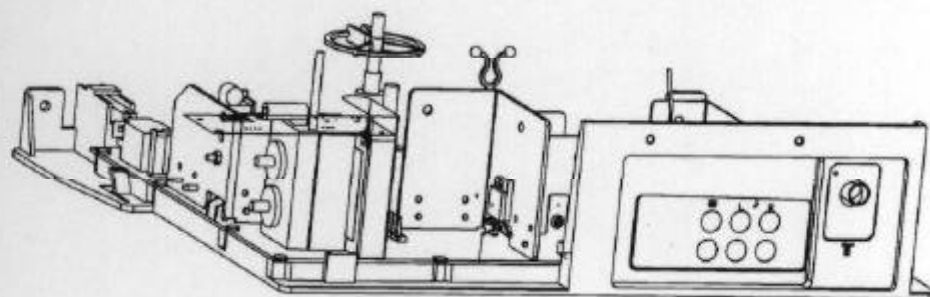


**APEX**

# **COLOR TELEVISION SERVICE MANUAL**

**MODEL NO.: GT2015**

**CHASSIS NO.: CN-12C2**



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## SAFETY INSTRUCTIONS

**WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.**

### X-RAY RADIATION PRECAUTION

1. The EHT must be checked every time the TV is serviced to ensure that the CRT does not emit X-ray radiation as result of excessive EHT voltage. The nominal EHT for this TV is 27.5KV at zero beam current (minimum brightness) operating at AC 120V. The maximum EHT voltage permissible in any operating circumstances must not exceed 30KV. When checking the EHT, use the High Voltage Check procedure in this manual using an accurate EHT voltmeter.
2. The only source of X-RAY in this TV is the CRT. To prevent X-ray radiation, the replacement CRT must be identical to the original fitted as specified in the parts list.
3. Some components used in this TV have safety related characteristics preventing the CRT from emitting X-ray radiation. For continued safety, replacement component should be made after referring the PRODUCT SAFETY NOTICE below.

### SAFETY PRECAUTION

1. The TV has a nominal working EHT voltage of 27.5KV. Extreme caution should be exercised when working on the TV with the back removed.
  - 1) Do not attempt to service this TV if you are not conversant with the precautions and procedures for working on high voltage equipment.
  - 2) When handling or working on the CRT, always discharge the anode to the TV chassis before removing the anode cap in case of electric shock.
  - 3) The CRT, if broken, will violently expel glass fragments. Use shatterproof goggles and take extreme care while handling.
  - 4) Do not hold the CRT by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all power cord forms be replaced exactly as supplied from factory.
3. Voltage exists between the hot and cold ground when the TV is in operation. Install a suitable isolating transformer of beyond rated overall power when servicing or connecting any test equipment for the sake of safety.
4. Replace blown fuses within the TV with the fuse specified in the parts list.
5. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols in the circuit diagram and parts list, it must be the company-approved type and must be mounted as the original.
6. Keep wires away from high temperature components.

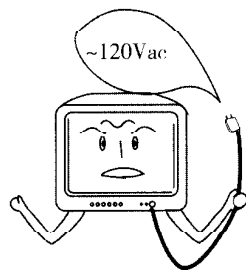
## SAFETY INSTRUCTIONS (continued)

### PRODUCT SAFETY NOTICE

Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols in the circuit diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

### PRECAUTIONS

**Power Sources**—The TV set should be operated only from the type of power source indicated on the TV set or as indicated in the Service Manual. If you are not sure of the type of power supply in your home, consult your sales person or your local power company. For TV sets designed to operate from battery power, or other sources, refer to the operating instructions.

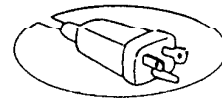


**Grounding or Polarization**—Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

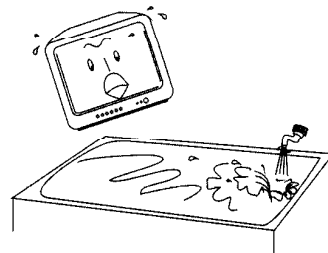


Wide blade  
Lame large  
Cuchilla ancha

**Alternate Warnings**—A three wire grounding type plug—a plug having a third (grounding) pin. This plug will only fit into grounding type power outlet.



**Water and Moisture Warnings**—Do not use the TV set near water—for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool; and the like. The TV set shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the TV set.



**Ventilation**—Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the TV set and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the TV set on a bed, sofa, rug, or other similar surface. This TV set should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

## **SPECIFICATIONS**

|                            |   |
|----------------------------|---|
| Television system:         | NTSC-M  |
| Channel coverage:          | VHF 2~13<br>UHF 14~69<br>CABLE TV :MID BAND (A-8~A-1, A~I)<br>SUPER BAND (J~W)<br>HYPER BAND (AA~ZZ, AAA, BBB)<br>ULTRA BAND (65~94, 100~125) |
| Channels preset:           | 181   |
| Antenna input:             | 75Ω (unbalanced)  |
| Picture tube:              | Effective screen dimensions: 406mm×305mm (15.98×12.01 in.) (Approx.)  |
| Max. audio output:         | 2.5W+2.5W (THD≤7%)  |
| Power source:              | ~120Vac 60Hz  |
| Weight:                    | 25.2kg (55.44 lbs) (Approx.)  |
| Dimensions(W/H/D):         | 512×522×510mm (20.16×20.55×20.08 in.) (Approx.)   |
| Packing dimensions(W/H/D): | 614×634×614mm (24.17×24.96×24.17 in.) (Approx.)   |
| Rated power consumption:   | ~110W   |

Designs and specifications are subject to change without notice.

## **KEY ICS AND ASSEMBLIES**

Table 1 Key ICs and Assemblies

| Serial No. | Position No. | Type        | Function Description                          |
|------------|--------------|-------------|---|
| 1          | N101         | LA76835     | Small signal processor                        |
| 2          | N301         | LA7840      | Vertical output circuit                       |
| 3          | N191         | TDA7057AQ   | Sound power amplifier                         |
| 4          | D701         | LC86F344BA  | Microcontroller                               |
| 5          | D702         | ST24C04     | EEPROM  |
| 6          | NY01         | KA2102B     | TV/Video switch circuit                       |
| 7          | N503         | LM7805      | Tri-terminal regulator                        |
| 8          | NK01         | HEF4053     | Analog switch circuit                         |
| 9          | NB01         | MSP3440     | Audio demodulating and NICAM decoding circuit |
| 10         | NB02         | TDA9808T    | IF signal processor                           |
| 11         | U101         | TDQ-3B8-135 | Tuner   |

## SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS

CN-12C2 chassis mainly consists of an LA76835 small signal processor together with a MSP3440 audio demodulating and processing circuit, LA7840 vertical output circuit, TDA7057AQ audio power amplifier, KA2102B TV/Video switch circuit, TDA9808T IF signal processor and video amplifier. The following give descriptions of signal flow process for the chassis on basis of GT2015's tuner, video signal processor, audio signal processor and scan signal processor. Refer to Fig.1 about signal process of GT2015.

### 1. Tuner

The high frequency circuit comprises a U101 tuner. The RF TV signal received by the antenna is tuned, high-frequency amplified and converted in U101 tuner to develop IF TV signals which are output in two ways after separated by the separated audio/video separator: One set is sent to the audio signal processor and another set to the video signal processor.

### 2. Audio Signal Processor

The audio signal processor contains a V101 pre-IF amplifier, audio/video separator formed of Z102, Z103, TDA9808T IF processor, part of LA76835 (including an audio IF amplitude-limit amplifier, PLL discriminator, audio amplifier, volume control and audio switch), TV/Video switch circuit, MSP3440 audio demodulating and processing circuit, TDA7057AQ audio power amplifier and speakers.

#### 1) Sound IF circuit

One set of IF TV signal output from U101 is output in two ways after amplified by V101: The first set is separated out sound IF signals to Pin19 and Pin20 of TDA9808T respectively by ZB02 surface acoustic wave filter; the second set is separated out picture IF signals to Pin1 and Pin2 of TDA9808T respectively by ZB01 SAW filter.

The picture IF signals are sent into the PLL voltage-control oscillator in the sync IC to develop a stable 45.75MHz signal for use of 4.5MHz second SIF signal. Externally connect Pin14 and Pin15 of TDA9808T to LB05 tuning component of the voltage-control oscillator, Pin4 to PLL's low pass filtering circuit incorporating RB26 and CB50, Pin17 to the PIF AGC's filtering circuit incorporating CB48 and RB23, and Pin3 to RB26 and RB27 start-control adjustment resistors of RFAGC.

The sound IF signal input to Pin19 and Pin20 of TDA9808T is multi-sound IF amplified and double mixed to develop a second sound IF signal, which is then output from TDA9808T's Pin10. Externally connect Pin5 to CB51 filtering capacitor of the SIF AGC.

The second SIF signal from TDA9808T's Pin10 is sent to MSP3440's Pin47 after low-pass filtered by LB09, CB37, CB308 and amplified by VB03 and VB02. In MSP3440, the analog audio signal is converted into a digital audio signal through AGC control and A/D conversion, which later is processed into a digital stereo audio signal or digital dual sound signal to the related switch circuit after through FM demodulation and NICAM decoding. AV audio signals switched over and output from the AV PCB are input to Pin41 and Pin42 of MSP3440, which are also sent into the related switch circuit after through D/A conversion and proper amplification. The two audio signals are output in several ways after switchover in the switch circuit, of which one set is processed into analog audio signals and output from Pin24 and Pin25 to the audio power amplifier after through matrix processing, tone/loudness equalization/balance/volume controls and D/A conversion; another set is processed into analog audio signals to be output from Pin30 and Pin31 to the AV PCB after through matrix processing, volume

## **SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)**

control, D/A conversion and switchover of the audio output switch and then output from the corresponding terminal after buffered by VV03 and VV04.

### **2) Audio switchover circuit**

The audio switchover circuit consists of KA2102B and HEF4053. From the circuit diagram, we can see that audio L1/R1 signals from the AV1 terminals are sent into Pin4, Pin5, Pin9 and Pin10 of KA2102B respectively, audio L2/R2 signals from the AV2 terminals into Pin1, Pin2, Pin12 and Pin13 of KA2102B respectively, all of which are output from Pin21 and Pin22 to Pin41 and Pin42 of MSP3440 after switched over by KA2102B. After digital processed in MSP3440, the signals are switched over with the TV digital audio signal, which are finally output from Pin24, Pin25, Pin30 and Pin31 of MSP3440 respectively.

### **3) Audio power amplifier**

The audio power amplifier comprises a TDA7057AQ (N601). Two sets of audio signals from MSP3440's Pin24 and Pin25 are input to N191's Pin3 and Pin5 respectively, which are then output from Pin8, Pin10, Pin11 and Pin13 respectively to drive the speakers to output sound after though BTL power amplifying.

N191's Pin1 and Pin7, volume-control pins, function as mute control pins for the chassis. When Pin23 of D701 microcontroller outputs high level, V191 saturates and conducts and N191's Pin1 and Pin7 output low level to mute sound. The power-off mute circuit is formed of V192, VD191, C191, R191, and R194.

## **3. Video Signal Processor**

### **1) Picture IF circuit**

The video signal processor consists of a V101 pre-IF amplifier, Z101 picture IF SAW filter, LA76835 small signal processor, video amplifier and CRT.

Another set of IF signal output from U101 tuner is coupled to base of V101 by R101 and C108 to compensate insertion loss of Z101 SAW filter after amplified by V101. Then the signal is IF filtered out a picture IF signal to LA76835's Pin5 and Pin6 by Z101. R105, R107 and R108 are bias resistors of DC operating point; C110 and R106 are negative feedback branch circuits to suppress self-excitation. L104 and resonator of the distributed capacitor are located near PIF to improve gain of PIF signal. R120 is a damping resistor to stretch frequency band of the amplifier. C109 is an AC bypass capacitor, and R104 and C112 are formed into a decoupling filter circuit.

In N101, the IF signals are filtered out a video signal as well as a second SIF signal after through multi IF amplifying and PLL sync detecting, which then are output in two ways: One set is output from Pin46 to the TV/Video switch circuit after trapped (to restrain the second SIF signal), cored and pre-video-amplified.

### **2) TV/Video switch circuit**

The TV/Video switch circuit comprises KA2102B and HEF4053. V1 and V2 video signals from the AV1 and AV terminals are input to Pin11 and Pin14 of KA2102B respectively. After switched over by KA2102B, the two signals are output from Pin30, and then are sent to Pin2 of HEF4053 after buffered and amplified by VV01. TV video signals from LA76835's Pin46 are sent to HEF4053's Pin1 where the

## SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)

TV/AV video signals are switched over by HEF4053 and sent to Pin24 of KA2102B from Pin15 of HEF4053. After switched with Y/C signals input to LA2012B's Pin6 and Pin8 from the S-VIDEO terminal, the signals are output from Pin18 and Pin20 to Pin32 and Pin42 of LA76835 for video processing and sync separation.

### 3) Luminance signal processor

The luminance signal processor includes a luminance delay line, definition control circuit, coring circuit and contrast/ luminance control circuit.

As the bandwidth of channel processing the luminance signal is wider than that one processing the chroma signal, the transmission speed of the luminance signal is faster than that of the chroma signal. If without delay processing, the time when the luminance signal reaches the CRT is not consistent with that when chroma signal reaches the CRT, resulting in displayed luminance and color not coinciding. A luminance delay line integrated in LA76835 can adjust delay time of the delay line by the I<sup>2</sup>C bus so that the luminance and chroma signals reach the CRT synchronously. After delay processed, the luminance signal is sent into the definition control circuit, coring circuit, black level stretcher and contrast/ luminance control circuit for processing, and then sent into the luminance amplifier for amplifying and outputting a Y signal to the primary color matrix circuit.

LA76835 is equipped with an aperture compensating circuit to improve definition of pictures, coring circuit to reduce high frequency noise and black level stretcher to improve picture quality greatly.

### 4) Chroma signal processor

The chroma signal processor includes an ACC amplifier, killer identification control circuit, sub-carrier restorer, baseband delay circuit, PAL/NTSC demodulator and color difference matrix/primary color matrix circuit.

After the video signals or Y/C separation signals input to Pin32 and Pin42 are selected by the TV/ Video switch, the output video signals are filtered out chroma signals with luminance element removed by the band pass filter, which are sent to the chroma signal selector. After selected, the chroma signals are amplified and chroma-controlled by the ACC circuit, and then output in two ways: One set is sent to the NTSC chroma demodulator and another set to the sub-carrier restorer.

The sub-carrier restorer in LA76835 uses a voltage-control crystal oscillator. Externally connect a 3.58MHz crystal (G201) to N101's Pin38, a low pass filter of APC2 to LA76835's Pin36 and a low pass filter of APC1 to LA76835's Pin39.

The calibrated sub-carrier regeneration signal is sent into the sync demodulator together with the modulated signal from ACC to demodulate out R-Y and B-Y color difference signals.

The demodulated color difference signals are sent into 1H baseband delay circuit for color difference signal separation after clamped by the clamper, and then sent to the matrix circuit.

The color difference matrix/primary color matrix circuit includes a matrix circuit to generate a G-Y signal, contrast/luminance control circuit, primary color matrix circuit, character clamper, character contrast control circuit, primary selector, white balance adjuster and beam current control circuit.

The R-Y and B-Y color difference signals from the baseband delay circuit are sent to the color difference matrix circuit for matrix processing to get a G-Y signal. The three color-difference signals are sent to the contrast/luminance control circuit together with the Y signal.

## **SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)**

Before sent to the primary matrix, the color difference signals/Y signal should be unitedly adjusted by the contrast/luminance control circuit to get proper three primary colors. In addition, LA76835 is equipped with setup circuit for sub-brightness, sub-contrast and sub-saturation so that users can adjust brightness, contrast and saturation, all of which are controlled by CPU through the I<sup>2</sup>C bus.

The R-Y, B-Y and G-Y color difference signals can be processed into R, G and B three primary color signals after together with the Y signal in the primary color matrix circuit, which function as drive signals to display main pictures. Send the three primary color signals and the three character primary color signals from the CPU into the primary color selector for selection, then output.

The three character primary color signals from the CPU are input to Pin14, Pin15 and Pin16 of LA76835 respectively. Firstly, clamp them on a fixed DC level to restore out the DC element lost when AC coupling transmission. Secondly, send the signals to the primary selector through the character contrast control circuit. Under normal condition, characters are slightly brighter than pictures while the former changing range is narrower than the latter. The character blanking signal is input to Pin17 of LA76835. When the signal is abnormal, no character display may occur.

Traditional white balance is adjusted through adjusting the bright and dark balance potentiometer of the CRT drive circuit. The white balance adjuster of the chassis is equipped in LA76835, which is performed by the CPU through the I<sup>2</sup>C bus.

### **5) Video amplifier**

The video output circuit is to amplify three primary colors and drive the CRT to display color pictures.

V901, V902 and V903 are three end video amplifying triodes. V904, D901, D902, D903, D905, C905 and C907 are formed into a spot killer.

When the TV operates, 9V supply voltage supplies enough voltage to C905 so that C905's negative has lower potential to saturate V905 and its positive has higher potential to cut off V904. As the positive potentials of D901, D902 and D903 diodes lower than their negative potentials, the diodes cut off, not affecting the TV's operation. When turn-off, C904, C905 and C906 discharge to cut off V904 through D904, D905 and R911. As the electric charge of C907 is discharged quickly due to its too small capacitance, V904's emitter is conducted to conduct D901, D902 and D903, ensuring V901, V902 and V903 end video amplifying triodes conducting for a period of time and high voltage of the CRT discharged quickly through the end amplifying triodes. Thus spot is killed when turn-off.

V905, D904, D905, R909, R910, R911 and R912 are formed into a DC bias circuit of the video amplifier.

## **4. Horizontal/Vertical Scan Circuit**

The horizontal/vertical scan circuit in this chassis comprises a sync separator, horizontal oscillator, horizontal/vertical divider, 50Hz/60Hz identify circuit, AFC1/AFC2 and line pre-drive circuit in LA76835; V431 line drive circuit, V432 horizontal output circuit and LA7840 vertical output circuit.

### **1) LA76835 horizontal/vertical scan small signal processor**

LA76835 applies a digital dividing horizontal/vertical scan circuit. In the circuit the oscillation signal with nearly 256 times the size of horizontal frequency generated from the voltage-control oscillator is processed into a horizontal frequency pulse signal by the divider and AFC1 and AFC2 circuits, which



## SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)

later is divided into a vertical frequency pulse signal. The circuit improves sync performance greatly with low horizontal start voltage (5V) and without horizontal sync and vertical sync adjustments.

### 2) Sync separator

The sync separator in LA76835 consists of a horizontal sync separator (including a sync separation triode T1 and comparison amplifier 1) and vertical sync separator. The bias of T1 is supplied with -7V fixed bias voltage. With sync chip (downwards) in the video signal, potential of T1's emitter drops and the emitter conducts. The conducted current charges the internal capacitor C through T1 with positive to the upper and negative to the lower. Without sync chip, potential of T1's emitter rises and the emitter cuts off, thus the collector outputting high level to get negative pulse with the same width as the sync chip's on the T1's collector and separate out a composite sync signal. At the same time, C discharges slowly through R1 to get ready for the next sync separation.

The negative sync pulse separated by the T1's collector is out-phased to positive pulse by the comparison amplifier 1, which is output in three ways: The first set is sent to the AFC1 PLL discriminator to function as a reference phase signal; the second set is separated out vertical frequency pulse by the vertical sync separator and shaped into vertical sync pulse with steep edges to be sent to the vertical divider; the third set is supplied to the horizontal consistency detector for checking horizontal scan for sync.

### 3) Horizontal oscillator

The horizontal oscillator in LA76835 is a integrated voltage-control oscillator whose free oscillating frequency is  $256 \times f_{H.L.} = 4\text{MHz}$ . Different from conventional integrated horizontal scan oscillator, the horizontal frequency oscillator in LA76835 only needs to be externally connected to a error resistor with smaller reference current source set to decide reference current source in the horizontal oscillator.

### 4) AFC1 PLL discriminator and horizontal divider

AFC1 PLL discriminator in LA76835 includes a voltage-control crystal oscillator, horizontal divider, discriminator 1 and low-pass filter externally connected to Pin26. The discriminator is a frequency phase lock loop circuit, whose reference signal comes from horizontal sync pulse output from the comparison amplifier 1. 4MHz oscillation signal generated from the horizontal oscillator in LA76835 is sent to the horizontal divider, which is sent to horizontal count divider after fixedly divided with 256 times the size of horizontal frequency.

### 5) AFC2 discriminator and phase shifter

In LA76835, the second group PLL formed of AFC2 circuit and horizontal output phase control circuit (phase shifter) is to correct phase of horizontal frequency pulse output from Pin27.

AFC2 has two sets of signals input: One set of signal is a horizontal frequency square wave pulse from the horizontal divider functioning as a reference signal for the phase of the horizontal frequency pulse is locked in AFC1 PLL by the horizontal sync pulse and remains unchanged. After delayed for  $4\mu\text{s}$  (to compensate delay resulted from the horizontal output circuit for convenience of locking loop), the signal is sent to the AFC2 circuit.

Another is a horizontal flyback pulse output from T432 FBT. The pulse is sent into the IC from Pin28 of LA76835 to be pulse shaped into a pulse signal with steep locked edges, which is sent into the AFC2 circuit as a comparison signal. Through phase comparison, the two signals are processed into error

**SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)**

current, which later is filtered out to DC error voltage by the IC's low pass filter to control phase-shift angle and adjust horizontal frequency pulse phase output from Pin27, thus controlling start time of horizontal flyback and positive/negative peak of the horizontal scan current and correcting positive conducting time and current peak value of the horizontal output triode.

**6) Vertical divider**

The horizontal frequency oscillation pulse from the horizontal scan count divider is sent to the vertical count divider. Meanwhile the vertical sync signal from the vertical sync separator (frequency separator) is also sent to the vertical count divider. Controlled by the vertical sync pulse, the circuit counts horizontal frequency pulses and identifies and corrects vertical frequency, all of which are controlled by the CPU through the I<sup>2</sup>C bus. The vertical frequency is shifted to the Capture, Identification or Locking mode by the CPU.

**Capture mode:** The vertical sync count divider enters the wide-range count comparison mode, in which the CPU provides a wide-range count comparison value, i.e. when vertical frequency of the received signal changes within a wide range, the count circuit can always pause counting and enters another mode for counting and comparing.

**Identification mode:** Once the count circuit pauses counting in the Capture mode, the CPU provides a relatively narrow-range of count comparison value and the count divider recounts and re-compares until the comparison is finished to enter the Locking mode.

**Locking mode:** After identification, the CPU provides a narrower-range of count comparison value. Only when vertical frequency of the received signal changes within a very narrow range, can the operation mode be changed and enter the wide hold range, ensuring the generated vertical drive pulse strict sync with the vertical sync pulse.

**7) Vertical sawtooth generator and vertical output circuit**

The vertical frequency pulse output from the vertical count divider is sent to the sawtooth generator to develop a sawtooth with corresponding vertical frequency, which is output from LA76835's Pin23 to the vertical output circuit. To get stable amplitude of the locked vertical sawtooth signal, an auto level limiter (ACL) is also integrated in LA76835 to control amplitude of the output sawtooth. Externally connect the ALC's filtering component to Pin24 of LA76835. The chassis' vertical output circuit consists of LA7840.

The vertical frequency sawtooth from LA76835's Pin23 is DC coupled by R302 to LA7840's Pin5 to be amplified by the internal differential amplifier. Pin4 is an in-phase input terminal of the differential amplifier. Externally connected R301 and R301A are DC bias resistors, and C321 is a filtering capacitor. The amplified vertical sawtooth voltage is output from Pin2 to the deflection yoke to generate deflection current. R309 and C307 filter out of horizontal frequency element inducted by the horizontal scan circuit. VD302 is a clipping diode. R310 and C308 eliminate parasitic oscillation generated when the deflection yoke and distributed capacitors harmonically oscillate. The branch formed of C304, R307 and R304 fetches out an AC sawtooth from lower part of the deflection yoke to feed it back to the input terminal to correct vertical scan linearity. R314, R313, R305 and R304 are formed into a DC voltage divider to fetch out DC voltage to feed back the input terminal to regulate DC operating point of the vertical output stage. C301 is a high frequency decoupling capacitor. VD301 and C302 are formed into

## SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)

a pump supply voltage raiser. The vertical flyback pulse output from Pin7 is used for positioning characters.

### 8) Line drive and horizontal output circuit

Similar to that of conventional TVs, the line drive and horizontal output circuit comprises discrete components including a V431 line drive triode, V432 horizontal output triode, T431 line drive transformer and T432 FBT.

LA76835's Pin27 outputs line drive pulse with width of 24 $\mu$ s which is supplied to base of V431. After amplified and pulse shaped by V431 and coupled by T431, the horizontal frequency pulse is supplied to base of V432. R403 and C402 are formed into a damping resistor to restrict primary of T431 from generating large-amplitude inductive electric potential and avoid breakdown of the line drive triode. C401 is a high frequency filtering capacitor to filter out of high harmonic.

Line drive pulse from the secondary of T431 line drive transformer is supplied to base of V432 to control V432 operation and develop sawtooth scan current in the horizontal deflection yoke so that electron beams in CRT scan horizontally and over 1KV horizontal flyback pulse is formed on collector of the V432.

C435 and C436 are flyback capacitors. Adjusting their capacitances properly can change horizontal flyback time.

L431 and L432 are used to restrain horizontal radiation. DY-H is a horizontal deflection yoke. C441 and C442 are S correcting capacitors, L441 and L442 are linear correcting inductors and R441 and R442 are dampening resistors.

The flyback pulse from T432's Pin2 provides filament voltage for the CRT through RF481. The horizontal flyback pulse from Pin7 is supplied to the CPU to position character level after out-phased by V703 or supplied to N101's Pin28 for AFC discrimination. The horizontal flyback pulse from T432's Pin8 is pulse rectified by VD555A to develop +190V voltage to the video amplifier. In addition, T432 provides focus voltage, screen voltage and anode high voltage for the CRT.

# SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)

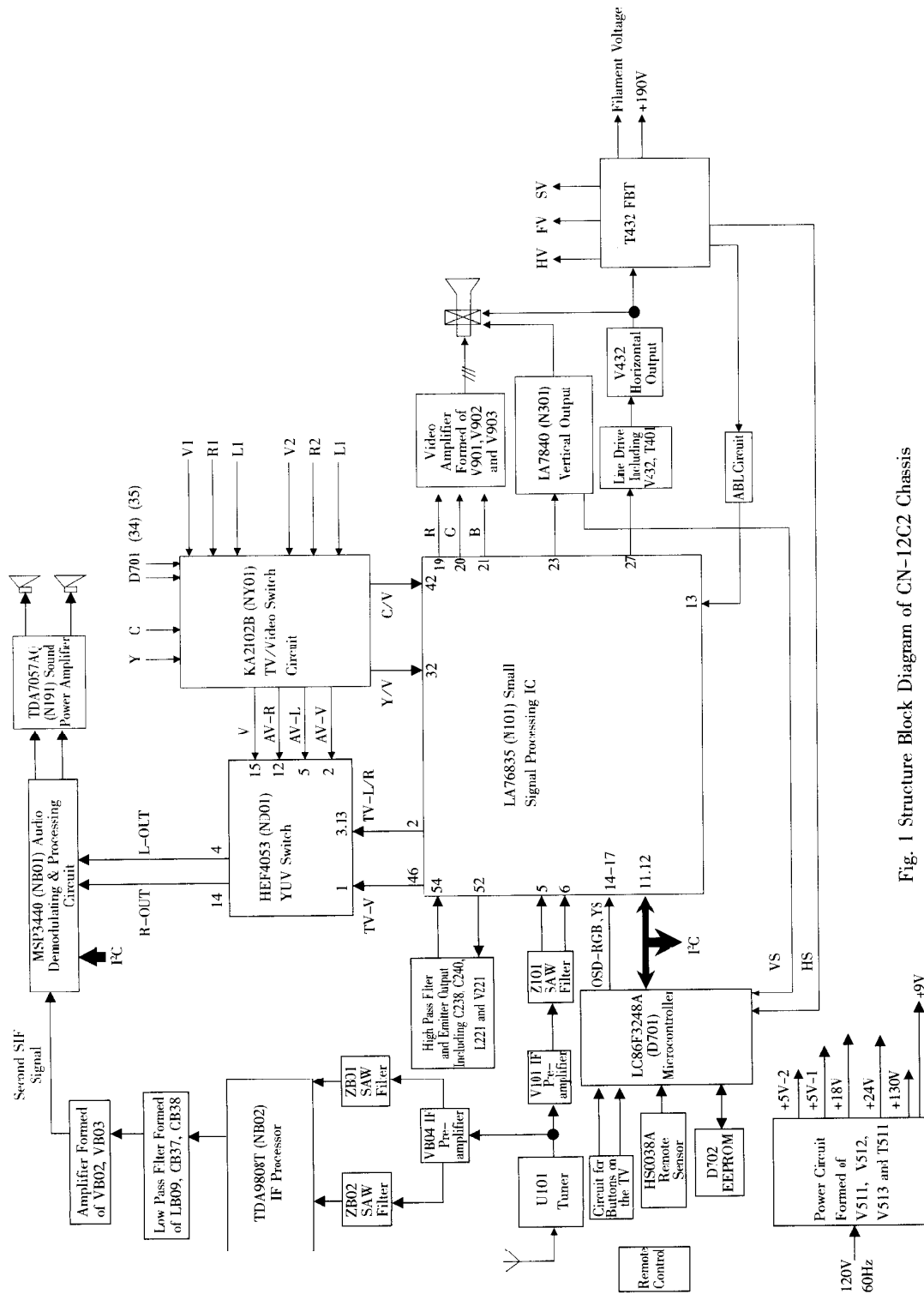
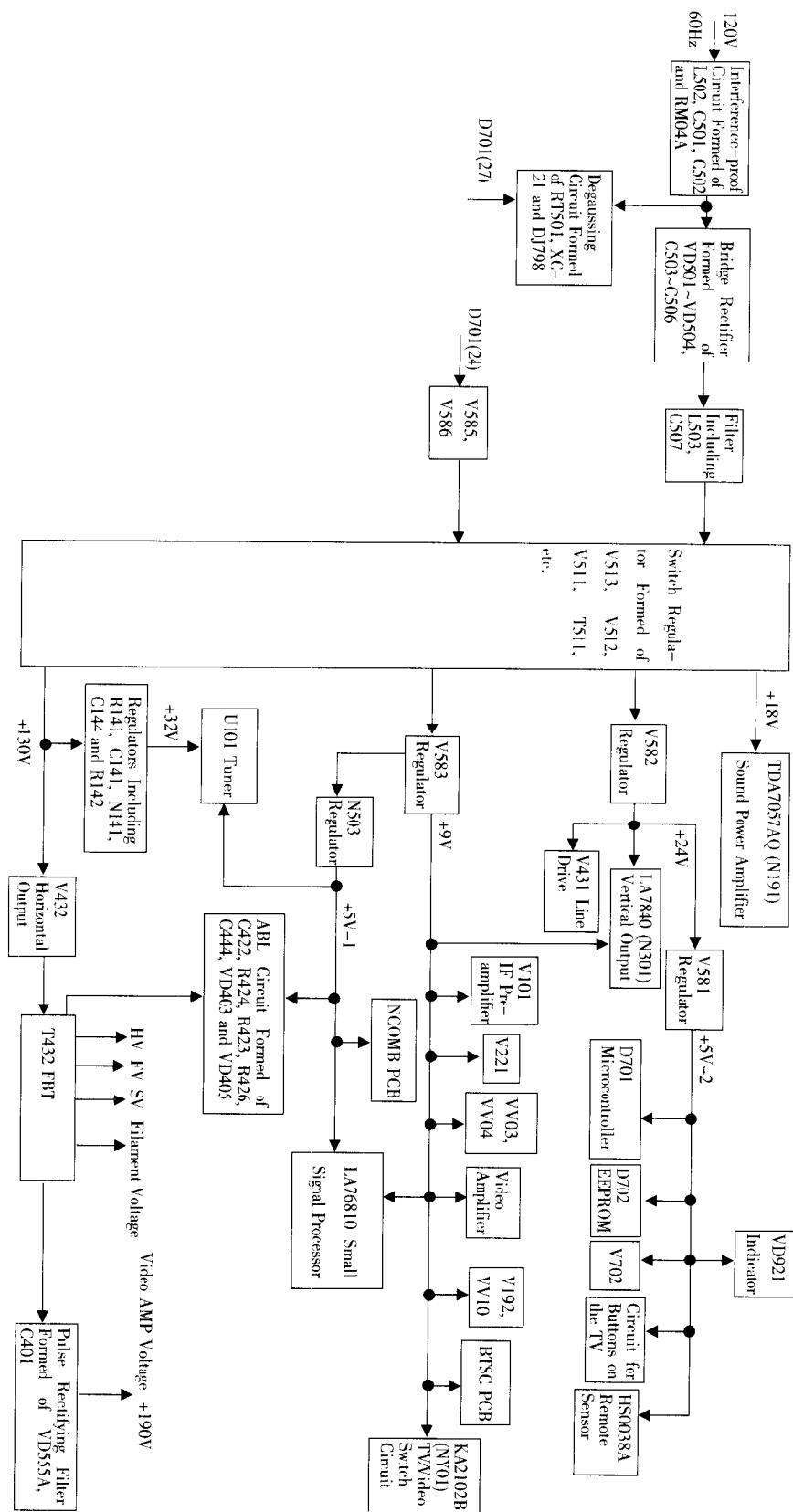


Fig. 1 Structure Block Diagram of CN-12C2 Chassis



## SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)

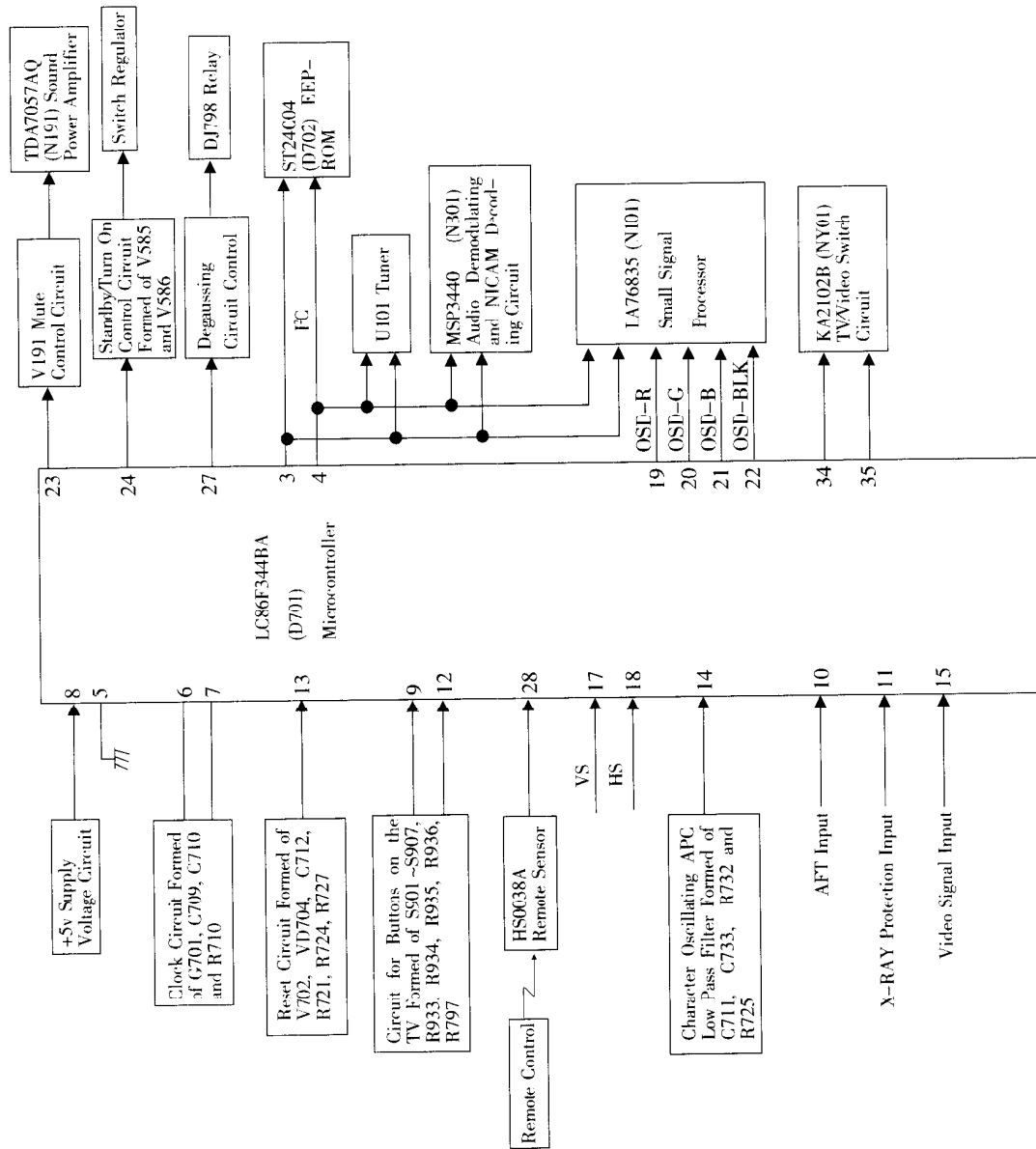


Fig. 3 Block Diagram for CN-12C2 Remote Control Structure



## IC DATA AND SERVICE DATA (continued)

### LC86F344BA (D701) 8-Bit Single Chip Microcontroller

#### 1. Overview

The LC86F344BA are 8-bit single chip microcontrollers with the following on-chip functional blocks:

- CPU: Operable at a minimum bus cycle time of 0.424 $\mu$ s
  - On-chip ROM capacity
    - Program ROM: 32K/28K/24K/20K/16K bytes
    - CCROM: 16K bytes
  - On-chip ROM capacity: 512 bytes
  - OSD RAM: 352 $\times$ 9 bits
  - Closed-Caption TV controller and the on-screen display controller
  - Closed-Caption data slicer
  - Four channels $\times$ 6-bit AD Converter
  - Three channels $\times$ 7-bit PWM
  - 16-bit timer/counter, 14-bit base timer
  - IIC-bus compliant serial interface circuit (Multi-master type)
  - ROM correction function
  - 11-source 8-vectored interrupt system
  - Integrated system clock generator and display clock generator
    - Only one X $\bar$ tal oscillator (32.768kHz) for PLL reference is used for both generators
  - TV control and the Closed Caption function
- All of the above functions are fabricated on a single chip.



## IC DATA AND SERVICE DATA (continued)

LC86F344BA (continued)

## 2. System Block Diagram

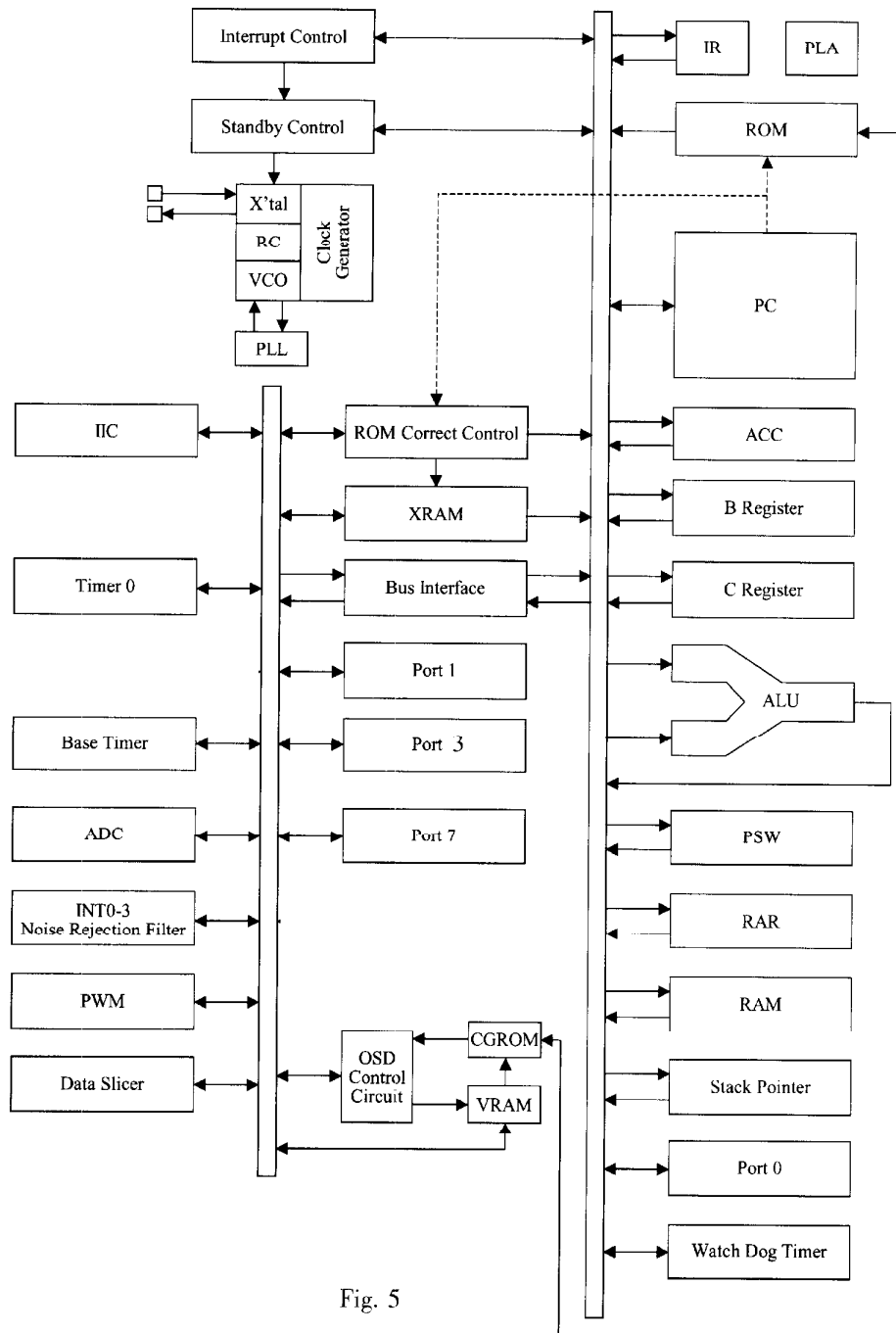


Fig. 5

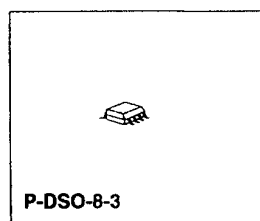
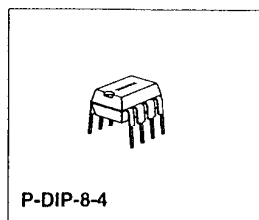
3. Refer to Table 3 about Functions and Service Data of LC86F344BA's Pins.

## IC DATA AND SERVICE DATA (continued)

## ST24C04 (D702) EEPROM

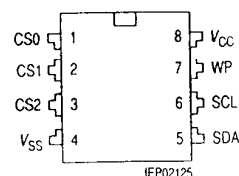
## 1. Features

- Data EEPROM internally organized as 512 bytes and 32 pages×16 bytes
- Page protection mode, flexible page-by-page hardware write protection
- Additional protection EEPROM of 32 bits, 1 bit per data page
- Protection setting for each data page by writing its protection bit
- Protection management without switching WP pin
- Low power CMOS
- $V_{CC}=2.7$  to 5.5V operation
- Two wire serial interface bus, I<sup>2</sup>C–Bus compatible
- Filtered inputs for noise suppression with Schmitt trigger
- Clock frequency up to 400 kHz
- High programming flexibility
- Internal programming voltage
- Self timed programming cycle including erase
- Byte–write and page–write programming, between 1 and 16 bytes
- Typical programming time 6 ms(<10ms) for up to 16 bytes
- High reliability
- Endurance  $10^6$  cycles<sup>1)</sup>
- Data retention 40 years<sup>1)</sup>
- ESD protection 4000 V on all pins
- 8 pin DIP/DSO packages
- Available for extended temperature ranges
- Industrial:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Automotive:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$

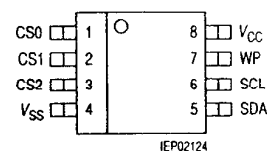


## 2. Pin Configuration

P-DIP-8-4



P-DSO-8-3



## 3. Block Diagram

## 4. Refer to Table 4 about Functions and Service Data of ST24C04's Pins.

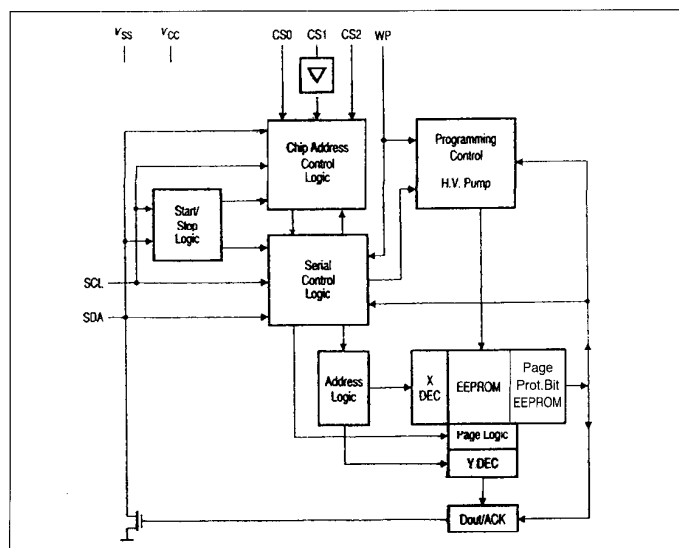


Fig. 6

## IC DATA AND SERVICE DATA (continued)

### KA2102B (NY01) TV/Video Switch Circuit

#### 1. Features

The KA2102B (NY01) TV/Video switch circuit is an electronic switch circuit controlling four sets of audio signal inputs, three sets of video signal inputs, two sets of Y/C separation signals inputs, one set of video signal output, one set of Y/C separation signal output and one set of audio signal output.

#### 2. Block Diagram

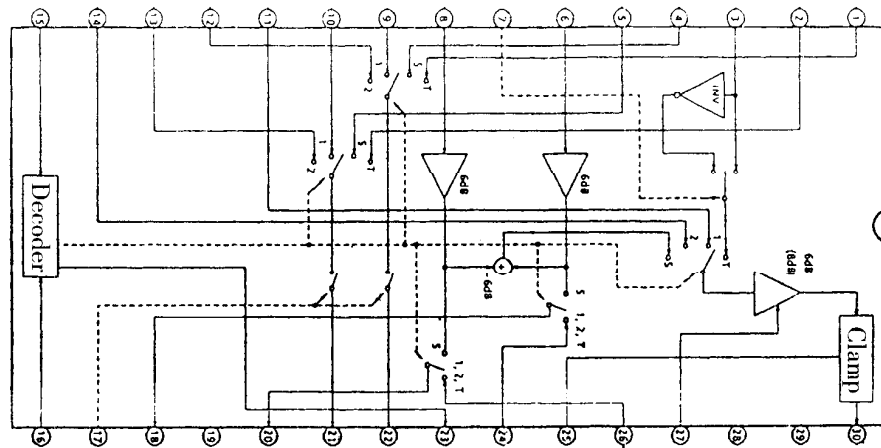


Fig.7

#### 3. Value Table

| Level for Control Terminal |      | Switchover Mode |
|----------------------------|------|-----------------|
| (15)                       | (16) |                 |
| H                          | H    | TV              |
| H                          | L    | AV1             |
| L                          | H    | SVHS            |
| L                          | L    | AV2             |

4. Refer to Table 5 about Functions and Service Data of KA2102B's Pins.

### Vertical Deflection Output Circuit

- Low power dissipation due to built-in pump-up circuit
- Vertical output circuit
- Thermal protection circuit built in
- Excellent crossover characteristics
- DC coupling possible

**3. Refer to Table 6 about Functions and Service Data of LA7840's Pins.**

**IC DATA AND SERVICE DATA (continued)****TDA7057AQ****2×8W Stereo BTL Audio Output Amplifier with DC Volume Control****1. Features**

- DC volume control
- Few external components
- Mute mode
- Thermal protection
- Short-circuit proof
- No switch -on and switch -off clicks
- Good overall stability
- Low power consumption
- Low HF radiation
- ESD protected on all pins.

**3. Block Diagram****2. General Description**

The TDA7057AQ is a stereo BTL output amplifier with DC volume control. The device is designed for use in TVs and monitors, but is also suitable for battery-fed portable recorders and radios.

**Missing Current Limiter (MCL)**

A MCL protection circuit is built-in. The MCL circuit is activated when the difference in current between the output terminal of each amplifier exceeds 100 mA (typical 300 mA). This level of 100 mA allows for single-ended headphone applications.

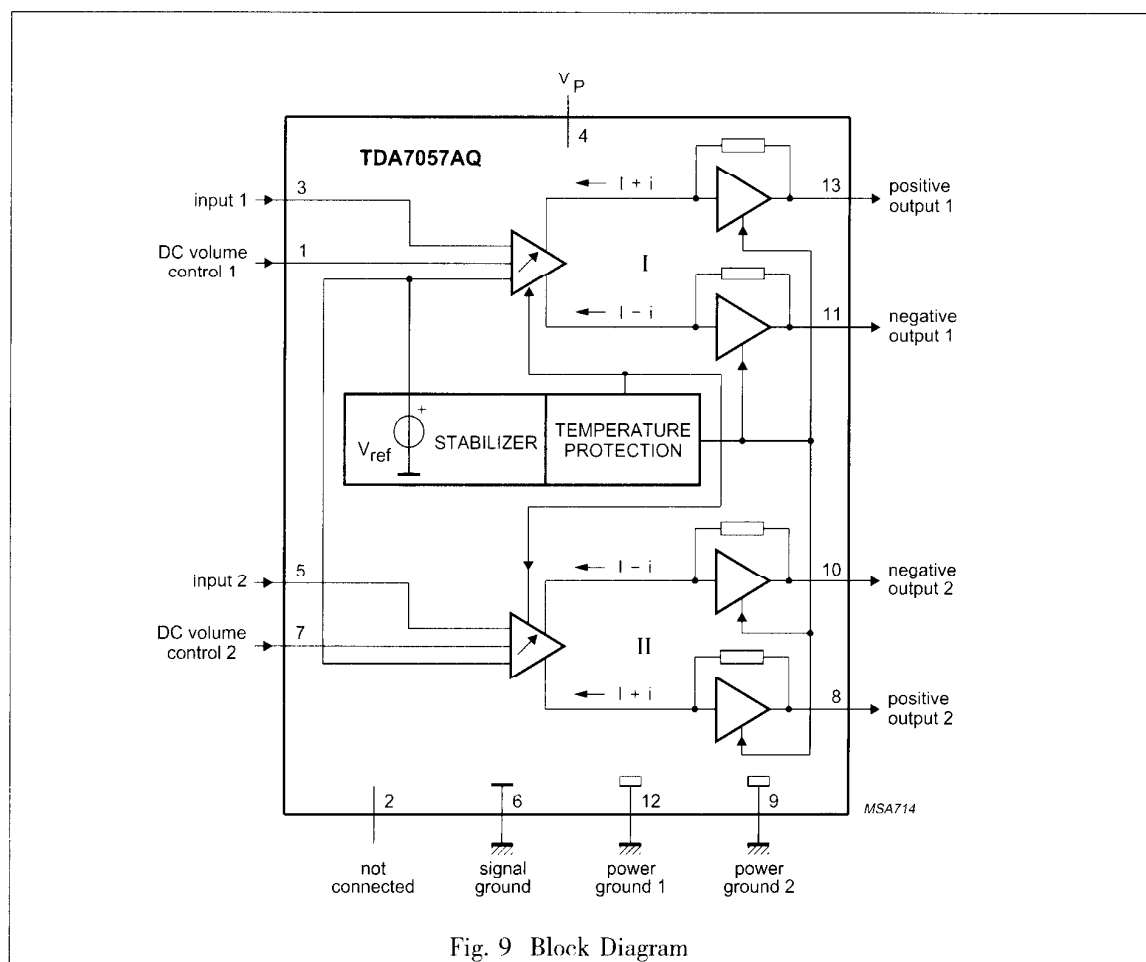


Fig. 9 Block Diagram

4. Refer to Table 7 about Functions and Service Data of TDA7057AQ's Pins.

## IC DATA AND SERVICE DATA (continued)

### MSP3440

#### Multistandard Sound Processor Family

Release Note: Revision bars indicate significant changes to the previous edition. The hardware and software description in this document is valid for the MSP3440 version B5 and following versions.

#### 1. Introduction

The MSP3440 family of single-chip Multistandard Sound Processors covers the sound processing of all analog TV-Standards worldwide, as well as the NICAM digital sound standards. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed on a single chip. Figure 10 shows a simplified functional block diagram of the MSP3440.

This new generation of TV sound processing ICs now includes versions for processing the multichannel television sound (MTS) signal conforming to the standard recommended by the Broadcast Television Systems Committee (BTSC). The DBX noise reduction, or alternatively MICRONAS Noise Reduction (MNR) is performed alignment free.

Other processed standards are the Japanese FM-FM multiplex standard (EIA-J) and the FM Stereo Radio standard.

Current ICs have to perform adjustment procedures in order to achieve good stereo separation for BTSC and EIA-J. The MSP3440 has optimum stereo performance without any adjustments.

All MSP3440 versions are pin and software downward-compatible to the MSP3440. The MSP3440 further simplifies controlling software. Standard selection requires a single I<sup>2</sup>C transmission only.

The MSP3440 has built-in automatic functions. The IC is able to detect the actual sound standard automatically (Automatic Standard Detection). Furthermore, pilot levels and identification signals can be evaluated internally with subsequent switching between mono/stereo/bilingual; no I<sup>2</sup>C interaction is necessary (Automatic Sound Selection).

The ICs are produced in submicron CMOS technology.

The MSP3440 is available in the following packages: PLCC68, PSDIP64, PSDIP52, PQFP80 and PLQFP64.

#### 2. Block Diagram

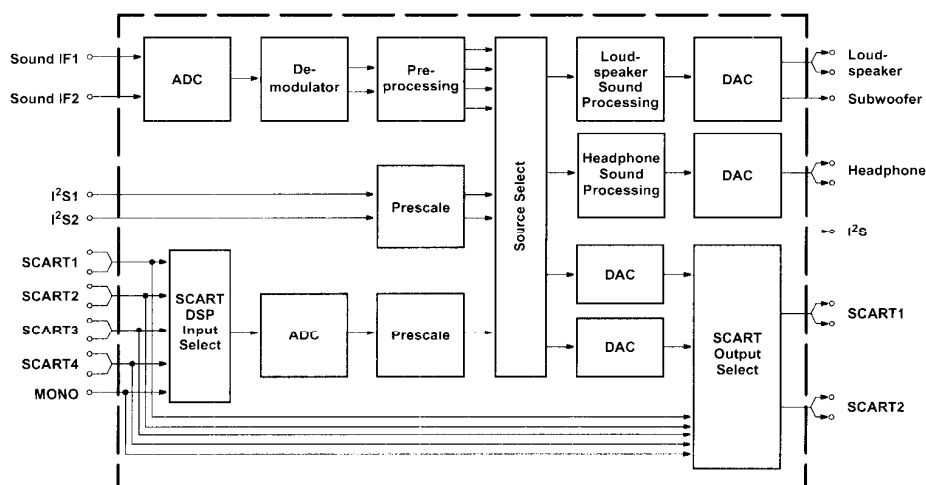


Fig. 10 Simplified Functional Block Diagram of the MSP3440

#### 3. Refer to Table 8 about Functions and Service Data of MSP3440's Pins.

## IC DATA AND SERVICE DATA (continued)

### TDA9808T

#### Single Standard VIF-PLL with QSS-IF and FM-PLL Demodulator

##### 1. Features

- 5V supply voltage (9V supply voltage for TDA9808T (DIP20) only)
- Applicable for IFs (Intermediate Frequencies) of 38.9MHz, 45.75MHz and 58.75 MHz
- Gain controlled wide band Video IF (VIF)-amplifier (AC-coupled)
- True synchronous demodulation with active carrier regeneration (very linear demodulation, good intermodulation figures, reduced harmonics, excellent pulse response)
- Robustness for over-modulation better than 105% due to Phase Locked Loop (PLL)-bandwidth control at negative modulated standards
- VIF Automatic Gain Control (AGC) detector for gain control, operating as peak sync detector
- Tuner AGC with adjustable TakeOver Point (TOP)
- Automatic Frequency Control (AFC) detector without extra reference circuit
- AC-coupled limiter amplifier for sound intercarrier signal
- Alignment-free FM-PLL demodulator with high linearity
- Sound IF (SIF) input for single reference Quasi Split Sound (QSS) mode (PLL controlled); SIF AGC detector for gain controlled SIF amplifier; single reference QSS mixer for high performance
- Electrostatic Discharge (ESD) protection for all pins.

##### 2. General Description

The TDA9808T is an integrated circuit for single standard (negative modulated) vision IF signal processing and FM demodulation, with single reference QSS-IF in TV and VTR sets.

# IC DATA AND SERVICE DATA (continued)

## TDA9808T (continued)

### 3. Block Diagram

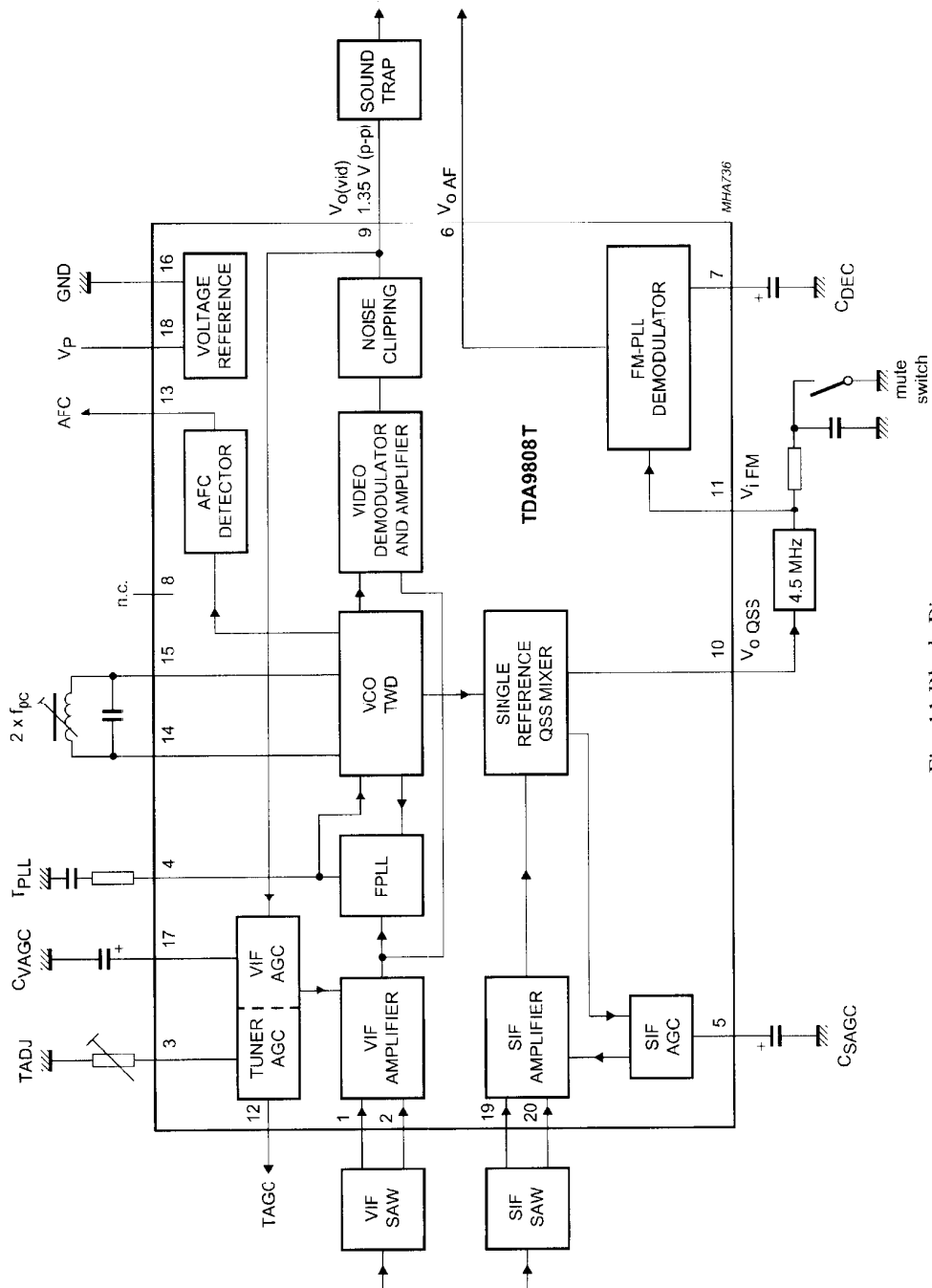


Fig. 11 Block Diagram

3. Refer to Table 9 about Functions and Service Data of TDA9808T's Pins.



## IC DATA AND SERVICE DATA (continued)

## HEF4053

## Triple 2-channel Analog Multiplexer/Demultiplexer

## 1. Description

The HEF4053 is a triple 2-channel analog multiplexer/demultiplexer with a common enable input ( $\bar{E}$ ). Each multiplexer/demultiplexer has two independent inputs/outputs ( $Y_0$  and  $Y_1$ ), a common input/output ( $Z$ ), and select inputs ( $S_n$ ). Each also contains two-bidirectional analog switches, each with one side connected to an independent input/output ( $Y_0$  and  $Y_1$ ) and the other side connected to a common input/output ( $Z$ ).

With ( $\bar{E}$ ) LOW, one of the two switches is

selected (low impedance ON-state) by  $S_n$ . With  $\bar{E}$  HIGH, all switches are in the high impedance OFF-state, independent of  $S_A$  to  $S_C$ .

$V_{DD}$  and  $V_{SS}$  are the supply voltage connections for the digital control inputs ( $S_A$  to  $S_C$  and  $\bar{E}$ ).

The  $V_{DD}$  to  $V_{SS}$  range is 3 to 15V. The analog inputs/outputs ( $Y_0$ ,  $Y_1$  and  $Z$ ) can swing between  $V_{DD}$  as a positive limit and  $V_{EE}$  as a negative limit.  $V_{DD}-V_{EE}$  may not exceed 15 V.

For operation as a digital multiplexer/demultiplexer,  $V_{EE}$  is connected to  $V_{SS}$  (typically ground).

## 2. Block Diagrams

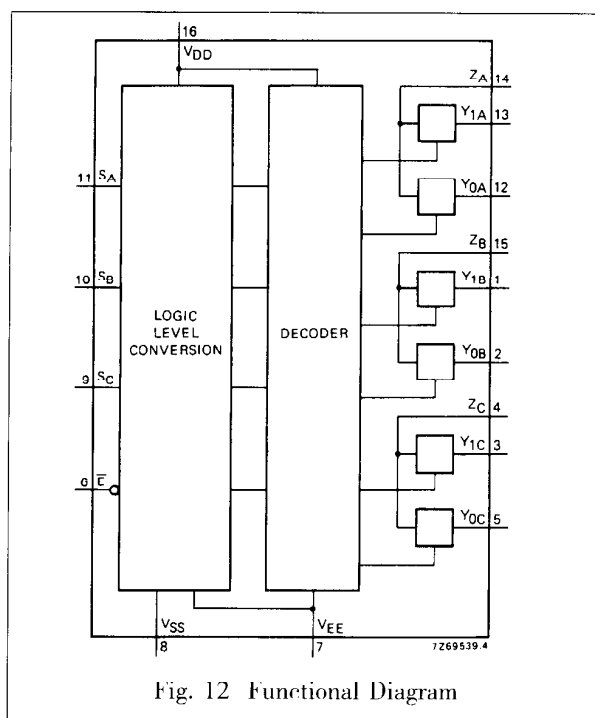


Fig. 12 Functional Diagram

## 3. Function Table

| Inputs    |       | Channel      |
|-----------|-------|--------------|
| $\bar{E}$ | $S_n$ |              |
| L         | L     | $Y_{0n}-Z_n$ |
| L         | H     | $Y_{1n}-Z_n$ |
| H         | X     | none         |

## Notes

H=HIGH state (the more positive voltage)

L=LOW state (the less positive voltage)

X=STATE is immaterial

## 4. Refer to Table 10 about Functions and Data of HEF4053's Pins.

## IC DATA AND SERVICE DATA (continued)

Table 2 Functions and Service Data of LA76835 (N001)'s Pins

| Pin No. | Function Description                      | GDM8145 Multimeter |   |   |
|---------|---|--------------------|---|---|
|         |   | Voltage of Pin (V) | Ground Resistance ( $\Omega$ )                      |   |
|         |   |                    | Measure with red probe while grounding black probe. | Measure with black probe while grounding red probe. |
| 1       | Audio signal output (NC)                  | 2.33               | 810   | 712   |
| 2       | Audio demodulation output                 | 2.36               | 975   | 675   |
| 3       | IF AGC filter                             | 2.6                | 860   | 718   |
| 4       | RFAGC voltage output                      | 1.95               | $\infty$  | 680   |
| 5       | IF signal input                           | 2.89               | 780   | 693   |
| 6       | IF signal input                           | 2.89               | 778   | 712   |
| 7       | IF circuit ground                         | 0                  | 0   | 0   |
| 8       | Supply voltage for IF circuit             | 5.04               | 500   | 280   |
| 9       | Filter for discriminator                  | 1.98               | 910   | 713   |
| 10      | AFT voltage output                        | 3.65               | 910   | 617   |
| 11      | IFC bus data line                         | 4.71               | 1560  | 640   |
| 12      | IFC bus clock line                        | 4.41               | 1542  | 667   |
| 13      | Auto brightness control input             | 3.68               | 945   | 577   |
| 14      | R character signal input                  | 1.43/0             | 920   | 700   |
| 15      | G character signal input                  | 1.46/0             | 913   | 701   |
| 16      | B character signal input                  | 1.44/0             | 906   | 700   |
| 17      | Character blanking signal input           | 0.02/0             | 780   | 683   |
| 18      | Supply voltage for decoder                | 8.28               | 525   | 500   |
| 19      | Red (R) signal output                     | 2.81               | 780   | 671   |
| 20      | Green (G) signal output                   | 2.79               | 780   | 670   |
| 21      | Blue (B) signal output                    | 2.7                | 780   | 670   |
| 22      | White balance adjusting signal input (NC) | 1.85               | 830   | 696   |
| 23      | Vertical sawtooth output                  | 2.45               | 710   | 672   |
| 24      | Vertical sawtooth generation              | 2.64               | 782   | 702   |
| 25      | Horizontal start supply voltage           | 5.27               | 350   | 350   |
| 26      | Low pass filter for horizontal AFC        | 2.72               | 815   | 708   |
| 27      | Line drive pulse output                   | 0.72               | 700   | 653   |
| 28      | Line flyback pulse input                  | 0.91               | 785   | 707   |
| 29      | Reference voltage generation terminal     | 1.74               | 746   | 700   |
| 30      | B-Y color difference signal input (SECOM) | 0.93               | 825   | 608   |
| 31      | C-Y color difference signal input (SECOM) | 0.94               | 330   | 330   |
| 32      | External video/chroma signals inputs      | 4.17               | $\infty$  | 567   |
| 33      | IH baseband delay circuit ground          | 0                  | 0   | 0   |

(Continued)

## IC DATA AND SERVICE DATA (continued)

|    |   |      |     |     |
|----|---|------|-----|-----|
| 34 | X-RAY detection input   | 0    | 775 | 712 |
| 35 | 4.43MHz CW signal output or SECAM killer signal input                         | 2.05 | 776 | 712 |
| 36 | AFC filter for color sub-carrier  | 3.41 | 810 | 724 |
| 37 | Clamp filter  | 0    | 800 | 706 |
| 38 | 4.43 MHz crystal oscillator connection  | 2.83 | 790 | 716 |
| 39 | APC filter  | 1.89 | 760 | 697 |
| 40 | Video signal output (NC)  | 2.76 | 730 | 662 |
| 41 | Video/chroma/scan part ground   | 0    | 0   | 0   |
| 42 | Video signals input from AV terminals or Y signal input from S-VIDEO terminal | 2.93 | 800 | 711 |
| 43 | Supply voltage for video/chroma/scan part                                     | 4.99 | 285 | 280 |
| 44 | C signal input from AV terminals or S-VIDEO terminal (NC)                     | 2.76 | 805 | 707 |
| 45 | Filter for black level stretch  | 3.16 | 762 | 700 |
| 46 | Video detection output  | 2.9  | 397 | 397 |
| 47 | IF lock detection filter  | 3.58 | 840 | 712 |
| 48 | External VCO harmonic oscillating coil  | 4.29 | 526 | 526 |
| 49 | External VCO harmonic oscillating coil  | 4.29 | 530 | 530 |
| 50 | IF PLL APC filter   | 2.47 | 820 | 698 |
| 51 | Audio signal input (NC)   | 2.23 | 800 | 701 |
| 52 | Sound IF output   | 1.94 | 809 | 697 |
| 53 | APC filter for audio discrimination   | 2.41 | 808 | 691 |
| 54 | Sound IF input  | 3.17 | 824 | 712 |

Table 3 Functions and Service Data of LC86F344BA (D701)'s Pins

| Pin No. | Function Description                         | GDM8145 Multimeter |   |   |
|---------|--|--------------------|---|---|
|         |  | Voltage of Pin (V) | Ground Resistance (K $\Omega$ )                     |   |
|         |  |                    | Measure with red probe while grounding black probe. | Measure with black probe while grounding red probe. |
| 1       | Not connected                                | 1.50               | 11.8  | 4.40  |
| 2       | Not connected                                | 1.43               | 12.1  | 5.20  |
| 3       | Bus data line                                | 4.70               | 11.6  | 6.20  |
| 4       | Bus clock line                               | 4.47               | 12.1  | 6.00  |
| 5       | Ground                                       | 0.00               | 0.00  | 0.00  |
| 6       | Input terminal for clock oscillating signal  | 1.78               | 12.6  | 5.1   |
| 7       | Output terminal for clock oscillating signal | 2.88               | 12.0  | 4.91  |
| 8       | Supply voltage                               | 5.31               | 7.90  | 3.72  |
| 9       | Button-control voltage input terminal 1      | 0.02               | 9.70  | 5.34  |
| 10      | AFT voltage input terminal                   | 2.47               | 4.90  | 5.08  |
| 11      | X-RAY detection input                        | 2.25               | 6.70  | 4.59  |
| 12      | Button-control voltage input terminal 2      | 0.015              | 8.86  | 3.81  |

(Continued)

**IC DATA AND SERVICE DATA (continued)**

|    |   |       |       |       |
|----|---|-------|-------|-------|
| 13 | Reset                                       | 5.27  | 4.67  | 1.88  |
| 14 | Character oscillating filter                | 3.87  | 1.11  | 4.98  |
| 15 | Video signal input terminal                 | 3.53  | 12.3  | 4.50  |
| 16 | Three bits input/output terminals           | 0.01  | 9.76  | 15.0  |
| 17 | Input terminal for vertical flyback pulse   | 5.07  | 15.4  | 18.1  |
| 18 | Input terminal for horizontal flyback pulse | 4.62  | 17.4  | 18.4  |
| 19 | R character output terminal                 | 0.015 | 3.92  | 3.29  |
| 20 | G character output terminal                 | 0.014 | 3.95  | 3.71  |
| 21 | B character output terminal                 | 0.015 | 3.19  | 3.66  |
| 22 | Output terminal for fast blanking signal    | 0.015 | 6.50  | 3.67  |
| 23 | Mute  | 0.015 | 18.7  | 17.62 |
| 24 | Standby control                             | 0.015 | 1.43  | 7.30  |
| 25 | Not connected                               | 1.23  | 9.50  | 6.65  |
| 26 | Control terminal for production modes       | 4.61  | 13.0  | 6.95  |
| 27 | Degaussing circuit control                  | 0.014 | 3.713 | 3.42  |
| 28 | Remote control signal input                 | 5.19  | 12.2  | 5.32  |
| 29 | Not connected                               | 5.30  | 12.4  | 5.49  |
| 30 | Not connected                               | 5.30  | 12.6  | 5.42  |
| 31 | Not connected                               | 0.01  | 12.7  | 5.35  |
| 32 | Not connected                               | 0.01  | 12.7  | 5.30  |
| 33 | Output terminal for on/off control signals  | 5.30  | 12.7  | 6.59  |
| 34 | Output terminal for AV2 on/off control      | 5.30  | 11.8  | 6.36  |
| 35 | Output terminal for AV1 on/off control      | 5.30  | 11.4  | 6.33  |
| 36 | Output terminal for AVO on/off control      | 5.29  | 11.2  | 6.33  |

**Table 4 Functions and Service Data of ST24C04 (D702)'s Pins**

| Pin No. | Function Description         | DT890D Digital Multimeter |   |   |
|---------|------------------------------|---------------------------|---|---|
|         |                              | Voltage of Pin (V)        | Ground Resistance ( $\Omega$ )                      | Negative Resistance ( $K\Omega$ )                   |
|         |                              |                           | Measure with red probe while grounding black probe. | Measure with black probe while grounding red probe. |
| 1       | Address input terminal       | 0.00                      | 0.00  | 0.00  |
| 2       | Address input terminal       | 0.00                      | 0.00  | 0.00  |
| 3       | Address input terminal       | 0.00                      | 0.00  | 0.00  |
| 4       | Common ground                | 0.00                      | 0.00  | 0.00  |
| 5       | Clock line                   | 4.94                      | 6.85  | 4.83  |
| 6       | Data line                    | 4.94                      | 6.89  | 5.15  |
| 7       | PW write protection terminal | 0.00                      | 9.58  | 5.31  |
| 8       | Supply voltage               | 5.32                      | 3.5   | 3.25  |

## IC DATA AND SERVICE DATA (continued)

Table 5 Functions and Service Data of KA2102B (NY01)'s Pins

| Pin No. | Function Description | DT890D Digital Multimeter |   |   |
|---------|----------------------|---------------------------|---|---|
|         |                      | Voltage of Pin (V)        | Ground Resistance ( $\Omega$ )                      |   |
|         |                      |                           | Measure with red probe while grounding black probe. | Measure with black probe while grounding red probe. |
| 1       | L TV IN              | 5.67                      | 6.45  | 3.53  |
| 2       | R TV IN              | 5.67                      | 6.45  | 3.74  |
| 3       | TV IN                | 5.67                      | 6.57  | 4.02  |
| 4       | LS IN                | 5.69                      | 6.45  | 3.66  |
| 5       | RS IN                | 5.69                      | 6.47  | 3.72  |
| 6       | SY IN                | 5.54                      | 6.85  | 3.96  |
| 7       | TV SW                | 0.00                      | 0.00  | 0.00  |
| 8       | SC IN                | 5.54                      | 6.75  | 3.85  |
| 9       | L1 IN                | 5.69                      | 6.43  | 3.36  |
| 10      | R1 IN                | 5.70                      | 6.37  | 3.72  |
| 11      | E1 IN                | 5.56                      | 6.85  | 3.96  |
| 12      | L2 IN                | 5.70                      | 6.43  | 3.87  |
| 13      | R2 IN                | 5.70                      | 6.33  | 3.67  |
| 14      | E2 IN                | 5.56                      | 6.83  | 4.01  |
| 15      | SW1                  | 5.25                      | 6.84  | 5.59  |
| 16      | SW2                  | 5.25                      | 6.85  | 5.59  |
| 17      | MUTE                 | 0.00                      | 0.00  | 0.00  |
| 18      | Y OUT                | 3.89                      | 1.418   | 1.51  |
| 19      | GND                  | 0.00                      | 0.00  | 0.00  |
| 20      | C OUT                | 3.84                      | 0.96  | 1.15  |
| 21      | R OUT                | 4.37                      | 6.63  | 3.35  |
| 22      | L OUT                | 4.37                      | 6.61  | 3.31  |
| 23      | NC                   | 0.06                      | 6.71  | 3.97  |
| 24      | Y IN                 | 5.55                      | 6.70  | 4.18  |
| 25      | SYNC CLAMP           | 3.47                      | 6.80  | 5.75  |
| 26      | C IN                 | 5.57                      | 6.67  | 4.07  |
| 27      | NC                   | 0.25                      | 6.69  | 4.13  |
| 28      | VCC                  | 9.38                      | 0.34  | 0.33  |
| 29      | VCC                  | 9.38                      | 0.31  | 0.30  |
| 30      | V OUT                | 3.17                      | 6.47  | 0.48  |

## IC DATA AND SERVICE DATA (continued)

Table 6 Functions and Service Data of LA7840 (N301)'s Pins

| Pin No. | Function Description                   | DT890D Digital Multimeter |   |   |
|---------|--|---------------------------|---|---|
|         |  | Voltage of Pin (V)        | Ground Resistance ( $\Omega$ )                      |   |
|         |  |                           | Measure with red probe while grounding black probe. | Measure with black probe while grounding red probe. |
| 1       | Ground                                 | 0                         | 0   | 0   |
| 2       | Vertical output terminal               | 14.8                      | 365   | 360   |
| 3       | Pump supply voltage input              | 24.5                      | $\infty$  | 584   |
| 4       | Reference voltage                      | 2.24                      | 660   | 600   |
| 5       | Inverting input terminal               | 2.23                      | 800   | 672   |
| 6       | Supply voltage                         | 24                        | 770   | 465   |
| 7       | Vertical flyback pulse output terminal | 2.25                      | 1167  | 638   |

Table 7 Functions and Service Data of TDA7057AQ (N601)'s Pins

| Pin No. | Function Description                  | GDM8145 Multimeter |                                   |                                   |
|---------|---------------------------------------|--------------------|-----------------------------------|-----------------------------------|
|         |                                       | Voltage (V)        | Positive Resistance (K $\Omega$ ) | Negative Resistance (K $\Omega$ ) |
| 1       | Volume control input                  | 0.95               | 6.85                              | 6.15                              |
| 2       | Not connected                         | 0.00               | $\infty$                          | $\infty$                          |
| 3       | Audio R signal input                  | 2.38               | 12.59                             | 6.51                              |
| 4       | Supply voltage                        | 17.48              | 0.47                              | 0.47                              |
| 5       | Audio L signal input                  | 2.37               | 12.5                              | 6.51                              |
| 6       | Ground                                | 0.00               | 0.00                              | 0.00                              |
| 7       | Volume control input                  | 0.95               | 6.85                              | 0.15                              |
| 8       | Left channel in-phase signal output   | 8016               | 6.46                              | 5.59                              |
| 9       | Ground                                | 0.00               | 0.00                              | 0.00                              |
| 10      | Left channel inverting signal output  | 8.25               | 6.46                              | 5.59                              |
| 11      | Right channel inverting signal output | 8.24               | 6.46                              | 5.59                              |
| 12      | Ground                                | 0.00               | 0.00                              | 0.00                              |
| 13      | Right channel in-phase signal output  | 8.13               | 6.46                              | 5.59                              |

Table 8 Functions and Service Data of MSP3440 (NB01)'s Pins

| Pin No. | Function Description | GDM8145 Multimeter |                                   |                                   |
|---------|----------------------|--------------------|-----------------------------------|-----------------------------------|
|         |                      | Voltage (V)        | Positive Resistance (K $\Omega$ ) | Negative Resistance (K $\Omega$ ) |
| 1       | NC                   | 0.00               | 15.32                             | 5.3                               |
| 2       | NC                   | 2.57               | 13.41                             | 5.51                              |
| 3       | NC                   | 0.00               | 15.32                             | 5.57                              |
| 4       | NC                   | 0.00               | 15.32                             | 5.58                              |
| 5       | ADR-SEL              | 5.03               | 8.62                              | 4.54                              |
| 6       | STANDBYQ             | 5.03               | 8.63                              | 4.54                              |
| 7       | 12C-DC               | 3.8                | 6.98                              | 4.44                              |
| 8       | 12C-DA               | 3.9                | 6.98                              | 4.44                              |

(Continued)

**IC DATA AND SERVICE DATA (continued)**

|    |           |      |          |          |
|----|-----------|------|----------|----------|
| 9  | NC        | 2.5  | 15.32    | 6.24     |
| 10 | NC        | 2.82 | 15.32    | 6.24     |
| 11 | NC        | 2.5  | 15.32    | 6.24     |
| 12 | NC        | 0.27 | 15.32    | 5.29     |
| 13 | NC        | 0.2  | 15.32    | 5.59     |
| 14 | NC        | 0.1  | 15.32    | 5.59     |
| 15 | NC        | 0.1  | 15.32    | 5.59     |
| 16 | DVSUP     | 5.04 | 8.6      | 4.54     |
| 17 | DVSS      | 0.00 | 0.00     | 0.00     |
| 18 | NC        | 0.00 | 15.32    | 5.31     |
| 19 | NC        | 0.00 | $\infty$ | $\infty$ |
| 20 | RESETQ    | 5    | 15.04    | 5.24     |
| 21 | NC        | 0.00 | 3.54     | 3.54     |
| 22 | NC        | 0.00 | 3.52     | 3.52     |
| 23 | VREF2     | 0.00 | 0.00     | 0.00     |
| 24 | DACM-R    | 2.03 | 3.52     | 3.52     |
| 25 | DACM-L    | 2.04 | 3.54     | 3.54     |
| 26 | NC        | 1.41 | 3.6      | 3.6      |
| 27 | NC        | 3.81 | 13.8     | 5.92     |
| 28 | NC        | 3.79 | 13.8     | 5.91     |
| 29 | GND       | 0.00 | 0.00     | 0.00     |
| 30 | SC1-OUT-R | 3.8  | 12.8     | 5.91     |
| 31 | SC1-OUT-L | 3.79 | 12.8     | 5.92     |
| 32 | CAPL-A    | 7.28 | $\infty$ | 6.04     |
| 33 | AHVSUP    | 8.26 | $\infty$ | 4.59     |
| 34 | CAPL-M    | 6.53 | $\infty$ | 6.04     |
| 35 | AHVSS     | 0.00 | 0.00     | 0.00     |
| 36 | ABNDC     | 3.74 | $\infty$ | 6.02     |
| 37 | NC        | 3.77 | $\infty$ | 6.1      |
| 38 | NC        | 3.77 | $\infty$ | 6.1      |
| 39 | NC        | 3.77 | $\infty$ | 6.1      |
| 40 | NC        | 3.77 | $\infty$ | 6.1      |
| 41 | SC1-IN-L  | 3.77 | $\infty$ | 6.1      |
| 42 | SC1-IN-R  | 3.77 | $\infty$ | 6.1      |
| 43 | VREFTOP   | 2.61 | 1.63     | 1.63     |
| 44 | NC        | 3.77 | 19.42    | 6.1      |
| 45 | AVSS      | 0    | 0.00     | 0.00     |
| 46 | AVSUP     | 5.13 | 8.62     | 4.53     |
| 47 | ANA-IN1+  | 1.52 | 15.3     | 5.27     |
| 48 | ANA-IN1-  | 1.52 | 15.3     | 5.26     |
| 49 | ANA-IN2+  | 0.00 | 15.3     | 5.27     |
| 50 | TESTEN    | 0.00 | 0.00     | 0.00     |
| 51 | XTAL-IN   | 2.49 | 14.79    | 5.27     |
| 52 | XTAL-OUT  | 2.49 | 14.63    | 5.3      |

## IC DATA AND SERVICE DATA (continued)

**Table 9 Functions and Service Data of TDA9808T (NB02)'s Pins**

| Pin No. | Function Description                               | GDM8145 Multimeter |                                   |                                   |
|---------|--|--------------------|-----------------------------------|-----------------------------------|
|         |  | Voltage (V)        | Positive Resistance (K $\Omega$ ) | Negative Resistance (K $\Omega$ ) |
| 1       | PIF signal input 1                                 | 3.2                | 7.46                              | 6.03                              |
| 2       | PIF signal input 2                                 | 3.2                | 7.46                              | 5.99                              |
| 3       | RFAGC start-control level adjustment               | 0.96               | 6.82                              | 5.85                              |
| 4       | PLL APC filter                                     | 2.47               | 8.32                              | 6.3                               |
| 5       | Audio AGC filter                                   | 2.77               | 8.08                              | 6.17                              |
| 6       | Audio output (NTSC 4.5MHz)                         | 2.36               | 7.46                              | 5.86                              |
| 7       | Filter   | 1.78               | 8.25                              | 6.29                              |
| 8       | 1/2VCC comparison voltage bias                     | 0.00               | $\infty$                          | $\infty$                          |
| 9       | Video output                                       | 2.61               | 7.89                              | 6.09                              |
| 10      | Second SIF signal output                           | 2.01               | 8.03                              | 6.17                              |
| 11      | Second SIF signal input                            | 2.79               | 5.2                               | 4.99                              |
| 12      | RFAGC output                                       | 0.04               | $\infty$                          | 6.1                               |
| 13      | AGC signal output                                  | 3.99               | 8.25                              | 6.2                               |
| 14      | External connection for VCO oscillating LC network | 2.74               | 7.25                              | 6                                 |
| 15      | External connection for VCO oscillating LC network | 2.74               | 7.25                              | 6                                 |
| 16      | Ground   | 0.00               | 0.00                              | 0.00                              |
| 17      | AGC filter   | 2.74               | 8.3                               | 6.11                              |
| 18      | Supply voltage input terminal                      | 8.57               | 2.79                              | 2.7                               |
| 19      | SIF signal input                                   | 3.17               | 7.2                               | 6.27                              |
| 20      | SIF signal input                                   | 3.17               | 7.2                               | 6.27                              |

**Table 10 Functions and Service Data of HEF4053 (NK01)'s Pins**

| Pin No. | Function Description          | GDM8145 Multimeter |   |   |
|---------|-------------------------------|--------------------|---|---|
|         |                               | Voltage of Pin (V) | Ground Resistance ( $\Omega$ )                      |   |
|         |                               |                    | Measure with red probe while grounding black probe. | Measure with black probe while grounding red probe. |
| 1       | Signal input terminal         | 3.91               | 6.31  | 0.12  |
| 2       | Signal input terminal         | 5.01               | 6.31  | 0.11  |
| 3       | Signal input terminal         | 0.00               | 0.00  | 3.41  |
| 4       | Signal output terminal        | 0.02               | 6.07  | 0.05  |
| 5       | Signal input terminal         | 0.22               | 6.17  | 3.72  |
| 6       | Ground                        | 0.00               | 0.00  | 0.00  |
| 7       | Ground                        | 0.00               | 0.017   | 0.00  |
| 8       | Ground                        | 0.00               | 0.017   | 0.00  |
| 9       | Control signal input terminal | 4.42               | 6.27  | 6.08  |
| 10      | Control signal input terminal | 4.42               | 6.24  | 6.07  |
| 11      | Control signal input terminal | 4.42               | 6.24  | 6.08  |
| 12      | Signal input terminal         | 3.30               | 6.08  | 3.66  |
| 13      | Signal output terminal        | 1.31               | 5.96  | 4.72  |
| 14      | Signal input terminal         | 1.44               | 5.95  | 3.69  |
| 15      | Signal output terminal        | 1.43               | 6.017   | 4.01  |
| 16      | Supply voltage                | 5.04               | 0.352   | 0.33  |



## IC DATA AND SERVICE DATA (continued)

**Table 11 Functions and Service Data of LM7805 (N503)'s Pins**

| Pin No. | Function Description | DT890D Digital Multimeter |   |   |
|---------|----------------------|---------------------------|---|---|
|         |                      | Voltage of Pin (V)        | Ground Resistance ( $\Omega$ )                      |   |
|         |                      |                           | Measure with red probe while grounding black probe. | Measure with black probe while grounding red probe. |
| 1       | Input terminal       | 15                        | 865   | 477   |
| 2       | Regulation output    | 5                         | 1015  | 477   |
| 3       | Ground               | 0                         | 0   | 477   |

**Table 12 Each Electrode Voltage of Key Triodes**

| Position No.<br>Pin Voltage | V121   | V122   | V123 | V101 | V711 | V721 | V723 | V830   | V831   | V801  |
|-----------------------------|--------|--------|------|------|------|------|------|--------|--------|-------|
| Ub(v)                       | 4.35/5 | 5/4.43 | 5/5  | 1.39 | 4.34 | 0    | 0    | 0.63/0 | 0.72/0 | 18.37 |
| Uc(v)                       | 4.9/0  | 0/5    | 0/0  | 7.5  | 4.98 | 4.1/ | 4./1 | 0/8.7  | 0.1/10 | 35    |
| Ue(v)                       | 5/5    | 5/5    | 5/5  | 0.64 | 5    | 0    | 0    | 0/0    | 0/0    | 19    |

| Position No.<br>Pin Voltage | V906 | V907 | V908 | V901  | V902  | V903  | V904 | V905 | V431 | V432   | V301  |
|-----------------------------|------|------|------|-------|-------|-------|------|------|------|--------|-------|
| Ub(v)                       | 2.34 | 2.38 | 2.37 | 3.2   | 3.06  | 3.05  | 0    | 0.8  | 0.15 | -26.45 | 0.62  |
| Uc(v)                       | 0    | 0    | 0    | 110.8 | 114.3 | 112.4 | 4.92 | 0    | 50.5 | 114    | 26.76 |
| Ue(v)                       | 3.12 | 3.06 | 3.05 | 2.66  | 2.60  | 2.60  | 0.29 | 1.53 | 0    | -26.28 | 0     |

## CIRCUIT ADJUSTMENTS

### 1. General Description

All adjustments are thoroughly checked and corrected before the TV outgoing. Therefore the TV should operate normally and deliver proper colour pictures upon installation. However, several minor adjustments may be required depending on the particular location where the TV is operated. This TV is shipped completely in carton. Carefully take out the TV from the carton and remove all packing materials. Connect the power cord into a 120V AC, 60Hz two-pin power outlet. Turn on the TV. Check and adjust all the customer controls such as brightness, contrast and colour to obtain natural colour pictures.

### 2. Automatic Degaussing

A degaussing coil is mounted around the CRT so that external degaussing after moving the TV is generally unnecessary, providing it is properly degaussed upon installation. The degaussing coil operates in about 1 second after power on. If the set is moved or faced to a different direction, the power switch must be switched off for 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 colour purity, use an external-degaussing coil. Slowly move the degaussing coil around the screen, the sides and front of the TV and slowly withdraw the coil to a distance of about 2m before unplug it. If colour shading still exists, perform the Colour Purity Adjustment and Convergence Adjustment procedures.

### 3. Supply Voltage Adjustment

Caution: +B voltage has close relation to high voltage. To avoid X-ray radiation, +B voltage should be +130V.

- 1) Set AC power supply to  $120 \pm 2V$ .
- 2) Connect a digital voltmeter to two pins of C551, and then turn on the TV.
- 3) Receive Philips test pattern signals.
- 4) The voltmeter should read  $130 \pm 0.5V$ .

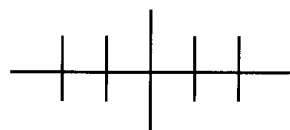
### 4. High Voltage Inspection

- 1) Connect a precise high voltmeter to the second anode of the CRT.
- 2) Turn on the TV and set the brightness and contrast to minimum (i.e. set beam current of the CRT to zero).
- 3) The high voltage tested should be  $27.5 \pm 0.5KV$ .
- 4) Set the brightness to minimum or maximum, and ensure high voltage not beyond limitation of 30KV in any case.

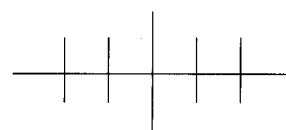
### 5. Focus Adjustment

- 1) Use the remote control to set the contrast to maximum and the brightness, chroma to medium.
- 2) Set H. V. lines near Philips pattern center to thinnest with the FCB on the FBT. After finishing adjustment, ensure that no poor focusing exists near the center or around of the frame.

## CIRCUIT ADJUSTMENTS (continued)



Before Adjusting



After Adjusting

## SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new CRT is installed. Perform the adjustments in order as follows.

1. Colour purity
2. Convergence
3. White Balance

Note:

The purity/convergence magnet assembly and rubber wedges need mechanical positioning. Refer to Fig. 13.

### 1. Colour Purity Adjustment

Note:

Before attempting any purity adjustment, the TV should be operated for at least 15 minutes.

- 1) Demagnetize the CRT and cabinet using a degaussing coil.
- 2) Set the brightness and contrast to maximum.
- 3) Receive the green raster test signals.
- 4) Loosen the clamp screw holding the deflection yoke and slide it backward or forward to display vertical green belt (zone) on the screen.
- 5) Remove the rubber wedge.
- 6) Rotate and spread the tabs of the purity magnet around the neck of the CRT until the green belt is on the centre of the screen.
- 7) Slowly move the deflection yoke forward or backward until a uniform green screen is obtained. Tighten the clamp screw of the yoke temporarily.
- 8) Check purity of the red and blue raster.

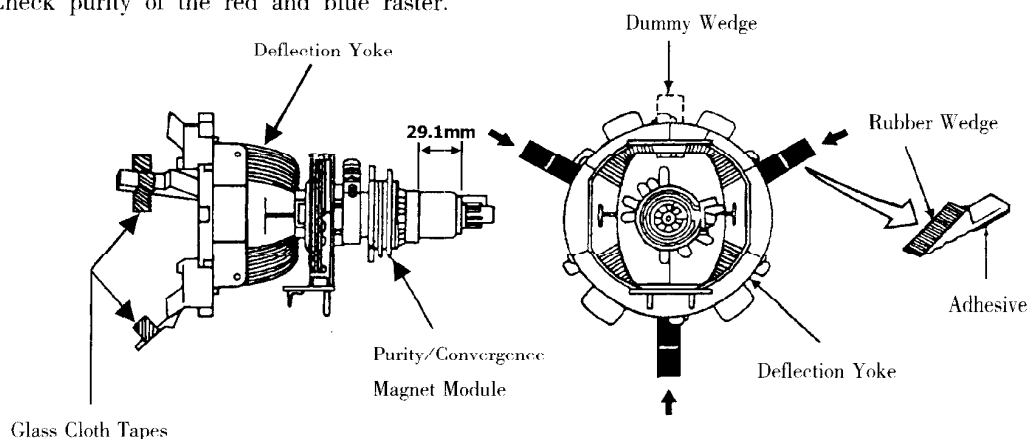


Fig. 13

## SET-UP ADJUSTMENTS (continued)

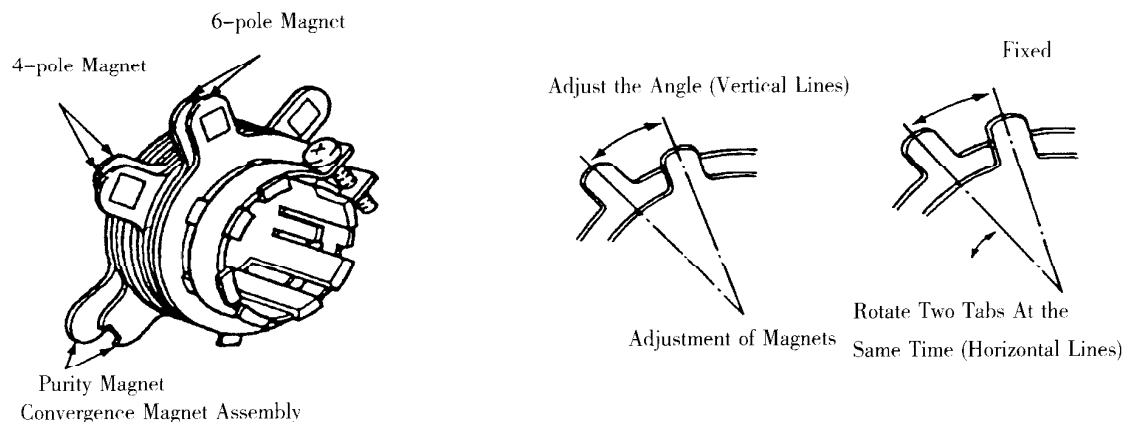


Fig. 14

### 2. Convergence Adjustment

#### Note:

Before attempting any convergence adjustment, the TV should be operated for at least 15 minutes.

#### • Center convergence adjustment

- 1) Receive the grille test pattern signals.
- 2) Set the brightness and contrast properly.
- 3) Adjust two tabs of the 4-pole magnet to change the angle between them and red and blue vertical lines are superimposed on the center area of the screen.
- 4) Turn both tabs at the same time keeping the angle constant to superimpose red and blue horizontal lines on the center of the screen.
- 5) Adjust two tabs of 6-pole magnet to superimpose red/blue line and green line. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
- 6) Repeat steps 3)~5) keeping in mind red, green and blue movement. 4-pole magnet and 6-pole magnet interact each other, resulting in complicating and dot movement.

#### • Circumference convergence adjustment

- 1) Loosen the clamping screw of the deflection yoke slightly to allow it to tilt.
- 2) Temporarily put a wedge as shown in Fig. 13. (Do not remove cover paper on adhesive part of the wedge.)
- 3) Tilt front of the deflection yoke up or down to obtain better convergence in circumference.  
Push the mounted wedge into the space between the CRT and yoke to fix the yoke temporarily.
- 4) Put other wedge into bottom space and remove the cover paper to stick.
- 5) Tilt front of the deflection yoke right or left to obtain better convergence in circumference.
- 6) Keep the deflection yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on the CRT to fix the yoke.
- 7) Detach the temporarily mounted wedge and put it in another upper space. Stick it on the CRT to fix the yoke.
- 8) After fixing three wedges, recheck overall convergence.  
Tighten the screw firmly to fix the yoke and check if the yoke is fixed.

## SET-UP ADJUSTMENTS (continued)

9) Stick three adhesive tapes on wedges as shown in Fig. 13.

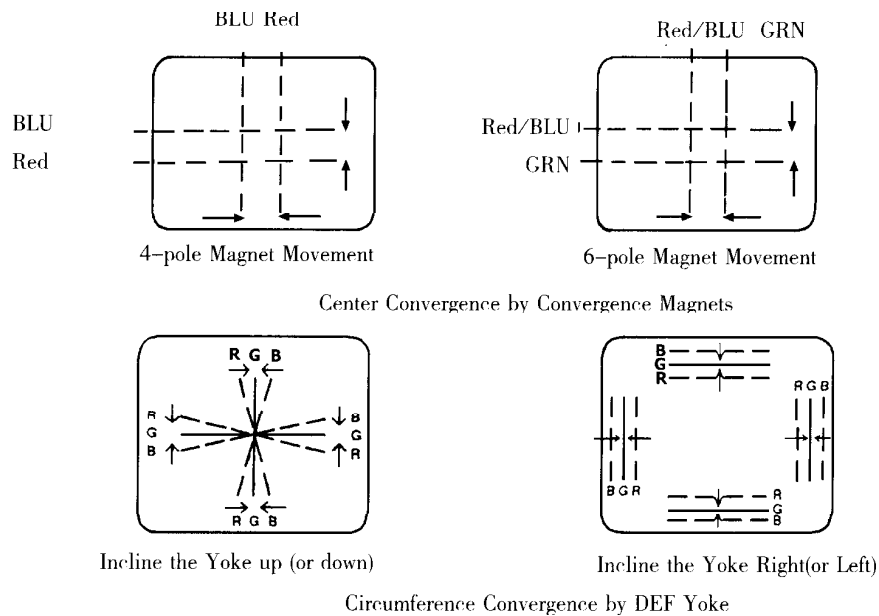


Fig. 15

## SERVICE MODE AND BUS DATA

### 1. To Enter the Service Mode

- 1) Decrease the volume to 0 with the remote control.
- 2) Press the MUTE button on the remote control and MENU button on the TV at the same time. "S" appears on the TV screen and the TV enters the Service mode.
- 3) Press the CH-/++ buttons to select an adjustment, and the VOL-/++ buttons to adjust data.

## SERVICE MODE AND BUS DATA (continued)

### 2. Bus Data

|            |     |
|------------|-----|
| MENU. 00   |     |
| V.POSITION | 40  |
| H.PHASE    | 15  |
| V.SIZE     | 60  |
| V.SC       | 18  |
| V.LINE     | 19  |
| V.SIZE CMP | 7   |
| MENU. 01   |     |
| SUB.BIAS   | 63  |
| SUB.CONT   | 63  |
| V.KILL     | 0   |
| RF.AGC     | 20  |
| R.BIAS     | 130 |
| G.BIAS     | 130 |
| B.BIAS     | 130 |
| R.DRIVE    | 75  |
| G.DRIVE    | 15  |
| B.DRIVE    | 75  |
| MENU. 02   |     |
| SECAM B DC | 0   |
| SECAM B DC | 0   |
| H.AFC GAIN | 0   |
| SYNC.KIL   | 0   |
| H.BLK.L    | 4   |
| H.BLK.R    | 4   |
| CROS.B/W   | 0   |
| VIDEO.LVL  | 7   |
| FM.LEVEL   | 16  |
| MENU. 03   |     |
| FM.MUTE    | 0   |
| AUDIO.MUTE | 0   |
| VIDEO.MUTE | 0   |
| DEEM.TC    | 0   |
| SND.TRAP   | 0   |

## SERVICE MODE AND BUS DATA (continued)

|             |    |
|-------------|----|
| MENU. 04    |    |
| SUB.COLOR   | 63 |
| SUB.TINT    | 32 |
| SUB.SHARP   | 63 |
| AUTO FLESH  | 0  |
| CORING.GAN  | 1  |
| C.EXT       | 0  |
| C.BYPASS    | 0  |
| C.KILL ON   | 0  |
| MENU. 05    |    |
| FIL.SYS     | 0  |
| COLOR.SYS   | 5  |
| VOL.FIL     | 0  |
| VIF.SYS     | 0  |
| SIF.SYS.SW  | 0  |
| VIDEO.SW    | 1  |
| MENU. 06    |    |
| R/B G.BAL   | 7  |
| R/B ANGLE   | 9  |
| CD.MODE     | 0  |
| CRAY MODE   | 0  |
| V.SEPUP     | 1  |
| MENU. 07    |    |
| BLANK.DEF   | 0  |
| BRT.ABL.TH  | 7  |
| RGB TEMP    | 1  |
| BRT.ABL.DF  | 0  |
| MID.STP.DF  | 1  |
| FBP.BLK.SW  | 0  |
| MENU. 08    |    |
| DIGITAL OSD | 0  |
| OSD.CONT    | 10 |
| OSD.CONTST  | 0  |
| OSD H.POS   | 22 |

**SERVICE MODE AND BUS DATA (continued)**

|            |    |
|------------|----|
| MENU. 09   |    |
| H.FREQ     | 46 |
| FM.GAIN    | 0  |
| C.KILL.OFF | 0  |
| AUDIO.SW   | 0  |
| T.DISBLE   | 1  |

|            |   |
|------------|---|
| MENU. 10   |   |
| G/Y ANGLE  | 0 |
| COL KIL OP | 7 |
| CBCR-IN    | 1 |
| Y-APF      | 0 |
| PRE SHOOT  | 0 |
| WPL OPE    | 0 |
| DC REST    | 0 |
| BK STR STA | 1 |
| BK STR GAN | 1 |

|            |   |
|------------|---|
| MENU. 11   |   |
| OVER MD SW | 1 |
| Y GAMMA    | 0 |
| FSC C.SYNC | 1 |
| VBLK SW    | 0 |
| SND TRAP   | 1 |
| HALF TONE  | 3 |
| HALF T SW  | 1 |
| TST VERSET | 0 |

|            |    |
|------------|----|
| MENU. 12   |    |
| E/W DC     | 32 |
| E/W AMP    | 32 |
| E/W TILT   | 32 |
| E/W C TOP  | 5  |
| E/W C BOTM | 5  |

|            |   |
|------------|---|
| MENU. 13   |   |
| E/W TEST   | 7 |
| HSIZE COMP | 7 |



**SERVICE MODE AND BUS DATA (continued)**

|            |   |
|------------|---|
| IF TEST 3B | 0 |
| V.LEV ADJ  | 0 |
| OV MOD LEV | 5 |
| PRE/OVER   | 0 |
| C.VCO SW   | 0 |
| C.VCO ADJ  | 0 |

|            |   |
|------------|---|
| MENU. 14   |   |
| VNSYNC     | 0 |
| TINT.THROU | 0 |
| HLOCK.VDET | 0 |

|            |   |
|------------|---|
| MENU. 15   |   |
| OPT.1CHIP  | 1 |
| OPT.VIDEO  | 1 |
| OPT.AV1AV2 | 1 |
| OPT.AV3    | 0 |
| OPT.S-VHS  | 1 |
| OPT.YUV    | 0 |
| OPT.COMB   | 0 |
| OPT.BYPASS | 0 |

|            |    |
|------------|----|
| MENU. 16   |    |
| OPT.VM     |    |
| OPT.BLUEBK | 0  |
| OPT.V-CHIP | 1  |
| OPT.CCD    | 1  |
| OPT.CLOCK  | 1  |
| OPT.P-ON   | 1  |
| X-RAY.VOLT | 0  |
| SRCH.SPEED | 40 |
| ROM        | 0  |
| CORREC     | 0  |

|            |   |
|------------|---|
| MENU. 17   |   |
| OPT.BTSC   | 1 |
| OPT.AV-INP | 0 |
| OPT.BBE    | 0 |

## SERVICE MODE AND BUS DATA (continued)

|            |     |
|------------|-----|
| SUB.BASS   | 3   |
| SUB.TREBLE | 3   |
| MENU. 18   |     |
| LOUDNESS   | 9   |
| FM/AM.PRES | 63  |
| SCART.PRES | 27  |
| SCART.VOL  | 117 |
| OPT.AVC    | 1   |
| AVC.DECAY  | 2   |
| BBE.BASS   | 32  |
| BBE.TREBLE | 32  |

### Notes:

- ① The data sheet may differ dependent on different models.
- ② The data sheet may differ dependent on different CRTs for the same model.
- ③ Do not adjust I<sup>2</sup>C data with the remote jig unless necessary.
- ④ The remote jigs on neighboring work position cannot affect each other.
- ⑤ For the TVs with the AV3 function, set OPT.AV3 to 1.
- ⑥ For the TVs with the YUV function, set OPT.YUV to 1.
- ⑦ For the TVs with the BLUE BACK function, set OPT.BLUEBK to 1.
- ⑧ For the TVs with the BTSC function, set OPT.BTSC to 1.

### 3. Service Mode Adjustment

#### 1) Sub-brightness

- a) Receive colour signals.
- b) Set the contrast to maximum and brightness to medium.
- c) Set the chroma to medium.

Enter the TV to the Service mode. Select "BRIGHT-MID" by pressing the ←/→ buttons on the remote control, and set the data to 31 by pressing the data adjustment buttons. Operate the TV for 5 minutes in the mode.

- d) Adjust the BRIGHT-MID data until blurry picture does not appear on the high bright area of the screen and too dim picture not on the low-bright area.
- e) Set the contrast and brightness to maximum or minimum, and then test normal picture alternation.
- f) If the picture does not become dark when the contrast and brightness are set to minimum, or not become bright when set to maximum, then adjust the BRIGHT-MID data to get normal picture.

#### 2) White balance adjustment

## SERVICE MODE AND BUS DATA (continued)

- a) Turn on the TV and preheat it for over 7 minutes.
- b) Use the remote control to set the contrast to maximum and the brightness to medium. Set the chroma to minimum.
- c) Enter the TV to the Service mode, and set the following data without changing other items.

R-DRIVE..... 75

G-DRIVE..... 15

B-DRIVE..... 75

- d) Pull out the external antenna and press the MUTE button once on the remote control until a right horizontal line appears on the screen. Adjust the R-DRV data to get  $160V \pm 0.5$  green gun voltage across the CRT RGB PCB.
- e) Adjust the G-DRV and B-DRV data according to Step 4 so that the bright horizontal line turns to yellow, then to white.

### 3) Horizontal centering adjustment

Enter the TV to the Service mode and receive Philips test pattern signals. Select "H-SHIFT" by pressing the  $\leftarrow/\rightarrow$  buttons on the remote control, and adjust horizontal picture position in the centre of screen by pressing the data adjustment buttons.

### 4) Vertical centering adjustment

Enter the TV to the Service mode and receive Philips test pattern signals. Select "V-SHIFT" or "VP60" by pressing the  $\leftarrow/\rightarrow$  buttons on the remote control, and adjust vertical picture position in the centre of screen by pressing the data adjustment buttons.

### 5) Vertical amplitude adjustment

Enter the TV to the Service mode and receive grille test pattern signals. Select "V-AMPL" by pressing the  $\leftarrow/\rightarrow$  buttons on the remote control, and adjust vertical amplitude by pressing the data adjustment buttons so that vertical amplitude is not enough. Continue to adjust vertical amplitude by pressing the data adjustment button until the first bar on grille signals touches edge of the screen.

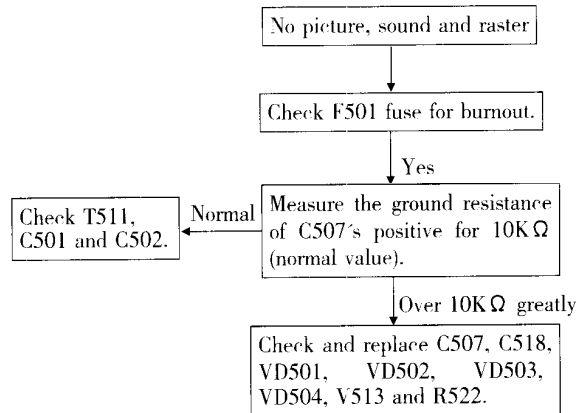
### 6) Horizontal amplitude adjustment

Enter the TV to the Service mode and receive grille test pattern signals. Select "H-AMPL" by pressing the  $\leftarrow/\rightarrow$  buttons on the remote control, and adjust horizontal amplitude by pressing the data adjustment buttons so that horizontal amplitude is not enough. Continue to adjust horizontal amplitude by pressing the data adjustment button until the first bar on grille signals touches edge of the screen.

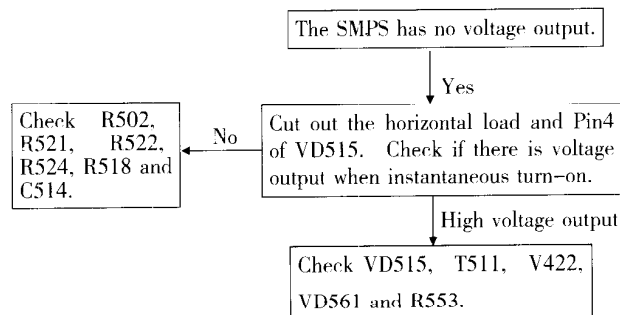
## TROUBLESHOOTING FLOW CHARTS

### 1. Switch Mode Power Supply

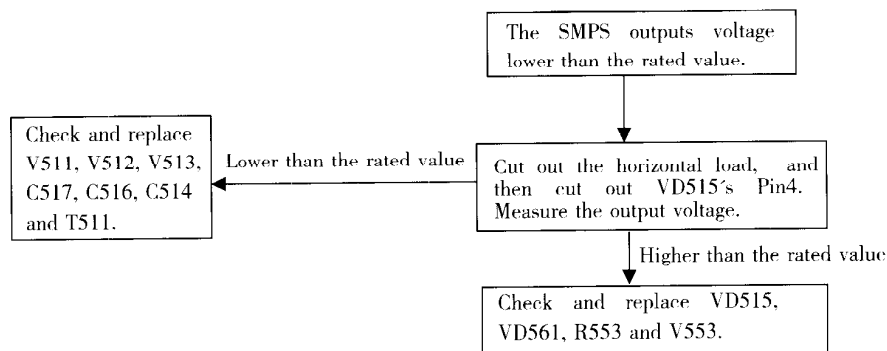
#### 1.1 No picture, sound and raster



#### 1.2 The SMPS has no voltage output.

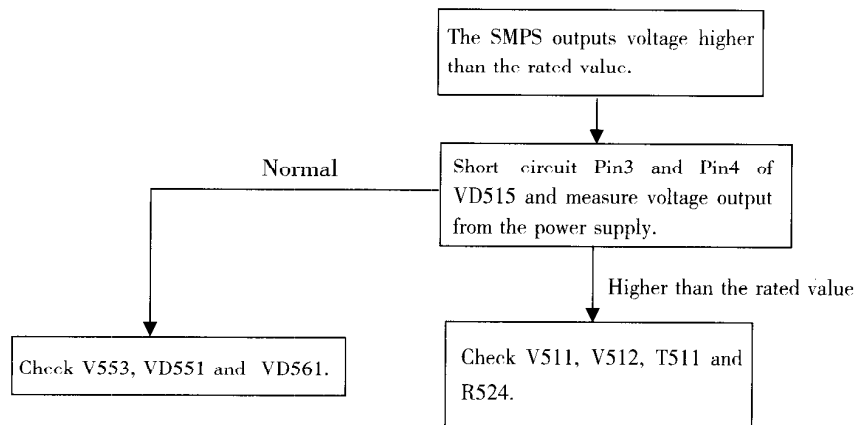


#### 1.3 The SMPS outputs voltage lower than the rated value.

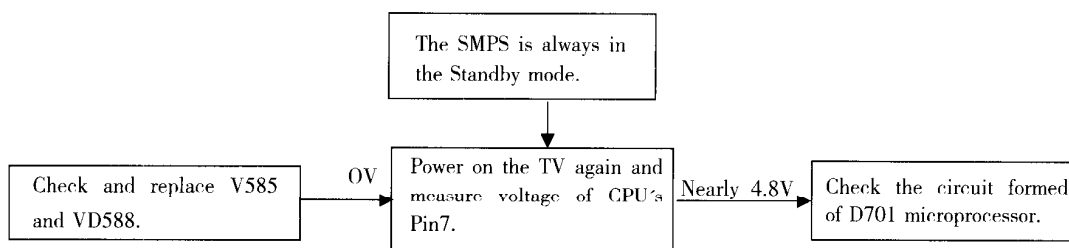


## TROUBLESHOOTING FLOW CHARTS (continued)

1.4 The SMPS outputs voltage higher than the rated value.

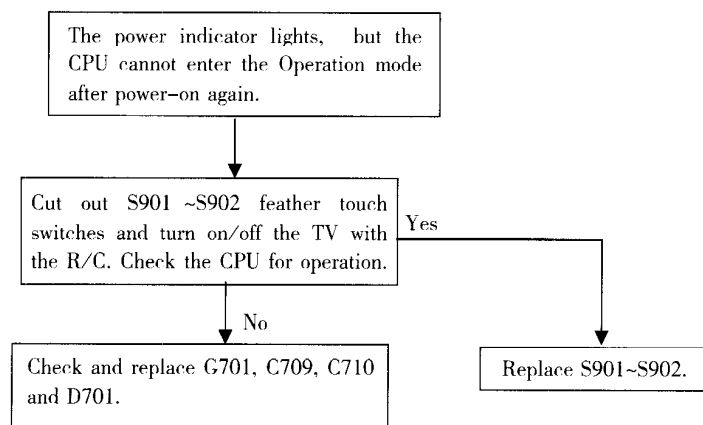


1.5 The power indicator lights, but the SMPS is still in the Standby mode.



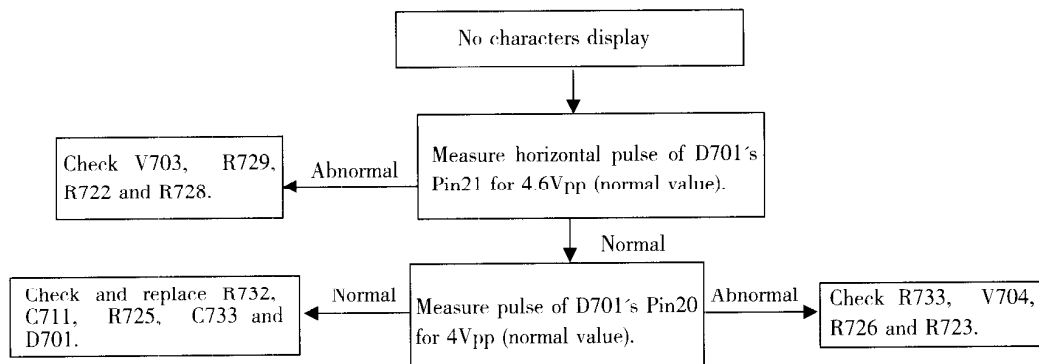
## 2. Control System

2.1 The power indicator lights, but the CPU cannot enter the Operation mode after power-on again.

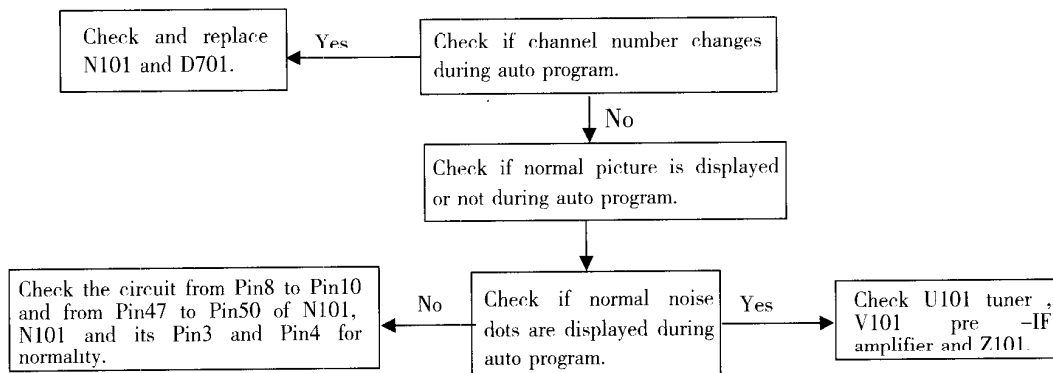


## TROUBLESHOOTING FLOW CHARTS (continued)

### 2.2 No characters display



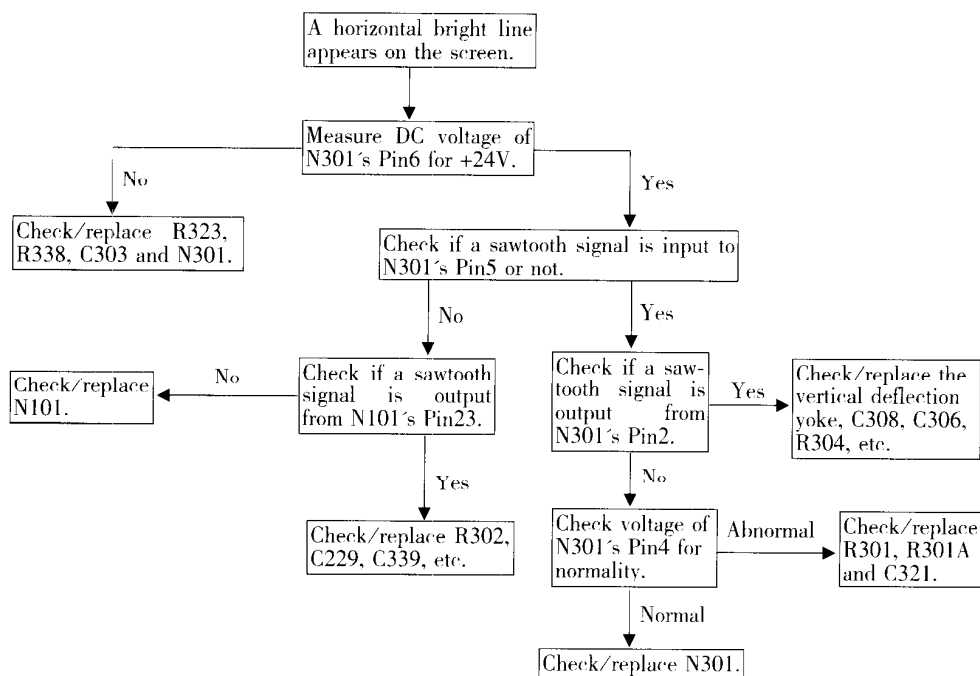
### 2.3 Channel number remains unchanged during auto program.



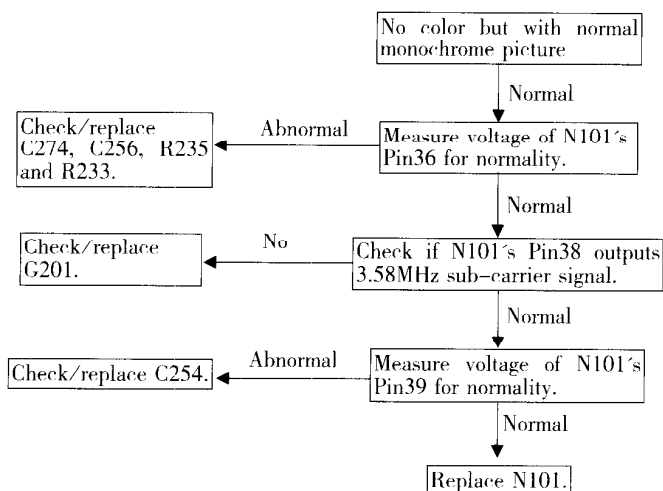
## TROUBLESHOOTING FLOW CHARTS (continued)

## 3. Video Signal Processor

3.1 A horizontal bright line appears on the screen.



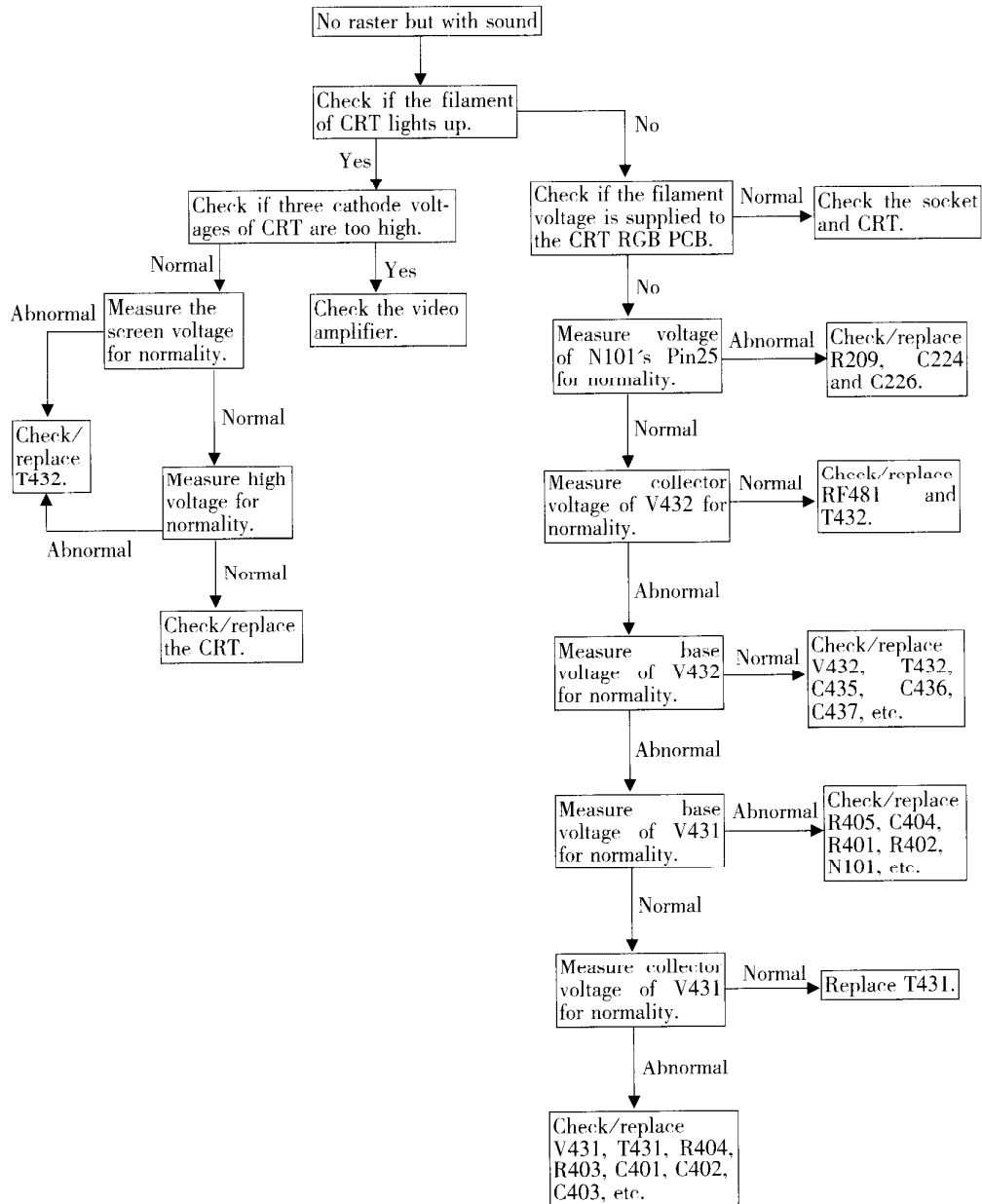
3.2 No color but with normal monochrome picture



# TROUBLESHOOTING FLOW CHARTS (continued)

## 4. Horizontal/Vertical Scan Circuit

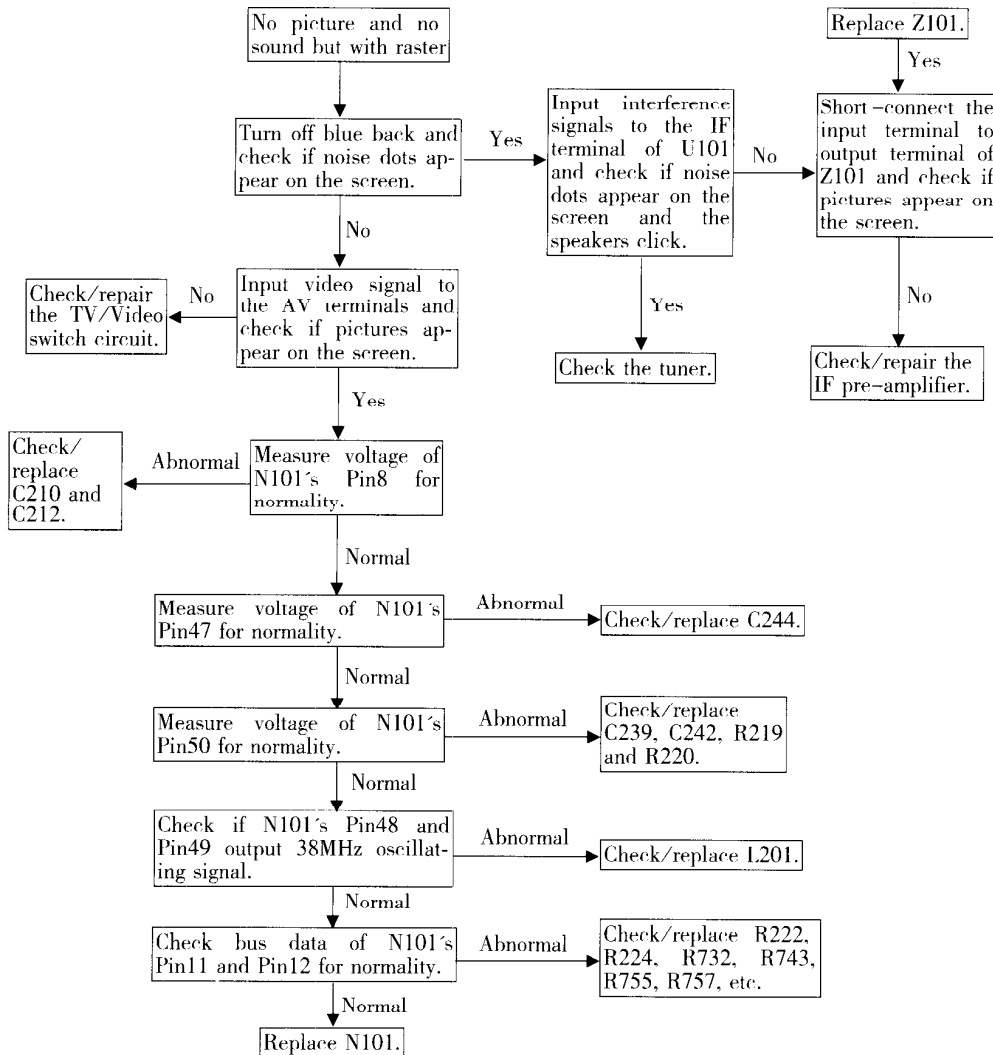
### 4.1 No raster but with sound





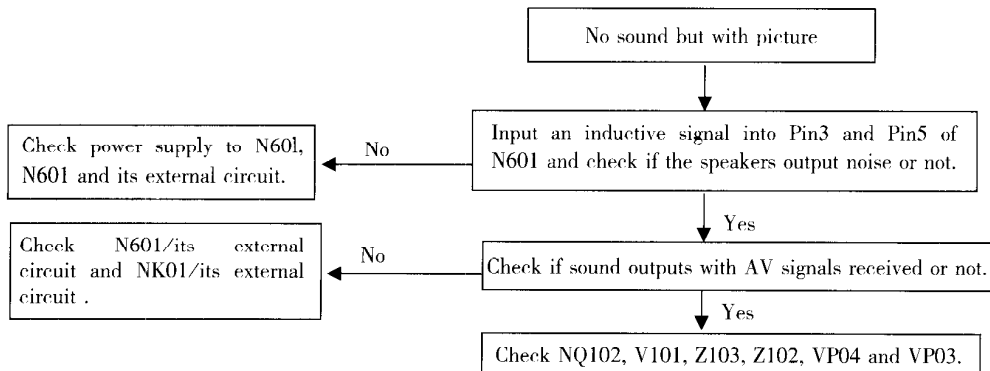
## TROUBLESHOOTING FLOW CHARTS (continued)

### 4.2 No picture and no sound but with raster



## 5. Audio System

### 5.1 No sound



## PARTS LIST

| Position | Parts                | Type              |
|----------|----------------------|-------------------|
|          |                      | Parts on Main PCB |
| R309     | Carbon film resistor | RT13-0.166W-1ΩJ   |
| R519     | Carbon film resistor | RT13-0.166W-22ΩJ  |
| R207     | Carbon film resistor | RT13-0.166W-56ΩJ  |
| R108     | Carbon film resistor | RT13-0.166W-68ΩJ  |
| RV32     | Carbon film resistor | RT13-0.166W-75ΩJ  |
| RV01     | Carbon film resistor | RT13-0.166W-82ΩJ  |
| RV03     | Carbon film resistor | RT13-0.166W-82ΩJ  |
| RV05     | Carbon film resistor | RT13-0.166W-82ΩJ  |
| RV11     | Carbon film resistor | RT13-0.166W-82ΩJ  |
| RV17     | Carbon film resistor | RT13-0.166W-82ΩJ  |
| R292     | Carbon film resistor | RT13-0.166W-100ΩJ |
| R707     | Carbon film resistor | RT13-0.166W-100ΩJ |
| R743     | Carbon film resistor | RT13-0.166W-100ΩJ |
| R744     | Carbon film resistor | RT13-0.166W-100ΩJ |
| R800     | Carbon film resistor | RT13-0.166W-100ΩJ |
| R805     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RS05     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RS06     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV02     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV04     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV06     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV08     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV10     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV12     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV14     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV16     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV18     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV23     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV24     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV25     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV26     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV28     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV39     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV40     | Carbon film resistor | RT13-0.166W-100ΩJ |
| RV41     | Carbon film resistor | RT13-0.166W-100ΩJ |
| R101     | Carbon film resistor | RT13-0.166W-120ΩJ |
| R209     | Carbon film resistor | RT13-0.166W-150ΩJ |
| R219     | Carbon film resistor | RT13-0.166W-150ΩJ |
| RV21     | Carbon film resistor | RT13-0.166W-150ΩJ |
| R104     | Carbon film resistor | RT13-0.166W-180ΩJ |
| RV31     | Carbon film resistor | RT13-0.166W-180ΩJ |
| R122     | Carbon film resistor | RT13-0.166W-220ΩJ |

**PARTS LIST (continued)**

| Position | Parts                | Type                        |
|----------|----------------------|-----------------------------|
| R123     | Carbon film resistor | RT13-0.166W-220 $\Omega$ J  |
| R222     | Carbon film resistor | RT13-0.166W-220 $\Omega$ J  |
| R224     | Carbon film resistor | RT13-0.166W-220 $\Omega$ J  |
| R732     | Carbon film resistor | RT13-0.166W-220 $\Omega$ J  |
| R730     | Carbon film resistor | RT13-0.166W-270 $\Omega$ J  |
| R741     | Carbon film resistor | RT13-0.166W-470 $\Omega$ J  |
| R742     | Carbon film resistor | RT13-0.166W-470 $\Omega$ J  |
| R184     | Carbon film resistor | RT13-0.166W-560 $\Omega$ J  |
| R120     | Carbon film resistor | RT13-0.166W-680 $\Omega$ J  |
| R405     | Carbon film resistor | RT13-0.166W-680 $\Omega$ J  |
| R746     | Carbon film resistor | RT13-0.166W-680 $\Omega$ J  |
| R747     | Carbon film resistor | RT13-0.166W-680 $\Omega$ J  |
| R748     | Carbon film resistor | RT13-0.166W-680 $\Omega$ J  |
| RV20     | Carbon film resistor | RT13-0.166W-680 $\Omega$ J  |
| RV19     | Carbon film resistor | RT13-0.166W-750 $\Omega$ J  |
| RV22     | Carbon film resistor | RT13-0.166W-820 $\Omega$ J  |
| R142     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R186     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R193     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R217     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R282     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R291     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R401     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R416     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R517     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R791     | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| RV19A    | Carbon film resistor | RT13-0.166W-1K $\Omega$ J   |
| R106     | Carbon film resistor | RT13-0.166W-1.2K $\Omega$ J |
| R107     | Carbon film resistor | RT13-0.166W-1.2K $\Omega$ J |
| R423     | Carbon film resistor | RT13-0.166W-1.2K $\Omega$ J |
| R523     | Carbon film resistor | RT13-0.166W-1.5K $\Omega$ J |
| R721     | Carbon film resistor | RT13-0.166W-1.5K $\Omega$ J |
| R797     | Carbon film resistor | RT13-0.166W-1.5K $\Omega$ J |
| R799     | Carbon film resistor | RT13-0.166W-1.5K $\Omega$ J |
| R130     | Carbon film resistor | RT13-0.166W-1.8K $\Omega$ J |
| R215     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R301A    | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R307     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R402     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R728     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R798     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R804     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R809     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |

**PARTS LIST (continued)**

| Position | Parts                | Type                        |
|----------|----------------------|-----------------------------|
| RV35     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| RV38     | Carbon film resistor | RT13-0.166W-2.2K $\Omega$ J |
| R301B    | Carbon film resistor | RT13-0.166W-2.4K $\Omega$ J |
| R228     | Carbon film resistor | RT13-0.166W-2.7K $\Omega$ J |
| R526     | Carbon film resistor | RT13-0.166W-2.7K $\Omega$ J |
| R191     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R192     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R211     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R736     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R737     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R738     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R739     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R739A    | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R749     | Carbon film resistor | RT13-0.166W-3.3K $\Omega$ J |
| R572     | Carbon film resistor | RT13-0.166W-3.9K $\Omega$ J |
| R105     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R302     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R424     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R553     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R727     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R755     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R757     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R778     | Carbon film resistor | RT13-0.166W-4.7K $\Omega$ J |
| R511     | Carbon film resistor | RT13-0.166W-5.6K $\Omega$ J |
| R183     | Carbon film resistor | RT13-0.166W-8.2K $\Omega$ J |
| R724     | Carbon film resistor | RT13-0.166W-8.2K $\Omega$ J |
| R894A    | Carbon film resistor | RT13-0.166W-8.2K $\Omega$ J |
| R896A    | Carbon film resistor | RT13-0.166W-8.2K $\Omega$ J |
| R194     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R235B    | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R280     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R281     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R293     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R426     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R573     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R586     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R710     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R726     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R729     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R733     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R734     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R773     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R774     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |

## PARTS LIST (continued)

| Position | Parts                | Type                        |
|----------|----------------------|-----------------------------|
| R775     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| RV27     | Carbon film resistor | RT13-0.166W-10K $\Omega$ J  |
| R201     | Carbon film resistor | RT13-0.166W-12K $\Omega$ J  |
| R305     | Carbon film resistor | RT13-0.166W-12K $\Omega$ J  |
| R313     | Carbon film resistor | RT13-0.166W-12K $\Omega$ J  |
| R233     | Carbon film resistor | RT13-0.166W-15K $\Omega$ J  |
| R235     | Carbon film resistor | RT13-0.166W-15K $\Omega$ J  |
| R415     | Carbon film resistor | RT13-0.166W-15K $\Omega$ J  |
| R522     | Carbon film resistor | RT13-0.166W-15K $\Omega$ J  |
| R515     | Carbon film resistor | RT13-0.166W-22K $\Omega$ J  |
| R556     | Carbon film resistor | RT13-0.166W-22K $\Omega$ J  |
| RV29     | Carbon film resistor | RT13-0.166W-22K $\Omega$ J  |
| R131     | Carbon film resistor | RT13-0.166W-33K $\Omega$ J  |
| R185     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| R203     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| R205     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| R585     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| RV30     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| RV33     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| RV34     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| RV36     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| RV37     | Carbon film resistor | RT13-0.166W-47K $\Omega$ J  |
| R314     | Carbon film resistor | RT13-0.166W-51K $\Omega$ J  |
| R561     | Carbon film resistor | RT13-0.166W-51K $\Omega$ J  |
| R562     | Carbon film resistor | RT13-0.166W-51K $\Omega$ J  |
| R132     | Carbon film resistor | RT13-0.166W-100K $\Omega$ J |
| R225     | Carbon film resistor | RT13-0.166W-100K $\Omega$ J |
| R723     | Carbon film resistor | RT13-0.166W-100K $\Omega$ J |
| RV07     | Carbon film resistor | RT13-0.166W-100K $\Omega$ J |
| RV09     | Carbon film resistor | RT13-0.166W-100K $\Omega$ J |
| RV13     | Carbon film resistor | RT13-0.166W-100K $\Omega$ J |
| RV15     | Carbon film resistor | RT13-0.166W-100K $\Omega$ J |
| R182     | Carbon film resistor | RT13-0.166W-150K $\Omega$ J |
| R554     | Carbon film resistor | RT13-0.166W-150K $\Omega$ J |
| R220     | Carbon film resistor | RT13-0.166W-220K $\Omega$ J |
| R440     | Carbon film resistor | RT13-0.166W-220K $\Omega$ J |
| R722     | Carbon film resistor | RT13-0.166W-220K $\Omega$ J |
| R701     | Carbon film resistor | RT13-0.166W-390K $\Omega$ J |
| R725     | Carbon film resistor | RT13-0.166W-1M $\Omega$ J   |
| R583     | Carbon film resistor | RT14-0.25W-1.8K $\Omega$ J  |
| R304     | Carbon film resistor | RT15-0.5W-1 $\Omega$ J      |
| R323A    | Carbon film resistor | RT15-0.5W-1K $\Omega$ J     |
| R403     | Carbon film resistor | RT15-0.5W-1K $\Omega$ J     |

**PARTS LIST (continued)**

| Position | Parts                      | Type                             |
|----------|----------------------------|----------------------------------|
| R245     | Metal film resistor        | RJ14-0.25W-4.7K $\Omega$ F       |
| R310     | Metal oxide film resistor  | RY21-0.5W-220 $\Omega$ J         |
| R443A    | Metal oxide film resistor  | RY21-0.5W-15K $\Omega$ J         |
| R555     | Metal oxide film resistor  | RY21-0.5W-47K $\Omega$ J         |
| R323     | Metal oxide film resistor  | RY21-1W-220 $\Omega$ J           |
| R443     | Metal oxide film resistor  | RY21-1W-1K $\Omega$ J            |
| R446     | Metal oxide film resistor  | RY21-2W-2.2K $\Omega$ J          |
| R581     | Metal oxide film resistor  | RY21-2W-2.2K $\Omega$ J          |
| R581A    | Metal oxide film resistor  | RY21-2W-2.2K $\Omega$ J          |
| R537     | Metal oxide film resistor  | RY21-2W-27 $\Omega$ J            |
| R525     | Metal oxide film resistor  | RY21-2W-68 $\Omega$ J            |
| R404     | Metal oxide film resistor  | RY21-2W-330 $\Omega$ J           |
| R141     | Metal oxide film resistor  | RY21-2W-15K $\Omega$ J           |
| R551     | Metal oxide film resistor  | RY21-2W-15K $\Omega$ J           |
| R552     | Metal oxide film resistor  | RY21-2W-15K $\Omega$ J           |
| R568     | Metal oxide film resistor  | RY21-2W-22K $\Omega$ J           |
| R571     | Metal oxide film resistor  | RY21-2W-39K $\Omega$ J           |
| R565     | Metal oxide film resistor  | RY21-3W-2.4 $\Omega$ J           |
| R565A    | Metal oxide film resistor  | RY21-3W-2.4 $\Omega$ J           |
| R525A    | Metal oxide film resistor  | RY21-3W-33K $\Omega$ J           |
| R520     | Solid resistor             | RS11-0.5W-120K $\Omega$ K        |
| R520     | Glass glazed resistor      | RI40-0.5W-120K $\Omega$ K        |
| R521     | Solid resistor             | RS11-0.5W-120K $\Omega$ K        |
| R521     | Glass glazed resistor      | RI40-0.5W-120K $\Omega$ K        |
| R524     | Wirewound resistor         | RXC4-6W-15 $\Omega$ J            |
| R435     | Wirewound resistor         | RXC4-6W-8.2 $\Omega$ K           |
| R502     | Wirewound resistor         | RXC6-H3-10W-2.2 $\Omega$ J       |
| RF569    | Fuse resistor              | RF10-2W-1 $\Omega$ J             |
| RF569    | Fuse resistor              | RF11-2W-1 $\Omega$ J             |
| RF481    | Fuse resistor              | RF11-2W-2.7 $\Omega$ J           |
| RM04A    | Glass glazed resistor      | VR68-2M7J/232224413275           |
| RM04A    | Glass glazed resistor      | RI81-1W-2.7M $\Omega$ J          |
| RP551    | Glass glazed potentiometer | WI06-2Y-0.125W-2K $\Omega$ -A    |
| RT501A   | Thermistor                 | PH96709-7 $\Omega$ /232266296709 |
| C710     | Ceramic capacitor          | CC1-63V-06a-C-15PFJ              |
| C238     | Ceramic capacitor          | CC1-63V-06a-C-18PFJ              |
| C553A    | Ceramic capacitor          | CC1-63V-06a-C-18PFJ              |
| C709     | Ceramic capacitor          | CC1-63V-06a-C-18PFJ              |
| C240     | Ceramic capacitor          | CC1-63V-06a-C-39PFJ              |
| C239     | Ceramic capacitor          | CT1-63V-06a-2B4-470PFK           |
| C108     | Ceramic capacitor          | CT1-63V-06a-2B4-1000PFK          |
| C182     | Ceramic capacitor          | CT1-63V-06a-2B4-1000PFK          |
| C234     | Ceramic capacitor          | CT1-63V-06a-2B4-1000PFK          |

**PARTS LIST (continued)**

| Position | Parts             | Type                          |
|----------|-------------------|-------------------------------|
| C301     | Ceramic capacitor | CT1-63V-06a-2B4-1000PFK       |
| C109     | Ceramic capacitor | CT1-63V-06a-2B4-1500PFK       |
| C110     | Ceramic capacitor | CT1-63V-06a-2B4-1500PFK       |
| C111     | Ceramic capacitor | CT1-63V-06a-2B4-1500PFK       |
| C416     | Ceramic capacitor | CT1-63V-10a-2B4-3900PFK       |
| C191     | Ceramic capacitor | CT1-63V-10a-2B4-4700PFK       |
| C193     | Ceramic capacitor | CT1-63V-10a-2B4-4700PFK       |
| C144     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C198     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C201     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C202     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C203     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C205     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C206     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C210     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C218     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C235     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C249     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C251     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C255     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C513     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C703     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C712     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C713     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C799     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| CV10     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| CV11     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| CV20     | Ceramic capacitor | CT1-63V-08a-2F4-10nFZ         |
| C309     | Ceramic capacitor | CC1-500V-06c-SL-18PFJ         |
| C415     | Ceramic capacitor | CT1-500V-06c-2B4-390PFK       |
| C401     | Ceramic capacitor | CT1-500V-10c-2B4-1000PFK      |
| C402     | Ceramic capacitor | CT1-500V-14c-2B4-3900PFK      |
| C554     | Ceramic capacitor | CT81-1KV-08c-2B4-470PFK       |
| C503     | Ceramic capacitor | CT81-1KV-10c-2B4-1000PFM      |
| C504     | Ceramic capacitor | CT81-1KV-10c-2B4-1000PFM      |
| C505     | Ceramic capacitor | CT81-1KV-10c-2B4-1000PFM      |
| C506     | Ceramic capacitor | CT81-1KV-10c-2B4-1000PFM      |
| C518     | Ceramic capacitor | CT81-1KV-10c-2B4-1000PFM      |
| C552A    | Ceramic capacitor | CT81-2KV-08c-2B4-220PFK       |
| C551     | Ceramic capacitor | CT81-2KV-10c-2B4-470PFK       |
| C436     | Ceramic capacitor | CT81-2KV-12c-2B4-680PFK       |
| C516     | Ceramic capacitor | CT81-2KV-12c-2B4-680PFK       |
| CR531    | Ceramic capacitor | CT81-250VAC-12c-2B4-470PFK-Y1 |

**PARTS LIST (continued)**

| Position | Parts                           | Type                           |
|----------|---------------------------------|--------------------------------|
| CR532    | Ceramic capacitor               | CT81-250VAC-12c-2B4-470PFK-Y1  |
| C534     | Ceramic capacitor               | CT81-250VAC-12c-2E4-2200PFM-Y1 |
| C181     | Aluminum electrolytic capacitor | CD110X-16V-47 $\mu$ FM         |
| C216     | Aluminum electrolytic capacitor | CD110X-16V-47 $\mu$ FM         |
| C777     | Aluminum electrolytic capacitor | CD110X-16V-47 $\mu$ FM         |
| CV19     | Aluminum electrolytic capacitor | CD110X-16V-47 $\mu$ FM         |
| C195     | Aluminum electrolytic capacitor | CD110X-16V-100 $\mu$ FM        |
| C212     | Aluminum electrolytic capacitor | CD110X-16V-100 $\mu$ FM        |
| CV23     | Aluminum electrolytic capacitor | CD110X-16V-220 $\mu$ FM        |
| C122     | Aluminum electrolytic capacitor | CD110X-16V-470 $\mu$ FM        |
| C250     | Aluminum electrolytic capacitor | CD110X-16V-470 $\mu$ FM        |
| C500     | Aluminum electrolytic capacitor | CD110X-16V-470 $\mu$ FM        |
| C538     | Aluminum electrolytic capacitor | CD110X-16V-470 $\mu$ FM        |
| C574     | Aluminum electrolytic capacitor | CD110X-16V-470 $\mu$ FM        |
| C226     | Aluminum electrolytic capacitor | CD110X-16V-1000 $\mu$ FM       |
| C564     | Aluminum electrolytic capacitor | CD110X-16V-1000 $\mu$ FM       |
| C303     | Aluminum electrolytic capacitor | CD110X-25V-470 $\mu$ FM        |
| C199     | Aluminum electrolytic capacitor | CD110X-25V-1000 $\mu$ FM       |
| C306     | Aluminum electrolytic capacitor | CD110X-25V-1000 $\mu$ FM       |
| C565     | Aluminum electrolytic capacitor | CD110X-25V-2200 $\mu$ FM       |
| C565     | Aluminum electrolytic capacitor | CD110X-25V-2200 $\mu$ FM       |
| C403     | Aluminum electrolytic capacitor | CD110X-35V-47 $\mu$ FM         |
| C302     | Aluminum electrolytic capacitor | CD110X-35V-100 $\mu$ FM        |
| C563     | Aluminum electrolytic capacitor | CD110X-35V-1000 $\mu$ FM       |
| C242     | Aluminum electrolytic capacitor | CD110-50V-0.47 $\mu$ FM        |
| C244     | Aluminum electrolytic capacitor | CD110-50V-0.47 $\mu$ FM        |
| C256     | Aluminum electrolytic capacitor | CD110-50V-0.47 $\mu$ FM        |
| C711     | Aluminum electrolytic capacitor | CD110-50V-0.47 $\mu$ FM        |
| C208     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C230     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C235B    | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C236     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C236B    | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C321     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C572     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C800     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C808     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| CV12     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| CV13     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM           |
| C131     | Aluminum electrolytic capacitor | CD110-50V-2.2 $\mu$ FM         |
| CV17     | Aluminum electrolytic capacitor | CD110-50V-2.2 $\mu$ FM         |
| C141     | Aluminum electrolytic capacitor | CD110-50V-4.7 $\mu$ FM         |
| C304     | Aluminum electrolytic capacitor | CD110-50V-4.7 $\mu$ FM         |



**PARTS LIST (continued)**

| Position | Parts                           | Type                     |
|----------|---------------------------------|--------------------------|
| C246     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| C701     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| C705     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| C733     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| C798     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV01     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV02     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV06     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV07     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV08     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV14     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV15     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV16     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV18     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV21     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV22     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV24     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV25     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV26     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV27     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV03     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV04     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV05     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| CV09     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM    |
| C422     | Aluminum electrolytic capacitor | CD71-50V-4.7 $\mu$ FM    |
| C443     | Aluminum electrolytic capacitor | CD81-160V-4.7 $\mu$ FM   |
| C443A    | Aluminum electrolytic capacitor | CD81-160V-4.7 $\mu$ FM   |
| C561A    | Aluminum electrolytic capacitor | CD110X-160V-47 $\mu$ FM  |
| C571     | Aluminum electrolytic capacitor | CD110X-160V-47 $\mu$ FM  |
| C561     | Aluminum electrolytic capacitor | CD288-160V-220 $\mu$ FM  |
| C507     | Aluminum electrolytic capacitor | CD293-200V-270 $\mu$ FM  |
| C204     | Polyester film capacitor        | CL21X-50V-0.015 $\mu$ FJ |
| C228     | Polyester film capacitor        | CL21X-50V-0.015 $\mu$ FJ |
| C112     | Polyester film capacitor        | CL21X-50V-0.022 $\mu$ FJ |
| C515     | Polyester film capacitor        | CL21X-50V-0.022 $\mu$ FJ |
| C726     | Polyester film capacitor        | CL21X-50V-0.022 $\mu$ FJ |
| C517     | Polyester film capacitor        | CL21X-50V-0.033 $\mu$ FJ |
| C229     | Polyester film capacitor        | CL21X-50V-0.056 $\mu$ FJ |
| C254     | Polyester film capacitor        | CL21X-50V-0.056 $\mu$ FJ |
| C404     | Polyester film capacitor        | CL21X-50V-0.056 $\mu$ FJ |
| C214     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ   |
| C444     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ   |
| C514     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ   |

## PARTS LIST (continued)

| Position | Parts                         | Type                      |
|----------|-------------------------------|---------------------------|
| C192     | Polyester film capacitor      | CL21X-50V-0.22 $\mu$ FK   |
| C194     | Polyester film capacitor      | CL21X-50V-0.22 $\mu$ FK   |
| C220     | Polyester film capacitor      | CL21X-50V-0.22 $\mu$ FK   |
| C222     | Polyester film capacitor      | CL21X-50V-0.47 $\mu$ FK   |
| C437     | Polyester film capacitor      | CL21X-50V-0.47 $\mu$ FK   |
| C308     | Polyester film capacitor      | CL12-100V-0.033 $\mu$ FK  |
| C307     | Polyester film capacitor      | CL12-100V-0.1 $\mu$ FK    |
| C442     | Polypropylene capacitor       | CBB13-400V-0.33 $\mu$ FJ  |
| C442     | Polypropylene capacitor       | CBB13-400V-0.33 $\mu$ FJ  |
| C516A    | Polypropylene capacitor       | CBB13-630V-0.022 $\mu$ FJ |
| C501     | Polypropylene capacitor       | MKP3355-275V-0.1 $\mu$ FM |
| C502     | Polypropylene capacitor       | MKP3355-275V-0.1 $\mu$ FM |
| C435     | Polypropylene capacitor       | CBB81-1.6KV-7200PFJ       |
| C435     | Polypropylene capacitor       | CBB81-1.6KV-7200PFJ       |
| L104     | Fixed inductor                | LCB0606-1 $\mu$ HJ        |
| L202     | Fixed inductor                | LGB0606-10 $\mu$ HK       |
| L204     | Fixed inductor                | LGB0606-10 $\mu$ HK       |
| L705     | Fixed inductor                | LGB0606-10 $\mu$ HK       |
| L287     | Fixed inductor                | LGB0606-15 $\mu$ HK       |
| LV01     | Fixed inductor                | LGB0606-22 $\mu$ HK       |
| L431     | Feed-through inductor         | ZZ008                     |
| L441     | Horizontal amplitude inductor | TLN0028C(JU4.756.034)     |
| L406     | Horizontal linear inductor    | HXT-39                    |
| L201     | IF transformer                | ST6030                    |
| L502     | Line filter                   | LCL-F15(JUB4.757.001)     |
| L503     | Filtering inductor            | LCL-F16(JUB4.757.002)     |
| L551     | Fixed inductor                | TLN3155D-100 $\mu$ HK     |
| T401     | Line drive transformer        | BCT-5(JU4.739.031)        |
| T511     | Switch transformer            | BCK24202L                 |
| T432     | FBT                           | BSC66G                    |
| DI798    | Relay                         | JZC-36F-005-HS            |
| VD704    | Diode                         | W05Z3.6A                  |
| VD704    | Diode                         | HZ4C3                     |
| VD704    | Diode                         | RD3.6EL                   |
| VD533    | Diode                         | W05Z5.6C                  |
| VD533    | Diode                         | MTZJ5.6C                  |
| VD561    | Diode                         | W05Z6.2C                  |
| VD561    | Diode                         | MTZJ6.2C                  |
| VD404    | Diode                         | W05Z7.5C                  |
| VD404    | Diode                         | MTZJ7.5C                  |
| VD519    | Diode                         | W05Z7.5C                  |
| VD519    | Diode                         | MTZJ7.5C                  |
| VD572    | Diode                         | W05Z7.5C                  |

**PARTS LIST (continued)**

| Position | Parts | Type     |
|----------|-------|----------|
| VD572    | Diode | MTZJ7.5C |
| VD587A   | Diode | W05Z10B  |
| VD587A   | Diode | MTZJ10B  |
| VD586    | Diode | W05Z16B  |
| VD586    | Diode | MTZJ16B  |
| VD302    | Diode | 1Z75     |
| VD191    | Diode | 1N4148   |
| VD191    | Diode | 2CK75D   |
| VD208    | Diode | 1N4148   |
| VD208    | Diode | 2CK75D   |
| VD261    | Diode | 1N4148   |
| VD261    | Diode | 2CK75D   |
| VD262    | Diode | 1N4148   |
| VD262    | Diode | 2CK75D   |
| VD263    | Diode | 1N4148   |
| VD263    | Diode | 2CK75D   |
| VD403A   | Diode | 1N4148   |
| VD403A   | Diode | 2CK75D   |
| VD405    | Diode | 1N4148   |
| VD405    | Diode | 2CK75D   |
| VD431    | Diode | 1N4148   |
| VD431    | Diode | 2CK75D   |
| VD514    | Diode | 1N4148   |
| VD514    | Diode | 2CK75D   |
| VD516    | Diode | 1N4148   |
| VD516    | Diode | 2CK75D   |
| VD518    | Diode | 1N4148   |
| VD518    | Diode | 2CK75D   |
| VD584    | Diode | 1N4148   |
| VD584    | Diode | 2CK75D   |
| VD798    | Diode | 1N4148   |
| VD798    | Diode | 2CK75D   |
| VD813A   | Diode | 1N4148   |
| VD813A   | Diode | 2CK75D   |
| VD571    | Diode | RM11C    |
| VD441    | Diode | RM11C    |
| VD501    | Diode | RL205    |
| VD502    | Diode | RL205    |
| VD503    | Diode | RL205    |
| VD504    | Diode | RL205    |
| VD520    | Diode | BYV26D   |
| VD551    | Diode | BYM26D   |
| VD301    | Diode | ZEM01Z   |

**PARTS LIST (continued)**

| Position | Parts         | Type      |
|----------|---------------|-----------|
| VD553    | Diode         | SR1505    |
| VD554    | Diode         | SR1505    |
| VD557    | Diode         | SR1505    |
| VD517    | Diode         | 2CZES1    |
| VD442    | Diode         | AU01Z     |
| VD555A   | Diode         | 2CZEU1C   |
| VD555A   | Diode         | EU1C      |
| VD515    | Photo coupler | LTV-816   |
| V581     | Triode        | 3DG2688-L |
| V581     | Triode        | 2SC2688-L |
| V581     | Triode        | 3DA2688   |
| V191     | Triode        | 3CG1015-Y |
| V191     | Triode        | 2SA1015-Y |
| V191     | Triode        | 2PA1015-Y |
| V511     | Triode        | 3CG1015-Y |
| V511     | Triode        | 2SA1015-Y |
| V511     | Triode        | 2PA1015-Y |
| V702     | Triode        | 3CG1015-Y |
| V702     | Triode        | 2SA1015-Y |
| V702     | Triode        | 2PA1015-Y |
| V181     | Triode        | 3DG1815-Y |
| V181     | Triode        | 2SC1815-Y |
| V181     | Triode        | 2PC1815-Y |
| V231     | Triode        | 3DG1815-Y |
| V231     | Triode        | 2SC1815-Y |
| V231     | Triode        | 2PC1815-Y |
| V232     | Triode        | 3DG1815-Y |
| V232     | Triode        | 2SC1815-Y |
| V232     | Triode        | 2PC1815-Y |
| V553     | Triode        | 3DG1815-Y |
| V553     | Triode        | 2SC1815-Y |
| V553     | Triode        | 2PC1815-Y |
| V585     | Triode        | 3DG1815-Y |
| V585     | Triode        | 2SC1815-Y |
| V585     | Triode        | 2PC1815-Y |
| V586     | Triode        | 3DG1815-Y |
| V586     | Triode        | 2SC1815-Y |
| V586     | Triode        | 2PC1815-Y |
| V703     | Triode        | 3DG1815-Y |
| V703     | Triode        | 2SC1815-Y |
| V703     | Triode        | 2PC1815-Y |
| V704     | Triode        | 3DG1815-Y |
| V704     | Triode        | 2SC1815-Y |

**PARTS LIST (continued)**

| Position | Parts                        | Type              |
|----------|------------------------------|-------------------|
| V704     | Triode                       | 2PC1815-Y         |
| VV01     | Triode                       | 3DG1815-Y         |
| VV01     | Triode                       | 2SC1815-Y         |
| VV01     | Triode                       | 2PC1815-Y         |
| VV02     | Triode                       | 3DG1815-Y         |
| VV02     | Triode                       | 2SC1815-Y         |
| VV02     | Triode                       | 2PC1815-Y         |
| VV03     | Triode                       | 3DG1815-Y         |
| VV03     | Triode                       | 2SC1815-Y         |
| VV03     | Triode                       | 2PC1815-Y         |
| VV04     | Triode                       | 3DG1815-Y         |
| VV04     | Triode                       | 2SC1815-Y         |
| VV04     | Triode                       | 2PC1815-Y         |
| VV10     | Triode                       | 3DG1815-Y         |
| VV10     | Triode                       | 2SC1815-Y         |
| VV10     | Triode                       | 2PC1815-Y         |
| V798     | Triode                       | 2SC2655-Y         |
| V101     | Triode                       | KSC388C-Y         |
| V431     | Triode                       | 3DG2383-O         |
| V431     | Triode                       | 3DG2383-Y         |
| V431     | Triode                       | 2SC2383-O         |
| V431     | Triode                       | 2SC2383-Y         |
| V431     | Triode                       | KSC2383-O         |
| V431     | Triode                       | KSC2383-Y         |
| V512     | Triode                       | 2SC3807           |
| V512     | Triode                       | 2SC3807A          |
| V582     | Triode                       | 2SD882-P          |
| V582     | Triode                       | 2SD882            |
| V583     | Triode                       | 2SC3852           |
| N101     | IC                           | LA76835           |
| D701     | IC                           | CH04T1223-5Z42    |
| D702     | IC                           | AT24C08           |
| NV01     | IC                           | KA2192B           |
| NV01     | IC                           | S1112192A01-A0B0  |
| N141     | IC                           | μ PC574J          |
| N141     | IC                           | CW574CS           |
| N141     | IC                           | KA33V             |
| F501     | Delay fuse                   | UCT 51S-4A-125VAC |
| G201     | Crystal oscillator           | JA18B-3.579545MHz |
| G701     | Crystal oscillator           | JA18D-32.768KHz   |
| Z101     | Surface acoustic wave filter | LBN49.5-58ML      |
| Z101     | Surface acoustic wave filter | LBN45.75M         |
| XS801    | AV terminals                 | AVL-43-9R-B       |

**PARTS LIST (continued)**

| Position | Parts            | Type                |
|----------|------------------|---------------------|
| XS804    | S-VIDEO terminal | PH-S                |
| U101     | Electronic tuner | TDQ-3B8/136         |
| XT501    | Degaussing coil  | XC-21(JUB4.759.020) |
| V432     | Triode           | 3DD1651             |
| V432     | Triode           | 3DD2102             |
| V513     | Triode           | 2SC4423-M           |
| N301     | IC               | LA7840              |
| N301     | IC               | LA7840L             |
| N191     | IC               | TDA7057AQ           |
| N503     | IC               | L7805CV             |
| N503     | IC               | AN7805              |
| N503     | IC               | CW7805CS            |
| J029     | Jumper           | 5mm                 |
| J032     | Jumper           | 5mm                 |
| J040     | Jumper           | 5mm                 |
| J105B    | Jumper           | 5mm                 |
| J121B    | Jumper           | 5mm                 |
| J140     | Jumper           | 5mm                 |
| J167     | Jumper           | 5mm                 |
| J210A    | Jumper           | 5mm                 |
| J211A    | Jumper           | 5mm                 |
| J215     | Jumper           | 5mm                 |
| J242     | Jumper           | 5mm                 |
| J252B    | Jumper           | 5mm                 |
| J506     | Jumper           | 5mm                 |
| C269     | Jumper           | 5mm                 |
| C288     | Jumper           | 5mm                 |
| L511     | Jumper           | 5mm                 |
| R221     | Jumper           | 5mm                 |
| 081      | Jumper           | 7.5mm               |
| J012     | Jumper           | 7.5mm               |
| J017     | Jumper           | 7.5mm               |
| J035     | Jumper           | 7.5mm               |
| J043     | Jumper           | 7.5mm               |
| J046     | Jumper           | 7.5mm               |
| J048     | Jumper           | 7.5mm               |
| J056     | Jumper           | 7.5mm               |
| J062     | Jumper           | 7.5mm               |
| J066     | Jumper           | 7.5mm               |
| J085     | Jumper           | 7.5mm               |
| J108     | Jumper           | 7.5mm               |
| J109     | Jumper           | 7.5mm               |
| J111     | Jumper           | 7.5mm               |

**PARTS LIST (continued)**

| Position | Parts  | Type  |
|----------|--------|-------|
| J113     | Jumper | 7.5mm |
| J131     | Jumper | 7.5mm |
| J158     | Jumper | 7.5mm |
| J200     | Jumper | 7.5mm |
| J206     | Jumper | 7.5mm |
| J208     | Jumper | 7.5mm |
| J212     | Jumper | 7.5mm |
| J213     | Jumper | 7.5mm |
| J217     | Jumper | 7.5mm |
| J220     | Jumper | 7.5mm |
| J221     | Jumper | 7.5mm |
| J223     | Jumper | 7.5mm |
| J231     | Jumper | 7.5mm |
| J237B    | Jumper | 7.5mm |
| J241     | Jumper | 7.5mm |
| J243     | Jumper | 7.5mm |
| J244B    | Jumper | 7.5mm |
| J355     | Jumper | 7.5mm |
| J427     | Jumper | 7.5mm |
| J500     | Jumper | 7.5mm |
| J533     | Jumper | 7.5mm |
| J611     | Jumper | 7.5mm |
| J619     | Jumper | 7.5mm |
| W202     | Jumper | 7.5mm |
| R289     | Jumper | 7.5mm |
| R321     | Jumper | 7.5mm |
| VD209    | Jumper | 7.5mm |
| VD587    | Jumper | 7.5mm |
| 400      | Jumper | 10mm  |
| J005     | Jumper | 10mm  |
| J041     | Jumper | 10mm  |
| J051     | Jumper | 10mm  |
| J072     | Jumper | 10mm  |
| J073     | Jumper | 10mm  |
| J074     | Jumper | 10mm  |
| J080     | Jumper | 10mm  |
| J090     | Jumper | 10mm  |
| J105     | Jumper | 10mm  |
| J138     | Jumper | 10mm  |
| J142     | Jumper | 10mm  |
| J150     | Jumper | 10mm  |
| J151     | Jumper | 10mm  |
| J168     | Jumper | 10mm  |

**PARTS LIST (continued)**

| Position | Parts  | Type   |
|----------|--------|--------|
| J184     | Jumper | 10mm   |
| J191     | Jumper | 10mm   |
| J193     | Jumper | 10mm   |
| J201     | Jumper | 10mm   |
| J237     | Jumper | 10mm   |
| J350A    | Jumper | 10mm   |
| J352     | Jumper | 10mm   |
| J624     | Jumper | 10mm   |
| L551A    | Jumper | 10mm   |
| J003     | Jumper | 12.5mm |
| J021     | Jumper | 12.5mm |
| J026     | Jumper | 12.5mm |
| J031     | Jumper | 12.5mm |
| J037     | Jumper | 12.5mm |
| J038     | Jumper | 12.5mm |
| J044     | Jumper | 12.5mm |
| J050     | Jumper | 12.5mm |
| J060     | Jumper | 12.5mm |
| J061     | Jumper | 12.5mm |
| J100     | Jumper | 12.5mm |
| J106     | Jumper | 12.5mm |
| J107     | Jumper | 12.5mm |
| J123     | Jumper | 12.5mm |
| J126     | Jumper | 12.5mm |
| J128     | Jumper | 12.5mm |
| J143     | Jumper | 12.5mm |
| J160     | Jumper | 12.5mm |
| J178     | Jumper | 12.5mm |
| J188     | Jumper | 12.5mm |
| J192     | Jumper | 12.5mm |
| J199     | Jumper | 12.5mm |
| J204     | Jumper | 12.5mm |
| J207     | Jumper | 12.5mm |
| J224     | Jumper | 12.5mm |
| J230     | Jumper | 12.5mm |
| J239     | Jumper | 12.5mm |
| J412     | Jumper | 12.5mm |
| J556     | Jumper | 12.5mm |
| R777     | Jumper | 12.5mm |
| 355      | Jumper | 15mm   |
| J007     | Jumper | 15mm   |
| J011     | Jumper | 15mm   |
| J015     | Jumper | 15mm   |



**PARTS LIST (continued)**

| Position | Parts  | Type   |
|----------|--------|--------|
| J047     | Jumper | 15mm   |
| J076     | Jumper | 15mm   |
| J079     | Jumper | 15mm   |
| J083     | Jumper | 15mm   |
| J11B     | Jumper | 15mm   |
| J124     | Jumper | 15mm   |
| J132     | Jumper | 15mm   |
| J134A    | Jumper | 15mm   |
| J141     | Jumper | 15mm   |
| J169     | Jumper | 15mm   |
| J181     | Jumper | 15mm   |
| J202     | Jumper | 15mm   |
| J210     | Jumper | 15mm   |
| J234     | Jumper | 15mm   |
| J251B    | Jumper | 15mm   |
| J340     | Jumper | 15mm   |
| J349     | Jumper | 15mm   |
| J349A    | Jumper | 15mm   |
| J350     | Jumper | 15mm   |
| J357     | Jumper | 15mm   |
| J359     | Jumper | 15mm   |
| J555     | Jumper | 15mm   |
| R422     | Jumper | 15mm   |
| J067     | Jumper | 17.5mm |
| J069     | Jumper | 17.5mm |
| J077     | Jumper | 17.5mm |
| J086     | Jumper | 17.5mm |
| J102     | Jumper | 17.5mm |
| J104     | Jumper | 17.5mm |
| J112     | Jumper | 17.5mm |
| J133     | Jumper | 17.5mm |
| J144     | Jumper | 17.5mm |
| J145     | Jumper | 17.5mm |
| J177     | Jumper | 17.5mm |
| J180     | Jumper | 17.5mm |
| J203     | Jumper | 17.5mm |
| J222     | Jumper | 17.5mm |
| J244     | Jumper | 17.5mm |
| J250A    | Jumper | 17.5mm |
| J606     | Jumper | 17.5mm |
| J068     | Jumper | 20mm   |
| J075     | Jumper | 20mm   |
| J103     | Jumper | 20mm   |

**PARTS LIST (continued)**

| Position | Parts                | Type                 |
|----------|----------------------|----------------------|
| J134     | Jumper               | 20mm                 |
| J137     | Jumper               | 20mm                 |
| J209A    | Jumper               | 20mm                 |
| J240     | Jumper               | 20mm                 |
| J250     | Jumper               | 20mm                 |
| J400     | Jumper               | 20mm                 |
| J404     | Jumper               | 20mm                 |
| J804     | Jumper               | 20mm                 |
| J071     | Special jumper       | 22.5mm               |
| J121     | Special jumper       | 22.5mm               |
| J216     | Special jumper       | 22.5mm               |
| J233     | Special jumper       | 22.5mm               |
| J501     | Special jumper       | 22.5mm               |
| J002A    | Jumper               | 25mm                 |
| J016     | Jumper               | 25mm                 |
| J052     | Jumper               | 25mm                 |
| J055     | Jumper               | 25mm                 |
| J114     | Jumper               | 25mm                 |
| J125     | Jumper               | 25mm                 |
| J159     | Jumper               | 25mm                 |
| J171     | Jumper               | 25mm                 |
| J173     | Jumper               | 25mm                 |
| J179     | Jumper               | 25mm                 |
| J190     | Jumper               | 25mm                 |
| J203A    | Jumper               | 25mm                 |
| J209     | Jumper               | 25mm                 |
| J211     | Jumper               | 25mm                 |
| J245     | Jumper               | 25mm                 |
| J333     | Jumper               | 25mm                 |
| J808     | Jumper               | 25mm                 |
|          |                      | Parts on CRT RGB PCB |
| R902     | Carbon film resistor | RT14-0.25W-15ΩJ      |
| R913     | Carbon film resistor | RT14-0.25W-56ΩJ      |
| R903     | Carbon film resistor | RT14-0.25W-470ΩJ     |
| R905     | Carbon film resistor | RT14-0.25W-470ΩJ     |
| R907     | Carbon film resistor | RT14-0.25W-470ΩJ     |
| R909     | Carbon film resistor | RT14-0.25W-680ΩJ     |
| RW01     | Carbon film resistor | RT14-0.25W-680ΩJ     |
| RW02     | Carbon film resistor | RT14-0.25W-680ΩJ     |
| RW03     | Carbon film resistor | RT14-0.25W-680ΩJ     |
| R904     | Carbon film resistor | RT14-0.25W-750ΩJ     |
| R906     | Carbon film resistor | RT14-0.25W-750ΩJ     |
| R908     | Carbon film resistor | RT14-0.25W-750ΩJ     |

**PARTS LIST (continued)**

| Position | Parts                           | Type                           |
|----------|---------------------------------|--------------------------------|
| R911     | Carbon film resistor            | RT14-0.25W-1K $\Omega$ J       |
| R912     | Carbon film resistor            | RT14-0.25W-1K $\Omega$ J       |
| R910     | Carbon film resistor            | RT14-0.25W-2.7K $\Omega$ J     |
| R917     | Carbon film resistor            | RT15-0.5W-1.2K $\Omega$ J      |
| R917     | Carbon film resistor            | RY21-1W-1.2K $\Omega$ J        |
| R918     | Carbon film resistor            | RT15-0.5W-1.2K $\Omega$ J      |
| R918     | Carbon film resistor            | RY21-1W-1.2K $\Omega$ J        |
| R919     | Carbon film resistor            | RT15-0.5W-1.2K $\Omega$ J      |
| R919     | Carbon film resistor            | RY21-1W-1.2K $\Omega$ J        |
| R914     | Metal oxide film resistor       | RY21-2W-18K $\Omega$ J         |
| R915     | Metal oxide film resistor       | RY21-2W-18K $\Omega$ J         |
| R916     | Metal oxide film resistor       | RY21-2W-18K $\Omega$ J         |
| C901     | Ceramic capacitor               | CT1-63V-06a-2B4-330PFK         |
| C902     | Ceramic capacitor               | CT1-63V-06a-2B4-330PFK         |
| C903     | Ceramic capacitor               | CT1-63V-06a-2B4-330PFK         |
| C910     | Ceramic capacitor               | CT81-1KV-10c-2B4-1000PFM       |
| C909     | Ceramic capacitor               | CD85-E2GA102MYHS               |
| C909     | Ceramic capacitor               | CT71-400VAC-10d-2E4-1000PFM-Y1 |
| C909     | Ceramic capacitor               | CT81-400VAC-11C-2E4-1000PFM-Y1 |
| C906     | Aluminum electrolytic capacitor | CD110X-16V-470 $\mu$ FM        |
| C907     | Aluminum electrolytic capacitor | CD110-50V-0.47 $\mu$ FM        |
| C904     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM          |
| C905     | Aluminum electrolytic capacitor | CD110-50V-22 $\mu$ FM          |
| C908     | Aluminum electrolytic capacitor | CD110X-250V-22 $\mu$ FM        |
| C908     | Aluminum electrolytic capacitor | UVR2E220MHA1AA                 |
| L901     | Fixed inductor                  | LGB0606-10 $\mu$ HK            |
| D901     | Diode                           | 1N4148                         |
| D901     | Diode                           | 2CK75D                         |
| D902     | Diode                           | 1N4148                         |
| D902     | Diode                           | 2CK75D                         |
| D903     | Diode                           | 1N4148                         |
| D903     | Diode                           | 2CK75D                         |
| D904     | Diode                           | 1N4148                         |
| D904     | Diode                           | 2CK75D                         |
| D905     | Diode                           | 1N4148                         |
| D905     | Diode                           | 2CK75D                         |
| D906     | Diode                           | 1N4148                         |
| D906     | Diode                           | 2CK75D                         |
| V905     | Triode                          | 3CG1015-Y                      |
| V905     | Triode                          | 2SA1015-Y                      |
| V905     | Triode                          | 2PA1015-Y                      |
| V904     | Triode                          | 3DG1815-Y                      |
| V904     | Triode                          | 2SC1815-Y                      |

## PARTS LIST (continued)

| Position | Parts                | Type                         |
|----------|----------------------|------------------------------|
| V904     | Triode               | 2PC1815-Y                    |
| V901     | Triode               | 3DG2482(FA-1)                |
| V901     | Triode               | 3DG2688-L                    |
| V901     | Triode               | 2SC2688-L                    |
| V901     | Triode               | 3DA2688                      |
| V901     | Triode               | 2SC2482                      |
| V902     | Triode               | 3DG2482(FA-1)                |
| V902     | Triode               | 3DG2688-L                    |
| V902     | Triode               | 2SC2688-L                    |
| V902     | Triode               | 3DA2688                      |
| V902     | Triode               | 2SC2482                      |
| V903     | Triode               | 3DG2482(FA-1)                |
| V903     | Triode               | 3DG2688-L                    |
| V903     | Triode               | 2SC2688-L                    |
| V903     | Triode               | 3DA2688                      |
| V903     | Triode               | 2SC2482                      |
| GZ01     | GZS CRT socket       | GZS10-2-108                  |
| W901     | Jumper               | 7.5mm                        |
| W910     | Jumper               | 10mm                         |
| R920     | Jumper               | 20mm                         |
|          |                      | Parts on Control Buttons PCB |
| R931     | Carbon film resistor | RT13-0.166W-270ΩJ            |
| R924     | Carbon film resistor | RT13-0.166W-4.7KΩJ           |
| R935     | Carbon film resistor | RT13-0.166W-4.7KΩJ           |
| R933     | Carbon film resistor | RT13-0.166W-18KΩJ            |
| R936     | Carbon film resistor | RT13-0.166W-18KΩJ            |
| S901     | Feather touch switch | KA1W6×5-41                   |
| S902     | Feather touch switch | KA1W6×5-41                   |
| S903     | Feather touch switch | KA1W6×5-41                   |
| S904     | Feather touch switch | KA1W6×5-41                   |
| S905     | Feather touch switch | KA1W6×5-41                   |
| S906     | Feather touch switch | KA1W6×5-41                   |
|          |                      | Parts on Indicator PCB       |
| VD921    | Diode                | FG5RD                        |
|          |                      | Parts on Remote Control PCB  |
| N945     | IC                   | HS0038A                      |
| N945     | IC                   | HS0038A2                     |
|          |                      | Parts on AV PCB              |
| X803     | AV terminals         | AV-1-3PE                     |
| WS11B    | Jumper               | 7.5mm                        |
|          |                      | Parts on Power PCB           |
| S907     | Feather touch switch | KA1W6×5-41                   |
|          |                      | Other Parts                  |

## SERVICE MANUAL

### PARTS LIST (continued)

| Position | Parts                           | Type                  |
|----------|---------------------------------|-----------------------|
| VE901    | 21" CRT                         | A51QDX992X001         |
| B301     | Electric speaker                | YDT59-A3-10W-8Ω       |
| B302     | Electric speaker                | YDT59-A3-10W-8Ω       |
| XS501    | Power cord                      | RVVZ-2U2M-C21-TJC1-3Y |
|          |                                 | Parts on NCOMB PCB    |
| RK03     | Carbon film resistor            | RT13-0.166W-100ΩJ     |
| RK04     | Carbon film resistor            | RT13-0.166W-100ΩJ     |
| RK05     | Carbon film resistor            | RT13-0.166W-100ΩJ     |
| RK45     | Carbon film resistor            | RT13-0.166W-100ΩJ     |
| RK41     | Carbon film resistor            | RT13-0.166W-390ΩJ     |
| RK44     | Carbon film resistor            | RT13-0.166W-1KΩJ      |
| RK48     | Carbon film resistor            | RT13-0.166W-1KΩJ      |
| RK42     | Carbon film resistor            | RT13-0.166W-22KΩJ     |
| RK47     | Carbon film resistor            | RT13-0.166W-22KΩJ     |
| RK02     | Carbon film resistor            | RT13-0.166W-47KΩJ     |
| RK43     | Carbon film resistor            | RT13-0.166W-47KΩJ     |
| RK46     | Carbon film resistor            | RT13-0.166W-47KΩJ     |
| CK03     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ |
| CK01     | Aluminum electrolytic capacitor | CD110-50V-10μFM       |
| CK01A    | Aluminum electrolytic capacitor | CD110-50V-10μFM       |
| CK02     | Aluminum electrolytic capacitor | CD110-50V-10μFM       |
| CK32     | Aluminum electrolytic capacitor | CD110-50V-10μFM       |
| CK41     | Aluminum electrolytic capacitor | CD110-50V-10μFM       |
| VK03     | Triode                          | 3DG1815-Y             |
| VK03     | Triode                          | 2SC1815-Y             |
| VK07     | Triode                          | 3DG1815-Y             |
| VK07     | Triode                          | 2SC1815-Y             |
| VK10     | Triode                          | 3DG1815-Y             |
| VK10     | Triode                          | 2SC1815-Y             |
| NK01     | IC                              | HEF4053BP             |
| JK25     | Jumper                          | 5mm                   |
| RK14     | Jumper                          | 5mm                   |
| JK02     | Jumper                          | 7.5mm                 |
| JK31     | Jumper                          | 10mm                  |
| JK32     | Jumper                          | 10mm                  |
| JK01     | Jumper                          | 12.5mm                |
| JK04     | Jumper                          | 12.5mm                |
| JK11     | Jumper                          | 12.5mm                |
|          |                                 | Parts on BTSC PCB     |
| RB16     | Carbon film resistor            | RT13-0.166W-10ΩJ      |
| RB20     | Carbon film resistor            | RT13-0.166W-27ΩJ      |
| RB15     | Carbon film resistor            | RT13-0.166W-47ΩJ      |
| RB22     | Carbon film resistor            | RT13-0.166W-47ΩJ      |

**PARTS LIST (continued)**

| Position | Parts                     | Type                    |
|----------|---------------------------|-------------------------|
| RB01     | Carbon film resistor      | RT13-0.166W-100ΩJ       |
| RB02     | Carbon film resistor      | RT13-0.166W-100ΩJ       |
| RB06     | Carbon film resistor      | RT13-0.166W-100ΩJ       |
| RB07     | Carbon film resistor      | RT13-0.166W-100ΩJ       |
| RB26     | Carbon film resistor      | RT13-0.166W-100ΩJ       |
| RB28     | Carbon film resistor      | RT13-0.166W-180ΩJ       |
| RB09     | Carbon film resistor      | RT13-0.166W-220ΩJ       |
| RB12     | Carbon film resistor      | RT13-0.166W-220ΩJ       |
| RB08     | Carbon film resistor      | RT13-0.166W-1KΩJ        |
| RB10     | Carbon film resistor      | RT13-0.166W-1KΩJ        |
| RB18     | Carbon film resistor      | RT13-0.166W-1KΩJ        |
| RB19     | Carbon film resistor      | RT13-0.166W-1.2KΩJ      |
| RB11     | Carbon film resistor      | RT13-0.166W-1.5KΩJ      |
| RB21     | Carbon film resistor      | RT13-0.166W-1.8KΩJ      |
| RB31     | Carbon film resistor      | RT13-0.166W-2.2KΩJ      |
| RB17     | Carbon film resistor      | RT13-0.166W-4.7KΩJ      |
| RB03     | Carbon film resistor      | RT13-0.166W-10KΩJ       |
| RB04     | Carbon film resistor      | RT13-0.166W-10KΩJ       |
| RB05     | Carbon film resistor      | RT13-0.166W-10KΩJ       |
| RB27     | Carbon film resistor      | RT13-0.166W-10KΩJ       |
| RB13     | Carbon film resistor      | RT13-0.166W-18KΩJ       |
| RB14     | Carbon film resistor      | RT13-0.166W-36KΩJ       |
| RB24     | Carbon film resistor      | RT13-0.166W-68KΩJ       |
| RB25     | Carbon film resistor      | RT13-0.166W-68KΩJ       |
| RB23     | Carbon film resistor      | RT13-0.166W-2.2MΩJ      |
| RB30     | Metal oxide film resistor | RY21-1W-2.2KΩJ          |
| CB01     | Ceramic capacitor         | CC1-63V-06a-C-1PFC      |
| CB02     | Ceramic capacitor         | CC1-63V-06a-C-10PFJ     |
| CB38     | Ceramic capacitor         | CC1-63V-06a-C-33PFJ     |
| CB37     | Ceramic capacitor         | CC1-63V-06a-C-39PFJ     |
| CB04     | Ceramic capacitor         | CC1-63V-06a-C-56PFJ     |
| CB05     | Ceramic capacitor         | CC1-63V-06a-C-56PFJ     |
| CB36     | Ceramic capacitor         | CT1-63V-06a-2B4-150PFK  |
| CB31     | Ceramic capacitor         | CT1-63V-06a-2B4-220PFK  |
| CB06     | Ceramic capacitor         | CT1-63V-06a-2B4-470PFK  |
| CB18     | Ceramic capacitor         | CT1-63V-06a-2B4-470PFK  |
| CB32     | Ceramic capacitor         | CT1-63V-06a-2B4-470PFK  |
| CB25     | Ceramic capacitor         | CT1-63V-06a-2B4-1000PFK |
| CB28     | Ceramic capacitor         | CT1-63V-06a-2B4-1000PFK |
| CB07     | Ceramic capacitor         | CT1-63V-06a-2B4-1500PFK |
| CB20     | Ceramic capacitor         | CT1-63V-06a-2B4-1500PFK |
| CB33     | Ceramic capacitor         | CT1-63V-06a-2B4-1500PFK |
| CB42     | Ceramic capacitor         | CT1-63V-06a-2B4-1500PFK |

**PARTS LIST (continued)**

| Position | Parts                           | Type                    |
|----------|---------------------------------|-------------------------|
| CB43     | Ceramic capacitor               | CT1-63V-10a-2B4-4700PFK |
| CB29     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB39     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB40     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB41     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB44     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB45     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB47     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB49     | Ceramic capacitor               | CT1-63V-08a-2F4-10nFZ   |
| CB10     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ  |
| CB12     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ  |
| CB17     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ  |
| CB48     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ  |
| CB51     | Polyester film capacitor        | CL21X-50V-0.1 $\mu$ FJ  |
| CB50     | Polyester film capacitor        | CL21X-50V-0.22 $\mu$ FJ |
| CB23     | Aluminum electrolytic capacitor | CD110-16V-22 $\mu$ FM   |
| CB24     | Aluminum electrolytic capacitor | CD110-16V-22 $\mu$ FM   |
| CB46     | Aluminum electrolytic capacitor | CD110-16V-47 $\mu$ FM   |
| CB11     | Aluminum electrolytic capacitor | CD110-16V-100 $\mu$ FM  |
| CB13     | Aluminum electrolytic capacitor | CD110-16V-100 $\mu$ FM  |
| CB26     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM    |
| CB27     | Aluminum electrolytic capacitor | CD110-50V-1 $\mu$ FM    |
| CB16     | Aluminum electrolytic capacitor | CD110-50V 3.3 $\mu$ FM  |
| CB08     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB09     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB14     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB15     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB19     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB21     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB22     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB30     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| CB34     | Aluminum electrolytic capacitor | CD110-50V-10 $\mu$ FM   |
| LB06     | Fixed inductor                  | LGB0606-1 $\mu$ HJ      |
| LB03     | Fixed inductor                  | LGB0606-15 $\mu$ HJ     |
| LB09     | Fixed inductor                  | LGB0606-22 $\mu$ HJ     |
| LB05     | Fixed inductor                  | LGB0606-68 $\mu$ HJ     |
| LB01     | Fixed inductor                  | LGB0606-100 $\mu$ HJ    |
| LB02     | Fixed inductor                  | LGB0606-100 $\mu$ HJ    |
| LB04     | Fixed inductor                  | LGB0606-100 $\mu$ HJ    |
| LB08     | IF transformer                  | ST6037                  |
| VDB01    | Diode                           | W05Z4.3A                |
| VDB01    | Diode                           | MTZJ4.3A                |
| VDB02    | Diode                           | W05Z9.1B                |

**PARTS LIST (continued)**

| Position | Parts                         | Type   |
|----------|-------------------------------|--|
| VDB02    | Diode                         | MTZJ9.1B   |
| VB01     | Triode                        | 3DG1815-Y  |
| VB01     | Triode                        | 2SC1815-Y  |
| VB01     | Triode                        | 2PC1815-Y  |
| VB02     | Triode                        | 3DG1815-Y  |
| VB02     | Triode                        | 2SC1815-Y  |
| VB02     | Triode                        | 2PC1815-Y  |
| VB03     | Triode                        | 3DG1815-Y  |
| VB03     | Triode                        | 2SC1815-Y  |
| VB03     | Triode                        | 2PC1815-Y  |
| VB05     | Triode                        | 3DD880   |
| VB04     | Triode                        | KSC388C-Y  |
| VB04     | Triode                        | 2SC388ATM  |
| GB01     | Crystal oscillator            | JA18A1-18.432MHz   |
| ZB01     | Surface acoustic wave filter  | M3953M   |
| ZB02     | Surface acoustic wave filter  | M9352M   |
| NB01     | IC                            | MSP3440G-PO-B8-V3  |
| NB02     | IC                            | TDA9808V4  |
| JB05     | Jumper                        | 5mm  |
| JB11     | Jumper                        | 5mm  |
| JB17     | Jumper                        | 5mm  |
| CB35     | Jumper                        | 5mm  |
| JB01     | Jumper                        | 7.5mm  |
| JB03     | Jumper                        | 7.5mm  |
| JB06     | Jumper                        | 7.5mm  |
| JB07     | Jumper                        | 7.5mm  |
| JB08     | Jumper                        | 7.5mm  |
| JB09     | Jumper                        | 7.5mm  |
| JB12     | Jumper                        | 7.5mm  |
| JB14     | Jumper                        | 7.5mm  |
| JB13     | Jumper                        | 10mm   |
| JB15     | Jumper                        | 10mm   |
| JB10     | Jumper                        | 15mm   |
| JB20     | Jumper                        | 25mm   |
|          |                               | When using Daewoo CRT, remove the following parts from those when using Samsung CRT. |
|          |                               |  |
|          |                               | Parts on Main PCB  |
| C435     | Polypropylene capacitor       | CBB81-1.6KV-7200PFJ  |
| C435     | Polypropylene capacitor       | CBB81-1.6KV-7200PFJ  |
| C436     | Ceramic capacitor             | CT81-2KV-12c-2B4-680PFK  |
| L441     | Horizontal amplitude inductor | TLN0028C(JU4.756.034)  |
| RF481    | Fuse resistor                 | RF11-2W-2.7ΩJ  |



## PARTS LIST (continued)

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