AKIRA

makes life better

# Colour TV
# Service Manual

# Model:
# 21WHS3/BN

# Chassis: UOC-TDA9381

# CONTENTS

# SAFETY NOTICE

**WARNING: BEFORE EXAMINING AND SERVICING THIS CHASSIS, READ CAREFULLY THE FOLLOWING SAFETY INSTRUCTIONS.**

## X-RAY RADIATION PRECAUTION

1. The primary source of X-RADIATION in television receiver is the picture tube. The picture tube is specially constructed to limit X-RADIATION emissions. For continued X-RADIATION protection, the replacement tube must be the same type as the original including suffix letter. Excessive high voltage may produce potentially hazardous X-RADIATION. To avoid such hazards, the high voltage must be maintained within specified limit. Refer to this service manual, high voltage adjustment for specific high voltage limit. If high voltage exceeds specified limits, take necessary corrective action. Carefully follow the instructions for +B1 volt power supply adjustment, and high voltage check to maintain the high voltage within the specified limits.
2. The EHT must be checked every time the receiver is serviced to ensure that the CRT does not emit X-ray radiation as result of excessive EHT voltage. The nominal EHT for this receiver is 22KV at zero beam current (minimum brightness) operating at AC 220V. The maximum EHT voltage permissible in any operating circumstances must not exceed 25KV. When checking the EHT, use the High Voltage Check procedure in this manual using an accurate EHT voltmeter.
3. The only source of X-RAY radiation in this receiver is the CRT. To prevent X-ray radiation, you should use the same type of CRT when replacing it.
4. Some components used in this receiver have safety-related characteristics preventing the CRT from emitting X-ray radiation. For continued safety, replacement component should only be made after referring the Product Safety notice below.

## SAFETY PRECAUTION

1. The high voltage in the TV reaches to 22KV when the TV is in operation. Be more careful during opening the back cover.
    a. The high voltage existing in the TV is very dangerous. Refer servicing to qualified personnel only.
    b. Before removing the high voltage cap. Discharge the anode of the CRT and the chassis in case of electric shock.
    c. Wear a pair of goggles when handling the CRT to avoid broken pieces damaging your eyes.
    d. Do not hold the CRT neck in case of causing damage to the CRT.
2. When the power cord needs replacing, use the same one as that provided by AKIRA factory.
3. Voltage exists between the hot and cold ground when TV is in operation. Install a separation transformer during repairing or connecting to any tester for the sake of safety. The power of the separation transformer should be beyond rated overall power.

4. When replacing a burnout fuse, use the one with the same specifications as the original.
5. When replacing old wire, wind new one round the shaft to weld. When replacing components with safety in performance, use the same type as that specified by AKIRA and install it in the former way.
6. Never place wire near high-temperature or high-voltage components.
7. An isolation transformer should be connected in the power line between the receiver and the AC line when a service is performed on the primary of the converter transformer of the set.
8. Comply with all caution and safety-related notes provided on the cabinet back, inside the cabinet, on the chassis or the picture tube.
9. When replacing a chassis in the cabinet, always be certain that all the protective devices are installed properly, such as, control knobs, adjustment covers or shields, barriers, isolation resistor-capacitor networks etc.. Before returning any television to the customer, the service technician must be sure that it is completely safe to operate without danger of electrical shock.

## PRODUCT SAFETY NOTICE

Product safety should be considered when a component replacement is made in any area of a receiver. Components indicated by mark in the parts list and the schematic diagram designate components in which safety can be of special significance. It is particularly recommended that only parts designated on the parts list in this manual be used for component replacement designated by mark. No deviations from resistance wattage or voltage ratings may be made for replacement items designated by mark.

# GENERAL DESCRIPTION

AKPH02 chassis series are applied in A14P01/A21P01 respectively which uses mainly Philips' advanced UOC-ultimate chip TDA935X/6X/8X and I2C-bus controlled IC. With combination of microcontroller and small signal processor, the TDA935X/6X/8X series feature high-integration, high-performance-to-price ratio and high-reliability and advanced functions with fewer external components, which provide much convenience for manufacturing and technical service.

Table 1 provides A14P01/A21P01 mainly ICs and functions.

# THE SURVEY

***Table 1, the main IC and functions***

| Position | Type | Function Description |
|---|---|---|
| N301 | TDA9361/TDA9381 | Microcontroller and small signal processor(UOC) |
| N702 | ST24C08-W | EEPROM |
| N701 | AN7522N | Sound power amplifier |
| N401 | LA78040 | Vertical scan output stage circuit |
| N801 | LC4052B/CD4052BE | AV1/AV2 Switch |
| N121 | LC4052B/CD4052BE | AV1/AV2 Switch |

## SIGNAL PROCESS

The TV signal enters into tuner (A201) from cable or antenna. Pin 10 and pin 11 of N301 are combined to select the band. Pin 4 of N301 outputs PWM tuning signal. The 38.9MHz IF signal is coupled to V308 (pre-amplify) and then to SAWF (Z301). After processed in the SAWF, the 38.9MHz signal gets to pin 23 and pin 24 of OM8370. The IF circuit in OM8370 includes such unit as the AGC amplifying circuit, 38.9MHz oscillator, PLL video demodulator, video amplifier, IF identify circuit and AFT circuit. The demodulated signal (CVBS) comes from the pin 38 of OM8370, the sound signal comes from the pin 44.

The internal CVBS signal needs norm identification then outputs from pin 38 of OM8370, via the trap circuit (composed of the V351, Z351, Z354, V352 and so on) feeds back to the pin 40 of OM8370. The RGB signal comes from pin51, Pin52, Pin53 of OM8370, and outputs to the CRT board. The internal sound signal comes from pin 44 of OM8370 and then input to pin 1 and pin 12 of HEF4052BP. The sound signals from RF and AV are selected in it. The selected signal is output from Pin 3 and pin13, then input AN7522N (sound amplifier) or output from AV terminals.

# TECHNICAL SPECIFICATION

| Test Item | Conditional | TD171 |
|---|---|---|
| AC Operating Range | RF&AV signal input with sound loud speaker (volume maximum) & Picture set in Dynamic mode | 140Vac ~ 240Vac |
| Total Power Consumption | Philips or Mono-scope pattern signal with howling sound Contrast & Brightness set in Maximum, sound increase maximum | 90Watts |
| | Standby Mode | 14 Watts |
| EHT | Brightness & contrast set in Maximum | Min: 26.2KVdc |
| | Typical Design value | Average: 26.5KVdc |
| | Brightness &contrast Minimum | Max: 27.8KVdc |
| Anode Current | Brightness &contrast Maximum | $I_{ABL} \leq 1.2mA$ |
| Heater Voltage | TV operate normally | $V_{Heater} = 6.2Vac$ |
| $B^+$ | Normal operating | $VB^+ = 112Vdc$ |
| Sound power output | RF signal input broadcasting at 217.25MHz/BG/DK(1KHz) Volume is maximum | V = 6.3Vrms<br>P = 5Watts X 2 |

# GENERAL SPECIFICATION

| | | | |
|---|---|---|---|
| Power consumption | 14” | 70W | MAX |
| | 21” | 90W | MAX |
| Receive system | DK/BG/I | | |
| Color system | PAL/ SECAM/ NTSC | | |
| Vision intermediate frequency | 38.9MHz | | |
| Inter-carrier frequency | 5.5 MHz(B/G) | | |
| | 6.5MHz(D/K) | | |
| Chroma if frequency PAL | 34.47/ 35.32MHz | | |
| Antenna type | DIN TYPE 75 Ohm | | |
| Channel receiving | VHF Low channel (VL) | =48.25 to 147.25 MHz | |
| | VHF high channel (VH) | =154.25 to 463.25 MHz | |
| | UHF channel (U) | =471.25 to 863.25 MHz | |
| Tuning system | VS tuning | | |
| AV IN/ OUT | 2 AV STEREO IN + 1 AV STEREO OUT | | |
| Component IN | 1 YUV-Component IN | | |
| AV IN/ OUT specification | VIDEO IN ----1.0 $0.2V_{p-p}$ 75 Ohm | | |
| | AUDIO IN ----0-2V (RMS) | | |
| | VIDEO OUT ----1.0 $0.2V_{p-p}$ 75 Ohm | | |
| | AUDIO OUT ---- 0-2V (RMS) | | |
| OSD language | English, Russian, Turkish, French, Spanish, Vietnamese, Indonesian, Arabian, Persian | | |
| Audio output power | > 8W (1KHz, 0.5V INPUT, 10% THD | | |
| Safety authentication standard | CB | | |
| LED indicator | Power ON | | |
| Hand set type | HS08 | | |
| Hans set power supply | Pin AAx2 | | |
| Color picture tube | 14” 21” 90 degree tube | | |
| Remote control distance | 5m | | |
| External input/output | Video/Audio (L/R) 2set input | | |
| | YUV input | | |
| | S-Video input | | |
| | Video/ Audio (L/R) 1 set output | | |

- $I^2C$ Bus Control
- Auto Search
- Off/On Timer
- Teletext

# SAFETY CAUTIONS FOR PRODUCTS

Many electric and mechanical components in AKPH01 chassis have special safety performances, which are always neglected. Even if replacing them with some components with the same voltage and power, you can not get effective protection to X-ray. In the circuit diagram, these special electric components are indicated by the special mark ⚠ and on the shadow. When replacing any of them, use the one with the same specifications as the original's. Otherwise, it may cause X-ray radiation and damage to overall safety.

# CIRCUIT ADJUSTMENTS

## GENERAL INFORMATIONS

All adjustment are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper color and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in carton. Carefully draw out the receiver from the carton and remove all packing materials. Power cord into a convenient 220 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural color or B/W picture.

## AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 30 minutes in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor color purity, use an external-degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the side and front of the receiver and slowly withdraw the coil to a distance of about 2m before disconnecting it from AC source. If color shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures.

# ADJUSTMENT MODE

| | | | |
|---|---|---|---|
| Item | B+ adjustment, TV signal receiving | | |
| | AKPH01 chassis | | |
| Measuring Equipment | TV SG (Signal Generator)<br>Digital multi-meter | | |
| Preparation Before Adj. | The set is turned on<br>Connect the TV SG to RF input terminal of the set. | | |

## Adjustment procedure

1, Turn VR501 potentiometer to adjust B+ to specified voltage.
2, Check voltages for video out, vertical out, circuit work and audio power out as follow

| | Voltage (volt) | | Tolerance |
|---|---|---|---|
| | 14 inch | 21 inch | |
| +B | 110 | 110 | ±2V |
| Video Out | 188 | 188 | ±5V |
| Vertical Out | 26 | 26 | ±1V |
| Circuit Work | 13 | 13 | ±1V |
| Audio Power Out | 12 | 12 | ±1V |

3, TV signal receiving
1. Press MENU key, to select POS.MEMORY item. Press V+ or V- key, to select SEARCH or AUTOMEMORY item, press P+ key to start searching.
2. Press P+ or P- key to inspect the set if there is channel skipped, if so, searching again by SEARCH as above described.

| Item | TV system adapting & AV in/output inspection | | |
|---|---|---|---|
| | AKPH01 chassis | | |
| Measuring Equipment | SG (with NTSC3.58). User remote controller<br>Dual trace oscilloscope | | |
| Preparation before Adj. | Input TV and AV signal | | |

Inspection procedure

1, Input the TV signal which system is designated in technical specification

2, Switch TV system to the set by pressing SYS key on user remote controller according to the TV system in SG. The picture and sound must be normal.

3, Press TV/AV key, to select AV input. The picture and sound must be normal

4, AV output inspection. Load a 75Ω resistor to VIDEO output terminal,1Vp-p video output signal that is from TV signal should be observed on the oscilloscope. Load a 10K resistor to AUDIO output terminal, 0.7Vp-p audio output signal that is from TV should be observed on the oscilloscope.

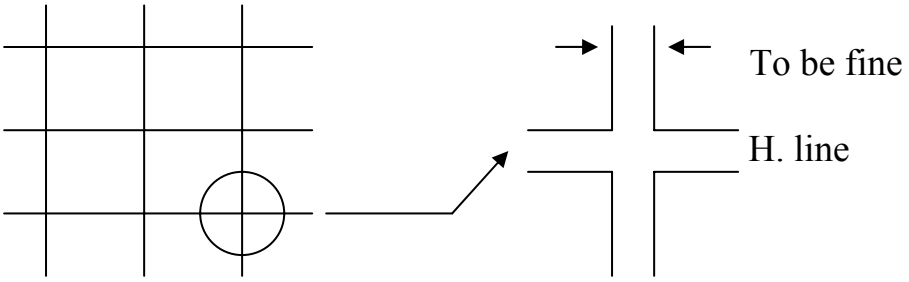
| Item | Focus adjustment | | |
|---|---|---|---|
| | AKPH01 chassis | | |
| Measuring Equipment | SG | | |
| Preparation before Adj. | Brightness, contrast and color should be set in standard | | |

# Adjustment procedure

1, Receive the cross-hatch pattern signal

2, Turn the focus adjusting VR watching the screen and adjust the vertical line of ◯ mark to make the most thin. Then the focus adj. VR is set as close low voltage side as possible.

Stop the focus adj. VR at the point that focus is a bit worse at once, turn back to the left and then turn back to the right a little again.




Magnified drawing of ◯ part

| Item | White balance adjustment |
|---|---|
| | AKPH01 chassis |
| Measuring Equipment | SG and white balance meter<br>service remote controller |
| Preparation before Adj. | Warm up the set for more than 30 min.<br>Brightness, contrast and color should be set in standard |

**MENU9 CRT cut-off and white balance and sub-brightness adjustment.**

Receive gray and white 2 steps signal.

**a)** CRT cut off adjustment.

1. push [P+][P-] key to select "SC", push [V+][V-] key then automatically vertical scan will be stopped.
2. adjust SCREEN control on Flyback transformer to get the darkest single horizontal line (red, green, or blue, sometimes shows more yellow, more purple or more white).
3. push [V+][V-] key again, vertical scan work repeat.

**b)** white balance adjustment.

a) select RD/BD menu.
b) adjustment RD/BD to get color temperature as x=282, y=292.

**c)** sub-brightness adjustment (use stair case signal)

1. select SB MENU.

adjust SB to get the darkest step being out off.

| Item | RF. AGC adjustment | | |
|---|---|---|---|
| | AKPH01 chassis | | |
| Measuring Equipment | SG and digital multi meter<br>service remote controller | | |
| Preparation before Adj. | Connect a digital multi meter to AGC point on the chassis | | |

Adjustment procedure

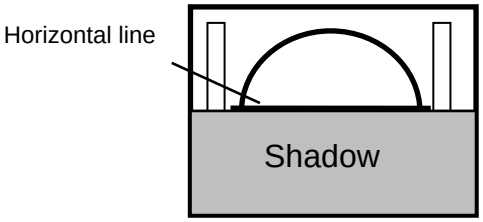
1, Receive the color bar signal that is 87.5% modulation and 60dBu level

2, Press AGC-TOP on service remote controller to select AGC-TOP adjustment, press + or – key to adjust the voltage of AGC-TOP to 6.2±0.05V that is read on the digital multi meter.

| Item | Vertical height, linearity and Hor. position adjustment | | |
|---|---|---|---|
| | AKPH01 chassis | | |
| Measuring Equipment | SG<br>service remote controllers | | |
| Preparation before Adj. | Brightness, contrast and color should be set in standard | | |

**MENU8 Geometrical adjustment**.

Receive standard Crosshatch pattern signal for PAL system .




**a)** Adjust VSLOPE value, to the horizontal line just appear from half bottom shadow.

**b)** Adjust VSHIFT value, the center horizontal line correspond to CRT vertical center.

**c)** Adjust Vamp value, to get 90% of vertical picture contents would be displayed on CRT.

**d)** Adjust HSHIFT value, to get the picture horizontal center correspond to CRT horizontal center.

**e)** Receive standard Crosshatch pattern signal for NTSC system, and again adjust.

| Item | OSD position adjustment | | |
|---|---|---|---|
| | AKPH01 chassis | | |
| Measuring Equipment | service remote controller | | |
| Preparation before Adj. | Brightness, contrast and color should be set in standard | | |

Adjustment procedure

1, Press 5 key on service remote controller to set the set into design mode adjustment

2, Press ↑ or ↓ key to select OSD VPOS item, press → or ← key to adjust the OSD to the center position on the screen or press OSD HPOS on service remote controller and press + or – key to adjust the OSD position.

3, Press M key again to quit design mode adjustment.

| Item | The functions of the set inspection | | |
|---|---|---|---|
| | AKPH01 chassis | | |
| Measuring Equipment | SG<br>User remote controller | | |
| Preparation Before Adj. | The set is turned on | | |

Inspection procedure

1, Receive the Philips pattern signal

2, Press PIC key on user remote controller to call the menu as adjusting picture quality. Adjust color, brightness, contrast, sharpness and tint (in NTSC) respectively and all adjustment should be right

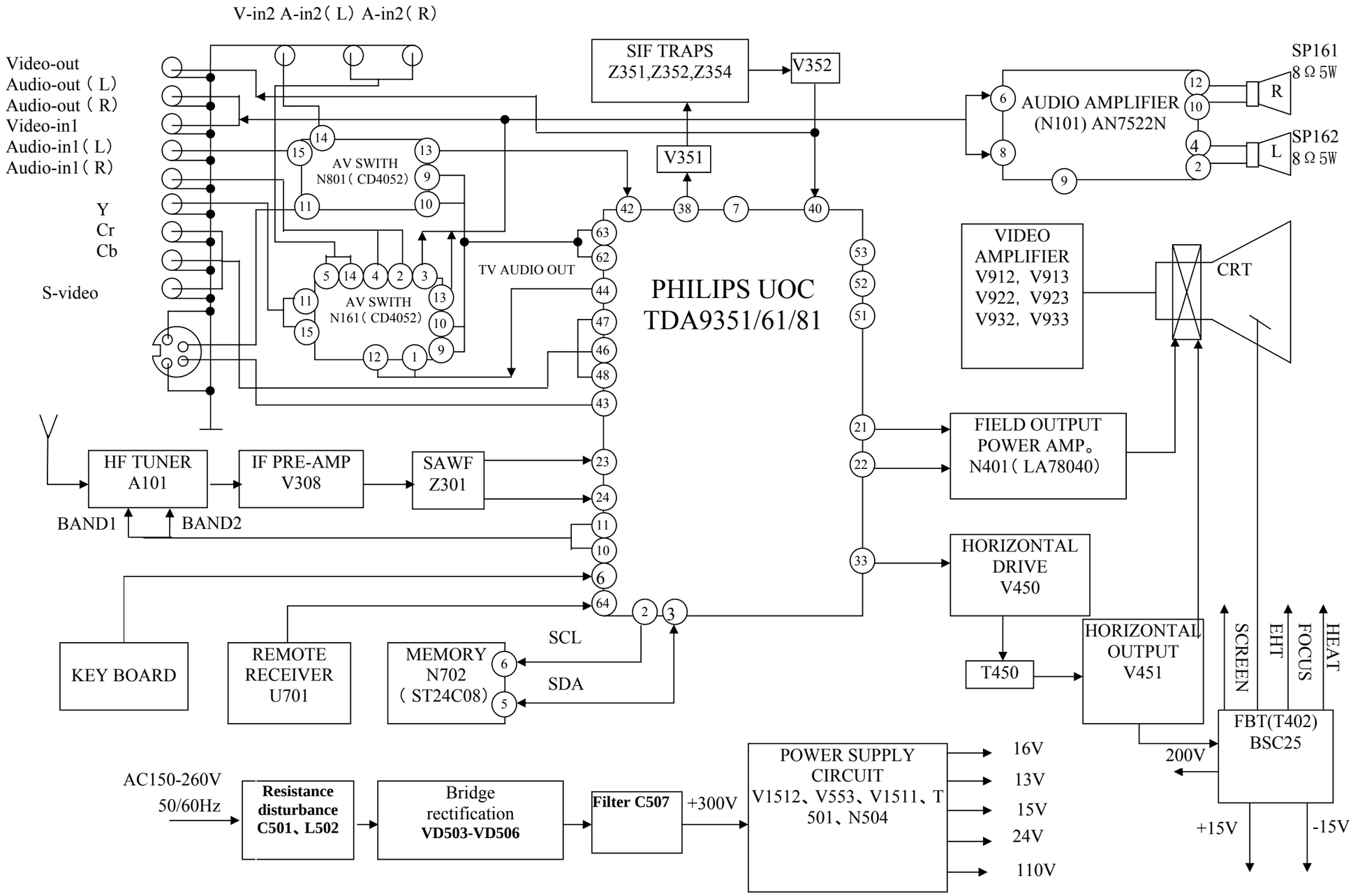
3, Press V+ key to increase the sound volume, no distortion heard at maximum level, press V- key to decrease the sound volume, no sound heard at minimum level

4, Press POWER key to switch the set into standby status, at mean time the manufactory adjustment mode is cancelled

5, Press POWER key again, the set should work in normal receiving mode

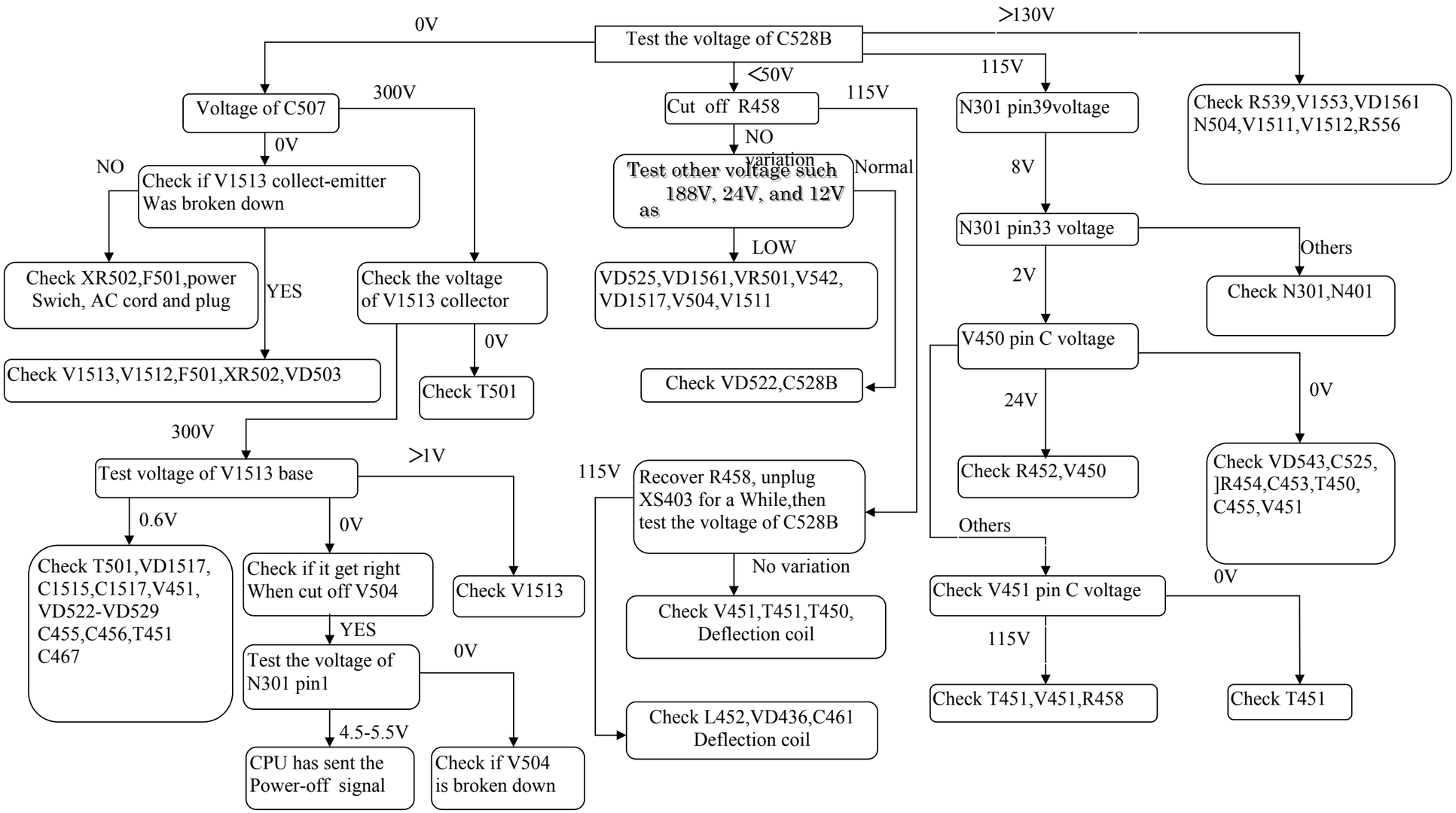
6, Press (mute), QV (display), PP and TIMER key respectively, the relevant function should be normal

# CHASSIS BLOCK DIAGRAM



# FAULT FINDING TREES

A Three-None(no raster, no picture, no sound)
This failure is mainly caused by big-power circuit such as power supply, horizontal scanning, vertical scanning.
The detail checking and repairing steps are as follow.



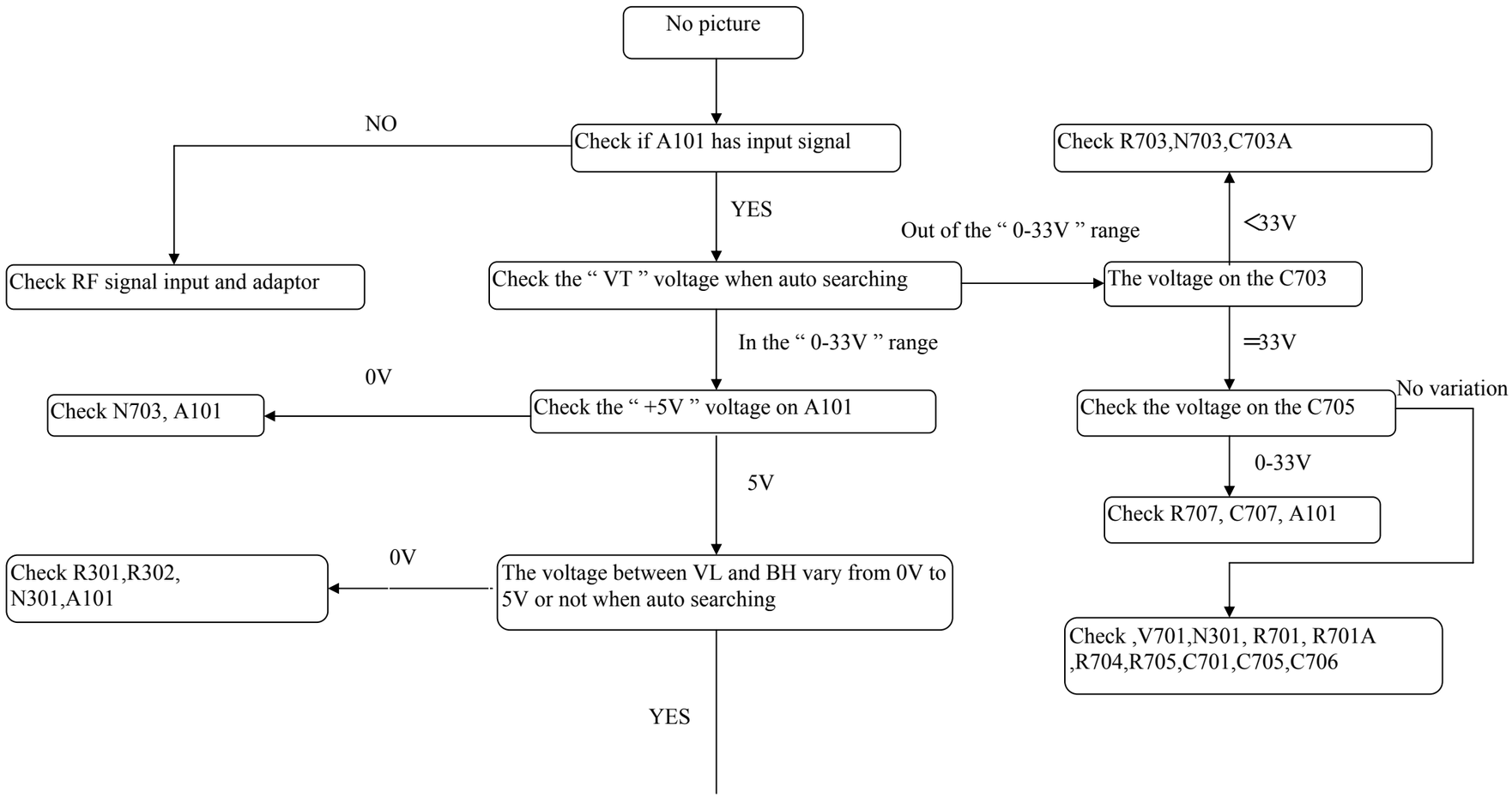
B Two-None (no picture, no sound)

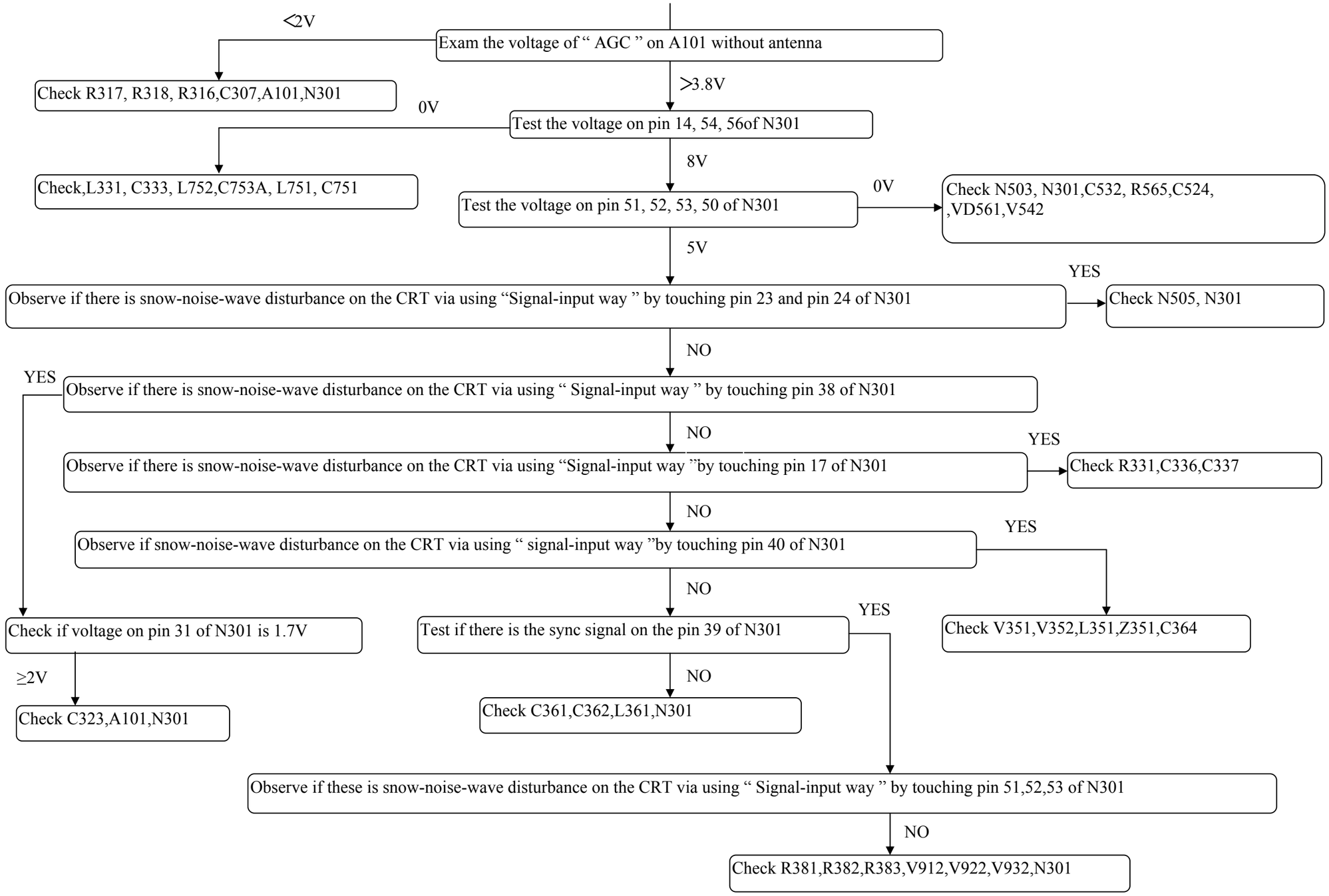
The failure shows that the set does not display the picture but it has noise wave or blue background or OSD on the screen. This means that the circuits of power supply, horizontal scanning, vertical scanning and video amplification are normal and they are not considered in the repairing. The failures are mainly in the small signal processing circuits.

Before checking these circuits, a kind of practical test method is introduced. It is called “Signal-input way ”. The detail is described as follow: We can use the resistance function of an analog multimeter, connect the red pole (negative in ohm scope) on the circuit board ground, then touch softly the test point with another pole (black pole) in ohm scope meanwhile observe the reactivity on the output device.

Note : In the TV test, we mainly observe the noise wave on the CRT and listen to the noise voice liking as “Ka…..Ka” from the loudspeakers.

1. No picture



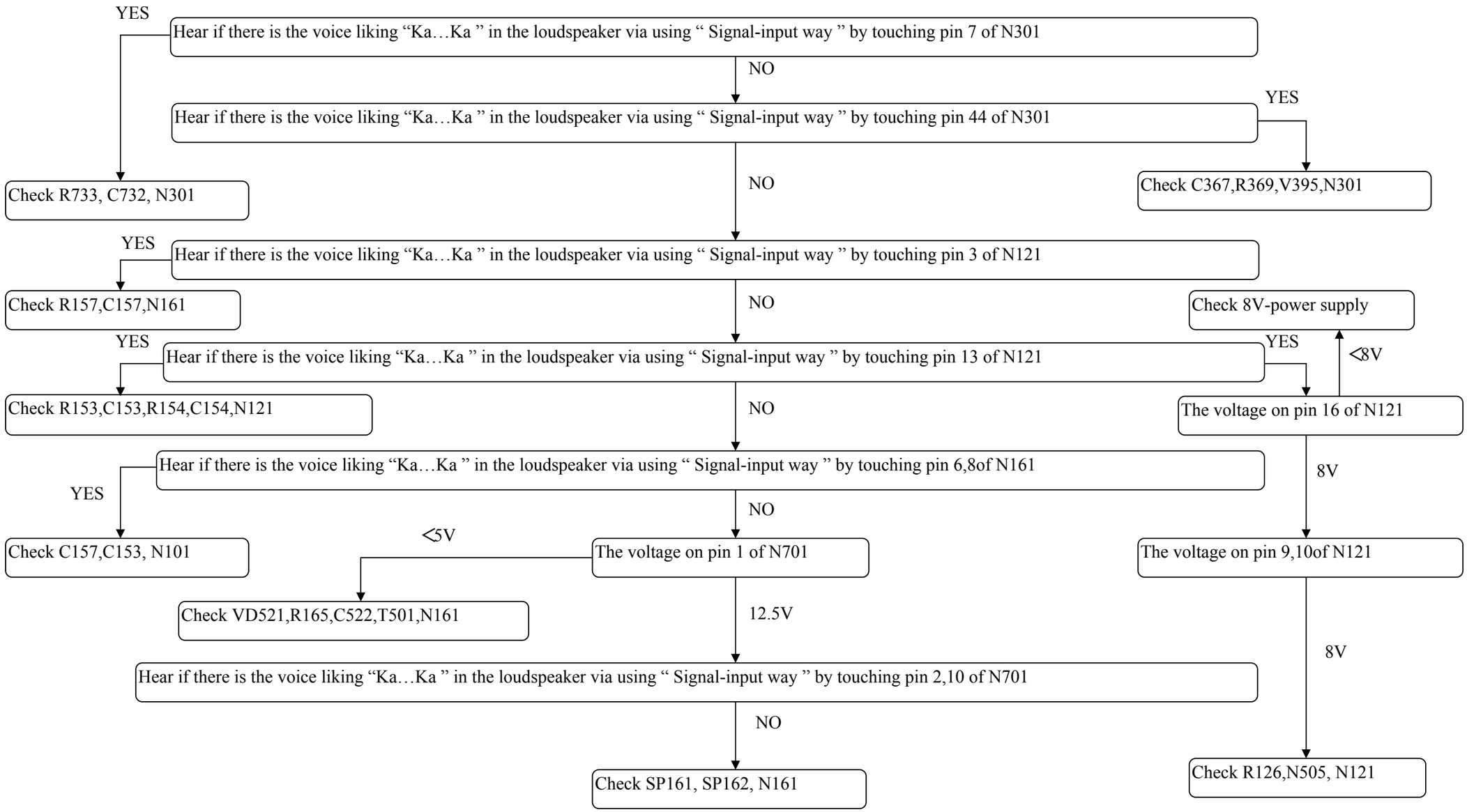

<2V
Exam the voltage of " AGC " on A101 without antenna
>3.8V
Check R317, R318, R316,C307,A101,N301
0V
Test the voltage on pin 14, 54, 56of N301
8V
Check,L331, C333, L752,C753A, L751, C751
Test the voltage on pin 51, 52, 53, 50 of N301
0V
Check N503, N301,C532, R565,C524, ,VD561,V542
5V
YES
Observe if there is snow-noise-wave disturbance on the CRT via using "Signal-input way " by touching pin 23 and pin 24 of N301
Check N505, N301
NO
YES
Observe if there is snow-noise-wave disturbance on the CRT via using " Signal-input way " by touching pin 38 of N301
NO
YES
Observe if there is snow-noise-wave disturbance on the CRT via using "Signal-input way "by touching pin 17 of N301
Check R331,C336,C337
NO
YES
Observe if snow-noise-wave disturbance on the CRT via using " signal-input way "by touching pin 40 of N301
NO
YES
Check if voltage on pin 31 of N301 is 1.7V
Test if there is the sync signal on the pin 39 of N301
Check V351,V352,L351,Z351,C364
≥2V
NO
Check C323,A101,N301
Check C361,C362,L361,N301
Observe if these is snow-noise-wave disturbance on the CRT via using " Signal-input way " by touching pin 51,52,53 of N301
NO
Check R381,R382,R383,V912,V922,V932,N301

## 5. No sound

In this kind of failure, first of all we should observe if there is the picture on the CRT. It proves the small signal circuit to work correctly with the picture on the CRT and we only check the sound signal processing and sound amplification circuit. The repairing method(B1) may be referred without picture. The detail checking and repairing steps are as follow.

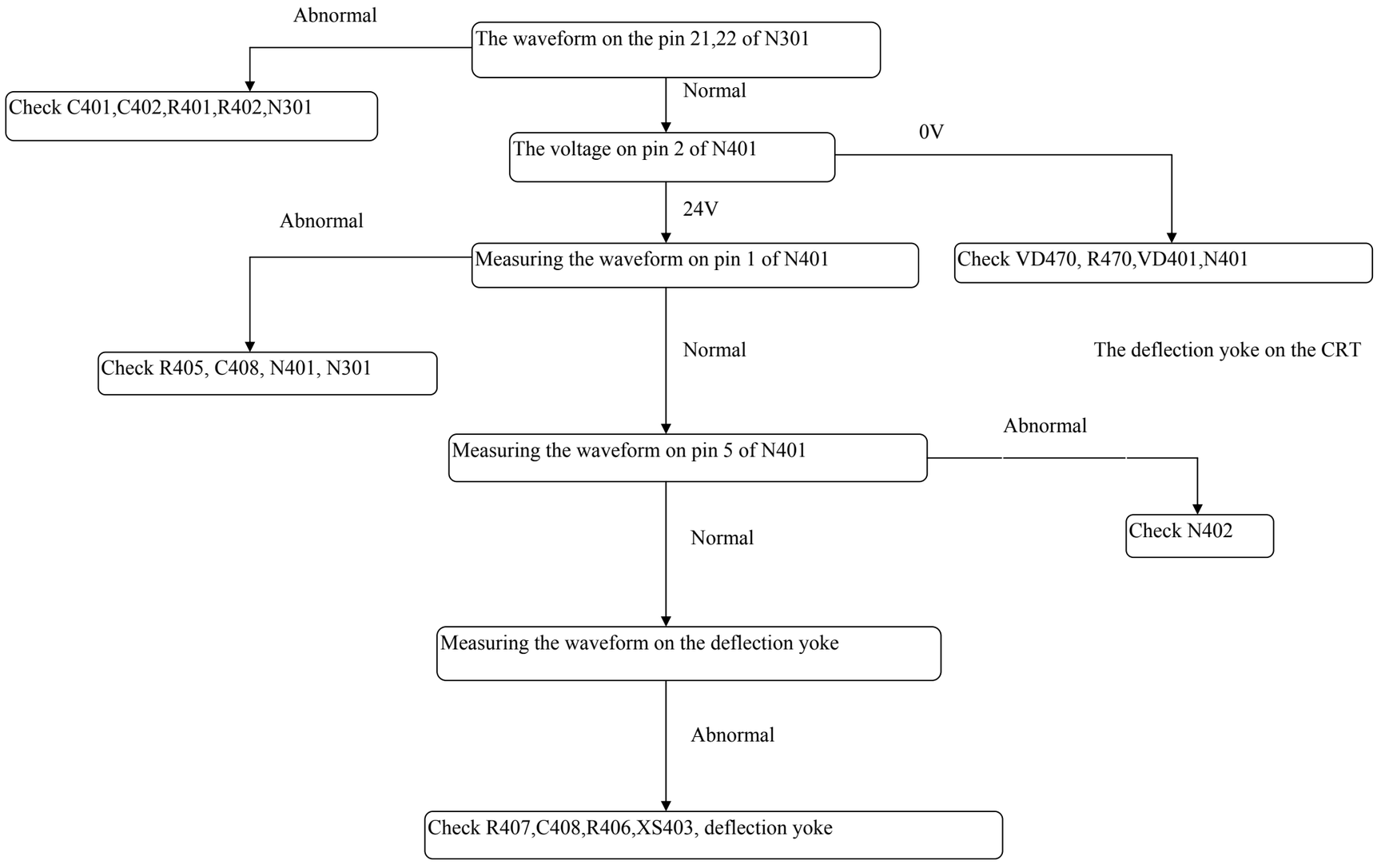
Note:

Before repairing, assure that the volume is on and the state of set is in “TV” .



## C Only horizontal line in the middle of the screen:

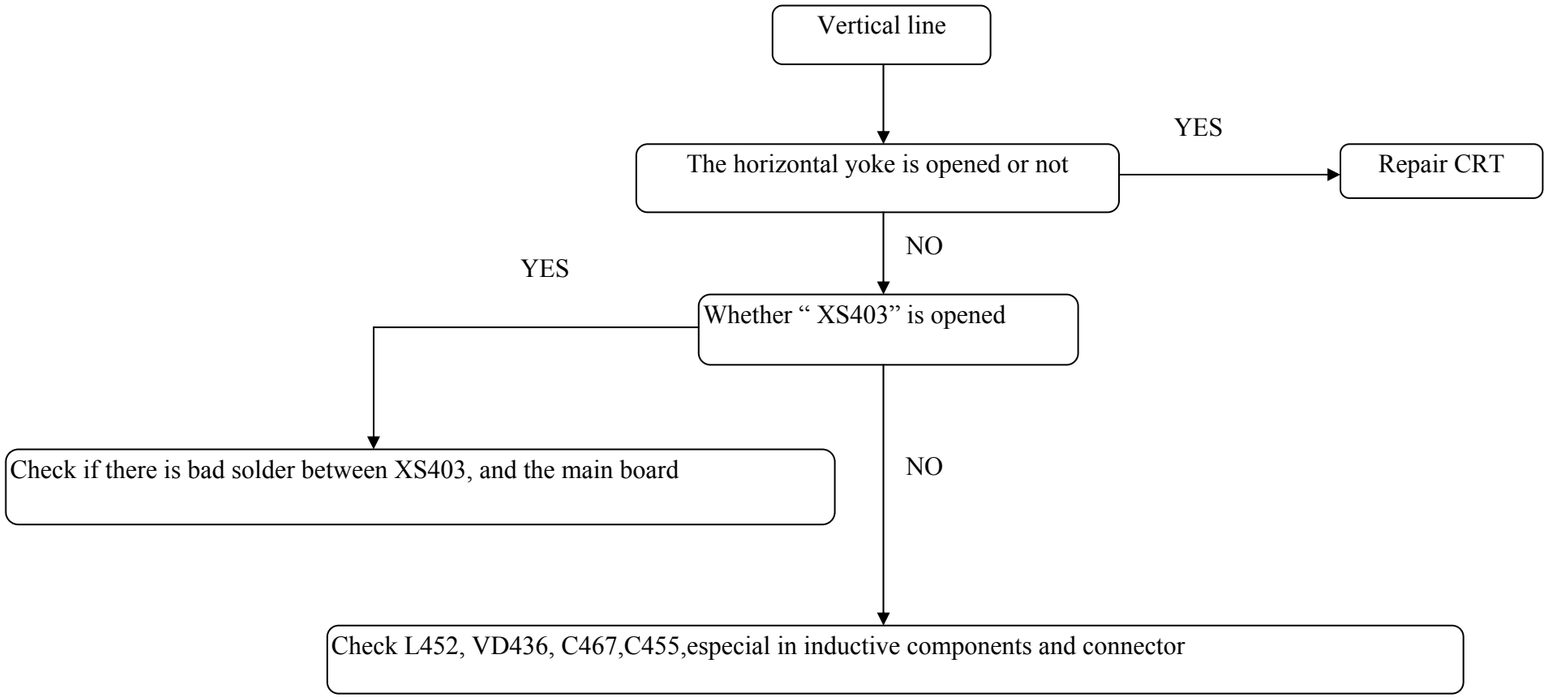
If vertical deflection circuit does not work, this kind of failure will happen. In deflection yoke, there only has horizontal sweeping , the electron beam in the CRT only moves in the horizontal orientation , so form this failure. (While checking horizontal and vertical deflection circuit' s failure , we have better to use an oscilloscope).



## D Only vertical line in the middle of the screen

This is a dangerous failure. It probable causes flashover and smoking inside the set. Don’ t let your TV work for a long time as this failure appears. Because the electron beam can not move in the horizontal orientation, the failure should be in the horizontal deflection circuit. We mainly check the open-circuit fault in horizontal deflection circuit.

The detail checking and repairing steps are as follow:

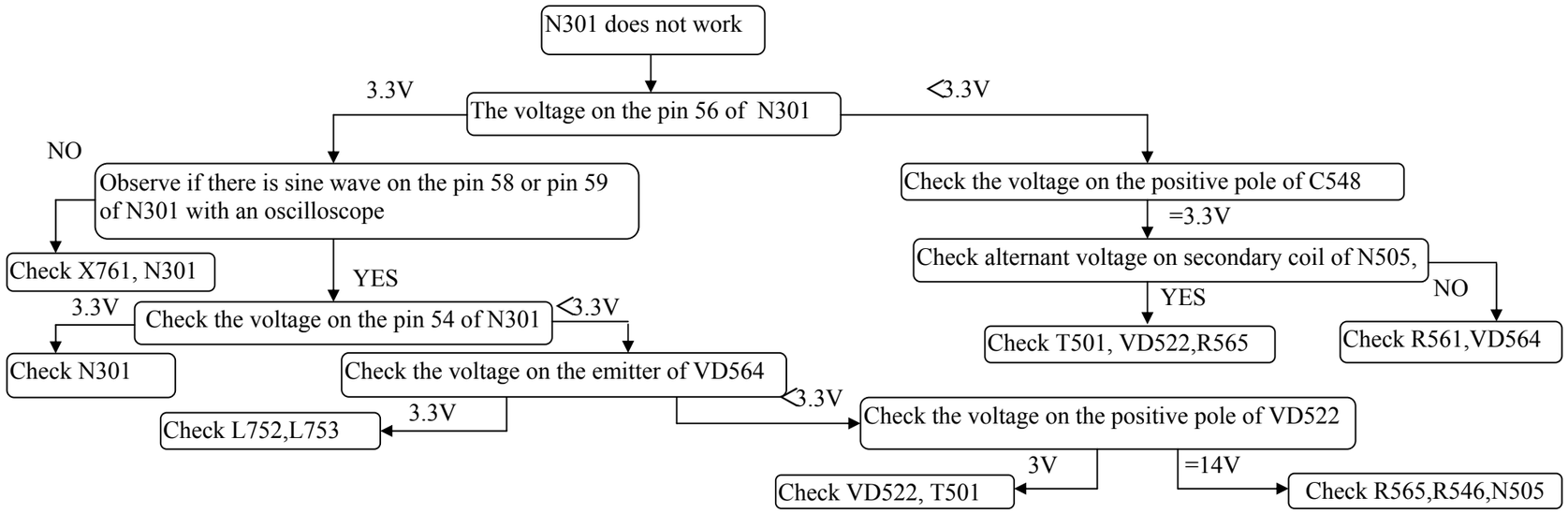


## E UOC does not work

In television, remote-control system is similar with the computer system. In theory , it can work if it holds two conditions as follow:

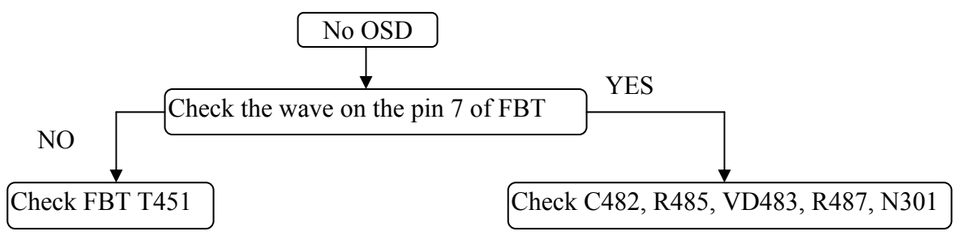
1. The power supply: In general, it is 5V, the error is not above 10% and the disturbance pulse is as small as possible.
2. The clock pulse: In TDA93XX circuit, the clock pulse is generated by pin58 / pin59 of N301 and 12M crystal oscillator. Television' s remote-control system also needs reset circuit that can preset the values in internal register. The circuit around pin57 of N204 is called auto-reset circuit. If UOC detects errors in resetting, it will come to the state of program protected.

The detail checking and repairing steps are as follow:



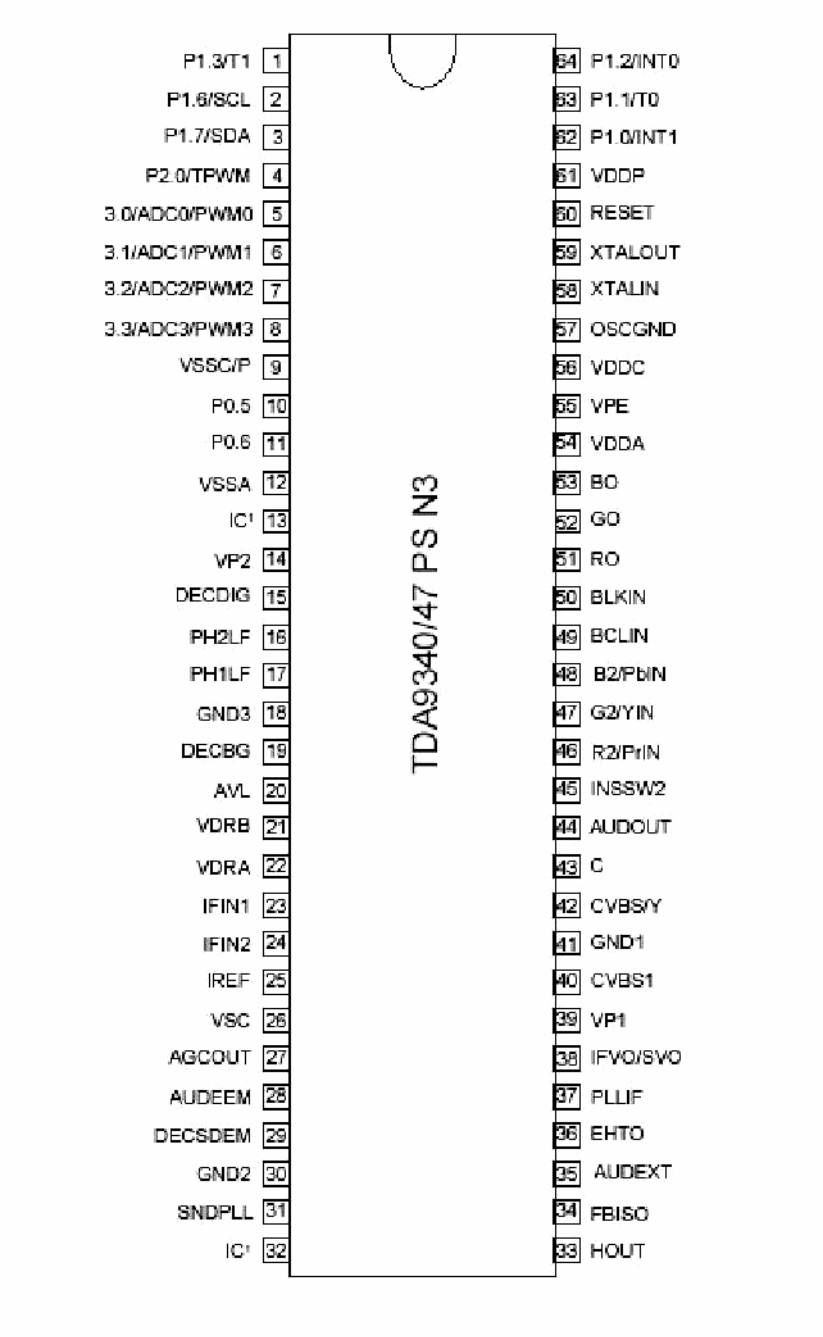

## F No OSD (On Screen Display)

This failure is usually cause by the circuit of character generated and located. Most of reasons are that the horizontal and vertical flyback pulse signals do not come to UOC.
We can judge this failure by measuring the wave of the character in an oscilloscope.
The detail checking and repairing steps are as follow:



# IC BLOCK DIAGRAM

## Fig 1: UOC-TDA9381 Illustration



# MAIN CHIP INSTRUCTION

| | |
|---|---|
| Pin 1 | Standby control, “1” is on, “0” is off. |
| Pin 2 | SCL |
| Pin 3 | SDA |
| Pin 4 | Tuning PWM output |
| Pin 5 | Auto AV control SW, connected with the SCART 8th pin. Input. The rising edge or the falling edge operates. |
| Pin 6 | Key board input. |
| Pin 7 | Volume |
| Pin 8 | Mute control, “1” is mute, “0” is off. |
| Pin 9, Pin 12, Pin 18, Pin 30, Pin 35, Pin 41, Pin 55 | GND |
| Pin 10 | BAND 1 control output. |
| Pin 11 | BAND 2 |
| Pin 13 | SECAM PLL, connected with a capacitance (no use in this type). |
| Pin 14 | +8V power source supply |
| Pin 15 | Using a capacitor of 220n in series to GND. This pin decouples the internal digital supply voltage of the video process and minimizes the disturbance to the sensitive analogue parts. |
| Pin 16 | Phase-2 control loop, this pin requires a capacitor at 2.2nF © in series to GND. |
| Pin 17 | Phase-1 control loop filter connected to pin 17 is suitable for various signal conditions like strong /weak and VCR signal. This is achieved by switching of the loop filter time constant by changing the Phase-1 output current. |
| Pin 18 | GND |
| Pin 19 | Bandgap decoupling, the bandgap circuit provides a very stable and temperature independent reference voltage. This reference voltage (4.0V) ensures optimal performance of the analogue video processor part of the OM8370 and is used in almost all functional circuit blocks. |
| Pin 20 | East-west pillow signal output. |
| Pin 21, Pin 22 | Vertical drive output. |
| Pin 23, Pin 24 | IF input. |
| Pin 25 | Reference current/ This pin requires a resistor to ground. The optimal reference current is 100mA which is determined by this resistor. The 100mA reference current should not be changed because the geometry processor is optimized for this current. Furthermore the output current of vertical drive and EW are proportional to this current. |
| Pin 26 | Vertical sawtooth. This pin requires a capacitor to ground of 100nF. |
| Pin 27 | AGC output. This output is used to control (reduce) the tuner gain for strong RF signals. |
| Pin 28 | Audio de-emphasis. |
| Pin 29 | Sound decoupling. This pin requires a capacitor connected to ground. The pin acts as a low pass filter needed for the DC feedback loop. |
| Pin 30 | GND |
| Pin 31 | Sound loop filter. |
| Pin 32 | AVL filter |
| Pin 33 | Horizontal drive signal output, needs a resistor in series to +8V. |
| Pin 34 | Sandcastle output /flyback input. |
| Pin 35 | External audio input, this pin should be grounded in this chassis. |

| | |
|---|---|
| Pin 36 | EHT tracking /over voltage protection. If something is wrong, the anode high voltage rise the heater voltage will rise too. When the rising voltage arrive some limit, the V406 works, the voltage of pin 36 will exceed 3.9V. The OM8370 will stop working. |
| Pin 37 | PLL loop filter. |
| Pin 38 | CVBS output. Monitor or RF videos can be selected. |
| Pin 39 | +8V supply source |
| Pin 40 | CVBS input |
| Pin 42 | Y signal input |
| Pin 43 | C signal input |
| Pin 44 | Main audio output. This pin is connected to the TDA9859. |
| Pin 45 | RGB signal input blanking. |
| Pin 46, Pin 47, Pin 48 | RGB signal input. |
| Pin 49 | ABL. It means been current limiter input. R410 is the control resistor. |
| Pin 50 | Black current input from the CRT board. |
| Pin 51, Pin 52, Pin 53 | RGB drive signal output to the CRT board. |
| Pin 54 | +3.3V |
| Pin 55 | GND |
| Pin 56 | +3.3V |
| Pin 57, Pin 58, Pin 59 | 12MHz crystal |
| Pin 60 | Reset. NC in this chassis |
| Pin 61 | +3.3V |
| Pin 62 | NC |
| Pin 63 | This pin is connected to the HEF4094. Functions expending. |
| Pin 64 | IR signal input. |

## Fig 2: HEF4052BP Illustration

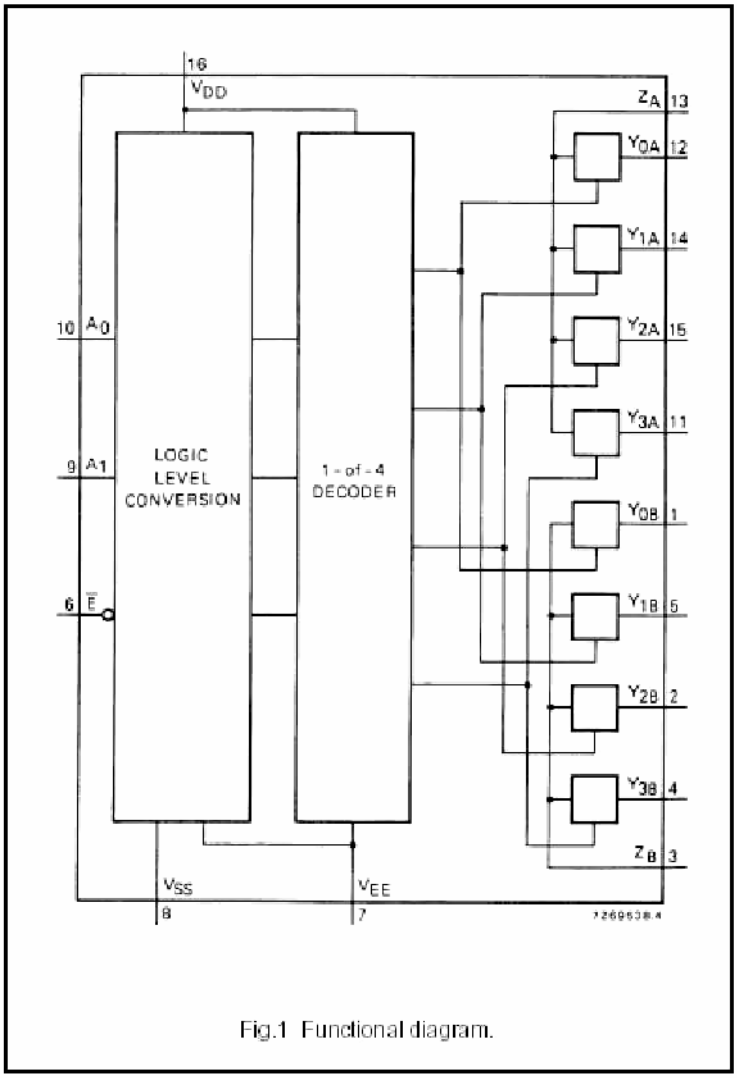



Fig.1 Functional diagram.

# FUNCTION TABLE OF N4052

| Input | | | Channel On |
|---|---|---|---|
| $\bar{E}$ | $A_1$ | $A_0$ | |
| L | L | L | $Y_{0A} - Z_A$; $Y_{0B} - Z_B$ |
| L | L | H | $Y_{1A} - Z_A$; $Y_{1B} - Z_B$ |
| L | H | L | $Y_{2A} - Z_A$; $Y_{2B} - Z_B$ |
| L | H | H | $Y_{3A} - Z_A$; $Y_{3B} - Z_B$ |
| H | X | X | NONE |

Notes:
H = HIGH state (the more positive voltage)
L = LOW state (the less positive voltage)
X = state is immaterial

# IC N402 <VERTICAL OUTPUT> LA78040 (or STV9302)

## STV9302A

### Vertical Deflection Booster for 2-$A_{PP}$ TV/Monitor Applications with 70-V Flyback Generator

### Main Features

- **Power Amplifier**
- **Flyback Generator**
- **Output Current up to 2 App**
- **Thermal Protection**
- **Stand-by Control**

**HEPTAWATT**
**(Plastic Package)**
**ORDER CODE: STV9302A**

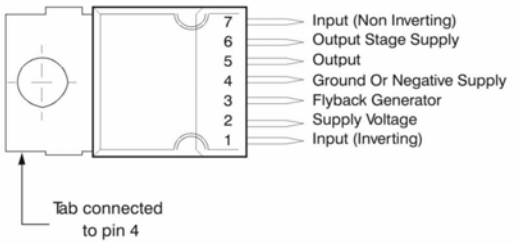
### Description

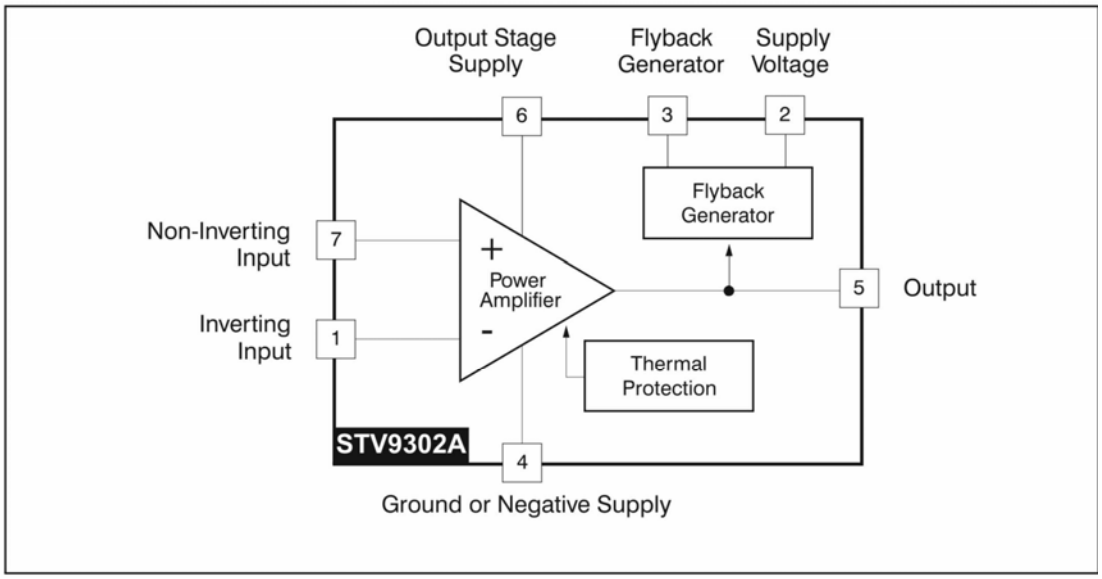
The STV9302A is a vertical deflection booster designed for TV and monitor applications.

This device, supplied with up to 35 V, provides up to 2 App output current to drive the vertical deflection yoke.

The internal flyback generator delivers flyback voltages up to 70 V.

in double-supply applications, a stand-by state will be reached by stopping the (+) supply alone.



# 1 Absolute Maximum Ratings

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| **Voltage** | | | |
| $V_S$ | Supply Voltage (pin 2) - Note 1 and Note 2 | 40 | V |
| $V_5$, $V_6$ | Flyback Peak Voltage - Note 2 | 70 | V |
| $V_3$ | Voltage at Pin 3 - Note 2, Note 3 and Note 6 | -0.4 to ($V_S$ + 3) | V |
| $V_1$, $V_7$ | Amplifier Input Voltage - Note 2, Note 6 and Note 7 | - 0.4 to ($V_S$ + 2) or +40 | V |
| **Current** | | | |
| $I_0$ (1) | Output Peak Current at f = 50 to 200 Hz, t£ 10µs - Note 4 | –5 | A |
| $I_0$ (2) | Output Peak Current non-repetitive - Note 5 | –2 | A |
| $I_3$ Sink | Sink Current, t<1ms -Note 3 | 1.5 | A |
| $I_3$ Source | Source Current, t < 1ms | 1.5 | A |
| $I_3$ | Flyback pulse current at f=50 to 200 Hz, t£10ms - Note 4 | –5 | A |
| **ESD Susceptibility** | | | |
| ESD1 | Human body model (100 pF discharged through 1.5 kW) | 2 | kV |
| ESD2 | EIAJ Standard (200 pF discharged through 0 W) | 300 | V |
| **Temperature** | | | |
| $T_s$ | Storage Temperature | -40 to 150 | °C |
| $T_j$ | Junction Temperature | +150 | °C |

*Note:1. Usually the flyback voltage is slightly more than 2 x $V_S$. This must be taken into consideration when setting $V_S$.*

2. *Versus pin 4*
3. *V3 is higher than $V_S$ during the first half of the flyback pulse.*
4. *Such repetitive output peak currents are usually observed just before and after the flyback pulse.*
5. *This non-repetitive output peak current can be observed, for example, during the Switch-On/Switch-Off phases. This peak current is acceptable providing the SOA is respected (Figure 8 and Figure 9).*
6. *All pins have a reverse diode towards pin 4, these diodes should never be forward-biased.*
7. *Input voltages must not exceed the lower value of either $V_S$ + 2 or 40 volts.*

# 2 Thermal Data

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{thJC}$ | Junction-to-Case Thermal Resistance | 3 | °C/W |
| $T_T$ | Temperature for Thermal Shutdown | 150 | °C |
| $T_J$ | Recommended Max. Junction Temperature | 120 | °C |

# 3 Electrical Characteristics

($V_S$ = 32 V, $T_{AMB}$ = 25°C, unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit | Fig. |
|---|---|---|---|---|---|---|---|
| **Supply** | | | | | | | |
| $V_S$ | Operating Supply Voltage Range ($V_2$-$V_4$) | Note 8 | 10 | | 35 | V | |
| $I_2$ | Pin 2 Quiescent Current | $I_3$ = 0, $I_5$ = 0 | | 5 | 20 | mA | 1 |
| $I_6$ | Pin 6 Quiescent Current | $I_3$ = 0, $I_5$ = 0, $V_6$ =35v | 8 | 19 | 50 | mA | 1 |
| **Input** | | | | | | | |
| $I_1$ | Input Bias Current | $V_1$ = 1 V, $V_7$ = 2.2 V | | - 0.6 | -1.5 | µA | 1 |
| $I_7$ | Input Bias Current | $V_1$ = 2.2 V, $V_7$ = 1 V | | - 0.6 | -1.5 | µA | |
| $V_{IR}$ | Operating Input Voltage Range | | 0 | | $V_S$ - 2 | V | |
| $V_{IO}$ | Offset Voltage | | | 2 | | mV | |
| $DV_{IO}/dt$ | Offset Drift versus Temperature | | | 10 | | µV/°C | |
| **Output** | | | | | | | |
| $I_O$ | Operating Peak Output Current | | | | -1 | A | |
| $V_{5L}$ | Output Saturation Voltage to pin 4 | $I_5$ = 1 A | | 1 | 1.7 | V | 3 |
| $V_{5H}$ | Output Saturation Voltage to pin 6 | $I_5$ = -1 A | | 1.8 | 2.3 | V | 2 |
| **Stand-by** | | | | | | | |
| $V_{5STBY}$ | Output Voltage in Stand-by | $V_1$ = $V_7$ = $V_S$ = 0 See Note 9 | $V_S$ - 2 | | | V | |
| **Miscellaneous** | | | | | | | |
| G | Voltage Gain | | 80 | | | dB | |
| $V_{D5-6}$ | Diode Forward Voltage Between pins 5-6 | $I_5$ = 1 A | | 1.4 | 2 | V | |
| $V_{D3-2}$ | Diode Forward Voltage between pins 3-2 | $I_3$ = 1 A | | 1.3 | 2 | V | |
| $V_{3SL}$ | Saturation Voltage on pin 3 | $I_3$ = 20 mA | | 0.4 | 1 | V | 3 |
| $V_{3SH}$ | Saturation Voltage to pin 2 (2nd part of flyback) | $I_3$ = -1 A | | 2.1 | | V | |

8. *In normal applications, the peak flyback voltage is slightly greater than 2 x ($V_S$ - $V_4$). Therefore, ($V_S$ - $V_4$) = 35 V is not allowed without special circuitry.*
9. *Refer to Figure 4, Stand-by condition.*

**Figure 1: Measurement of $I_1$, $I_2$ and $I_6$**

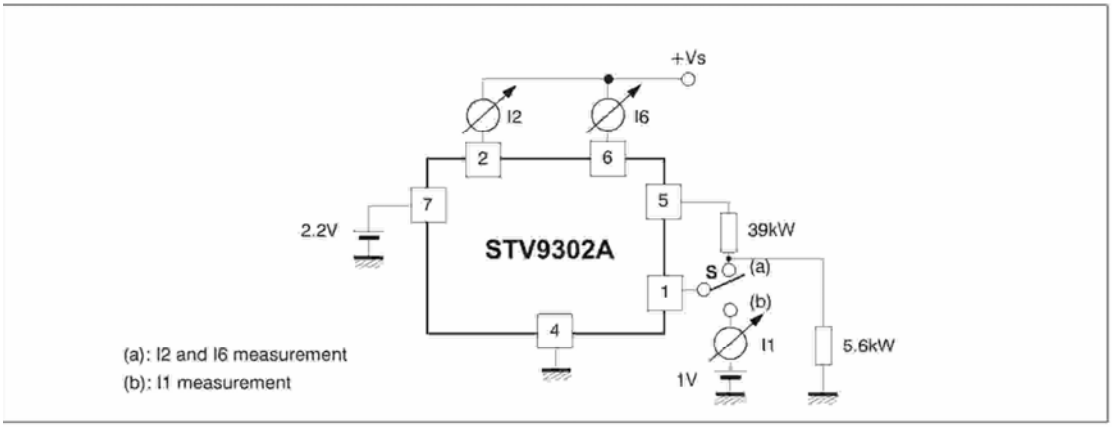



**Figure 2: Measurement of $V_{5H}$**

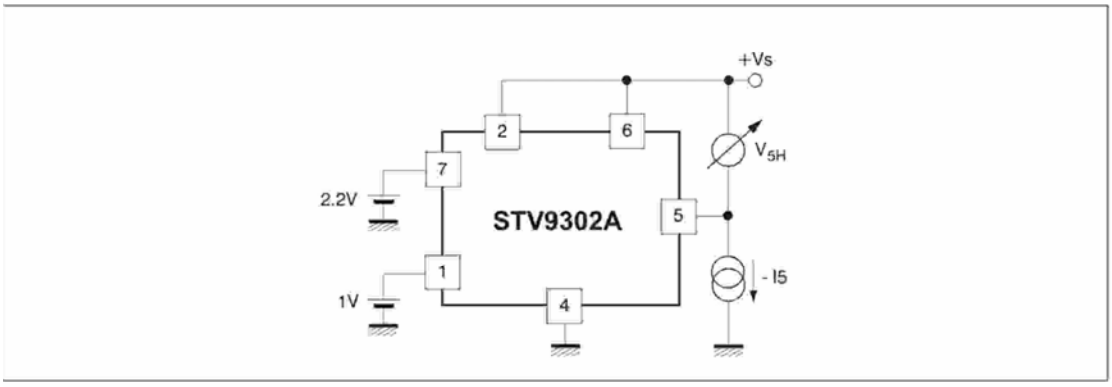
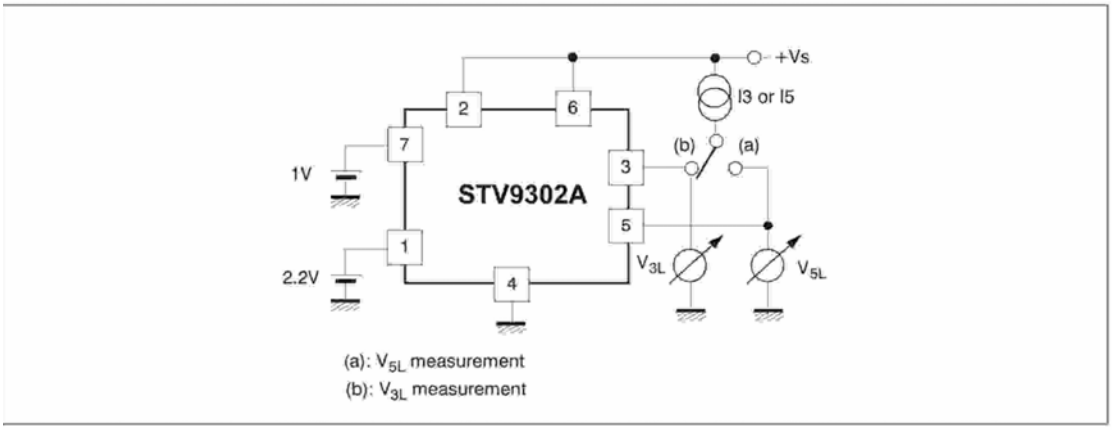



**Figure 3: Measurement of $V_{3L}$ and $V_{5L}$**



# 4 Application Hints

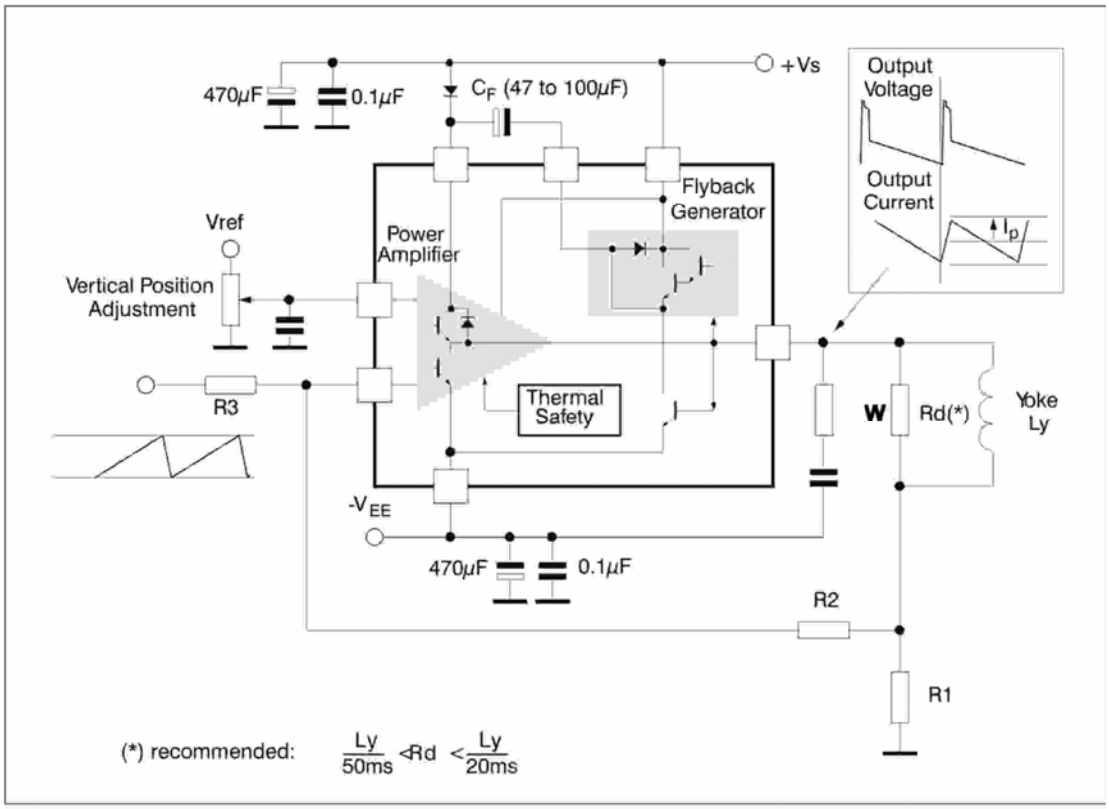
The yoke can be coupled either in AC or DC.

## 4.1 DC-coupled Application

When DC coupled (see Figure 4), the display vertical position can be adjusted with input bias. On the other hand, 2 supply sources ($V_S$ and $-V_{EE}$) are required.

A Stand-by state will be reached by switching OFF the positive supply alone. In this state, where both inputs are the same voltage as pin 2 or higher, the output will sink negligible current from the deviation coil.

**Figure 4: DC-coupled Application**




### 4.1.1 Application Hints

For calculations, treat the IC as an op-amp, where the feedback loop maintains $V_1 = V_7$.

#### 4.1.1.1 Centering

Display will be centered (null mean current in yoke) when voltage on pin 7 is ($R_1$ is negligible):

$$V_7 = \frac{V_M + V_m}{2} \cdot \frac{R_2}{R_2 + R_3}$$

#### 4.1.1.2 Peak Current

$$I_P = \frac{(V_M - V_m)}{2} \cdot \frac{R_2}{R_1 \times R_3}$$

Example: for $V_m$ = 2 V, $V_M$ = 5 V and $I_P$ = 1 A

Choose $R_1$ in the 1W range, for instance $R_1$ = 1W

From equation of peak current: $\frac{R_2}{R_3} = \frac{2 \cdot I_P \cdot R_1}{V_M - V_m} = \frac{2}{3}$

Then choose $R_2$ or $R_3$. For instance, if $R_2$ = 10 kW, then $R_3$ = 15 kW

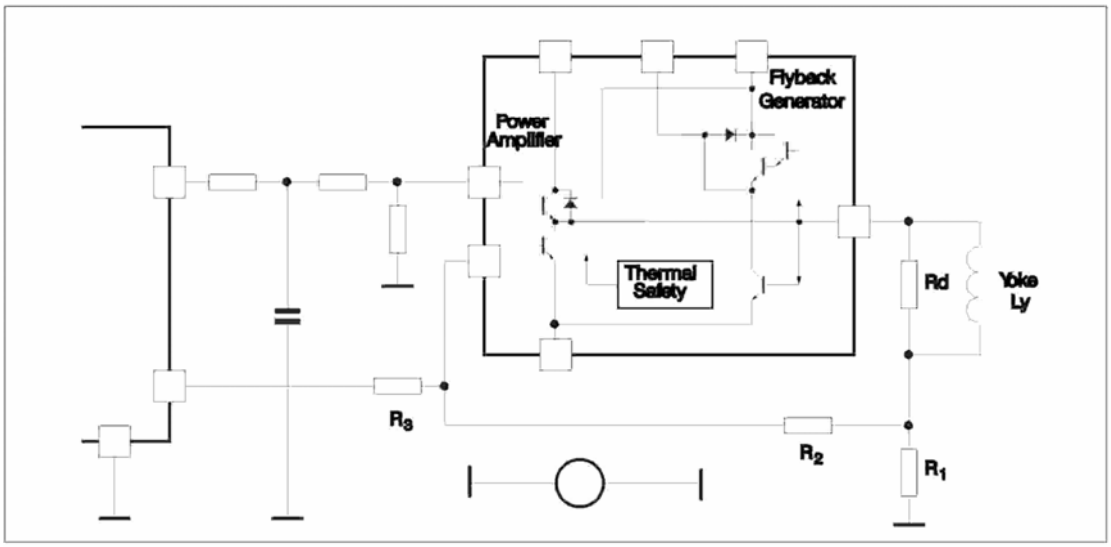
Finally, the bias voltage on pin 7 should be:

$$V_7 = \frac{V_M + V_m}{2} \cdot \frac{1}{1 + \frac{R_3}{R_2}} = \frac{7}{2} \cdot \frac{1}{2.5} = 1.4V$$

### 4.1.2 Ripple Rejection

When both ramp signal and bias are provided by the same driver IC, you can gain natural rejection of any ripple caused by a voltage drop in the ground (see Figure 5), if you manage to apply the same fraction of ripple voltage to both booster inputs. For that purpose, arrange an intermediate point in the bias resistor bridge, such that ($R_8$ / $R_7$) = ($R_9$ / $R_2$), and connect the bias filtering capacitor between the intermediate point and the local driver ground. Of course, $R_7$ should be connected to the booster reference point, which is the ground side of $R_1$.

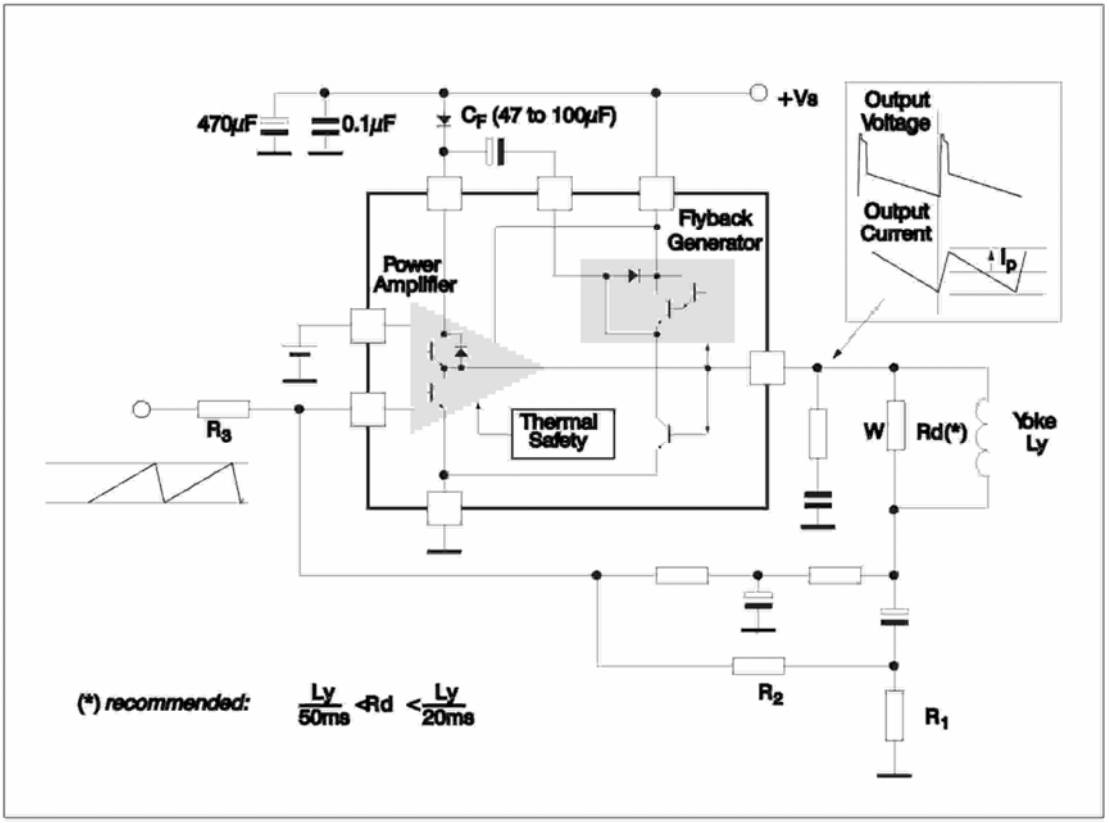
Figure 5: Ripple Rejection



## 4.2 AC-Coupled Applications

In AC-coupled applications (See Figure 6), only one supply ($V_S$) is needed. The vertical position of the scanning cannot be adjusted with input bias (for that purpose, usually some current is injected or sunk with a resistor in the low side of the yoke).

Figure 6: AC-coupled Application




### 4.2.1 Application Hints

Gain is defined as in the previous case:

$$I_p = \frac{V_M - V_m}{2} \cdot \frac{R_2}{R_1 \cdot R_3}$$

Choose $R_1$ then either $R_2$ or $R_3$. For good output centering, $V_7$ must fulfill the following equation:

$$\frac{\frac{V_S}{2} - V_7}{R_4 + R_5} = \frac{V_7 - \frac{V_M + V_m}{2}}{R_3} + \frac{V_7}{R_2}$$

or

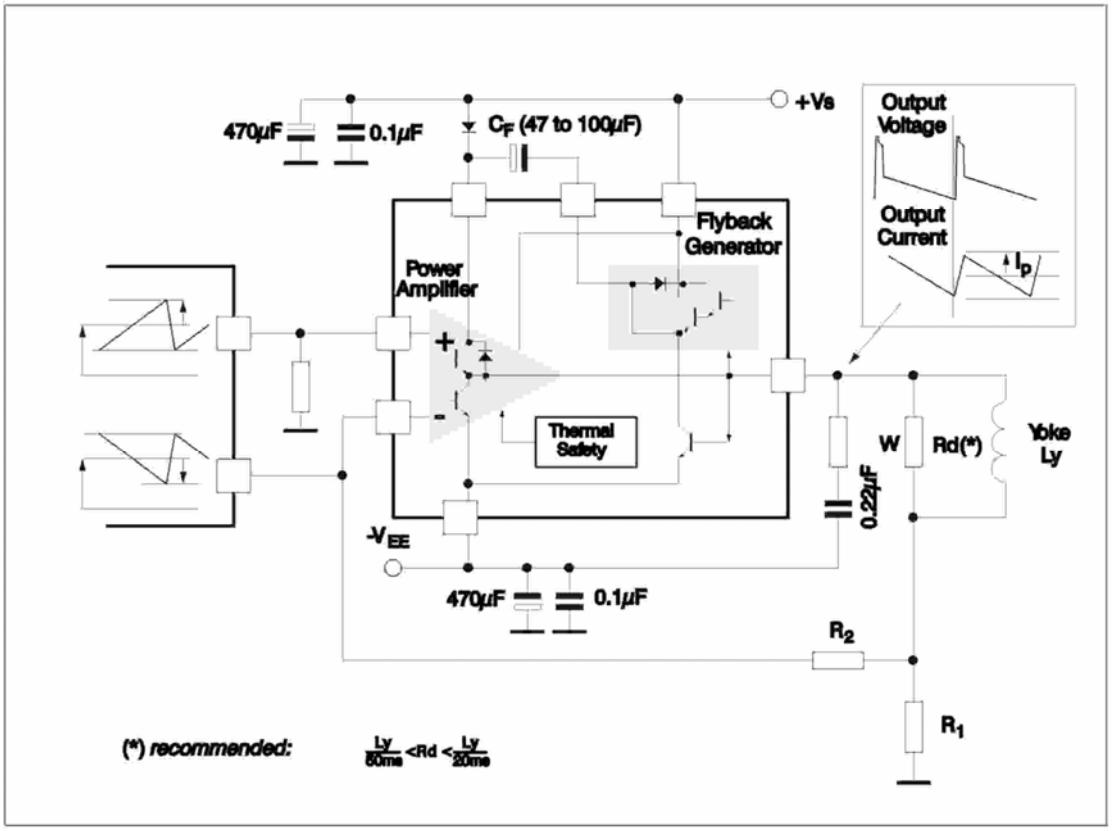
$$V_7 \cdot \left( \frac{1}{R_3} + \frac{1}{R_2} + \frac{1}{R_4 + R_5} \right) = \frac{V_S}{2(R_4 + R_5)} + \frac{V_M + V_m}{2 \cdot R_3}$$

$C_S$ performs an integration of the parabolic signal on $C_L$, therefore the amount of S correction is set by the combination of $C_L$ and $C_S$.

## 4.3 Application with Differential-output Drivers

Certain driver ICs provide the ramp signal in differential form, as two current sources $I_+$ and $I_-$ with opposite variations.

Figure 7: Using a Differential-output Driver




Let us set some definitions:

- $I_{cm}$ is the common-mode current: $I_{cm} = \frac{1}{2}(I_+ + I_-)$
- at peak of signal, $I_+ = I_{cm} + I_p$ and $I_- = I_{cm} - I_p$, therefore the peak differential signal is $I_p - (-I_p) = 2I_p$, and the peak-peak differential signal, $4I_p$.

The application is described in Figure 7 with DC yoke coupling. The calculations still rely on the fact that $V_1$ remains equal to $V_7$.

### 4.3.1 Centring

When idle, both driver outputs provide $I_{cm}$ and the yoke current should be null ($R_1$ is negligible), hence:

$$I_{cm} \times R_7 = I_{cm} \times R_2 \quad \text{therefore} \quad R_7 = R_2$$

### 4.3.2 Peak Current

Scanning current should be $I_p$ when positive and negative driver outputs provide respectively $I_{cm} - I_p$ and $I_{cm} + I_p$, therefore

$$(I_{cm} - I) \times R_7 = I_p \times R_1 + (I_{cm} + I) \times R_2 \quad \text{and since } R_7 = R_2: \quad \frac{I_p}{I} = \frac{2R_7}{R_1}$$

Choose $R_1$ in the 1W range, the value of $R_2 = R_7$ follows. Remember that I is one-quarter of driver peak-peak differential signal! Also check that the voltages on the driver outputs remain inside allowed range.

- Example: for $I_{cm}$ = 0.4mA, I = 0.2mA (corresponding to 0.8mA of peak-peak differential current), $I_p$ = 1A

  Choose $R_1$ = 0.75W/It follows $R_2 = R_7$ = 1.875kW.

### 4.3.3 Ripple Rejection

Make sure to connect $R_7$ directly to the ground side of $R_1$.

### 4.3.4 Secondary Breakdown Diagrams

Figure 8: Output Transistor Safe Operating Area (SOA) for Secondary Breakdown

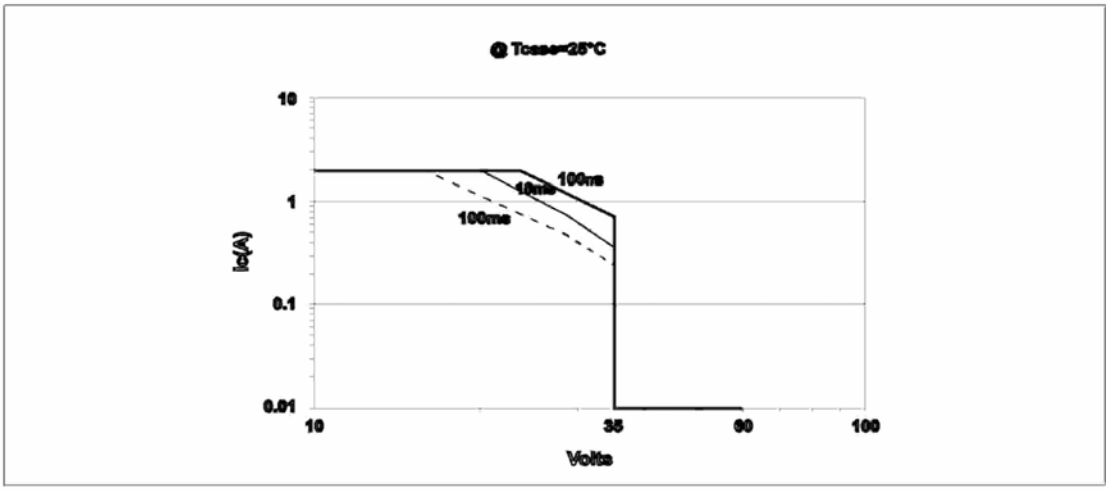
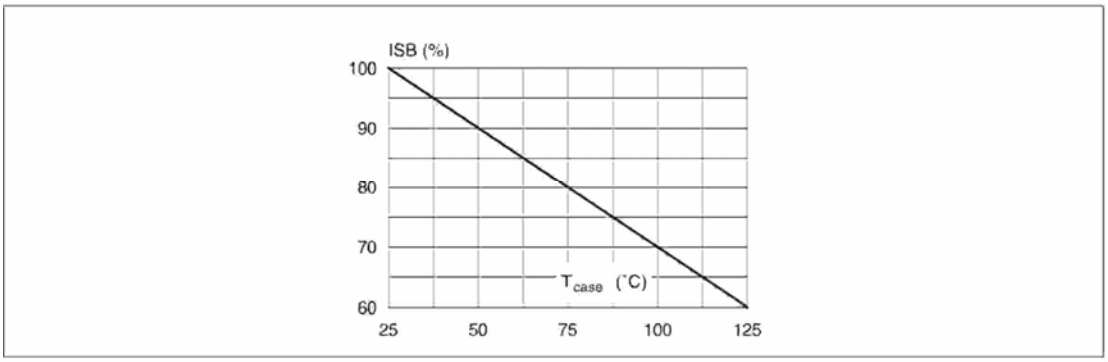


Figure 9: Secondary Breakdown Temperature Derating Curve (ISB = Secondary Breakdown Current)

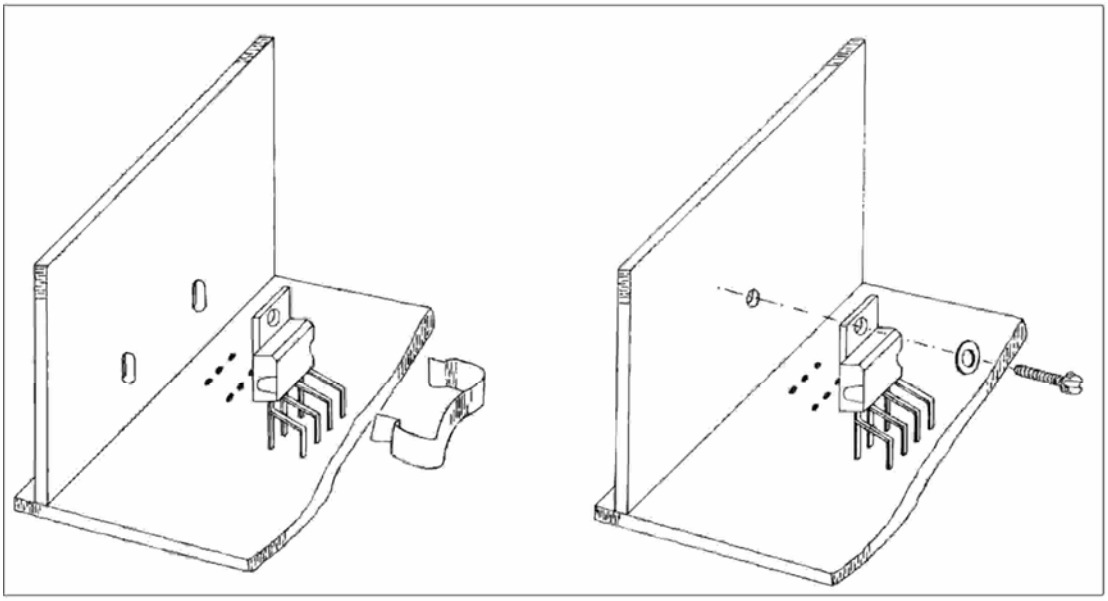



# 5 Mounting Instructions

The power dissipated in the circuit is removed by adding an external heatsink. With the HEPTAWATT ™ package, the heatsink is simply attached with a screw or a compression spring (clip).

A layer of silicon grease inserted between heatsink and package optimizes thermal contact. In DC-coupled applications we recommend to use a silicone tape between the device tab and the heatsink to electrically isolate the tab.

Figure 10: Mounting Examples



# 6 Pin Configuration

**Figure 11: Pins 1 and 7**

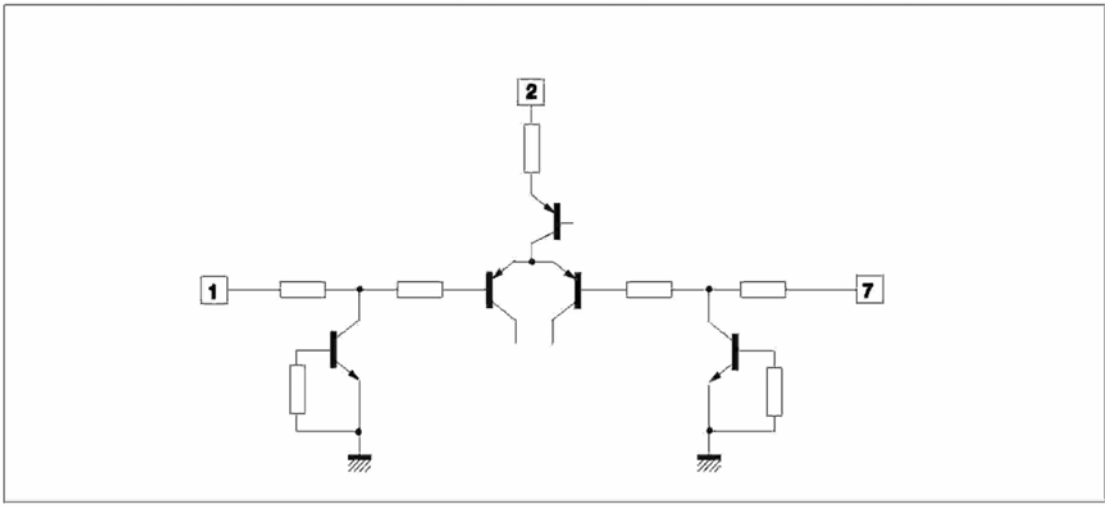
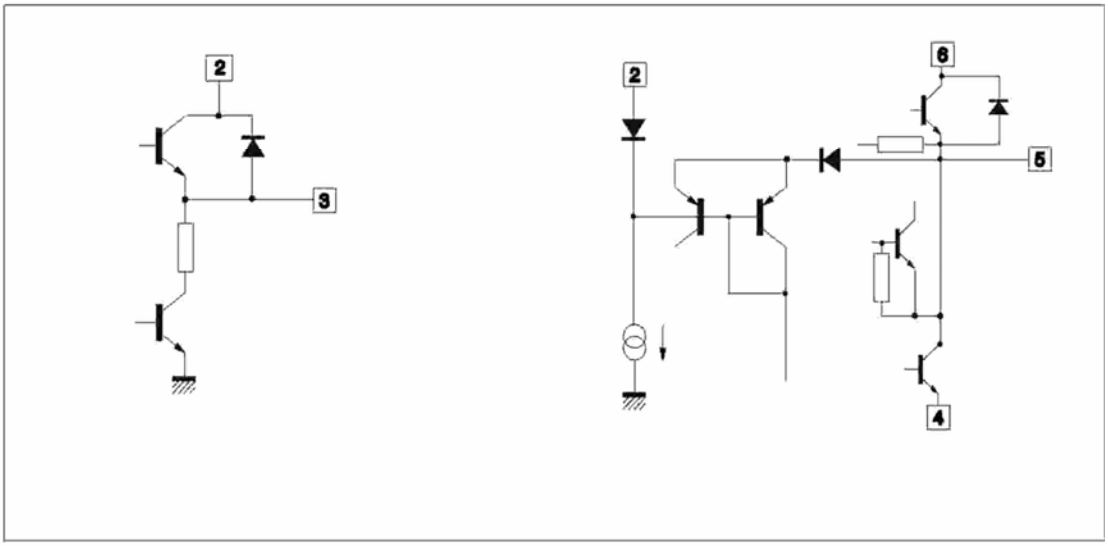



**Figure 12: Pin 3 & Pins 5 and 6**



# 7 Package Mechanical Data

Figure 13: 7-pin Heptawatt Package

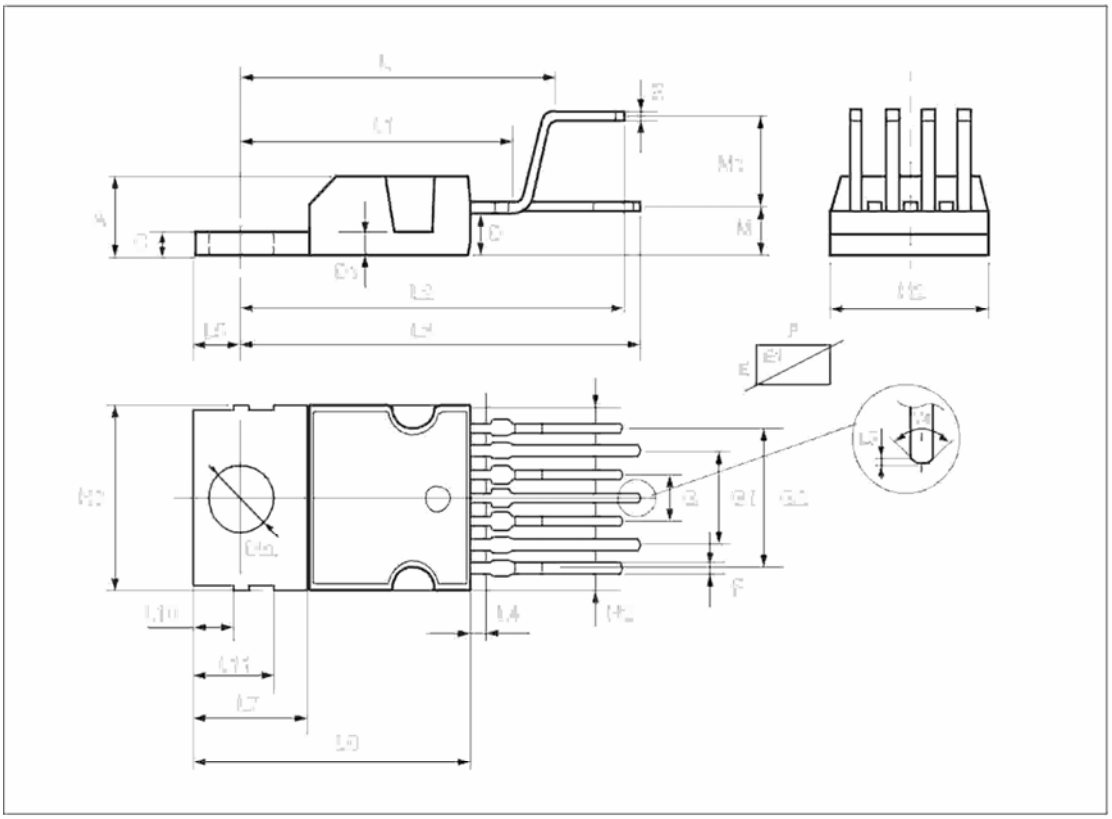


Table 1: Heptawatt Package

| Dim. | mm | | | Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 4.8 | | | 0.189 |
| C | | | 1.37 | | | 0.054 |
| D | 2.40 | | 2.80 | 0.094 | | 0.110 |
| D1 | 1.20 | | 1.35 | 0.047 | | 0.053 |
| E | 0.35 | | 0.55 | 0.014 | | 0.022 |
| E1 | 0.70 | | 0.97 | 0.028 | | 0.038 |
| F | 0.60 | | 0.80 | 0.024 | | 0.031 |
| G | 2.34 | 2.54 | 2.74 | 0.095 | 0.100 | 0.105 |
| G1 | 4.88 | 5.08 | 5.28 | 0.193 | 0.200 | 0.205 |
| G2 | 7.42 | 7.62 | 7.82 | 0.295 | 0.300 | 0.307 |
| H2 | | | 10.40 | | | 0.409 |
| H3 | 10.05 | | 10.40 | 0.396 | | 0.409 |
| L | 16.70 | 16.90 | 17.10 | 0.657 | 0.668 | 0.673 |

# 8 Revision History

Table 2: Summary of Modifications

| Version | Date | Description |
|---|---|---|
| 2.0 | January 2002 | First issue. |
| 2.1 | November 2002 | Addition of Stand-by Control Information, Section 8: Revision History. |
| 2.2 | April 2003 | Correction to Section 4.1.1.2: Peak Current. Creation of new title, Section 4.3.4: Secondary Breakdown Diagrams |

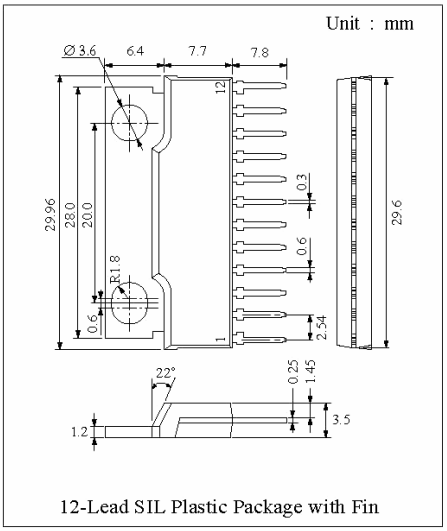
| | |
|---|---|
| 1 | Inverting input |
| 2 | $V_{cc}$ |
| 3 | Pump up out |
| 4 | GND |
| 5 | VER output |
| 6 | Output stage Vcc |
| 7 | Non inv. Put |

# Fig 4 AN7522N Illustration

## Dual 3W BTL Audio Power Amplifier

### ■ Description

The AN7522 is a monolithic integrated circuits designed for 3.0W x 2 channel BTL (8V, 8Ω) output audio power amplifier.

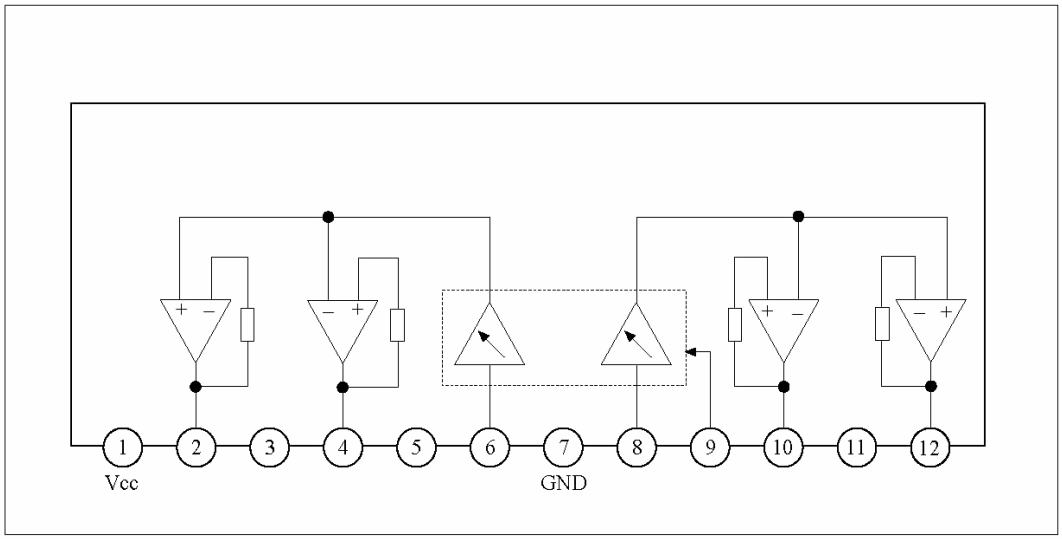



12-Lead SIL Plastic Package with Fin

### ■ Features

- Fewer external parts - no boucherot cells (output C, R), no bootstrap capacitors, no negative feedback capacitors, no ripple filter capacitor
- Built-in electronic volume function
- Built-in standby circuit
- Operating voltage range : Vcc = 3.5V ~ 13.5V

### ■ Block Diagram



## ■ Absolute Maximum Ratings (Ta=25°C)

| Item | Symbol | Rating | Unit |
|---|---|---|---|
| Supply Voltage (at no signal) | $V_{CC}$ | 14 | V |
| Supply Current | $I_{CC}$ | 2.0 | A |
| Power Dissipation | $P_D$ | 1.92 | W |
| Operating Ambient Temperature | Topr | -25 ~ +70 | °C |
| Storage Temperature | Tstg | -55 ~ +150 | °C |

Operating Supply Voltage Range: $V_{CC}$ =3.5V ~ 13.5V

## ■ Electrical Characteristics ($V_{CC}$=8.0V, $R_L$=8Ω, f=1kHz, Ta=25±2°C)

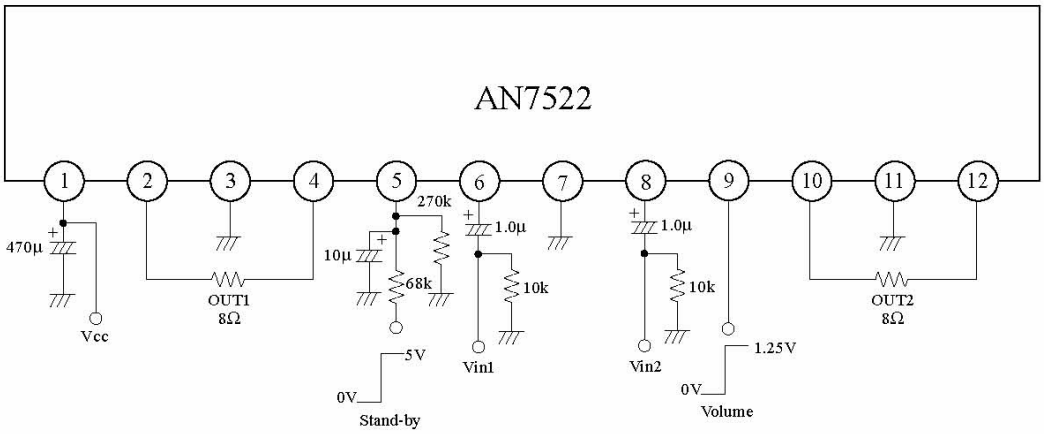
| Item | Symbol | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| Quiescent Current | $I_{CQ}$ | Vin=0mV, Vol=0V | | 45 | 100 | mA |
| Standby Current | $I_{STB}$ | Vin=0mV, Vol=0V | | 1 | 10 | μA |
| Output Noise Voltage (Note 1) | $V_{NO}$ | Rg=10kΩ, Vol=0V | | 0.10 | 0.4 | mVrms |
| Voltage Gain | $G_V$ | Po=0.5W, Vol=1.25V | 31 | 33 | 35 | dB |
| Total Harmonic Distortion | THD | Po=0.5W, Vol=1.25V | | 0.10 | 0.5 | % |
| Maximum Power Output | $P_O$ | THD=10%, Vol=1.25V | 2.4 | 3.0 | | W |
| Ripple Rejection Ratio (Note 1) | RR | Rg=10kΩ, Vol=0V, Vr=0.5Vrms, fr=120Hz | 30 | 50 | | dB |
| Output Offset Voltage | $V_{Off}$ | Rg=10kΩ, Vol=0V | -250 | 0 | 250 | mV |
| Volume Attenuation Ratio (Note 1) | Att | Po=0.5W, Vol=0V | 70 | 85 | | dB |
| Channel Balance 1 | CB1 | Po=0.5W, Vol=1.25V | -1 | 0 | 1 | dB |
| Channel Balance 2 | CB2 | Po=0.5W, Vol=0.6V | -3 | 0 | 3 | dB |
| Middle Voltage Gain | $G_{Vm}$ | Po=0.5W, Vol=0.6V | 20.5 | 23.5 | 26.5 | dB |
| Crosstalk | CT | Po=0.5W, Vol=1.25V | 40 | 55 | | dB |

Note 1) With a filter band 15Hz ~ 30kHz (12dB/OCT) used.

## ■ Pin

| Pin No | Pin Name | Pin No | Pin Name |
|---|---|---|---|
| 1 | N.C. | 9 | GND (Input) |
| 2 | Ch.1 Output (+) | 10 | Ch.2 Input |
| 3 | GND (Ch.1 Output) | 11 | Volume |
| 4 | Ch.1 Output (-) | 12 | Ch.2 Output (-) |
| 5 | Stand-by | 13 | GND (Ch.2 Output) |
| 6 | Ch.1 Input | 14 | Ch.2 Output (+) |

## Test Circuit




Note) If the standby pin is open or 0V, the IC is on standby state.
The IC is in the state of volume minimum if the Volume pin is ground.
The IC is in the state of volume maximum if the Volume pin is open.

## ■ Supplementary Explanation

### ● Application's Precaution

1) Make sure that the IC is free of any pin short-circuiting, ground fault, and load short-circuiting.

2) Ground the radiation fin so that there will be no difference in electric potential between the radiation fin and ground.

3) The thermal protection circuit operates at a Tj of approximately 150°C. The thermal protection circuit is reset automatically when the temperature drops.

4) Make sure that the heat radiation design is effective enough if the Vcc is comparatively high or the IC operates high output power.

5) Connect only ground pin for signal sources to the signal GND pin of the amplifier on the previous stage.

6) The electric surge voltage for this IC low, therefor be extra careful when using the following pin (at 200pF): Pin 5=+140V, Pin 6=+140V, Pin 9=+130V, Pin 8=+150V

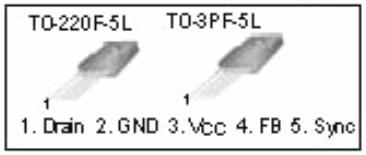
# Fig 5: KA5Q0765RT Illustration

## Features

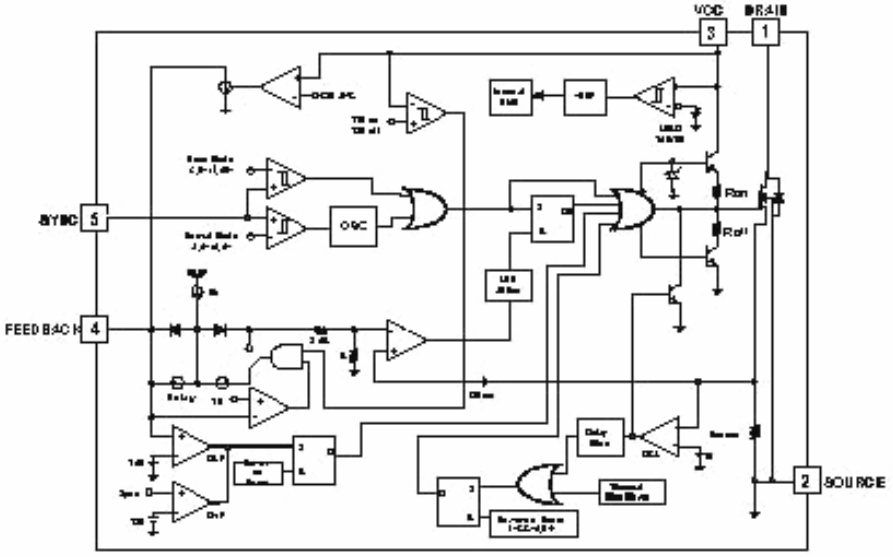
- Quasi Resonant Converter Controller
- Internal Burst Mode Controller for Stand-by Mode
- Pulse by Pulse Current Limiting
- Over Current Latch Protection
- Over Voltage Protection (Vsync : Min. 11V)
- Internal Thermal Shutdown Function
- Under Voltage Lockout
- Internal High Voltage Sense FET
- Auto-Restart Mode

## Description

The Fairchild Power Switch(FPS) product family is specially designed for an off-line SMPS with minimal external components. The Fairchild Power Switch(FPS) consist of high voltage power SenseFET and current mode PWM controller IC. PWM controller features integrated fixed oscillator, under voltage lock out, leading edge blanking, optimized gate turn-on/turn-off driver, thermal shut down protection, over voltage protection, temperature compensated precision current sources for loop compensation and fault protection circuit. compared to discrete MOSFET and controller or RCC switching converter solution, a Fairchild Power Switch(FPS) can reduce total component count, design size, and weight and at the same time increase & efficiency, productivity, and system reliability. It has a basic platform well suited for cost-effective design in quasi resonant converter as C-TV power supply.




## Internal Block Diagram



# FACTORY MENU

## Main power +B setting

Receive standard color pattern RF signal. Set picture to “Standard Mode”. Adjust VR501, to get +B (VD542 -) voltage =110V.

## $I^2C$ bus control adjustment method

**How to enter and exit factory mode (with customer’s remote controller)**

6. Press [menu] key → display picture menu
7. Press digital key “8” “5” “0” “0” → display “M”
8. Push [standby] key two time to exit factory mode and return to normal.

**How to select menus in factory mode**

In factory mode (“M” mode) there are ten menus totally. From Menu 0 to Menu 9 can be selected directly.

For example, to select Menu 7, you should press the numeric key 7.

# The BUS DATA for TDA9381

| MI | Items | Variable | Preset | |
|---|---|---|---|---|
| M0 | AVL | ON/OFF | ON | |
| | FSL | ON/OFF | ON | |
| | FMWS | ON/OFF | OFF | |
| | FFI | ON/OFF | OFF | |
| | OSO | ON/OFF | ON | |
| | FCO | ON/OFF | OFF | |
| | WOOFER | ON/OFF | OFF | |
| | DUAL OUT | 0~1 | 0 | |
| | Volume mode | 0~1 | 1 | |
| | | | | |
| M1 | BAND | 0~2 | 2 | |
| | AV CFG* | 0~8 | 3 | |
| | NTSC MX | | USA | |
| | VIDEO OUT | | CVBS | |
| | PIN5 | | NTSC | |
| | PRO | 0~3 | 0 | |
| | | | | |
| M2 | VISION IF | | 38.9M | |
| | DK | ON/OFF | OFF | |
| | BG | ON/OFF | ON | |
| | I | ON/OFF | OFF | |
| | M | ON/OFF | OFF | |
| | SIF PREFER | | BG | |
| | AUTO SOUND | ON/OFF | ON | |
| | | | | |
| M3 | START ON | 0~2 | 0 | |
| | ENGLISH | ON/OFF | ON | |
| | ARABIC | ON/OFF | OFF | |
| | PERSIAN | ON/OFF | OFF | |
| | TURKISH | ON/OFF | OFF | |
| | FRANCE | ON/OFF | OFF | |
| | RUSSIA | ON/OFF | OFF | |
| | | | | |

| MI | Items | Variable | Preset | |
|---|---|---|---|---|
| M4 | SUBCON | 0~63 | 63 | |
| | SUBCOL | 0~63 | 63 | |
| | SUBSHP | 0~63 | 63 | |
| | SUBTINT | 0~15 | 15 | |
| | YDLY PAL | 0~15 | 12 | |
| | YDLY NTSC | 0~15 | 12 | |
| | YDLY SEC | 0~15 | 12 | |
| | YDLY AV | 0~15 | 12 | |
| | UOC VOL | ON/OFF | Off | |
| | CATHODE | 0~15 | 15 | |
| | SC BRI | 0~63 | 10 | |
| | | | | |
| M5 | OSD VPOS | 0~63 | 53 | |
| | OSD HPOS | 0~59 | 15 | |
| | WIDE | 0~63 | 15 | |
| | ZOOM | 0~63 | 59 | |
| | NENU TITLE | 0~6 | 3 | |
| | E2PROM ADRESS | 0~33 | | |
| | E2PROM VALUE | 0~95 | | |
| | E2PROM WRITE | | | |
| M6 | SHIPMODE | | | |
| | SEARCH SPEED | 0~3 | 0 | |
| M7 | AGC-TOP | 0~63 | 25 | |
| | AGC-SPEED | 0~3 | 2 | |
| | | | | |
| M8 | FREQUENCY | | 50HZ | 60HZ |
| | VSLOPE | 0~63 | 30 | 30 |
| | VSHIFT | 0~63 | 42 | 42 |
| | VAMP | 0~63 | 37 | 37 |
| | VSCOR | 0~63 | 19 | 19 |
| | HSHIFT | 0~63 | 39 | 39 |
| | | | | |
| M9 | BT | 0~63 | 48 | |
| | CT | 0~63 | 48 | |
| | SC | | OFF | |
| | RB | 0~63 | 32 | |
| | GB | 0~63 | 32 | |
| | RD | 0~63 | 32 | |
| | GD | 0~63 | 32 | |
| | BD | 0~63 | 32 | |
| | SB | 0~63 | 40 | |

NOTE:
The data provided in the form provides to consult only!

## Directions for use

1. M1/AV CFG:

| Mode | Function select |
|---|---|
| 0 | TV→AV |
| 1 | TV→AV1→AV2 |
| 2 | TV→AV1→AV2→S-VIDEO |
| 3 | TV→AV1→AV2→S-VIDEO→YUV |
| 4 | TV→AV→S-VIDEO |
| 5 | TV→AV→S-VIDEO→YUV |
| 6 | TV→AV→YUV |
| 7 | TV-EURO |
| 8 | TV-AV-EURO |

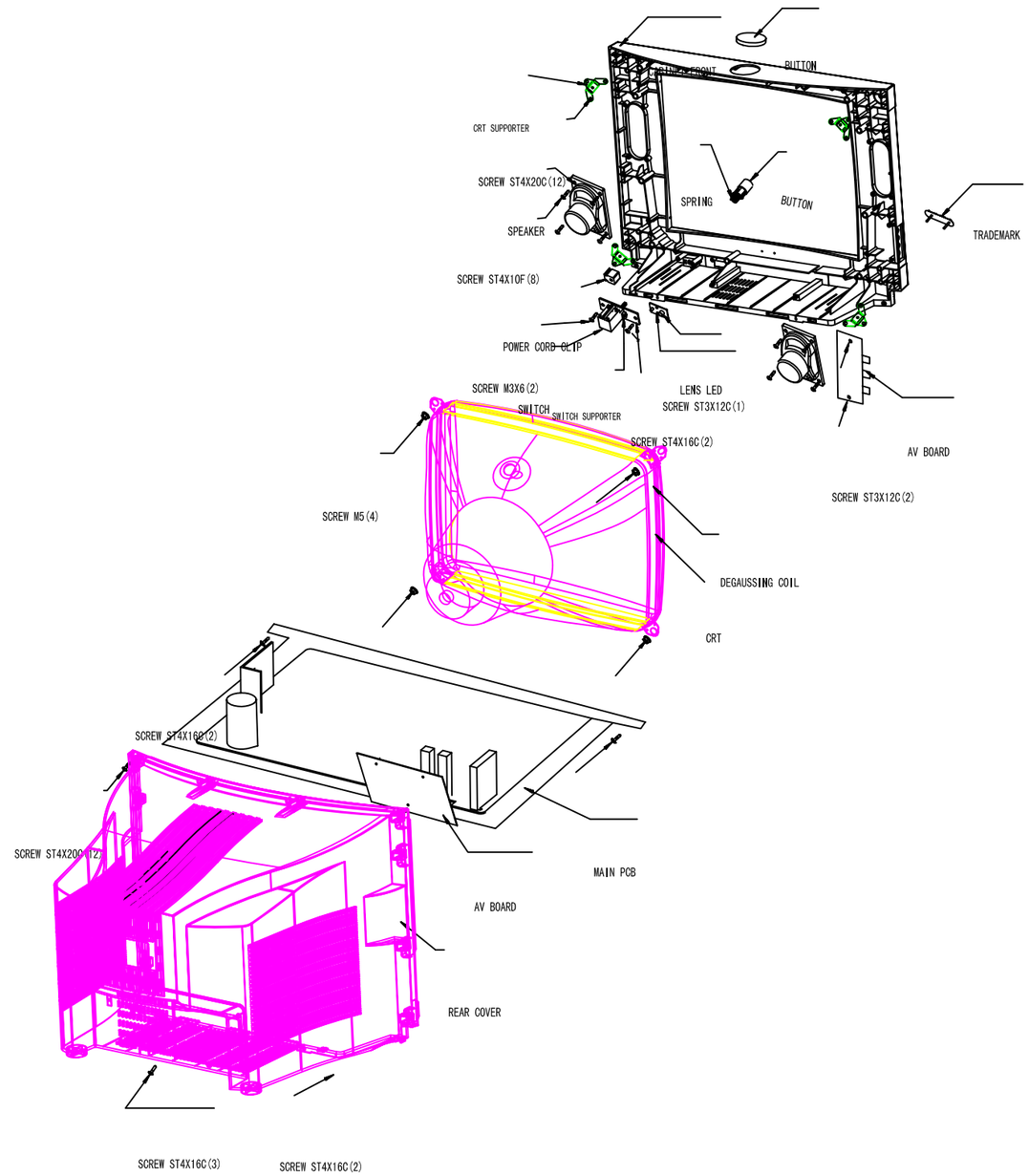
2. method of LOGO input:

3) when E2PROM ADRESS = 0, to adjust E2PROM VALUE may be changed horizontal position of LOGO.
   It's range is from 10 to 20.
4) when E2PROM ADRESS =1, to adjust E2PROM VALUE may be changed vertical position of LOGO.
   It's range is from 1 to 30.
5) when E2PROM ADRESS =2, to adjust E2PROM VALUE may be changed color of LOGO.
   It's range is from 0 to 7.

| VALUE | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| COLOR | RED | BLUE | GREEN | CYAN | ORANGE | PINK | YELLOW | WHITE |

6) when E2PROM ADRESS =3, to adjust E2PROM VALUE may be changed size of LOGO.
   It's range is from 0 to 3.
7) when E2PROM ADRESS =4~33, to adjust E2PROM VALUE may be changed character of LOGO.
   It's range is from 0 to 95.

# EXPLODED VIEW AND PART NAME



# BOM LIST

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| R411 | RJB393F-NAAF | Resistor metal | Rj13-1/6W-39KΩ-F |
| R312 | D10B683J-T | Carbon resistor | RT13-1/6W-10Ω-J |
| R871 | D10B4R7J-T | Carbon resistor | RT13-1/6W-10Ω-J |
| R914 | D10B4R7J-T | Carbon resistor | RT13-1/6W-22Ω-J |
| R924 | D10B330J-T | Carbon resistor | RT13-1/6W-22Ω-J |
| R934 | D10B101J-T | Carbon resistor | RT13-1/6W-22Ω-J |
| R398 | D10B101J-T | Carbon resistor | RT13-1/6W-33Ω-J |
| R806 | D10B101J-T | Carbon resistor | RT13-1/6W-33Ω-J |
| R368 | D10B101J-T | Carbon resistor | RT13-1/6W-47Ω-J |
| R708 | D10B101J-T | Carbon resistor | RT13-1/6W-47Ω-J |
| R911 | D10B101J-T | Carbon resistor | RT13-1/6W-47Ω-J |
| R921 | D10B101J-T | Carbon resistor | RT13-1/6W-47Ω-J |
| R931 | D10B101J-T | Carbon resistor | RT13-1/6W-47Ω-J |
| R354 | D10B101J-T | Carbon resistor | RT13-1/6W-56Ω-J |
| R355 | D10B101J-T | Carbon resistor | RT13-1/6W-56Ω-J |
| R304 | D10B101J-T | Carbon resistor | RT13-1/6W-68Ω-J |
| R801 | D10B101J-T | Carbon resistor | RT13-1/6W-75Ω-J |
| R313 | D10B101J-T | Carbon resistor | RT13-1/6W-82Ω-J |
| R301 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R302 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R363 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R365 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R366 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R381 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R382 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R383 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R401 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R402 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R452 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R723 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R724 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R743 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R815 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R824 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R861 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R862 | D10B101J-T | Carbon resistor | RT13-1/6W-100Ω±5% |
| R815A | D10B151J-T | Carbon resistor | RT13-1/6W-150Ω±5% |
| R848 | D10B151J-T | Carbon resistor | RT13-1/6W-150Ω±5% |
| R852 | D10B151J-T | Carbon resistor | RT13-1/6W-150Ω±5% |
| R353 | D10B151J-T | Carbon resistor | RT13-1/6W-180Ω±5% |
| R311 | D10B151J-T | Carbon resistor | RT13-1/6W-220Ω±5% |
| R917 | D10B221J-T | Carbon resistor | RT13-1/6W-220Ω±5% |
| R927 | D10B221J-T | Carbon resistor | RT13-1/6W-220Ω±5% |
| R937 | D10B221J-T | Carbon resistor | RT13-1/6W-220Ω±5% |
| R913 | D10B301J-T | Carbon resistor | RT13-1/6W-300Ω±5% |
| R923 | D10B301J-T | Carbon resistor | RT13-1/6W-300Ω±5% |
| R933 | D10B301J-T | Carbon resistor | RT13-1/6W-300Ω±5% |
| R805 | D10B331J-T | Carbon resistor | RT13-1/6W-330Ω±5% |
| R916 | D10B331J-T | Carbon resistor | RT13-1/6W-330Ω±5% |
| R926 | D10B331J-T | Carbon resistor | RT13-1/6W-330Ω±5% |
| R936 | D10B331J-T | Carbon resistor | RT13-1/6W-330Ω±5% |
| R322 | D10B391J-T | Carbon resistor | RT13-1/6W-390Ω±5% |
| R308 | D10B471J-T | Carbon resistor | RT13-1/6W-470Ω±5% |

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| R1517 | D10B471J-T | Carbon resistor | RT13-1/6W-470Ω±5% |
| R316 | D10B681J-T | Carbon resistor | RT13-1/6W-680Ω±5% |
| R482 | D10B681J-T | Carbon resistor | RT13-1/6W-680Ω±5% |
| R128 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R129 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R369 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R460 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R464 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R481 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R734 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R802 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R803 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R816 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R818 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R825 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R827 | D10B102J-T | Carbon resistor | RT13-1/6W-1KΩ±5% |
| R305 | D10B122J-T | Carbon resistor | RT13-1/6W-1.2KΩ±5% |
| R560 | D10B122J-T | Carbon resistor | RT13-1/6W-1.2KΩ±5% |
| R397 | D10B152J-T | Carbon resistor | RT13-1/6W-1.5KΩ±5% |
| R732 | D10B152J-T | Carbon resistor | RT13-1/6W-1.5KΩ±5% |
| R430 | D10B182J-T | Carbon resistor | RT13-1/6W-1.8KΩ±5% |
| R405 | D10B182J-T | Carbon resistor | RT13-1/6W-1.8KΩ±5% |
| R1523 | D10B182J-T | Carbon resistor | RT13-1/6W-1.8KΩ±5% |
| R351 | D10B222J-T | Carbon resistor | RT13-1/6W-2.2KΩ±5% |
| R371 | D10B222J-T | Carbon resistor | RT13-1/6W-2.2KΩ±5% |
| R451 | D10B222J-T | Carbon resistor | RT13-1/6W-2.2KΩ±5% |
| R463 | D10B222J-T | Carbon resistor | RT13-1/6W-2.2KΩ±5% |
| R701A | D10B222J-T | Carbon resistor | RT13-1/6W-2.2KΩ±5% |
| R321 | D10B272J-T | Carbon resistor | RT13-1/6W-2.7KΩ±5% |
| R702 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R721 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R722 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R728 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R735 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R736 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R737 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R741 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R742 | D10B332J-T | Carbon resistor | RT13-1/6W-3.3KΩ±5% |
| R455 | D10B392J-T | Carbon resistor | RT13-1/6W-3.9KΩ±5% |
| R462 | D10B392J-T | Carbon resistor | RT13-1/6W-3.9KΩ±5% |
| R131 | D10B472J-T | Carbon resistor | RT13-1/6W-4.7KΩ±5% |
| R133 | D10B472J-T | Carbon resistor | RT13-1/6W-4.7KΩ±5% |
| R154 | D10B472J-T | Carbon resistor | RT13-1/6W-4.7KΩ±5% |
| R158 | D10B472J-T | Carbon resistor | RT13-1/6W-4.7KΩ±5% |
| R306 | D10B472J-T | Carbon resistor | RT13-1/6W-4.7KΩ±5% |
| R733 | D10B472J-T | Carbon resistor | RT13-1/6W-4.7KΩ±5% |
| R370 | D10B562J-T | Carbon resistor | RT13-1/6W-5.6KΩ±5% |
| R540 | D10B562J-T | Carbon resistor | RT13-1/6W-5.6KΩ±5% |
| R701 | D10B562J-T | Carbon resistor | RT13-1/6W-5.6KΩ±5% |
| R1511 | D10B562J-T | Carbon resistor | RT13-1/6W-5.6KΩ±5% |
| R153A | D10B822J-T | Carbon resistor | RT13-1/6W-8.2KΩ±5% |
| R157A | D10B822J-T | Carbon resistor | RT13-1/6W-8.2KΩ±5% |
| R126 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R127 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| R163 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R380 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R395 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R396 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R434 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R461 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R548 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R551 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R704 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R705 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R706 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R707 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R709 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R816A | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R818A | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R825A | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R827A | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R851A | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R852A | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R912 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R922 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R932 | D10B103J-T | Carbon resistor | RT13-1/6W-10KΩ±5% |
| R331 | D10B153J-T | Carbon resistor | RT13-1/6W-15KΩ±5% |
| R162 | D10B223J-T | Carbon resistor | RT13-1/6W-22KΩ±5% |
| R384 | D10B223J-T | Carbon resistor | RT13-1/6W-22KΩ±5% |
| R804 | D10B223J-T | Carbon resistor | RT13-1/6W-22KΩ±5% |
| R1515 | D10B223J-T | Carbon resistor | RT13-1/6W-22KΩ±5% |
| R1556 | D10B223J-T | Carbon resistor | RT13-1/6W-22KΩ±5% |
| R484 | D10B223J-T | Carbon resistor | RT13-1/6W-27KΩ±5% |
| R487 | D10B223J-T | Carbon resistor | RT13-1/6W-27KΩ±5% |
| R171 | D10B333J-T | Carbon resistor | RT13-1/6W-33KΩ±5% |
| R175 | D10B333J-T | Carbon resistor | RT13-1/6W-33KΩ±5% |
| R317 | D10B333J-T | Carbon resistor | RT13-1/6W-33KΩ±5% |
| R385 | D10B333J-T | Carbon resistor | RT13-1/6W-33KΩ±5% |
| R172 | D10B473J-T | Carbon resistor | RT13-1/6W-47KΩ±5% |
| R732A | D10B473J-T | Carbon resistor | RT13-1/6W-47KΩ±5% |
| R745 | D10B473J-T | Carbon resistor | RT13-1/6W-47KΩ±5% |
| R173 | D10B683J-T | Carbon resistor | RT13-1/6W-68KΩ±5% |
| R483 | D10B104J-T | Carbon resistor | RT13-1/6W-100KΩ±5% |
| R802A | D10B104J-T | Carbon resistor | RT13-1/6W-100KΩ±5% |
| R803A | D10B104J-T | Carbon resistor | RT13-1/6W-100KΩ±5% |
| R807 | D10B104J-T | Carbon resistor | RT13-1/6W-100KΩ±5% |
| R318 | D10B154J-T | Carbon resistor | RT13-1/6W-150KΩ±5% |
| R174 | D10B274J-T | Carbon resistor | RT13-1/6W-270KΩ±5% |
| R465 | D10B564J-T | Carbon resistor | RT13-1/6W-560KΩ±5% |
| R404 | D10C1R0J-T | Carbon resistor | RT14-1/4W-1Ω±5% |
| R468 | D10C2R7J-T | Carbon resistor | RT14-1/4W-2.7Ω±5% |
| R513 | D10C220J-T | Carbon resistor | RT14-1/4W-22Ω±5% |
| R561 | D10C270J-T | Carbon resistor | RT14-1/4W-27Ω±5% |
| R486 | D10C101J-T | Carbon resistor | RT14-1/4W-100Ω±5% |
| R161 | D10C222J-T | Carbon resistor | RT14-1/4W-2.2KΩ±5% |
| R1526 | D10C222J-T | Carbon resistor | RT14-1/4W-2.2KΩ±5% |
| R485 | D10C103J-T | Carbon resistor | RT14-1/4W-10KΩ±5% |
| R1522 | D10C153J-T | Carbon resistor | RT14-1/4W-15KΩ±5% |

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| R539 | D10C513J-T | Carbon resistor | RT14-1/4W-51KΩ±5% |
| R539A | D10C513J-T | Carbon resistor | RT14-1/4W-51KΩ±5% |
| R1554 | D10C154J-T | Carbon resistor | RT14-1/4W-150KΩ±5% |
| R942 | D10C334J-T | Carbon resistor | RT14-1/4W-330KΩ±5% |
| R407 | D10D271J-T | Carbon resistor | RT15-1/2W-270Ω±5% |
| R453 | D10D102J-T | Carbon resistor | RT15-1/2W-1KΩ±5% |
| R1555 | D10D473J-T | Carbon resistor | RT15-1/2W-47KΩ±5% |
| R507 | D10D124J-T | Carbon resistor | RT15-1/2W-120KΩ±5% |
| R1520 | D10D124J-T | Carbon resistor | RT15-1/2W-120KΩ±5% |
| R406 | S10E1R2J-C | Metal oxide resistor | RY16/RY21-1W-1.2Ω±5% |
| R300A | S10E220J-C | Metal oxide resistor | RY17/RY21-1W-22Ω±5% |
| Ref. No | Part No. | Name | Specification |
| R466 | S10E102J-C | Metal oxide resistor | RY16/RY21-1W-1KΩ±5% |
| R941 | S10F5R6J-C | Metal oxide resistor | RY17/RY21-2W-5.6Ω±5% |
| R530 | S10F560J-C | Metal oxide resistor | RY17/RY21-2W-56Ω±5% |
| R454 | S10E271J-C | Metal oxide resistor | RY17/RY21-2W-270Ω±5% |
| R546 | S10F271J-C | Metal oxide resistor | RY17/RY21-2W-270Ω±5% |
| R467 | S10F103J-C | Metal oxide resistor | RY17/RY21-2W-10KΩ±5% |
| R703 | S10F103J-C | Metal oxide resistor | RY17/RY21-2W-10KΩ±5% |
| R915 | S10F123J-C | Metal oxide resistor | RY17/RY21-2W-12KΩ±5% |
| R925 | S10F123J-C | Metal oxide resistor | RY17/RY21-2W-12KΩ±5% |
| R935 | S10F123J-C | Metal oxide resistor | RY17/RY21-2W-12KΩ±5% |
| R556 | S10F223J-C | Metal oxide resistor | RY17/RY21-2W-22KΩ±5% |
| R519! | | Glass-Glazed Fixed RES | RI40-1/2W-24MΩ±5% |
| R918 | | Glass-Glazed Fixed RES | RI40-1/2W-1.5KΩ±5% |
| R928 | | Glass-Glazed Fixed RES | RI40-1/2W-1.5KΩ±5% |
| R938 | | Glass-Glazed Fixed RES | RI40-1/2W-1.5KΩ±5% |
| R555 ! | F10DR27J-C | Fuse resistor | RF10-1/2W-0.27Ω±5% |
| R565 ! | F10DR27J-C | Fuse resistor | RF10-1/2W-0.27Ω±5% |
| R566 ! | F10DR27J-C | Fuse resistor | RF10-1/2W-0.27Ω±5% |
| R165 ! | F10DR47J-C | Fuse resistor | RF10-1/2W-0.47Ω±5% |
| R470 ! | F10DR47J-C | Fuse resistor | RF10-1/2W-0.47Ω±5% |
| R472 ! | F10DR47J-C | Fuse resistor | RF10-1/2W-0.47Ω±5% |
| R480 ! | F10F3R9J-C | Fuse resistor | RF10-2W-3.9Ω±5% |
| R458 | W11H3R9K | Wire-wound resistor | RXG6-5W-3.9Ω-J |
| R502 ! | W10J1R8K | Wire-wound resistor | RXG6-6W-1.8Ω-J |
| R1524 | W11H270K | Wire-wound resistor | RX27-5W-27Ω-K |
| R504 | W11H680K | Wire-wound resistor | RX27-5W-68Ω-K |
| PS501 | P10X180J-C | Thermittor | PTC-180HM |
| VR501 | V11D202B | Potentiometer | WI06-2AA2KΩ |
| C761 | C2CF330J-T | Ceramic capacitor | CC1-06A-CH-50/63V-33pF-J |
| C762 | C2CF330J-T | Ceramic capacitor | CC1-06A-CH-50/63V-33pF-J |
| C701 | C2CF121J-T | Ceramic capacitor | CC1-06A-CH-50/63V-120pF-J |
| C701A | C2CF121J-T | Ceramic capacitor | CC1-06A-CH-50/63V-120pF-J |
| C911 | C2BF331K-T | Ceramic capacitor | CC1-06A-RH-50/63V-330pF-J |
| C921 | C2BF331K-T | Ceramic capacitor | CC1-06A-RH-50/63V-330pF-J |
| C931 | C2BF331K-T | Ceramic capacitor | CC1-06A-RH-50/63V-330pF-J |
| C803 | C2BF471K-T | Ceramic capacitor | CC1-06A-RH-50/63V-470pF-J |
| C805 | C2BF471K-T | Ceramic capacitor | CC1-06A-RH-50/63V-470pF-J |
| C812 | C2BF471K-T | Ceramic capacitor | CC1-06A-RH-50/63V-470pF-J |
| C814 | C2BF471K-T | Ceramic capacitor | CC1-06A-RH-50/63V-470pF-J |
| C824 | C2BF471K-T | Ceramic capacitor | CC1-06A-RH-50/63V-470pF-J |
| C826 | C2BF471K-T | Ceramic capacitor | CC1-06A-RH-50/63V-470pF-J |

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| C732 | C2BF471K-T | Ceramic capacitor | CC1-06A-RH-50/63V-470pF-J |
| C381 | C2BF561K-T | Ceramic capacitor | CC1-06A-RH-50/63V-560pF-J |
| C323 | C2BF821K-T | Ceramic capacitor | CC1-06A-RH-50/63V-820pF-J |
| C308 | C2BF102K-T | Ceramic capacitor | CC1-06A-RH-50/63V-1000pF-J |
| C311 | C2BF102K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-1000pF-K |
| C340 | C2BF102K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-1000pF-K |
| C401 | C2BF102K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-1000pF-K |
| C402 | C2BF102K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-1000pF-K |
| C481 | C2BF102K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-1000pF-K |
| C721 | C2BF102K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-1000pF-K |
| C861 | C2BF102K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-1000pF-K |
| C335 | C2BF222K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-2200pF-K |
| C324 | C2BF472K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-4700pF-K |
| C336 | C2BF472K-T | Ceramic capacitor | CT1-06A-2B4-50/63V-4700pF-K |
| C162 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C302 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C309 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C312 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C313 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C332 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C362 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C472 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C475 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C535 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C703A | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C723 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C744 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C752 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C756 | C2FF103Z-T | Ceramic capacitor | CT1-08A-2F4-50/63V-0.01uF-Z |
| C482 | C2BP101K-T | Ceramic capacitor | CT1-08C-2B4-500V-100PF-Z |
| C405 | C2BP221K-T | Ceramic capacitor | CT1-08C-2B4-500V-220F-Z |
| C452 | C2BP102K-T | Ceramic capacitor | CT1-08C-2B4-500V-1000pF-K |
| C451 | C2BP392K-T | Ceramic capacitor | CT1-08C-2B4-500V-3900pF-K |
| C503 | C2BW102K-O | Ceramic capacitor | CT81-08C-2R-1KV-1000pF-K |
| C504 | C2BW102K-O | Ceramic capacitor | CT81-08C-2R-1KV-1000pF-K |
| C505 | C2BW102K-O | Ceramic capacitor | CT81-08C-2R-1KV-1000pF-K |
| C506 | C2BW102K-O | Ceramic capacitor | CT81-08C-2R-1KV-1000pF-K |
| C529 | C2BW471K-O | Ceramic capacitor | CT81-08C-2R-1KV-470pF-K |
| C543 | C2RX471K-O | Ceramic capacitor | CT81-08C-2R-2KV-470pF-K |
| C509 | C2RX681K-O | Ceramic capacitor | CT81-08C-2R-2KV-680pF-K |
| C527 | C2RX681K-O | Ceramic capacitor | CT81-08C-2R-2KV-680pF-K |
| C456 | C2EX102Z-O | Ceramic capacitor | CT81-08C-2R-2KV-1000pF-K |
| C943 | C2EX102Z-O | Ceramic capacitor | CT81-08C-2R-2KV-1000pF-K |
| C515A ! | C2EM102M-O | Ceramic capacitor | CTJ1-AC250V-470PF-±20% |
| C598! | C2EM102M-O | Ceramic capacitor | CTJ1-AC250V-470PF-±20% |
| C515 ! | C2EM102M-O | Ceramic capacitor | CTJ1-AC250V-1000PF-±20% |
| C548 | E10C101M-T | Electrolytic Capacitor | CD110-10V-100uF –M |
| C163A | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C172 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF -M |
| C301 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C307 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C322 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |

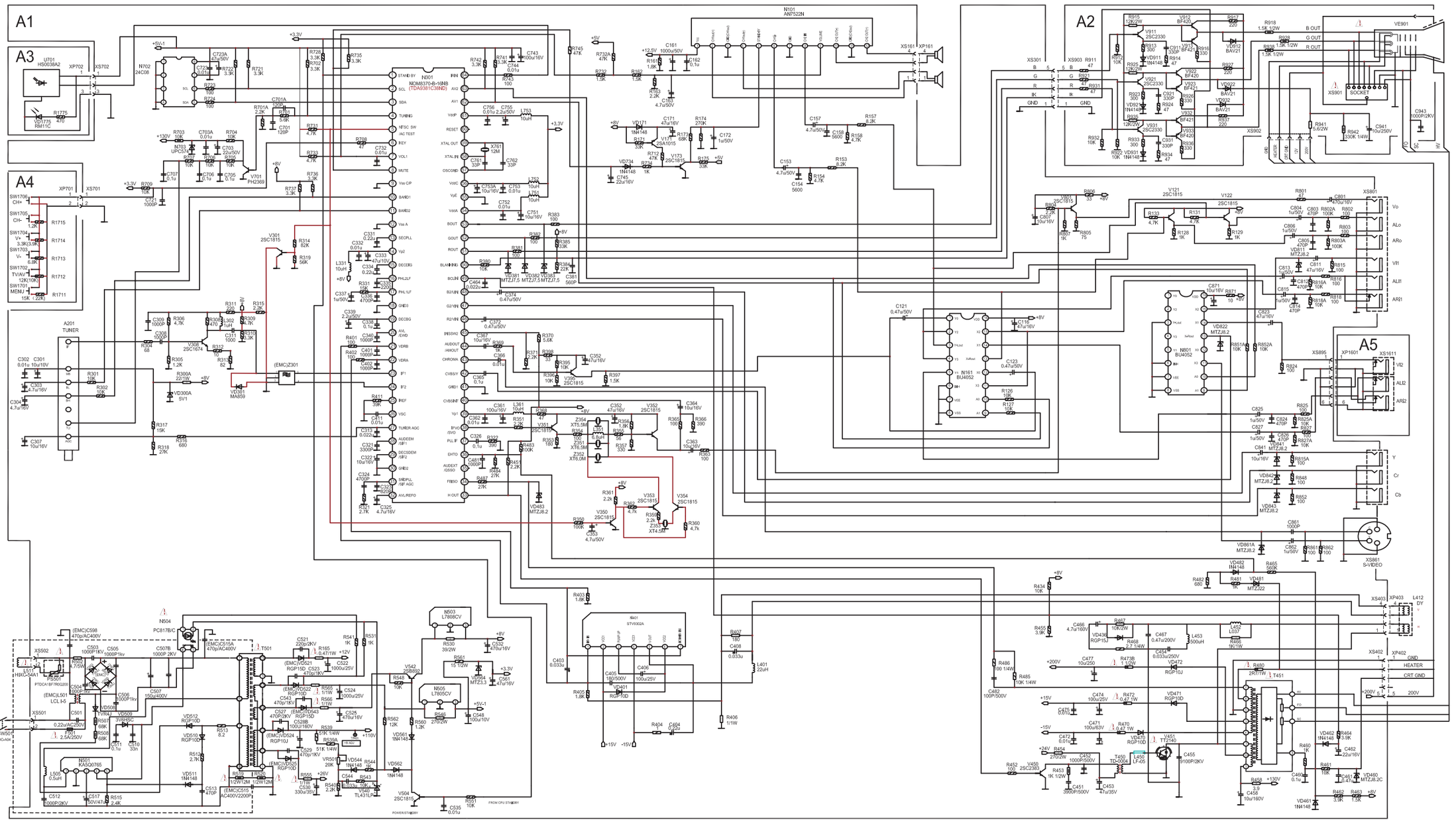
| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| C363 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C364 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C367 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF -M |
| C751 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C807 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C841 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF –M |
| C871 | E20C100M-T | Electrolytic Capacitor | CD110-16V-10uF -M |
| C745 | E20C220M-T | Electrolytic Capacitor | CD110-16V-22uF -M |
| C116 | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C171 | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C333 | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C352 | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C561 | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C723A | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C811 | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C823 | E20C470M-T | Electrolytic Capacitor | CD110-16V-47uF –M |
| C361 | E20C101M-T | Electrolytic Capacitor | CD110-16V-100uF –M |
| C743 | E20C101M-T | Electrolytic Capacitor | CD110-16V-100uF –M |
| C525 | E20C471M-T | Electrolytic Capacitor | CD110-16V-470uF –M |
| C532 | E20C471M-T | Electrolytic Capacitor | CD110-16V-470uF –M |
| C801 | E20C471M-T | Electrolytic Capacitor | CD110-16V-470uF –M |
| C406 | E20D101M-T | Electrolytic Capacitor | CD110-25V-100uF -M |
| C471 | E20D101M-T | Electrolytic Capacitor | CD110-25V-100uF -M |
| C471A | E20D101M-T | Electrolytic Capacitor | CD110-25V-100uF -M |
| C474 | E20D101M-T | Electrolytic Capacitor | CD110-25V-100uF -M |
| C474A | E20D101M-T | Electrolytic Capacitor | CD110-25V-100uF -M |
| C161 | E20D471M | Electrolytic Capacitor | CD110-25V-470uF -M |
| C522 | E20D102M | Electrolytic Capacitor | CD110-25V-1000uF –M |
| C524 | E20D222M | Electrolytic Capacitor | CD110-25V-2200uF –M |
| C453 | E20E470M-T | Electrolytic Capacitor | CD110-35V-47uF -M |
| C530 | E20E331M-T | Electrolytic Capacitor | CD110-35V-330uF -M |
| C121 | E20FR47M-T | Electrolytic Capacitor | CD110-50V-0.47uF –M |
| C123 | E20FR47M-T | Electrolytic Capacitor | CD110-50V-0.47uF –M |
| C372 | E20FR47M-T | Electrolytic Capacitor | CD110-50V-0.47uF –M |
| C374 | E20FR47M-T | Electrolytic Capacitor | CD110-50V-0.47uF -M |
| C153 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C157 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C163 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C337 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C804 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C806 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF -M |
| C813 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C815 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C825 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF –M |
| C837 | E20F1R0M-T | Electrolytic Capacitor | CD110-50V-1uF -M |
| C339 | E20F2R2M-T | Electrolytic Capacitor | CD110-50V-2.2uF –M |
| C755 | E20F2R2M-T | Electrolytic Capacitor | CD110-50V-2.2uF –M |
| C303 | E20F4R7M-T | Electrolytic Capacitor | CD110-50V-4.7uF –M |
| C304 | E20F4R7M-T | Electrolytic Capacitor | CD110-50V-4.7uF –M |
| C325 | E20F4R7M-T | Electrolytic Capacitor | CD110-50V-4.7uF –M |
| C464 | E20F4R7M-T | Electrolytic Capacitor | CD110-50V-4.7uF -M |
| C703 | E20F220M-T | Electrolytic Capacitor | CD110-50V-22uF -M |
| C462 | E20F470M-T | Electrolytic Capacitor | CD110-50V-47uF -M |

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| C466 | E21H4R7M-T | Electrolytic Capacitor | CD110-160V-4.7uF -M |
| C528B | E20H101M | Electrolytic Capacitor | CD110-160V-100uF-M |
| C477 | E21K100M-T | Electrolytic Capacitor | CD110-250V-10uF -M |
| C941 | E21K100M-T | Electrolytic Capacitor | CD110-250V-10uF -M |
| C458 | E20H100M | Electrolytic Capacitor | CD110-160V-10uF -M |
| C507 | E20M101M | Electrolytic Capacitor | CD293-400V-100uF-±10% |
| C326 | F20F104J-T | Mylar capacitor | CL11-50V/63V-0.1uF-K |
| C338 | F20F104J-T | Mylar capacitor | CL11-50V/63V-0.1uF-K |
| C365 | F20F104J-T | Mylar capacitor | CL11-50V/63V-0.1uF-K |
| C411 | F20F104J-T | Mylar capacitor | CL11-50V/63V-0.1uF-K |
| C331 | F20F224J-T | Mylar capacitor | CL11-50V/63V-0.22uF-K |
| C334 | F20F224J-T | Mylar capacitor | CL11-50V/63V-0.22uF-K |
| C404 | F20F224J-T | Mylar capacitor | CL11-50V/63V-0.22uF-K |
| C461 | F20F474J-T | Mylar capacitor | CL21-50V/63V-0.47uF-K |
| C321 | F20G332J-T | Mylar capacitor | CL11-100V-3300PF-K |
| C154 | F20G562J-T | Mylar capacitor | CL11-100V-5600PF-K |
| C158 | F20G562J-T | Mylar capacitor | CL11-100V-5600PF-K |
| C1515 | F22G123J-T | Mylar capacitor | CL21X-100V-0.012uF-K |
| C1517 | F20G223K-T | Mylar capacitor | CL11-100V-0.022uF-K |
| C403 | F20G333K-T | Mylar capacitor | CL11-100V-0.033uF-K |
| C408 | F20G333K-T | Mylar capacitor | CL11-100V-0.033uF-K |
| C1513 | F20G473K-T | Mylar capacitor | CL11-100V-0.047uF-K |
| C427 | F20G473K-T | Mylar capacitor | CL11-100V-0.047uF-K |
| C1514 | F20G104K-T | Mylar capacitor | CL11-100V-0.1uF-K |
| C460 | F20G104K-T | Mylar capacitor | CL11-100V-0.1uF-K |
| C705 | F20G104K-T | Mylar capacitor | CL11-100V-0.1uF-K |
| C706 | F20G104K-T | Mylar capacitor | CL11-100V-0.1uF-K |
| C707 | F20G104K-T | Mylar capacitor | CL11-100V-0.1uF-K |
| C467 | F20J394J | Polypropylene capacitor | CBB21-200V-0.3*9uF±5% |
| C415 ! | F20Z822J | Polypropylene capacitor | CBB81-1.6KV-8200PF-J |
| C501 ! | F20R224M | Polypropylene capacitor | CBB62-250VAC-0.22uF |
| L414 | LXXX0001 | H-linear | LH01 |
| L351 | L2X239K-T | Inductor | LGA0204-3.9uH-K |
| L302 | L3X210K-T | Inductor | LGA0204-1uH-K |
| L331 | L3X2100K-T | Inductor | LGA0307-10uH-K |
| L361 | L3X2100K-T | Inductor | LGA0307-10uH-K |
| L751 | L3X2100K-T | Inductor | LGA0307-10uH-K |
| Ref. No | Part No. | Name | Specification |
| L752 | L3X2100K-T | Inductor | LGA0307-10uH-K |
| L753 | L3X2100K-T | Inductor | LGA0307-10uH-K |
| L401 | L3X2220K-T | Inductor | LGA0307-22uH-K |
| L911 | L3X2820K-T | Inductor | LGA0307-82uH-K |
| L912 | L3X2820K-T | Inductor | LGA0307-82uH-K |
| L913 | L3X2820K-T | Inductor | LGA0307-82uH-K |
| L501 ! | LMXX0002 | Degaussing coil | |
| N504 ! | RX0001XX | Photo electricity coupler | PC817B/C |
| VD1001 | DL0008XX | LED | RED 5mm |
| VD171 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD461 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD462 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD482 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD561 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD734 | DR0001XX-T | Diode | IS1555/IN4148A |

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| VD911 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD921 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD931 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD1514 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD1516 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD1518 | DR0001XX-T | Diode | IS1555/IN4148A |
| VD912 | DR0002XX-T | Diode | BAV21 |
| VD922 | DR0002XX-T | Diode | BAV21 |
| VD932 | DR0002XX-T | Diode | BAV21 |
| VD401 | DR0003XX-T | Diode | FR105 |
| VD470 | DR0003XX-T | Diode | FR105 |
| VD471 | DR0003XX-T | Diode | FR105 |
| VD525 | DR0003XX-T | Diode | FR105 |
| VD1517 | DR0003XX-T | Diode | FR105 |
| VD503 | DR0015XX-T | Diode | TVR4N/TRM11C |
| VD504 | DR0015XX-T | Diode | TVR4N/TRM11C |
| VD505 | DR0015XX-T | Diode | TVR4N/TRM11C |
| VD506 | DR0015XX-T | Diode | TVR4N/TRM11C |
| VD436 | DR0017XX | Diode | RGP10J |
| VD472 | DR0017XX | Diode | RGP10J |
| VD524 | DR0017XX | Diode | RGP10J |
| VD521 | DR0018XX | Diode | RGP15D |
| VD543 | DR0018XX | Diode | RGP15D |
| VD300A | DZ0001XX-T | Diode | RD5.1EB3/HZ5C1 |
| VD481 | DZ0002XX-T | Diode | HZ22-2 |
| VD564 | DZ0006XX-T | Diode | RD3.3L/HZ3C3 |
| VD1561 | DZ0006XX-T | Diode | RD6.4L/HZ6C2 |
| VD381 | DZ0011XX-T | Diode | RD7.1EB2/HZ7C1 |
| VD382 | DZ0011XX-T | Diode | RD7.1EB2/HZ7C1 |
| VD383 | DZ0011XX-T | Diode | RD7.1EB2/HZ7C1 |
| VD1519 | DZ0011XX-T | Diode | RD7.1EB2/HZ7C1 |
| Ref. No | Part No. | Name | Specification |
| VD460 | DZ0010XX-T | Diode | HZ9A3 |
| VD483 | DZ0010XX-T | Diode | HZ9A3 |
| VD822 | DZ0010XX-T | Diode | HZ9A3 |
| VD861A | DZ0010XX-T | Diode | HZ9A3 |
| VD941 | DZ0010XX-T | Diode | HZ9A3 |
| N703 | IXXX0080 | IC | upc574J/CW574 |
| N161 | IXXX0180 | IC | AN7522N |
| N505 | IXXX0118 | IC | TA78M05 5V稳压 |
| N121 | IXXX0120 | IC | LC4052B/CD4052B |
| N801 | IXXX0120 | IC | LC4052B/CD4052B |
| N301 | | IC | TDA9381 |
| N401 | IXXX0142 | IC | LA78040 |
| N702 | IXXX0173 | IC | BR ST24C08-W |
| N503 | IXXX0118 | IC | TA78M08 8V稳压 |
| V1511 | RXA1015X-T | Audion | 2SA1015Y/2SA608/2SA733Q |
| V171 | RXA1015X-T | Audion | 2SA1015Y/2SA608/2SA733Q |
| V542 | RXB892XX-T | Audion | 2SB892/2SB985T |
| V308 | RXC1674X-T | Audion | 2SC1674 |
| V911 | RXC2482X | Audion | 2SC2482 |
| V921 | RXC2482X | Audion | 2SC2482 |
| V931 | RXC2482X | Audion | 2SC2482 |

| Ref. No | Part No. | Name | Specification |
|---|---|---|---|
| V913 | RXC421X | Audion | BF421/BF423 |
| V923 | RXC421X | Audion | BF421/BF423 |
| V933 | RXC421X | Audion | BF421/BF423 |
| V912 | RXC422X | Audion | BF422/BF420 |
| V922 | RXC422X | Audion | BF422/BF420 |
| V932 | RXC422X | Audion | BF422/BF420 |
| V450 | RXC2383X-T | Audion | 2SC2383-O |
| V1512 | RXC3807X | Audion | 2SC3807/2SC5070 |
| V1513 | RXC5287X | Audion | 2SD1710/2SC4584/C5586 |
| V121 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V122 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V173 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V351 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V352 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V354 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V395 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V504 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V801 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V1553 | RXC945XX-T | Audion | 2SC945/2SC1815/2SC536E |
| V451 | RXD2140X | Audion | TT2190LS |
| V701 | RXC2369XX-T | Audion | PH2369 |
| Z352 | FC0007XX | Ceramic trap filter | XT6.0M |
| Z354 | FC0008XX | Ceramic trap filter | XT5.5M |
| Z351 | FC0006XX | Ceramic trap filter | XT6.5M |
| Z301 | | SAWF | K2966 38.9M |
| F501 ! | FXXX0020 | FUSE | 3.15A 250V |
| A1001 | RXXX0016 | Remote receiver | HS0038 |
| A101 | BXATB066 | Tuner | ET-5G1E-EV100 |
| SW1001 | KXXX0101 | Touch switch | PUSH SW.(L:5mm) |
| SW1002 | KXXX0101 | Touch switch | PUSH SW.(L:5mm) |
| SW1003 | KXXX0101 | Touch switch | PUSH SW.(L:5mm) |
| SW1004 | KXXX0101 | Touch switch | PUSH SW.(L:5mm) |
| SW1005 | KXXX0101 | Touch switch | PUSH SW.(L:5mm) |
| SW1006 | KXXX0101 | Touch switch | PUSH SW.(L:5mm) |
| Z761 | XC0004XX-A | XTLO | 12.0MHz(18P) |

# CIRCUIT DIAGRAM




NOTICE:

1. All resistance values are in ohms. K represents K Ω, M represents M Ω.
2. The rated power of all resistance is 1/6W unless otherwise noted.
3. All capacitance values without unit is Pf, μ represents μ f。
4. The rated voltage of all capacitances is 50V unless otherwise noted.
5. The components indicated by a mark ⚠ in this circuit diagram is very important to product safety. It is particularly recommended that only the same type components supplied by the producer can be used for components replacement pointed by this mark.
6. This circuit diagram covers a basic or representative chassis only. There may be some component or partial circuit differences between the actual chassis and the circuit diagram.

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