	O		O	O
4	O	O	O		
5	O	O	O	O	
6	O	O	O		O
7	O	O	O	O	O
8	O		O	O	
9	O		O		O
10	O		O	O	O

Sound system (SOU) [initial data : 5](#)

	BG	I	DK	M
0	O			
1	O		O	
2		O		
3			O	
4	O	O		
5	O	O	O	
6	O			O
7	O		O	O
8	O	O	O	O
9				O

Sound default (S-D) [initial data : 0](#)

0=B/G, 1=I, 2=D/K, 3=M

Lock (LOC) [initial data : 1](#)

0= Off (TV lock, Child lock, Panel lock), 1= On

Multi-language OSD (LAN) initial data : 6

LAN	Language	LAN	Language
0	English Only	4	English – French - Russian
1	English- Russian	5	English – Persian - Arabic
2	English- Arabic	6	English - French –Russian - Persian - Arabic
3	English – Persian		

Auto Off (AOFF) Initial data : 2

If signal is not exist for 30 minutes TV will turn off the power automatically

0=Disabled, 1=TV, 2= TV&VIDEO

AMP MUTE (MUTE) Initial data : 1

0= When execute Power, Mute

1= When execute Power, Mute, Channel, TV/AV

Automatic Fine Tuning (AFT) Initial data : 0

0= Execute AFT one time when channel changed

1= Execute AFT continually if out of AFT range

SOUND IC (SIC) Initial data : 0

0=Simple Line Stereo, 1=TDA7439, 2= TDA7449

SVM (SVM) Initial data : 0

0=Disabled, 1=Enable

Clock Display (CLK) Initial data : 1

0=12 Hour, 1=24 Hour

OSD ICON Menu (ICO) initial data : 0

Selection OSD Icon Menu , whatever manufacturers want.

Check NTSC 3.58 (NT-C) Initial data : 1

Check whether NTSC3.58 or NTSC4.43 at RF mode

0=One time when source/channel changed, 1= continuously

Automatic Volume Leveler (AVL) Initial data : 0

0=Disabled, 1=Enable

East / West (EW) Initial data : 0

0=Disabled, 1=Enable

STEREO/BALANCE (ST) Initial data : 1

0=Disabled(Simple Stereo/Balance W/O), 1=Enable(Simple Stereo/Balance W/IN)

2-5. FACTORY SHIPPING MODE

The shipping mode is used during factory inspection.

This mode should be activated before packing a set for dispatch.

In this mode following functions will be performed.

- 1) Manufacturing mode will be made off
- 2) Blue back ground will be made on
- 3) Child lock status for all channels will be cleared.
- 4) Skip status for all channels will be cleared.
- 5) Volume level for all channels will be set to 15.
- 6) Selectable picture will be set to "Normal"
- 7) Video system will be set to "Auto"
- 8) Panel lock, TV lock will be made off.
- 9) Timer data in time menu will be cleared.
- 10) sharp, tint, FCC & balance controls will be set to center.
- 11) Volume fix will be made off.
- 12) Plug and Play will be set to on.
- 13) The chassis will be re-powered on by the s/w reset

Shipping time should be less than 2 seconds.

2-6. MANUFACTURING MFG MODE

This mode will be accessed by pressing a service key followed by number key 4. In manufacturing mode

- 1) All controls will be varied with the steps of four except Service and Design mode.
- 2) Auto shut off feature will be disabled.
- 3) Blue back will not appear even if it is made on in install menu.
- 4) Set will always go in st-by on mode when switched on from mains.
- 5) "M" will be displayed in bottom left corner on the blank screen.

2-7. TEST PATTERN

This mode has 7 kinds of built-in video pattern for TV screen adjustment ; White on the whole screen, Red on the whole screen, Cross-hatch, Cross-dot, Cross-bar, White on the upper side/ Black on the lower side, H-signal.

2-8. HEAT RUN Mode

This mode is used for pre-heating the CRT during manufacturing —it is accessed in the factory by pressing the "SERVICE → 6" key, then white pattern will be displayed.

Even if the TV power is cut off, the HEAT RUN Mode is not canceled , The HEAT RUN mode is cancelled by repressing the "SERVICE" key.

3. Other Adjustments Mode

3-1 Adjusting the Screen Voltage

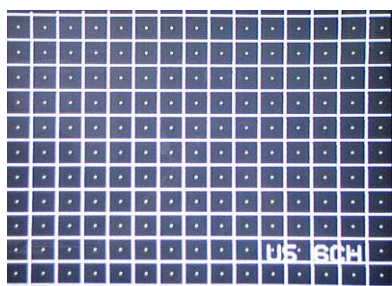
1. Access Service mode by pressing "0" keys in Adjust menu.
2. Select "VSD" by pressing the CHANNEL keys (▲▼), and set "VSD" to "1" by pressing Volume ►.
3. Make white colored line by adjusting "RDC", "GDC", "BDC" as follows;

Cut-off	Key	Action	Key	Action
RED	"1"	RED (-)	"2"	RED (+)
GREEN	"4"	GREEN (-)	"5"	GREEN (+)
BLUE	"7"	BLUE (-)	"8"	BLUE (+)

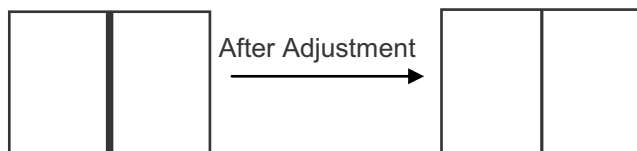
4. Adjust the Screen VR (on the FBT) so that horizontal line is just seen a little.
5. Set "VSD" to "0" by pressing Volume ◀ key.

3-2 Adjusting the FOCUS

1. Display the CROSS Hatch pattern.



2. Set the Screen Adjustment to "View as Standard".
3. Adjust the FOCUS control for well-defined scanning lines in the center area of the screen
5. Slowly turn the Static Focus VR counter clockwise so that the center vertical line is the most clearly displayed.



3-3 High Voltage Check

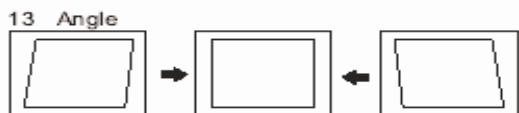
CAUTION: There is no high voltage adjustment on this chassis.

The B+ power supply must be set to +125 volts (Full color bar input and normal picture level).

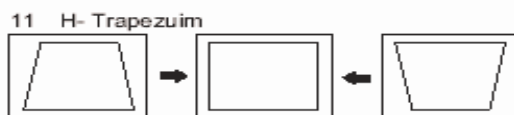
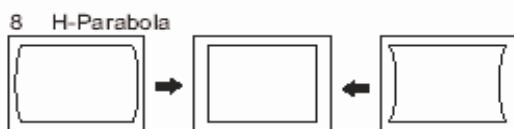
1. Connect a digital voltmeter to the second anode of the picture tube.
2. Turn on the TV. Set the Brightness and Contrast controls to minimum (zero beam current).
3. The high voltage should not exceed 20.0KV.
4. Adjust the Brightness and contrast controls to both extremes. Ensure that the high voltage does not exceed 20.0KV under any conditions.

3-4 Adjusting the Picture Straight Lines

1. Display the Cross Hatch pattern.
2. Adjust settings other than V-AMP, V-SHIFT, H-AMP and H-SHIFT so that straight lines are displayed without curves.
3. Adjust BOW and the Angle settings so that the center line becomes a straight line.



4. Adjust the H-Parabola and H-Trapezium settings so that the left and right lines become straight.



5. Adjust the Upper Corner and the Low Corner settings so that the end of the lines become straight.



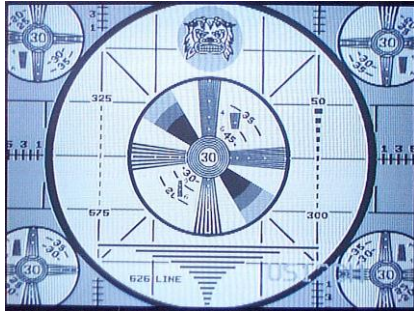
6. Adjust the V-Linearity and V-SC settings so that the intervals of the horizontal lines become uniform



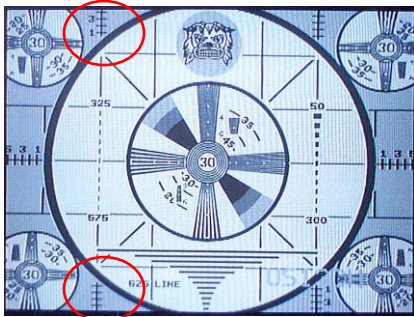
- ⑦ When the adjustments are complete, display the Lion pattern and check that the picture size has not been changed.
If there is no change, finish the adjustments.

3-5 Adjusting the Picture Size

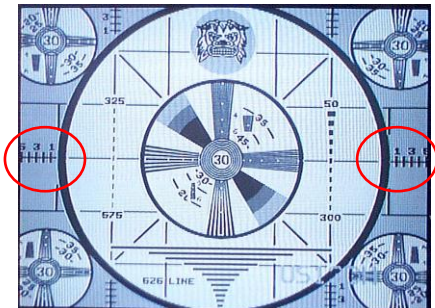
1. Display the Lion pattern



2. Adjust the V-AMP and V-SHIFT items so that the height becomes 4.



3. Adjust the HSI and H-SHIFT items so that the width becomes 5



3-6 Adjusting the White Balance

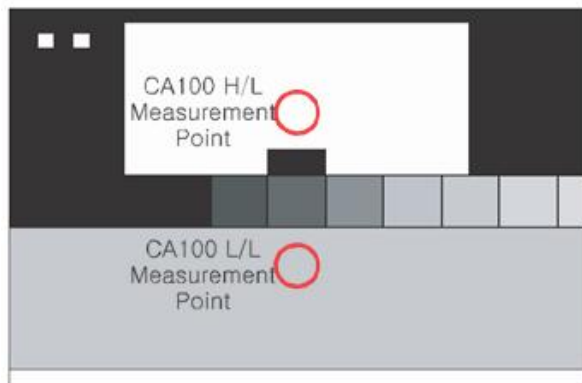
1. Set up

(1) Warm up the TV for at least 20 minutes in the HEAT RUN Mode (OSD White).

This mode is displayed by entering the following sequence: SERVICE → 5

(2) Input a Toshiba pattern.

2. Display the Toshiba pattern and adjust the White Balance using CA100 with the coordinates of the corresponding model.



[CA100]

3. Low-Light Adjustment

■ Set **SBRT** to 1.5 ± 0.3 fL in the Service Mode with using CA100.

- Adjust Sub Bright to set Y.
- Adjust BDC Cutoff to set y.
- Adjust RDC Cutoff to set x.

4. High-Light Adjustment

■ Set **SCON** to 40 ± 5 FL (21" Ultra Slim) in the Service Mode with using CA100.

- Adjust Sub Contrast to set Y.
- Adjust B Drive to set y.
- Adjust G Drive to set x.

5. Check Low/Light and readjust it if its value has been changed.

※ White Balance Standard Data

No	Item	Data	Required Adjustment
1	White Balance	x: 282 ± 3 / y: 302 ± 3 / 40 ± 3 x: 282 ± 5 / y: 302 ± 5 / 1.5 ± 0.2	White Balance (Europe)

☞ When the White Balance adjustment is finished, check the Screen Voltage

- Readjust a screen Voltage at your discretion after check the light of screen on Video mode no signal

3-7 Adjusting the Purity

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.
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.

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.

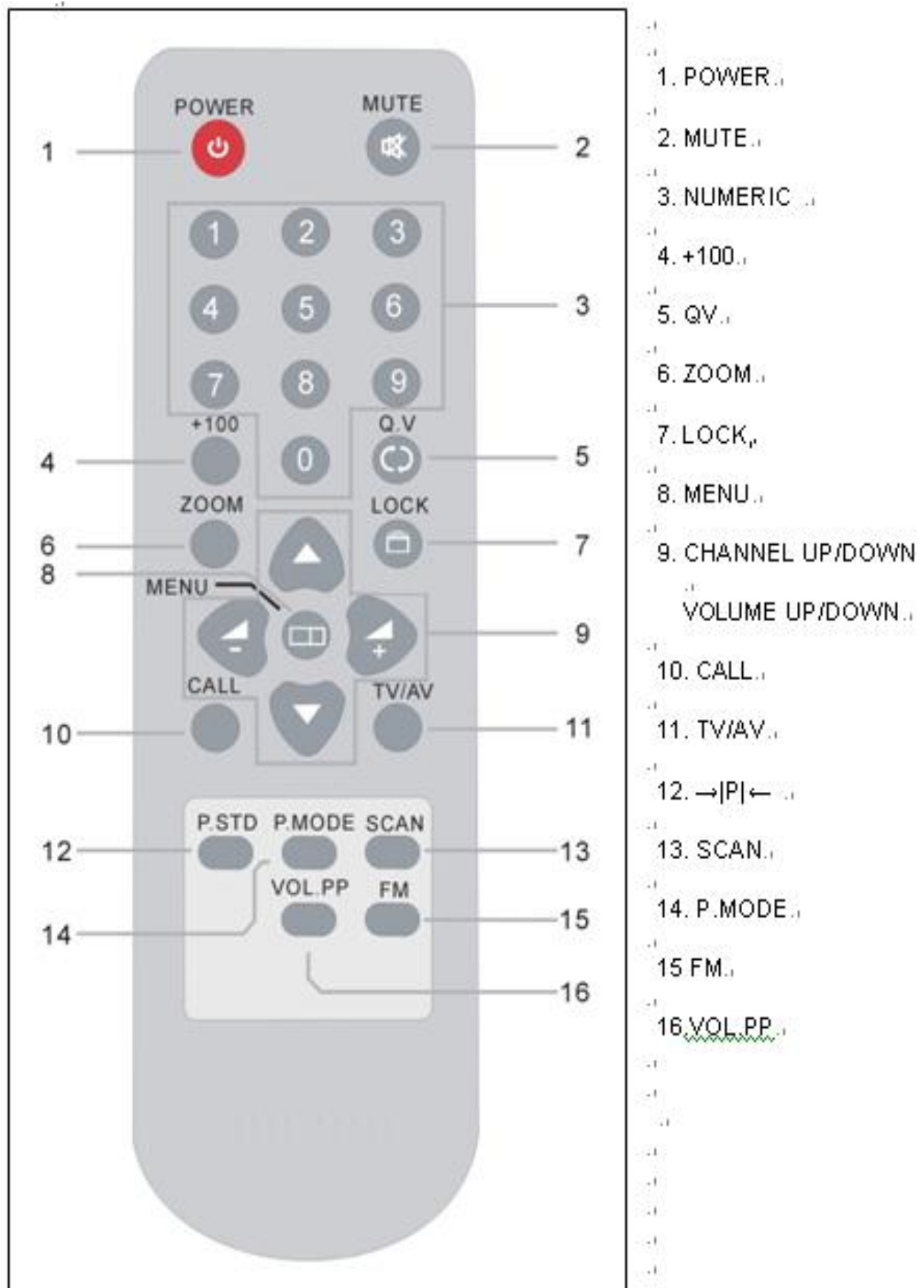
3-8 Adjusting the Center Convergence

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 .

3-9 Adjusting the RF AGC

- Set the AGC data to 35 (Adjust Mode).

4. REMOTE CONTROL



5. Using Devices and Description

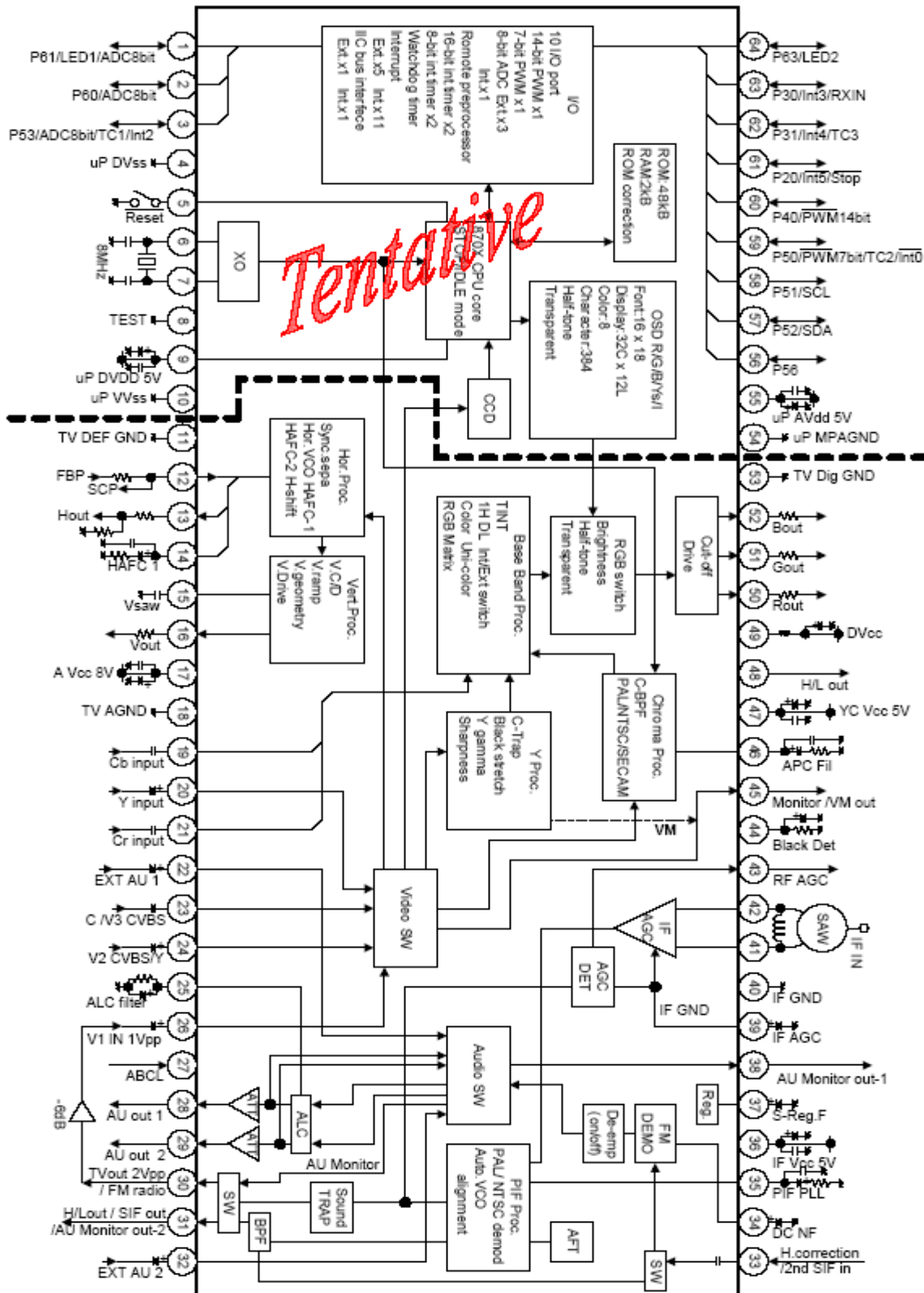
5-1 MAIN IC(TV PROCESSOR/U-COM/TMPA8891CSBNG)

5-1-1 PINNING

NO	NAME	I/O	FUNCTION	ACTIVE
1	ADC		ground for TV Processor	
2	ADC		Bus-Stop	
3	KEY 0	I	CONTROL KEY INPUT	
4	DVSS		Digital ground	
5	Reset		Reset	
6	X-TAL		Crystal Oscillator Out	
7	X-TAL		Crystal Oscillator In	
8	GND		ground for TV Processor	
9	DVDD 5V	I	Digital Supply Voltage(+5V)	
10	VVSS		ground for TV Processor	
11	AGND		ground for TV Processor	
12	FBP	I	FBP	
13	H-OUT	O	Horizontal driving pulse	
14	HAFC		HAFC Filter	
15	VSAW		Capactor to generate V SAW Signal	
16	VOUT	O	Vertical driving pulse	
17	HVCC		HVCC 8V	
18	TV-AGND	I	ground for TV Processor	
19	Pb input	I	Pb signal input	
20	Y input	I	Y signal input	
21	Pr input	I	Pr signal input	
22	EX-AU2		AV-AUDIO L-INPUT	
23	CVBS Y-IN	I	AV-VIDEO INPUT	
24	EXT-CVBS/Y	I	N.C	
25	ALCF		ALCF	
26	TV-IN		TV Signal input	
27	ABCL IN		ABL Control input	
28	A-OUT1	O	AUDIO-L OUTPUT	
29	IA-OUT2/		AUDIO-R OUTPUT	
30	TV-OUT		TV Signal output	
31	SIF OUT	O	SIF Signal output	
32	EX-AU2	I	AV-AUDIO R-INPUT	
33	SIF IN	I	SIF Signal input	
34	DC NF		capactor for DC negative feedback from SIF det out	
35	PIF PLL		Loop filter for PIF pll	
36	IF VCC 5V		IF Supply voltage(5V)	
37	S-Reg.F		capactor for stabilizing internal bias	
38	A-M, OUT		AUDIO MONITOR OUTPUT	
39	IF-AGC		IF AGC Filter	

TV signal processor- decoder with embedded μ -Controller

BLOCK DIAGRAM



5-2. POWER IC(STR-W6553A)

SANKEN ELECTRIC CO., LTD.

仮仕様
PRELIMINARY

STR-W6553A

1 適用範囲

Scope

この規格は、スイッチングレギュレータ用ハイブリッド IC STR-W6553A について適用する。
The present specifications shall apply to a hybrid IC type STR-W6553A for switching regulators.

2 概要

Outline

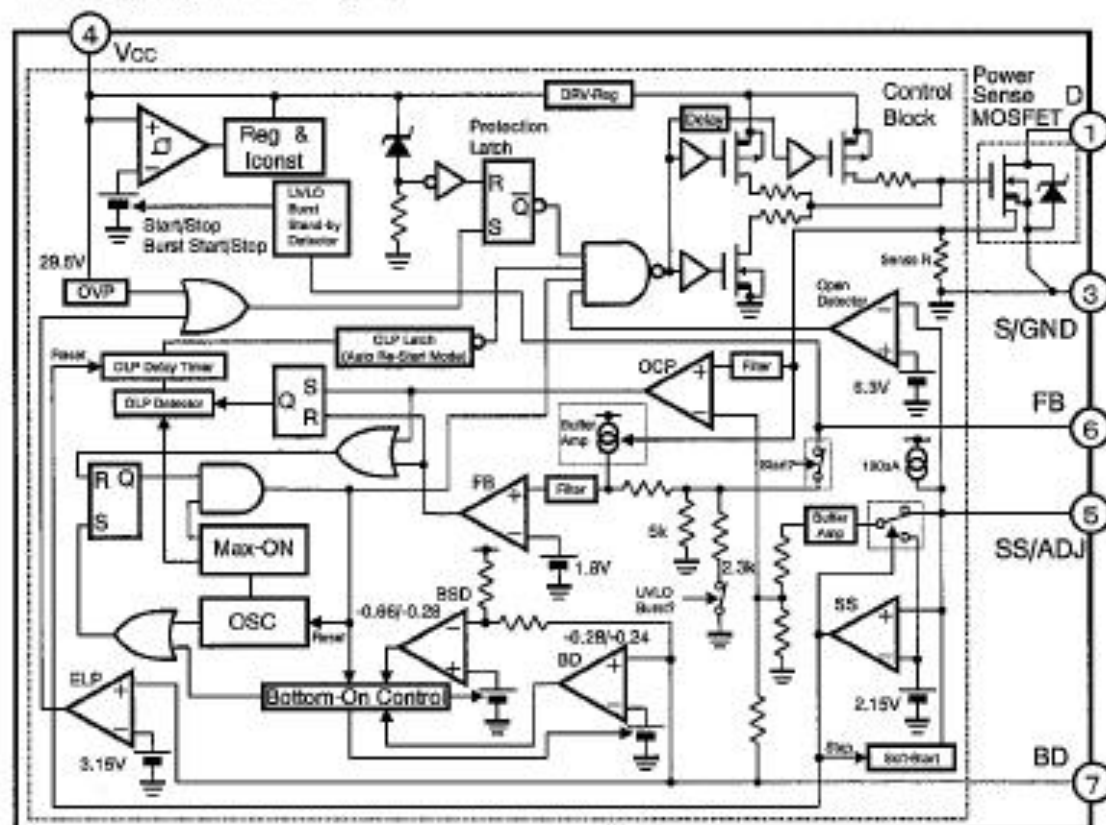
種 Type	別	ハイブリッド IC Hybrid IC
構 Structure	造	樹脂封止型 (トランスファーモールド) Plastic mold package (Transfer mold)
主 用 Applications	途	スイッチングレギュレータ Switching regulators

3 絶対最大定格 (Ta=25℃)

Absolute maximum ratings (Ta=25℃)

項 Parameter	端 子 Terminal	記 号 Symbol	規格値 Ratings	単位 Units	備 考 Conditions
ドレイン電流 Drain Current	1 - 3	I_{Dpeak}^{*1}	11	A	シングルパルス Single Pulse
最大スイッチング電流 Maximum switching current	1 - 3	I_{OMAX}^{*2}	11	A	Ta=-20~+125℃
アバランシェエネルギー耐量 Single pulse avalanche energy	1 - 3	E_{AS}^{*3}		mJ	シングルパルス Single Pulse V _{DD} =99V, L=20mH
		I_{Lpeak}		A	
制御部電源電圧 Input voltage in control part	4 - 3	V _{CC}	0~32	V	
SS/ADJ 端子電圧 SS/ADJ terminal voltage	5 - 3	V _{SSADJ}	0~7.9	V	
FB 端子流入電流 FB Terminal inflow current	6 - 3	I _{FB}	10	mA	
FB 端子電圧 FB terminal voltage	6 - 3	V _{FB}	0~16.5	V	
BD 端子電圧 BD terminal voltage	7 - 3	V _{BD}	-1.8(-3.0) ~5.5	V	括弧内は 0.5μs 以下時 The numerical value of parentheses is 0.5μs pulse or less.
MOS FET 部許容損失 Power Dissipation in MOSFET	1 - 3	P_{D1}^{*4}	25	W	無限大放熱器にて With infinite Heat Sink
			1.3	W	放熱器無し Without Heat Sink
制御部許容損失(MIC) Power dissipation for control part(MIC)	4 - 3	P _{D2}	0.5	W	V _{CC} ×I _{CC} にて規定 Specified by V _{CC} ×I _{CC}
動作時内部フレーム温度 Internal frame temperature in operation	—	T _F	-20~+115	℃	推奨動作温度参照 Refer to recommended operating temperature
動作周囲温度 Operating ambient temperature	—	T _{OP}	-20~+115	℃	
保存温度 Storage temperature	—	T _{stg}	-40~+125	℃	
チャネル温度 Channel temperature	—	T _{ch}	+150	℃	

5. ブロックダイアグラム (ピン配置)
Block diagram (Connection diagram)



各端子機能

Functions of Each Terminal

端子番号 Terminal No.	端子記号 Symbols	名称 Descriptions	機能 Functions
1	D	ドレイン端子 Drain terminal	MOSFET ドレイン MOSFET drain
3	S/GND	ソース/グランド端子 Source and Ground terminal	MOSFET ソース及びグランド MOSFET Source and Ground
4	VCC	電源端子 Power supply terminal	制御回路電源入力 Input of power supply for control circuit
5	SS/ADJ	ソフトスタート/過電流保護調整端子 Soft Start and Over-current protection adjustment Terminal	過電流保護の調整及び ソフトスタート動作の時間設定 Adjustment of over-current protection and Soft Start Operation Time set up
6	FB	フィードバック端子 Feedback terminal	定電圧制御信号入力及び間欠発振制御 Constant Voltage Control Signal Input and Burst(intermittent) mode Oscillation Control
7	BD	ボトム検出端子 Bottom Detection Terminal	ボトム検出信号入力及び 外部 Latch 信号入力 Bottom Detection Signal Input and External Latch Signal Input

5-3. Vertical Deflection

UTC78040

LINEAR INTEGRATED CIRCUIT

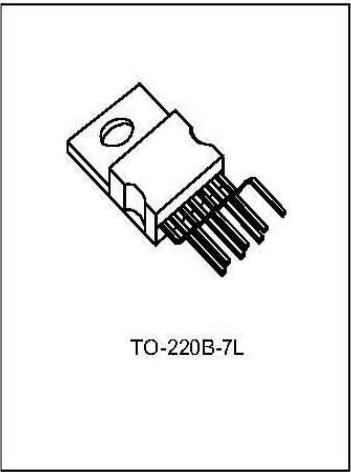
VERTICAL DEFLECTION IC

DESCRIPTION

The UTC78040 is a monolithic integrated circuit designed for use in the vertical deflection circuit of monitor and small color television receivers.

FEATURE

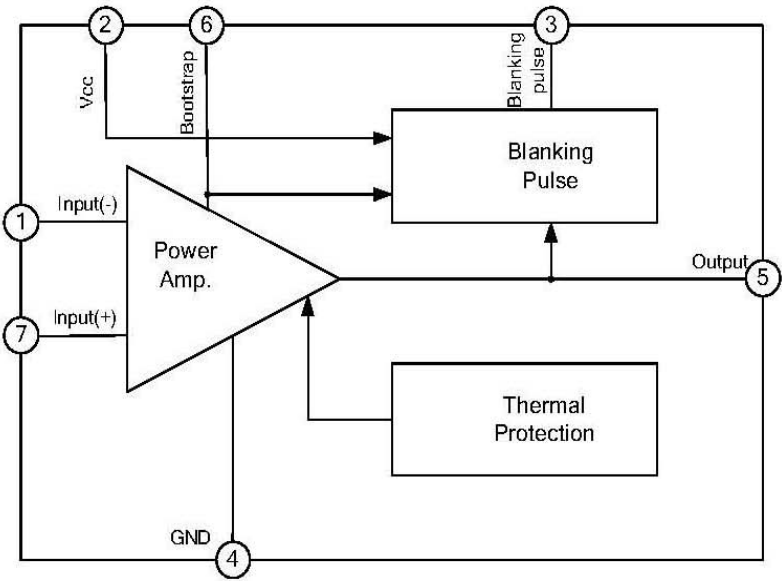
- * Built-in power amp.
- * Built-in blanking generator
- * Built-in thermal protection
- * Large output current:1.8Ap-p
- * High maximum voltage
- * DC coupling application



ORDERING INFORMATION

DEVICE	PACKAGE
UTC78040	TO-220B-7L

BLOCK DIAGRAM



UTC78040

LINEAR INTEGRATED CIRCUIT

PIN CONFIGURATION

Pin no.	Pin name
1	Input(-)
2	Vcc2
3	Blanking pulse
4	GND
5	Output
6	Bootstrap
7	Input(+)

ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

Characteristics	Symbol	Value	Unit
Supply Voltage (2pin to 4pin)	Vcc2	34	V
Output Supply Voltage (5pin to 4pin)	Vcc6	70	V
Maximum Peak Output Current	I5 max	-1.5~1.5	A
Thermal Resistance	R _θ	4.0	°C/W
Maximum Power Dissipation (with a specific big heatsink)	Pd max	9	W
Operating Temperature	Topr	-20~+85	°C
Storage Temperature	Tstg	-40~150	°C
Thermal shutdown Junction Temperature	Tsd	150	°C

ELECTRICAL CHARACTERISTICS (Vcc=24V,Ta=25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Operating Voltage Range	Vcc		16	24	33	V
Quiescent Operating Voltage	Id		20	-	50	mA
Maximum Deflection Current	I5p-p		-	-	1.8	Ap-p
Saturation Voltage (output to ground)	Vs5-4	I5=0.9A	-	-	1.3	V
Saturation Voltage (output to supply voltage)	Vs5-6	I5=0.9A	-	-	3.2	V
Pin 3 Saturation Voltage	Vs3-4	I3=20mA	-	-	1.8	V
Pin 3 Saturation Voltage (blanking the second part)	Vs3-2	I3=-0.9A	-	-	3.0	V
Output Midpoint Voltage	Vmid		11	12	13	V

5-4. HORIZONTAL OUT TR(C5296)

2SC5296

主要参数 MAIN CHARACTERISTICS

BV_{CEO}	1500 V
I_C	8 A
$V_{CE(sat)}$	3 V(max)
t_r	1 μs (max)

用途

- 彩色电视机行输出电路

APPLICATIONS

- Horizontal deflection output for color TV.

产品特性

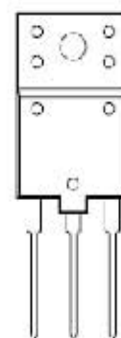
- 2SC5296 是 **NPN** 双极型高压大功率晶体管, 制造中采用的主要工艺技术有: 高压台面工艺技术、三重扩散技术等, 采用塑料全包封结构, 环保 (RoHS) 产品。

FEATURES

- 2SC5296 is high breakdown voltage of **NPN** bipolar transistor. The main process of manufacture: high voltage mesa type process, triple diffused process etc., adoption of fully plastic package. RoHS product.

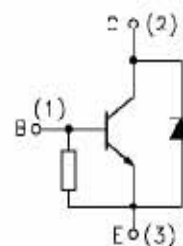
封装 Package

TO-3P(H)IS



1 2 3

等效电路 EQUIVALENT CIRCUIT



$R_{BE}=50 \Omega$ (Typ.)

绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

项 目 Parameter		符 号 Symbol	数 值 Value	单 位 Unit
集电极—基极直流电压 Collector–Base Voltage		BV_{CBO}	1500	V
集电极—发射极直流电压 Collector–Emitter Voltage		BV_{CEO}	600	V
发射极—基极直流电压 Emitter–Base Voltage		BV_{EBO}	6	V
最大集电极电流 Collector Current	直流 DC	I_C	8	A
	脉冲 Pulse	I_{CP}	16	
最大基极直流电流 Base Current		I_B	4	A
最大集电极耗散功率 Collector Power Dissipation		P_C	50	W
最高结温 Max. Junction Temperature		T_J	150	℃
储存温度 Storage Temperature Range		T_{STG}	-55~+150	℃

电特性 ELECTRICAL CHARACTERISTICS (Tc=25℃)

项 目 Parameter	测试条件 Tests conditions	最小值 Min	最大值 Max	单位 Unit
$V(BR)_{CBO}$	$I_C=1mA, I_E=0$	1500		V
$V(BR)_{EBO}$	$I_E=400mA, I_C=0$	6		V
I_{CBO}	$V_{CB}=1500V, I_E=0$		1	mA
I_{EBO}	$V_{EB}=4V, I_C=0$	40	150	mA
H_{FE}	$V_{CE}=5V, I_C=1A$	10	30	
	$V_{CE}=5V, I_C=4A$	5		
$V_{CE(sat)}$	$I_C=4.5A, I_B=0.9A$		3	V
$V_{BE(sat)}$	$I_C=4.5A, I_B=0.9A$		1.5	V
$-V_F$	$I_F=5A$		2	V
t_f	$I_C=4A, 2I_{B1}=-I_{B2}=1.6A$ $f_H=15.75kHz$		1	μs
t_s			9	μs
f_t	$V_{CE}=10V, I_C=0.1A$	1		MHz

5-4. SOUND AMP IC(LA42102)

Ordering number : ENA0494A



SANYO Semiconductors DATA SHEET

LA42102

Monolithic Linear IC
Audio Output for TV application
10W × 2ch Power Amplifier

Overview

LA42102 is 10W 2-channel AF power amplifier intended for televisions.

Functions

- 10W × 2 channels ($V_{CC} = 14V$, $R_L = 8\Omega$).
- Standby function.
- Built-in mute function.
- Built-in various protection circuit (short to V_{CC} /short to ground/load shorting/overheating).

Specifications

Maximum Ratings at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$		17	V
Allowable power dissipation	$P_d\ max$	Infinitely large heat sink	15	W
Maximum junction temperature	$T_j\ max$		150	$^\circ C$
Thermal resistance	θ_{jc}		3	$^\circ C/W$
Operating temperature	T_{opr}		-25 to +75	$^\circ C$
Storage temperature	T_{stg}		-40 to +150	$^\circ C$

Operating Conditions at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		14	V
Recommended load resistance	R_L		8	Ω
Allowable operating supply voltage range	$V_{CC\ op}$	Under conditions such that Maximum ratings are not exceeded	10 to 17	V

■ Any and all SANYO Semiconductor Co., Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

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SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

52307 MS PC / 40407 MS PC 20060926-S00001 No.A0494-1/8

LA42102

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 14\text{V}$, $R_L = 8\Omega$, $f = 1\text{kHz}$, $R_g = 600\Omega$

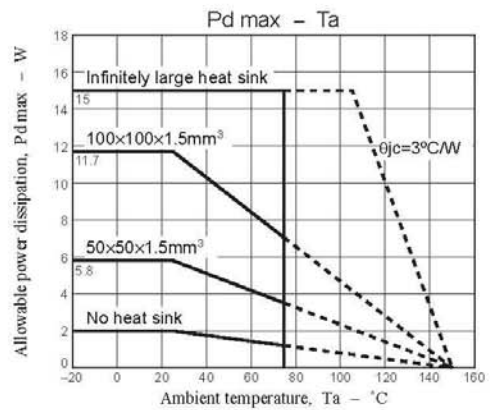
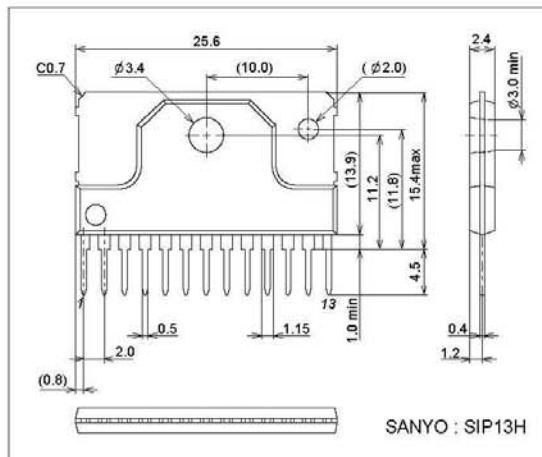
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby current	I_{st}	Amplifier OFF		0	10	μA
Quiescent current	I_{CCO}	$R_g = 0$, $R_L = \text{OPEN}$	40	70	140	mA
Output power	P_{O1}	THD = 10%	8	10		W
Total harmonic distortion	THD	$P_O = 1\text{W}$		0.06	0.2	%
Voltage gain	VG	$V_O = 0\text{dBm}$	33	35	37	dB
Output noise voltage	V_{NO}	$R_g = 0$, BPF = 20Hz to 20kHz		0.2	0.4	mVrms
Ripple rejection ratio	SVRR	$R_g = 0$, $f_R = 100\text{Hz}$, $V_{CCR} = 0\text{dBm}$	40	50		dB
Channel separation	CH.Sep	$R_g = 10\text{k}\Omega$, $V_O = 0\text{dBm}$	50	60		dB
Mute attenuation value	ATT	$V_O = 1\text{Vrms}$, BPF = 20Hz to 20kHz	80	90		dB
Mute control voltage (pin 6)	V_{mute}	Mute ON *1	1.7		3.0	V
		Mute OFF	0		0.5	V
Standby control voltage (pin 5)	V_{st}	Amplifier ON *1	2.5		V_{CC}	V
		Amplifier OFF	0		0.5	V
Input resistance	R_i		21	30	39	$\text{k}\Omega$

*1 : Note that the standby pin (pin 5) and MUTE pin (pin 6) incorporate the anti-electrostatic diode allowing the current to flow through the diode when the potential of V_{CC} 7 pin decreases below that of pin 5/6.

Package Dimensions

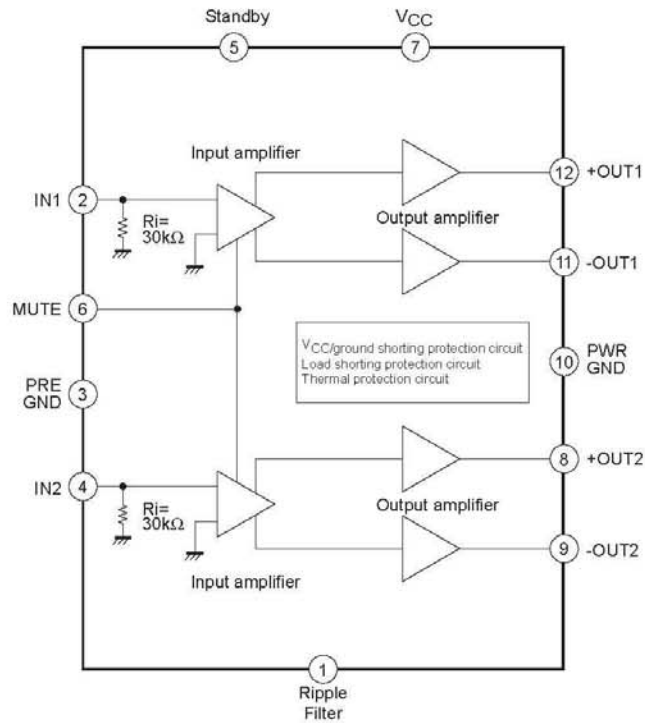
unit : mm (typ)

3107B

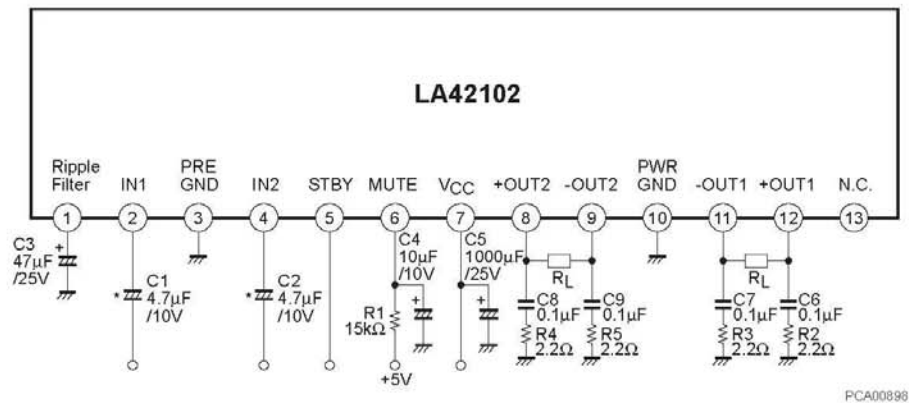


LA42102

Block Diagram



Test Circuit



* LA42102 employs the zero-bias type input circuit, with the input pin potential being nearly zero (about 0.01V). Accordingly, the polarity must be determined according to the DC potential of a circuit connected to the previous stage of LA42102.

LA42102

External Components

- C1, C2 : Input coupling capacitors, for which 4.7 μ F or less is recommended. LA42102 employs the zero-bias type input circuit, with the input pin potential being nearly zero. Accordingly, the polarity must be determined according to the DC potential of a circuit connected to the previous stage of LA42102.
- C3 : Capacitor for starting time of the ripple filter and amplifier, for which 47 μ F is recommended.
- C4, R1 : Capacitor and resistor for mute. C4 is necessary even when the mute function is not used.
- C5 : Power capacitor.
- C6 to C9 : Capacitor and resistor for oscillation prevention. For C6 to C9, the polyester film capacitor with superior temperature characteristics (Mylar capacitor) is recommended. Use R2 to R5 of 2.2 Ω along with the capacitor.

1. Mute function (pin 6)

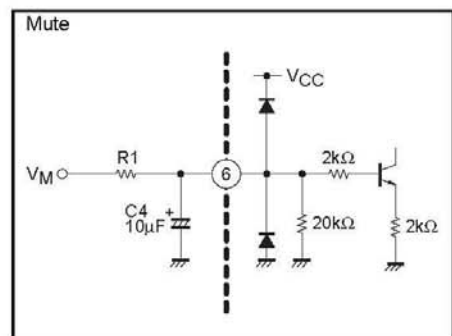
With the pin 6 voltage of 1.7V (minimum) or more, the mute function is turned ON.

Set the V_M application voltage so that the pin 6 voltage becomes 1.7V or more.

The mute time constant is determined by R1 and C4. Determine the constant after careful review because it is related to the pop sound at mute ON/OFF.

C4 is necessary even when the mute function is not used because it is related to the pop sound when the amplifier is turned ON.

Note that the MUTE pin (pin 6) incorporates the anti-electrostatic diode, allowing the current to flow through the diode when the potential of V_{CC} 7 pin decreases below that of pin 6.



2. Standby function (pin 5)

The amplifier is turned ON when the voltage of 2.5V (minimum) or more is applied to pin 5.

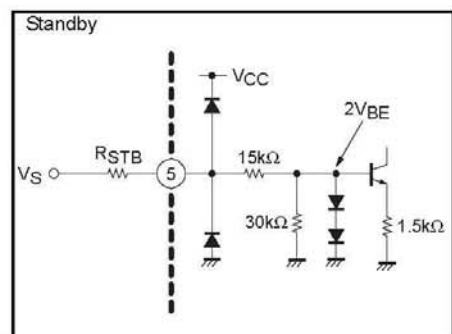
Pin 5 control voltage

Pin 5 voltage	Amplifier	Standby
0 to 0.5	OFF	ON
2.5 to 15	ON	OFF

To suppress the inrush current to pin 5 when the V_{STB} application voltage is high, insert the control resistor (R_{STB}).

Example : To suppress the pin 5 inrush current to 500 μ A or less

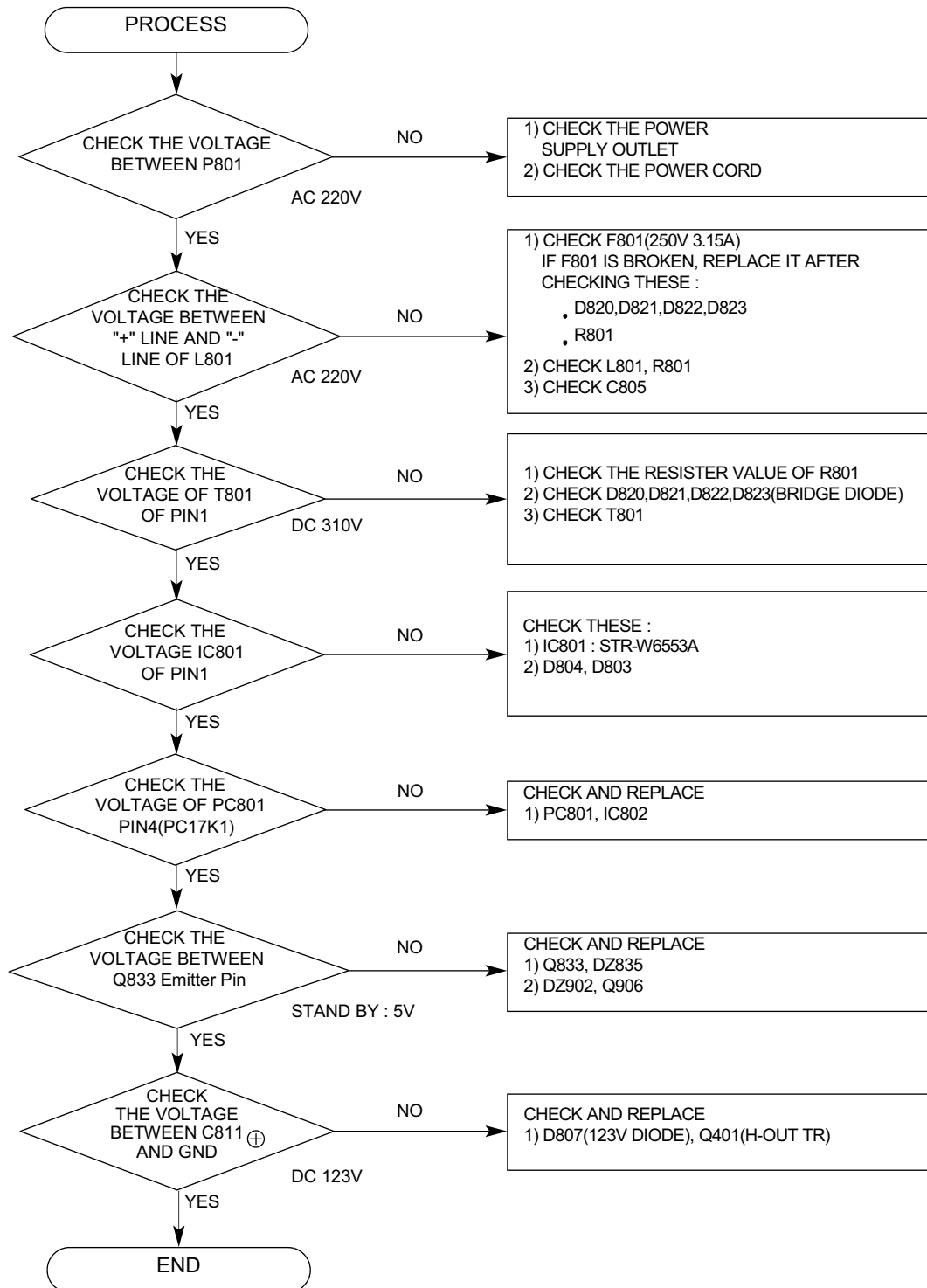
$$R_{STB} = \frac{\text{Applied voltage (V}_{STB}) - 2V_{BE} \text{ (About 1.4V)}}{500\mu\text{A}} - 15\text{k}\Omega$$



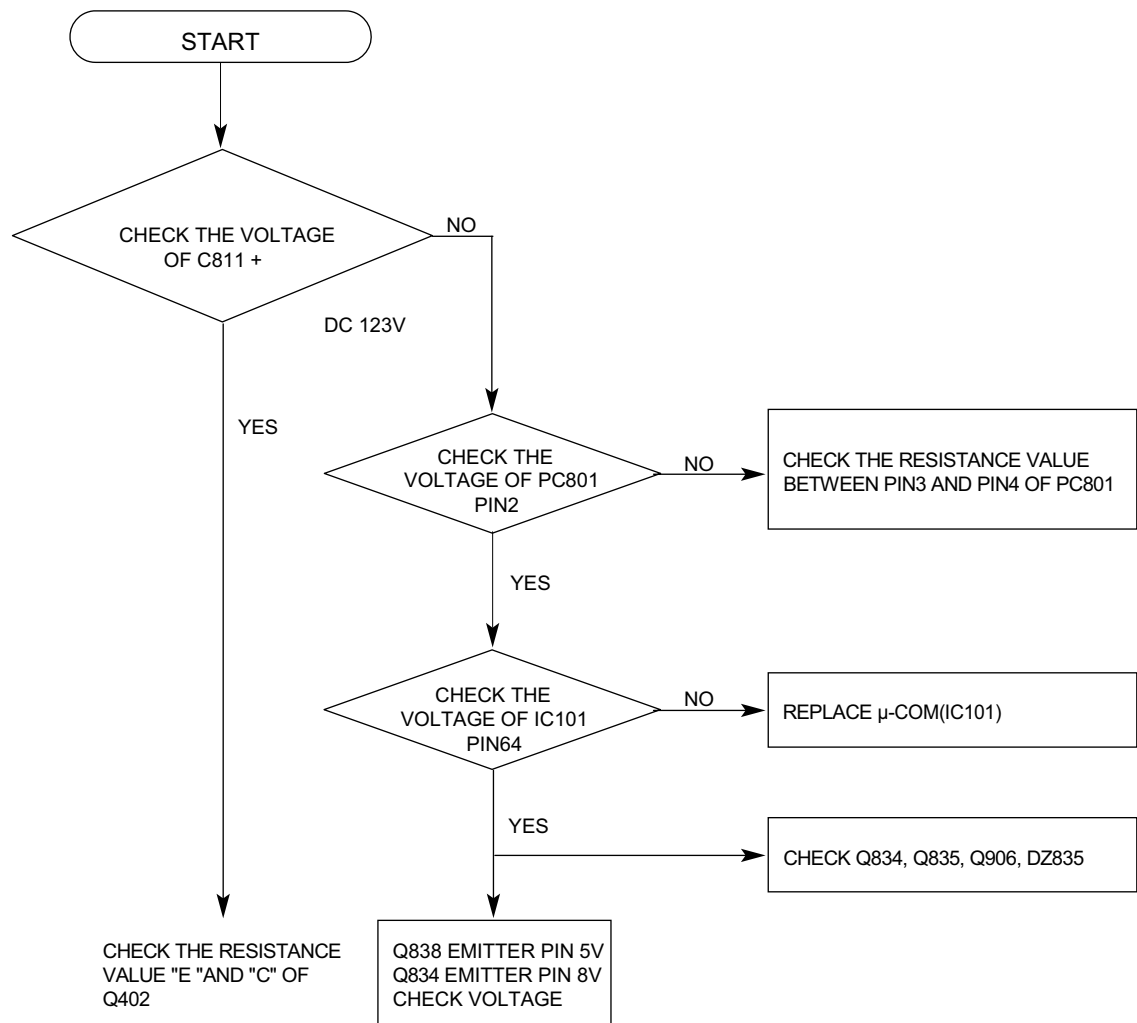
Note that the standby pin (pin 5) incorporates the anti-electrostatic diode, allowing the current to flow through the diode when the potential of V_{CC} pin 7 decreases below that of pin 5.

6. TROUBLE SHOOTING Flow Chart

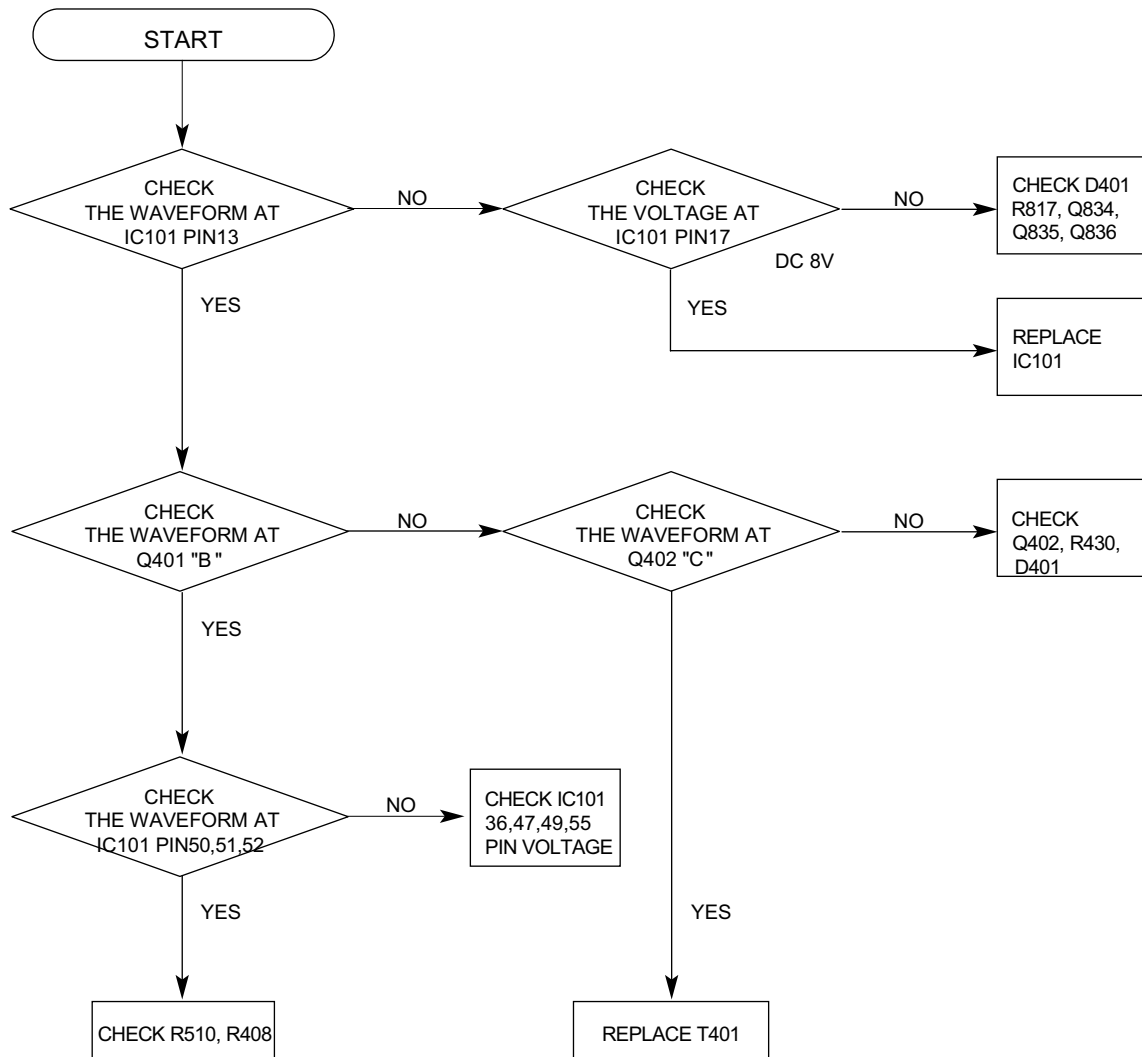
1. No Power



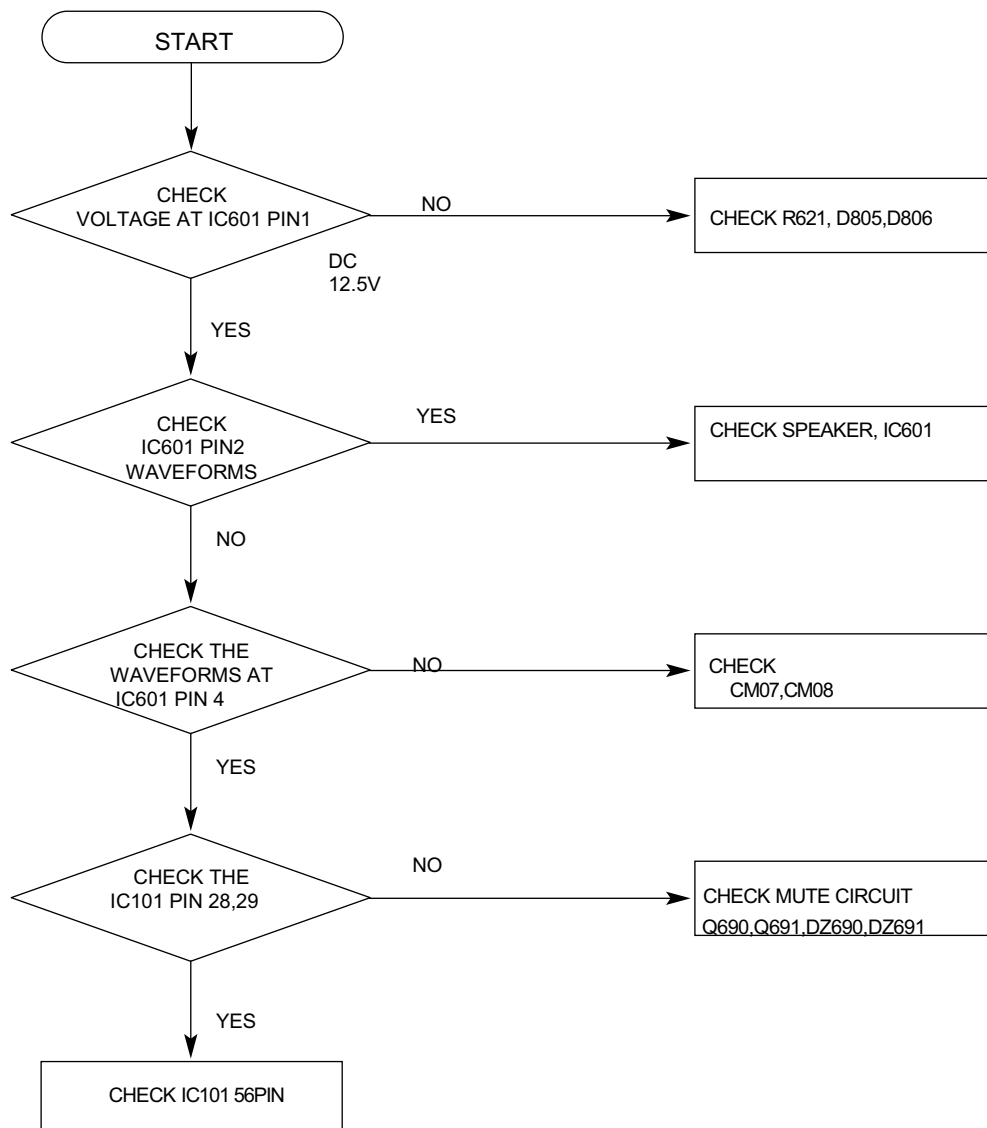
2. In stand-by status (POWER OK), TV is switched on, SMPS turns off and LED turns off (ON/OFF)



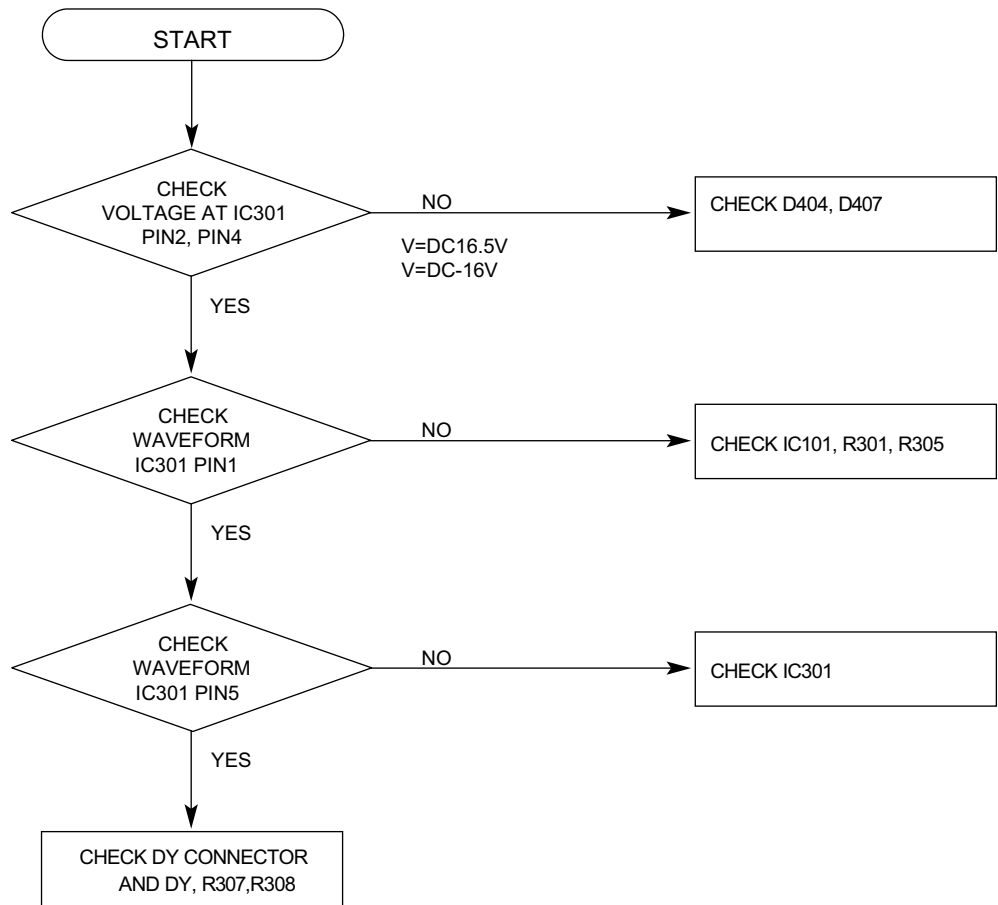
3. No Picture(sound ok)



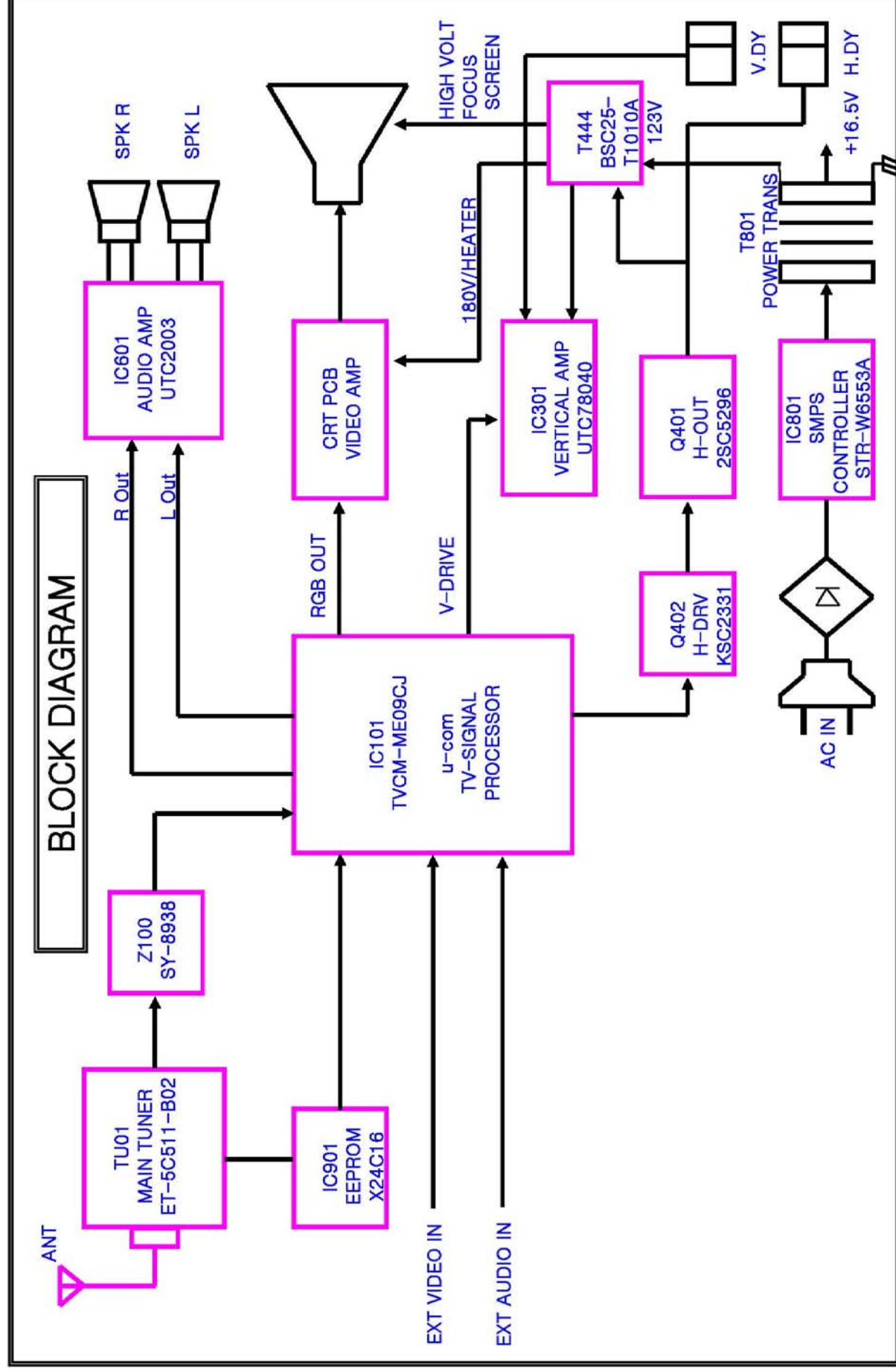
4. No Sound



5. Vertical Line(Reference Line)



7. BLOCK DIAGRAM



8. PCB LAYOUT

