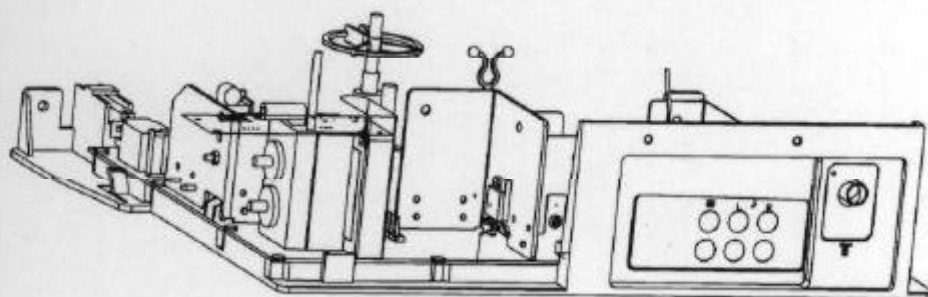


APEX

COLOR TELEVISION SERVICE MANUAL

MODEL NO.: GT2015

CHASSIS NO.: CN-12C2



CONTENTS

SAFETY INSTRUCTIONS	1
SPECIFICATIONS	3
KEY ICS AND ASSEMBLIES	3
SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS	4
IC DATA AND SERVICE DATA	11
CIRCUIT ADJUSTMENTS	33
SET-UP ADJUSTMENTS	34
SERVICE MODE AND BUS DATA	36
TROUBLESHOOTING FLOW CHARTS	43
PARTS LIST	49
APPENDIX 1. CIRCUIT DIAGRAM	
2. PRINTED CIRCUIT BOARD DIAGRAMS	
3. FINAL ASSEMBLY DIAGRAM AND FINAL WIRING DIAGRAM	

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.

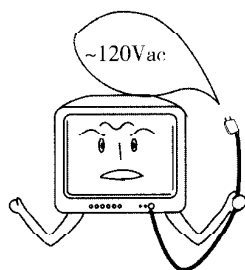
SAFETY INSTRUCTIONS (continued)

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.

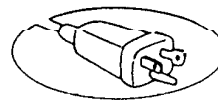


Grounding or Polarization—Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided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

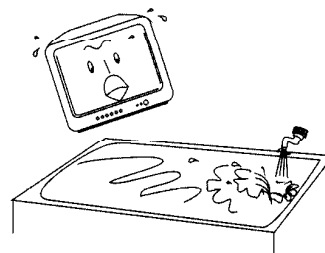


Wide blade
Lame large
Cuchilla ancha

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 UHF 14~69 CABLE TV :MID BAND (A-8~A-1, A~I) SUPER BAND (J~W) HYPER BAND (AA~ZZ, AAA, BBB) 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 I²C 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 I²C 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 I²C 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 I²C 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 $24\mu\text{s}$ 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)

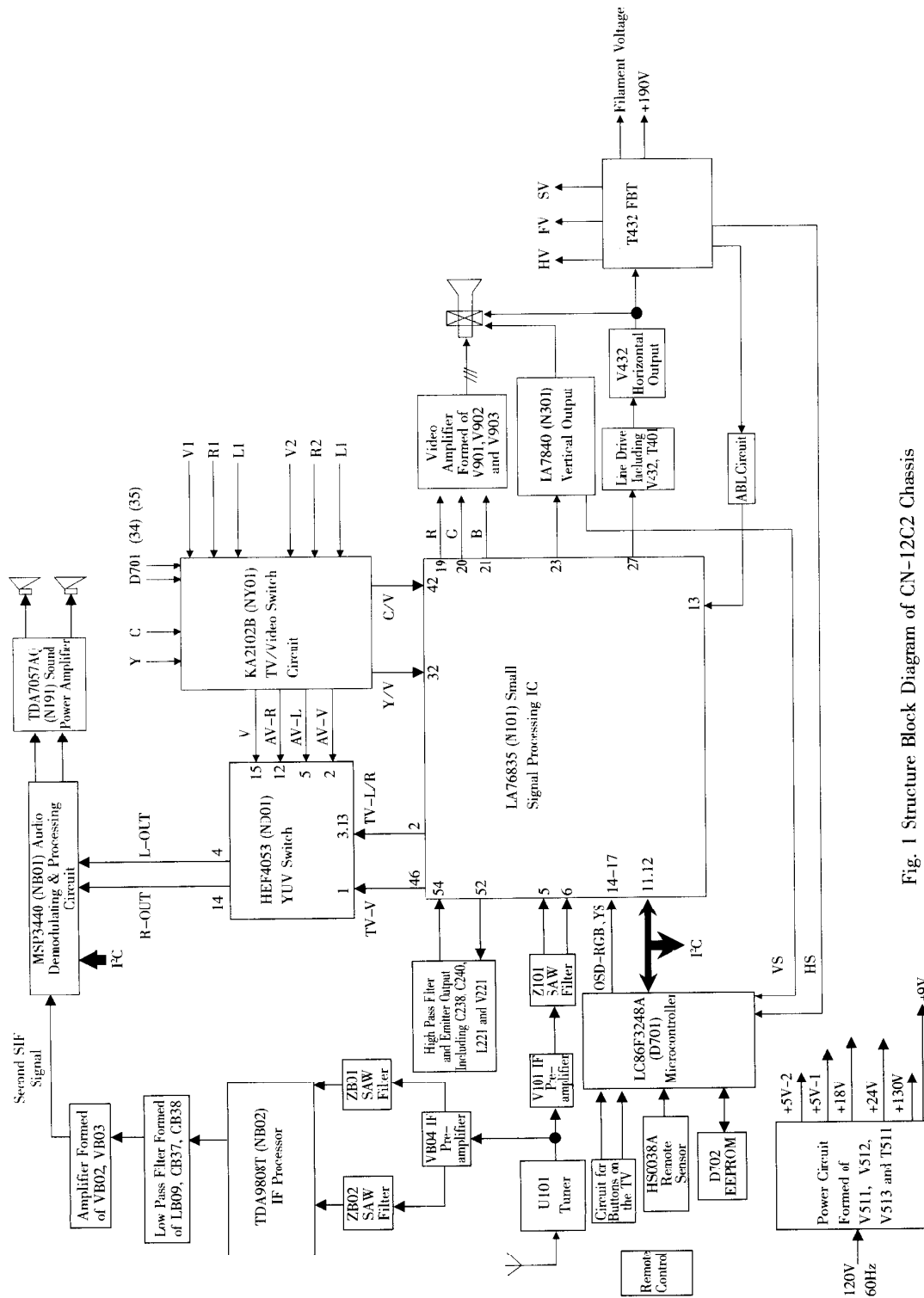


Fig. 1 Structure Block Diagram of CN-12C2 Chassis

SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)

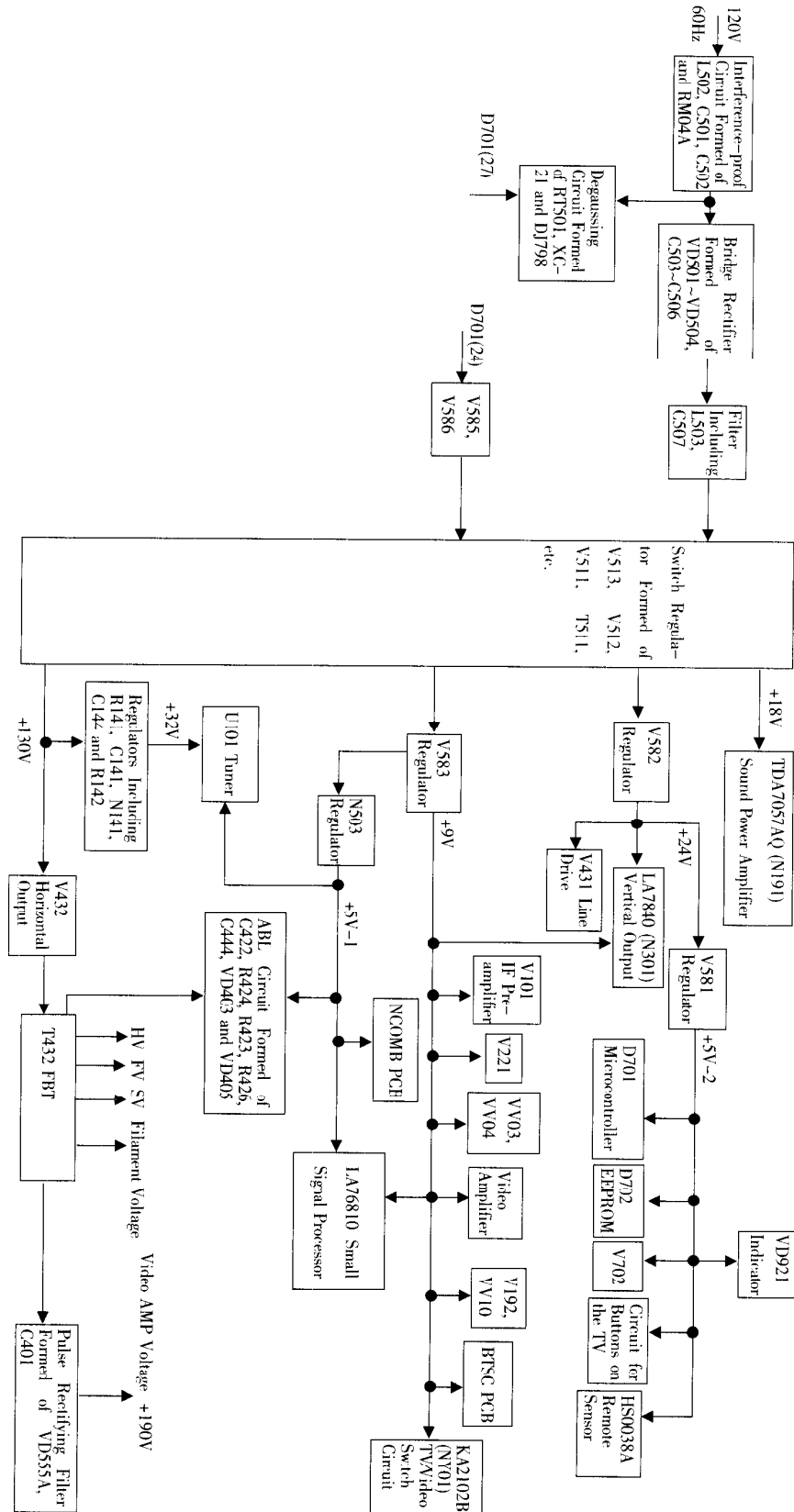


Fig. 2 Block Diagram for CN-12C2 Supply Voltage System

SIGNAL PROCESS AND SYSTEM BLOCK DIAGRAMS (continued)

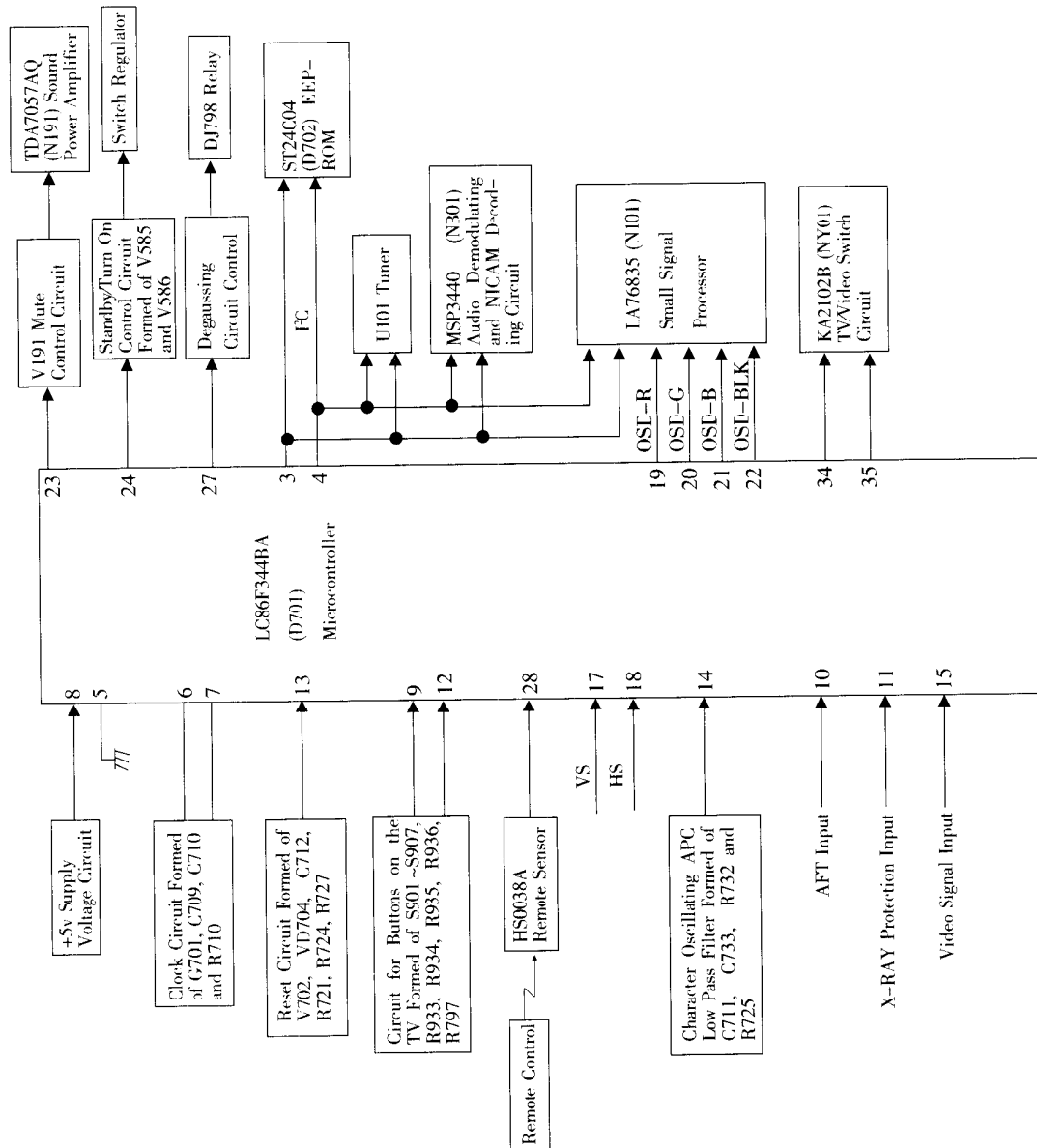


Fig. 3 Block Diagram for CN-12C2 Remote Control Structure

IC DATA AND SERVICE DATA

LA76835 Small Signal Processing IC

1. Block Diagram

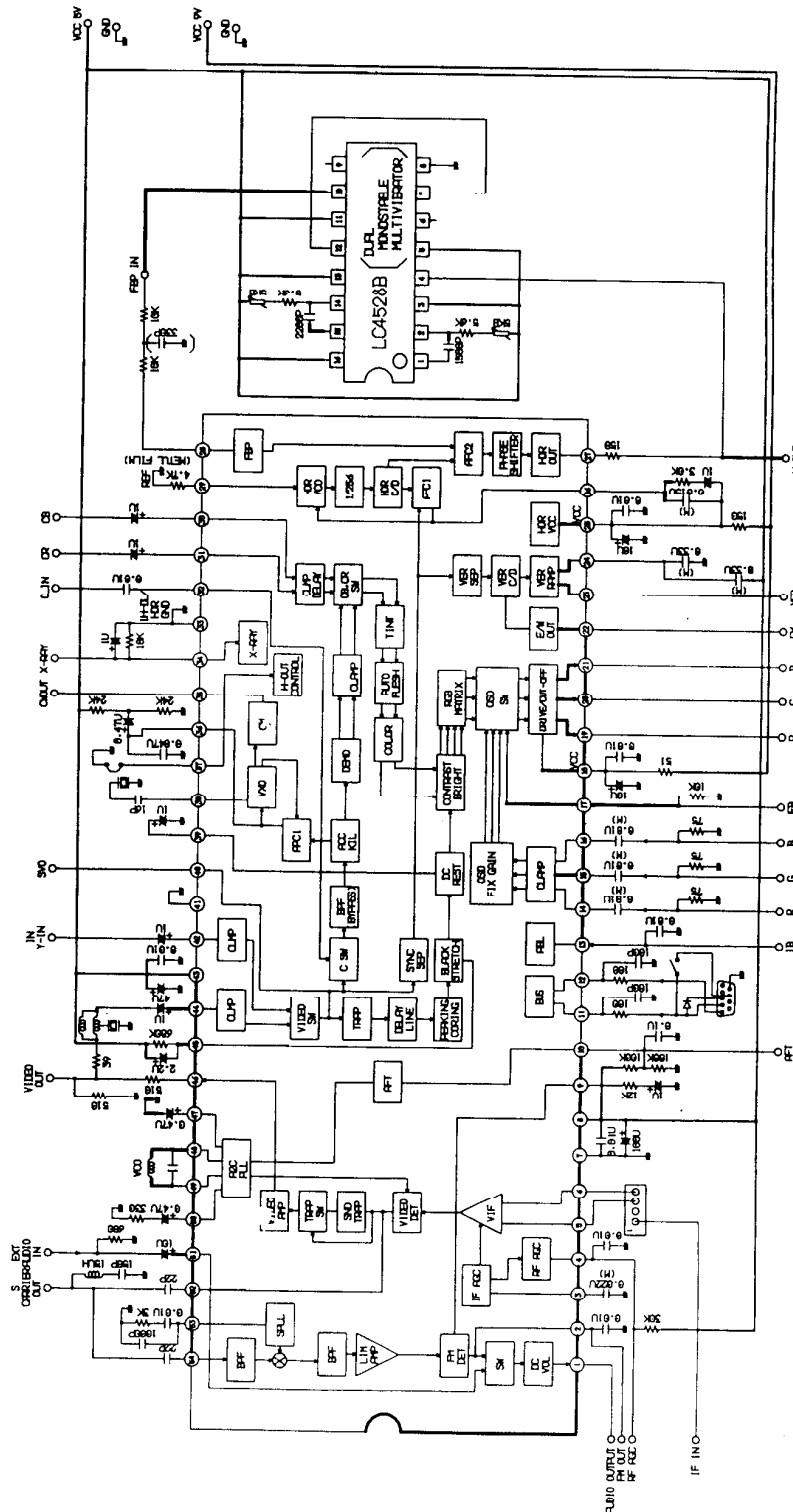


Fig. 4

2. Refer to Table 2 about Functions and Service Data of LA76835's Pins.

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 0.424μs
 - On-chip ROM capacity
 - Program ROM: 32K/28K/24K/20K/16K bytes
 - CCROM: 16K bytes
 - On-chip ROM capacity: 512 bytes
 - OSD RAM: 352×9 bits
 - Closed-Caption TV controller and the on-screen display controller
 - Closed-Caption data slicer
 - Four channels×6-bit AD Converter
 - Three channels×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^{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

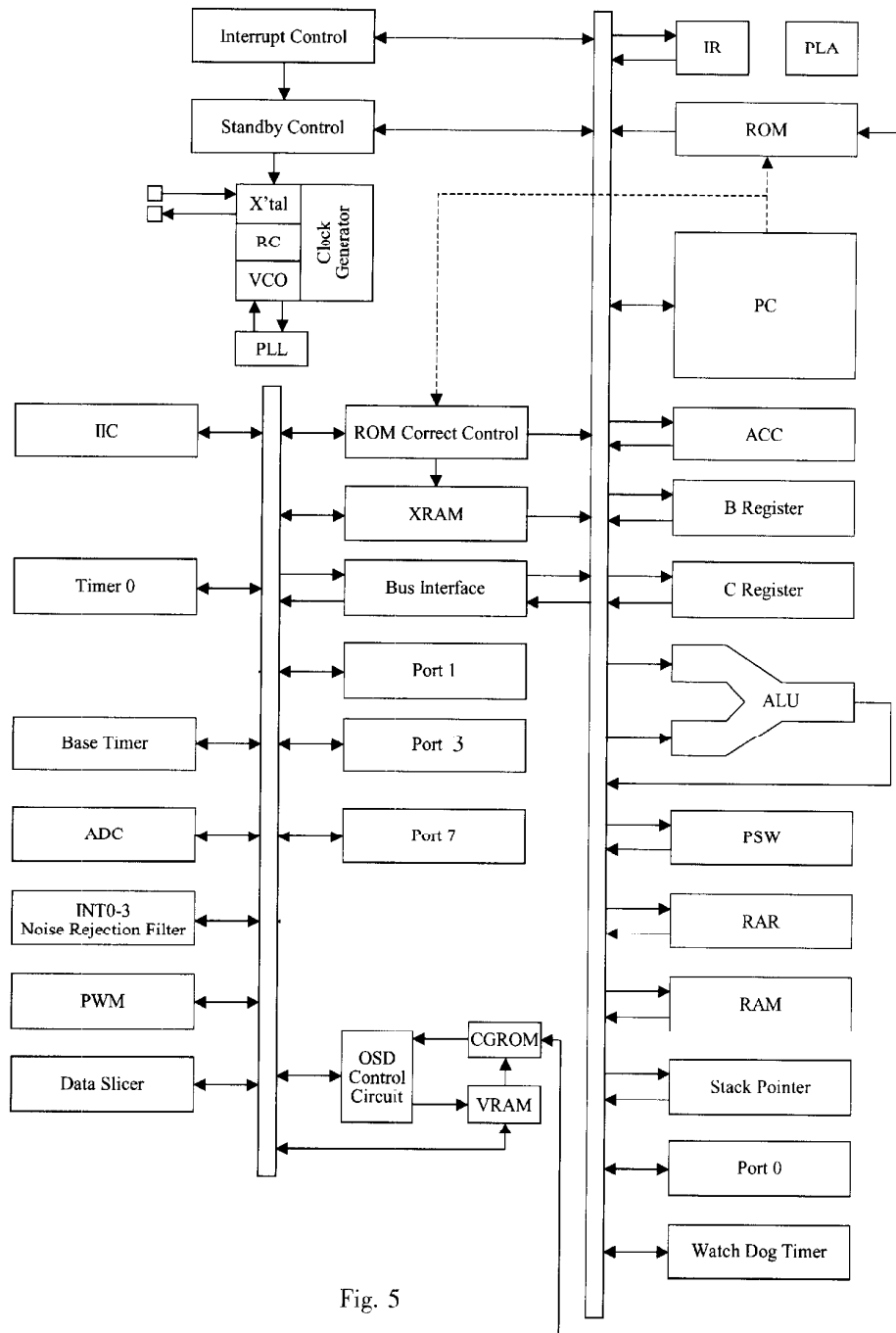


Fig. 5

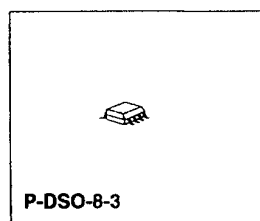
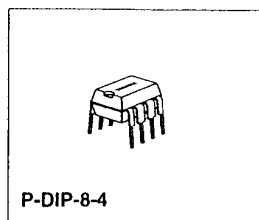
3. Refer to Table 3 about Functions and Service Data of LC86F344BA's Pins.

IC DATA AND SERVICE DATA (continued)

ST24C04 (D702) EEPROM

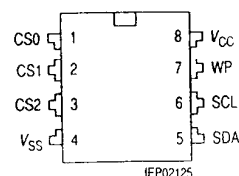
1. Features

- 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, I²C–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 cycles¹⁾
- Data retention 40 years¹⁾
- ESD protection 4000 V on all pins
- 8 pin DIP/DSO packages
- Available for extended temperature ranges
- Industrial: -40°C to $+85^{\circ}\text{C}$
- Automotive: -40°C to $+125^{\circ}\text{C}$

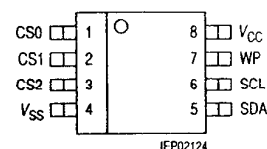


2. Pin Configuration

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.

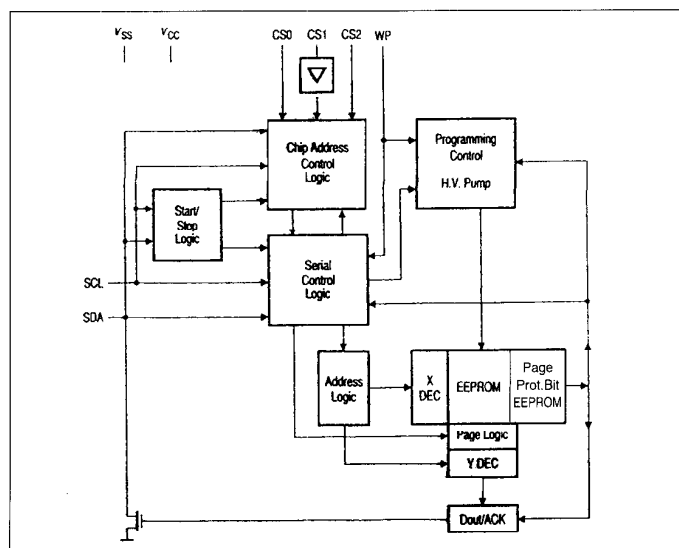


Fig. 6

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

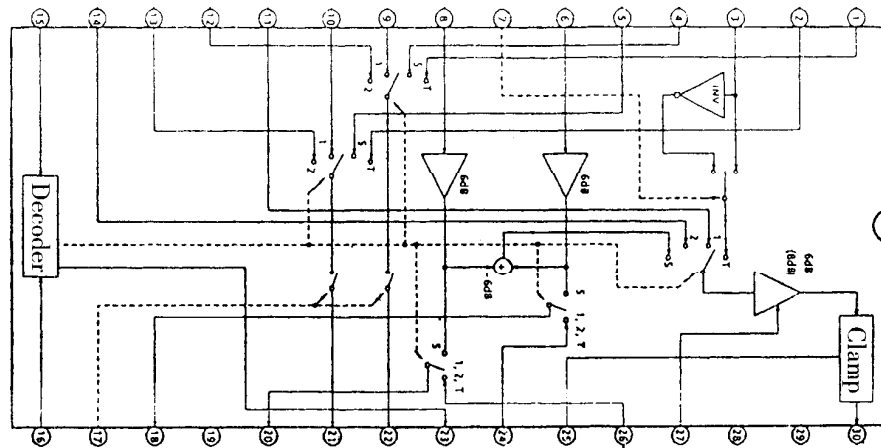


Fig.7

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.

IC DATA AND SERVICE DATA (continued)**LA7840 (N301)****Vertical Deflection Output Circuit****1. Features**

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

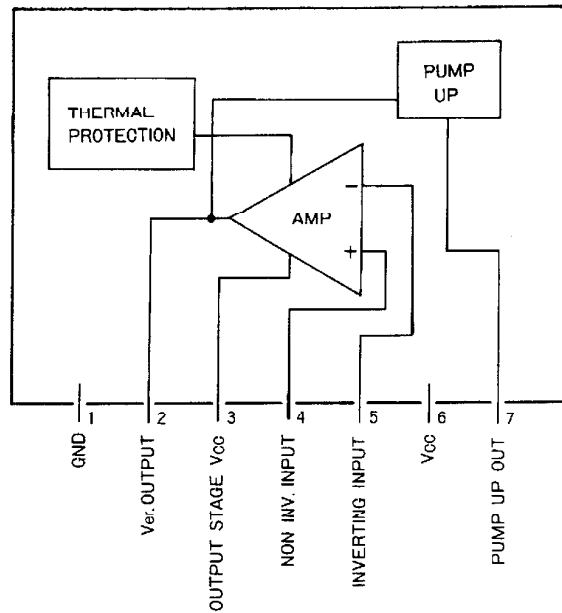
2. Block Diagram

Fig. 8

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.

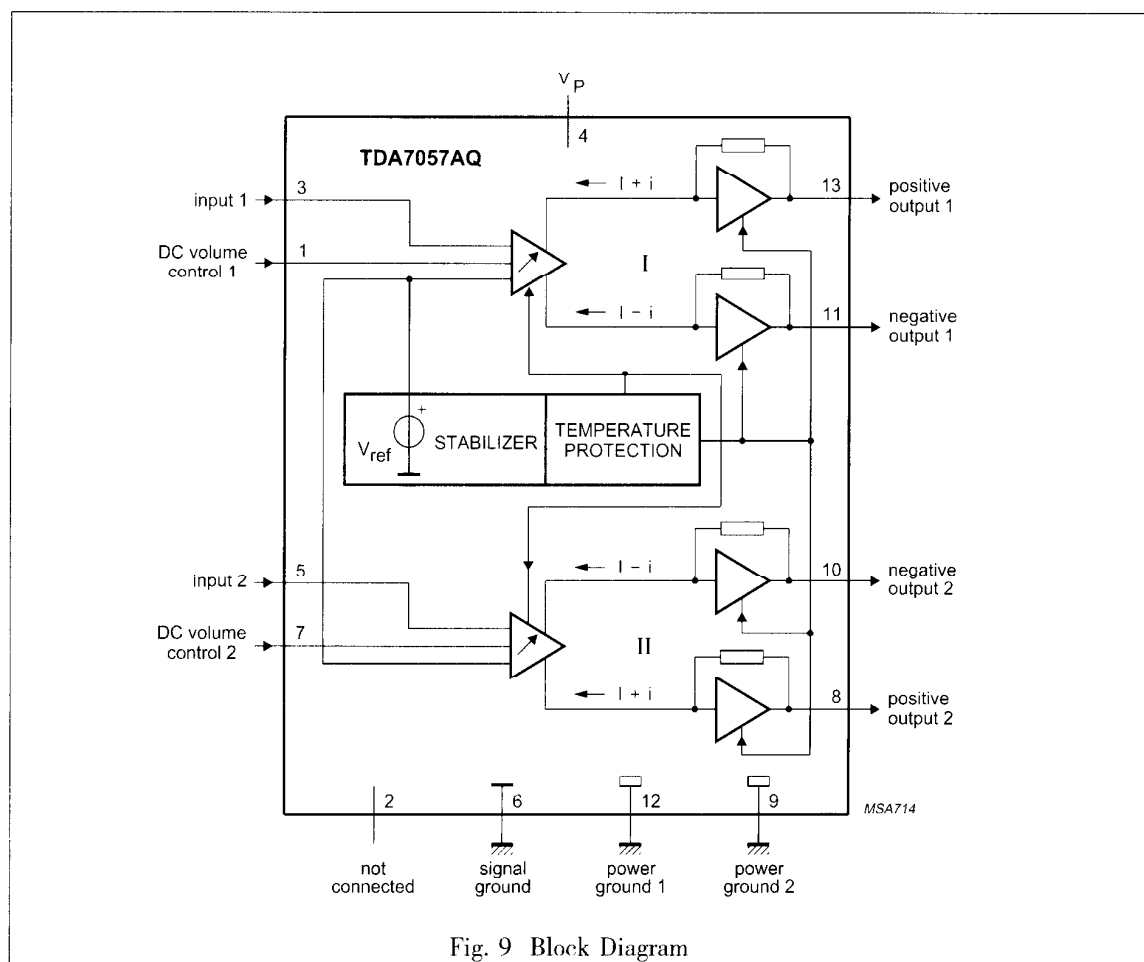


Fig. 9 Block Diagram

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 I²C 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 I²C 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

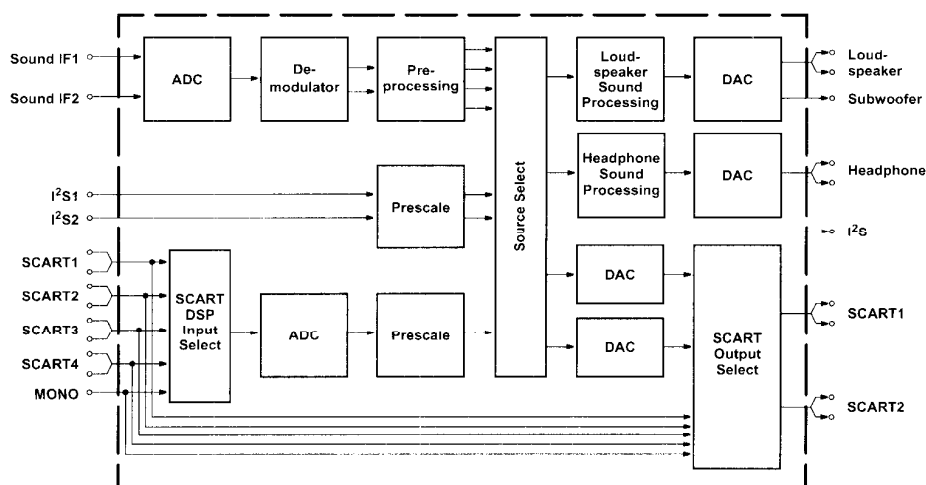


Fig. 10 Simplified Functional Block Diagram of the MSP3440

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

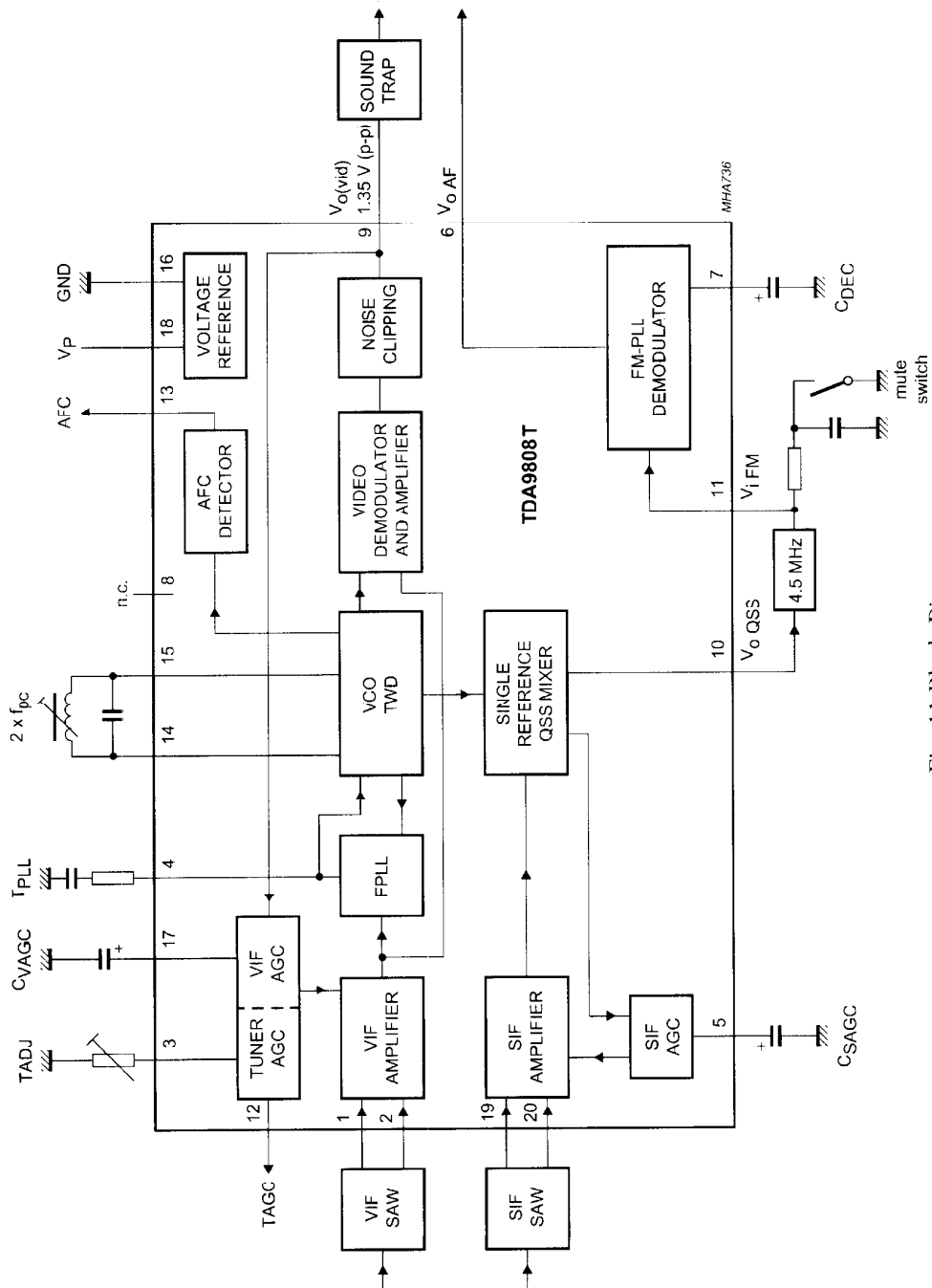


Fig. 11 Block Diagram

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).

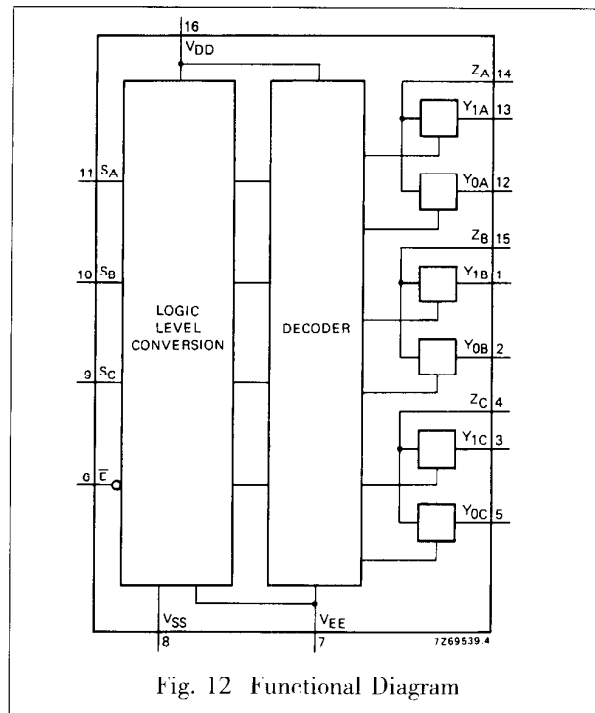
2. Block Diagrams

Fig. 12 Functional Diagram

3. Function Table

Inputs		Channel
\bar{E}	S_n	On
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 (Ω)	
			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	∞	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	∞	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 Ω)	
			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 (Ω)	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 (Ω)	
			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 (Ω)	
			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	∞	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 Ω)	Negative Resistance (K Ω)
1	Volume control input	0.95	6.85	6.15
2	Not connected	0.00	∞	∞
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 Ω)	Negative Resistance (K Ω)
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	∞	∞
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	∞	6.04
33	AHVSUP	8.26	∞	4.59
34	CAPL-M	6.53	∞	6.04
35	AHVSS	0.00	0.00	0.00
36	ABNDC	3.74	∞	6.02
37	NC	3.77	∞	6.1
38	NC	3.77	∞	6.1
39	NC	3.77	∞	6.1
40	NC	3.77	∞	6.1
41	SC1-IN-L	3.77	∞	6.1
42	SC1-IN-R	3.77	∞	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 Ω)	Negative Resistance (K Ω)
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	∞	∞
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	∞	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 (Ω)	
			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 (Ω)	
			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. 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. 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 $130 \pm 0.5V$.

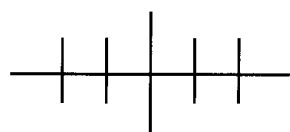
4. High Voltage Inspection

- 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.

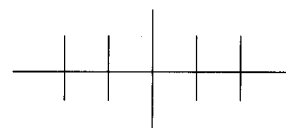
5. Focus Adjustment

- 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.

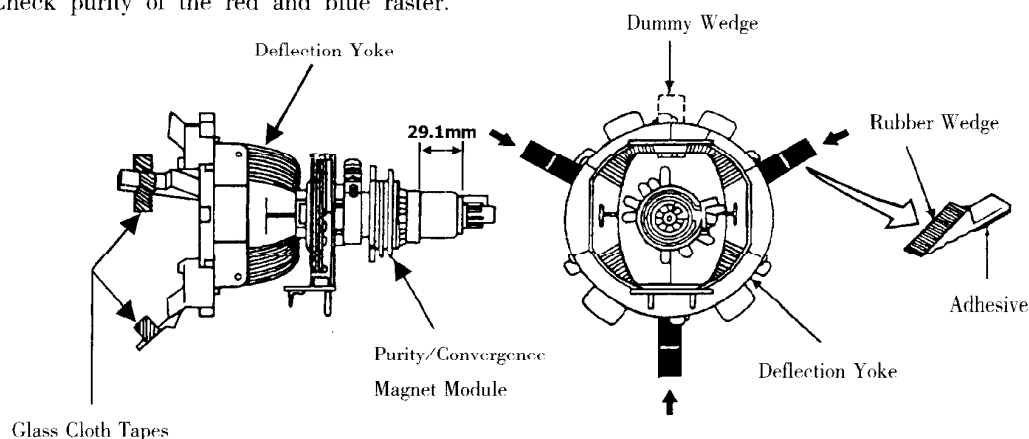


Fig. 13

SET-UP ADJUSTMENTS (continued)

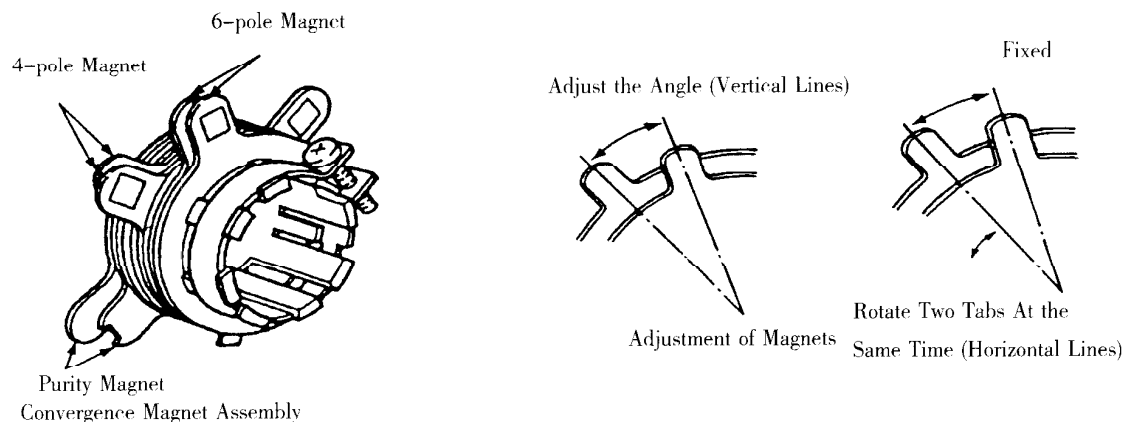


Fig. 14

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.

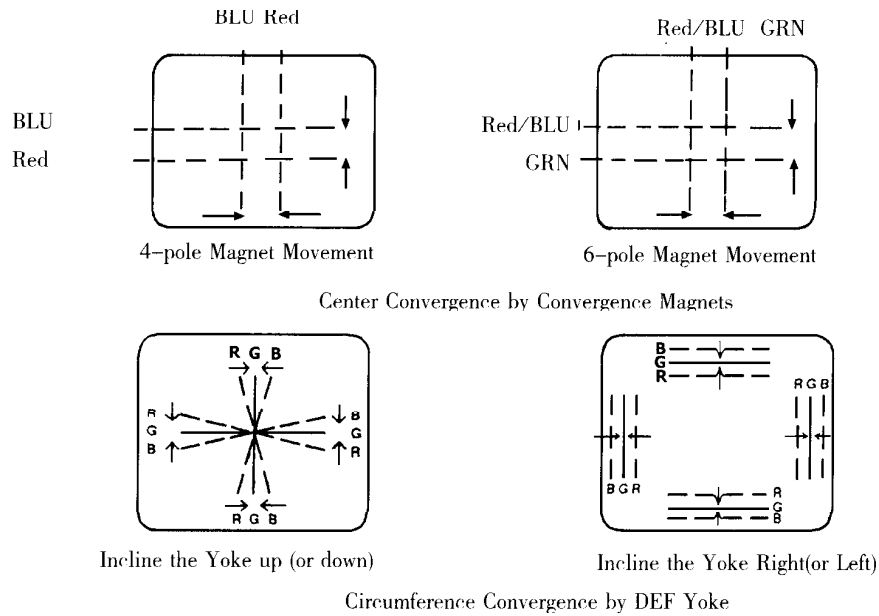


Fig. 15

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 I²C 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.

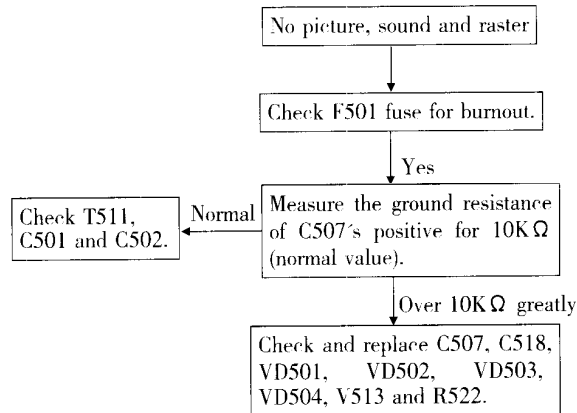
6) Horizontal amplitude adjustment

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.

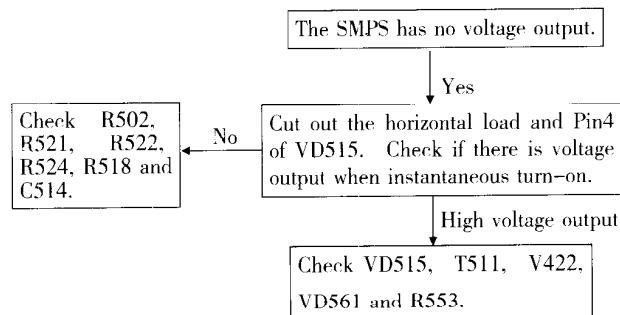
TROUBLESHOOTING FLOW CHARTS

1. Switch Mode Power Supply

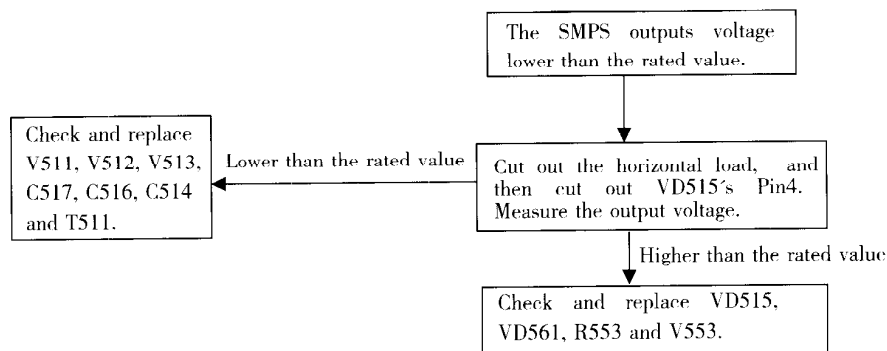
1.1 No picture, sound and raster



1.2 The SMPS has no voltage output.

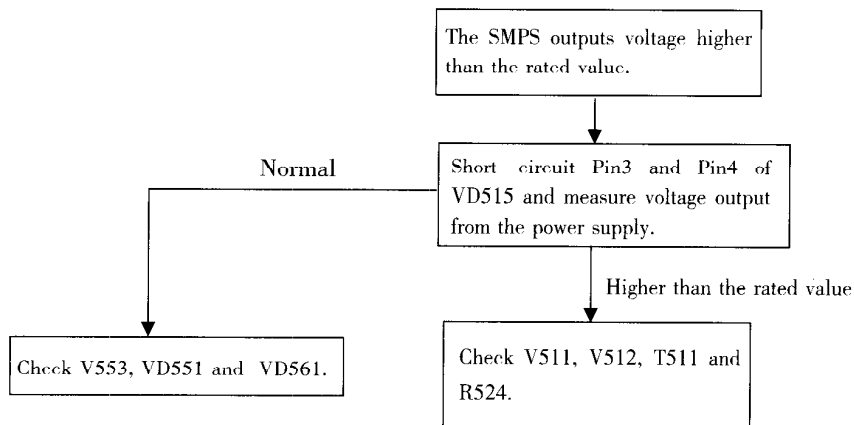


1.3 The SMPS outputs voltage lower than the rated value.

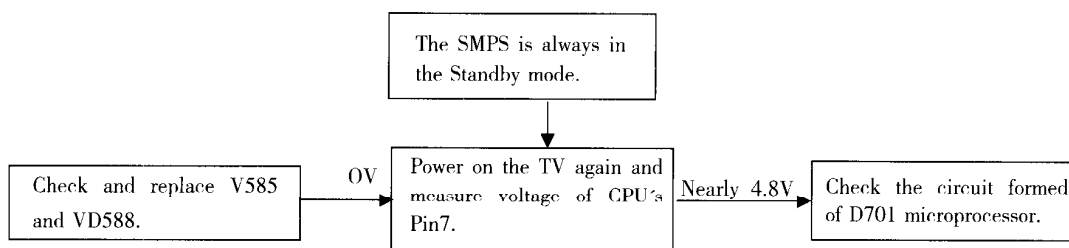


TROUBLESHOOTING FLOW CHARTS (continued)

1.4 The SMPS outputs voltage higher than the rated value.

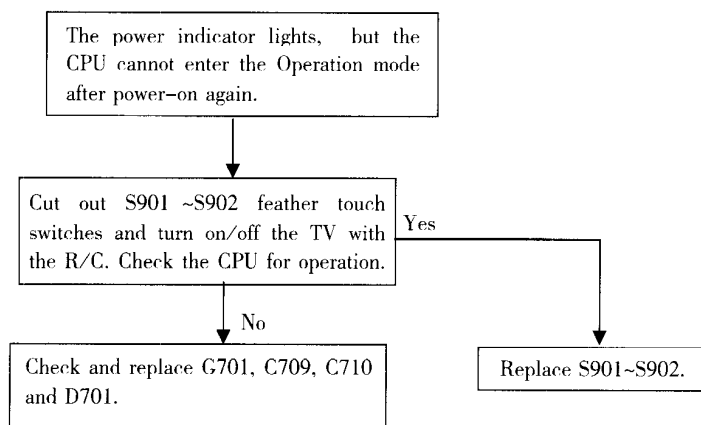


1.5 The power indicator lights, but the SMPS is still in the Standby mode.



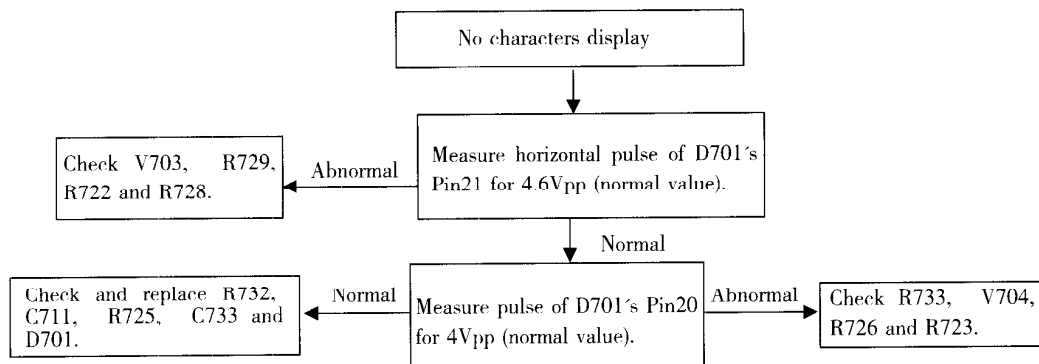
2. Control System

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

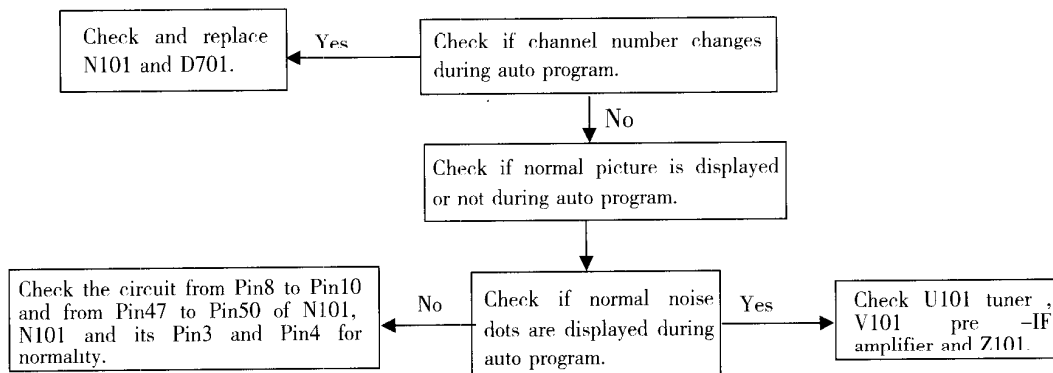


TROUBLESHOOTING FLOW CHARTS (continued)

2.2 No characters display



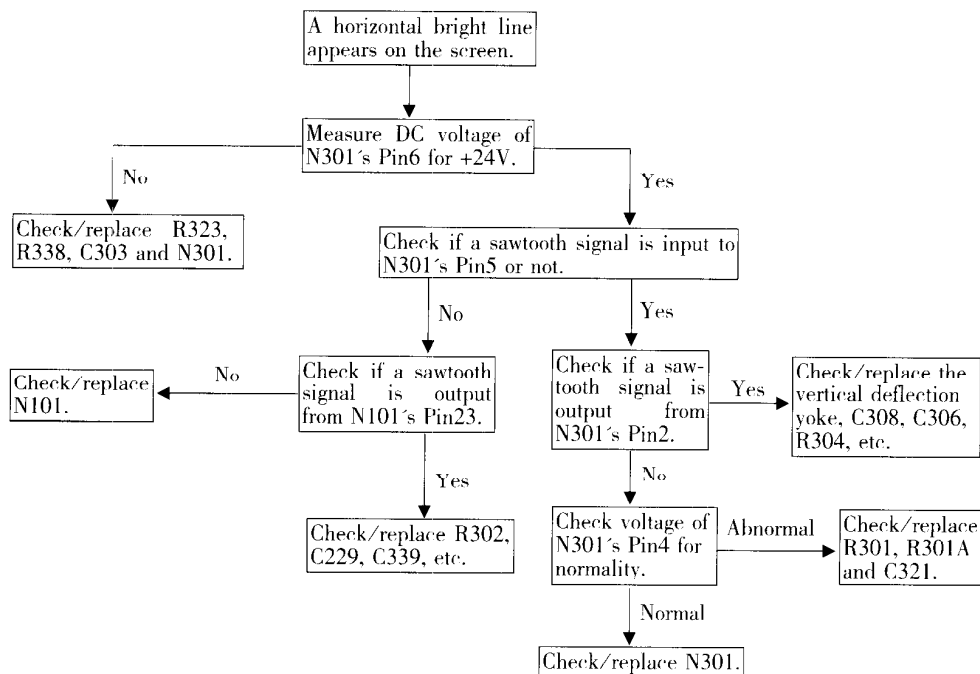
2.3 Channel number remains unchanged during auto program.



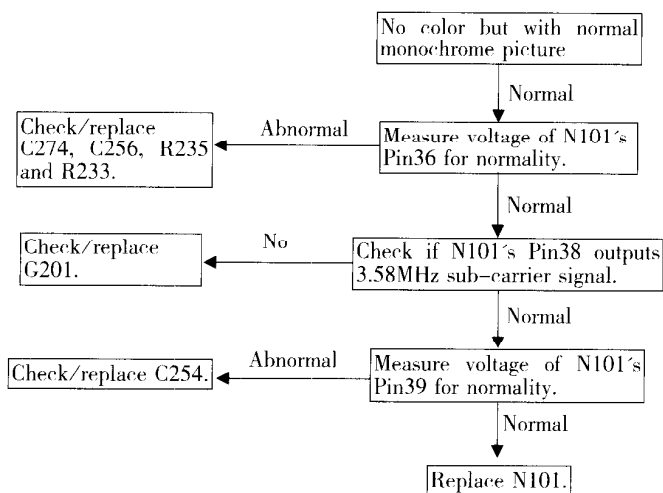
TROUBLESHOOTING FLOW CHARTS (continued)

3. Video Signal Processor

3.1 A horizontal bright line appears on the screen.



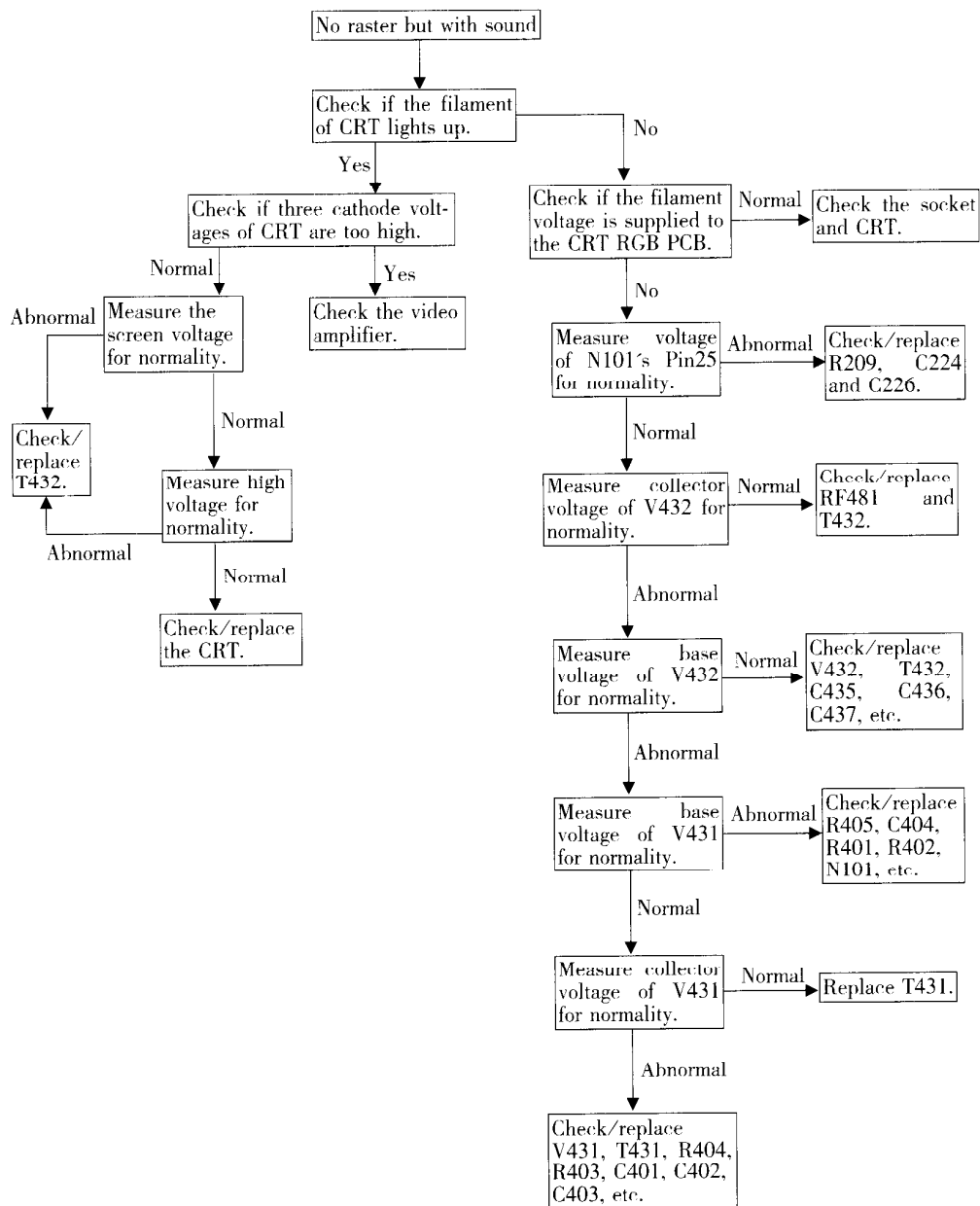
3.2 No color but with normal monochrome picture



TROUBLESHOOTING FLOW CHARTS (continued)

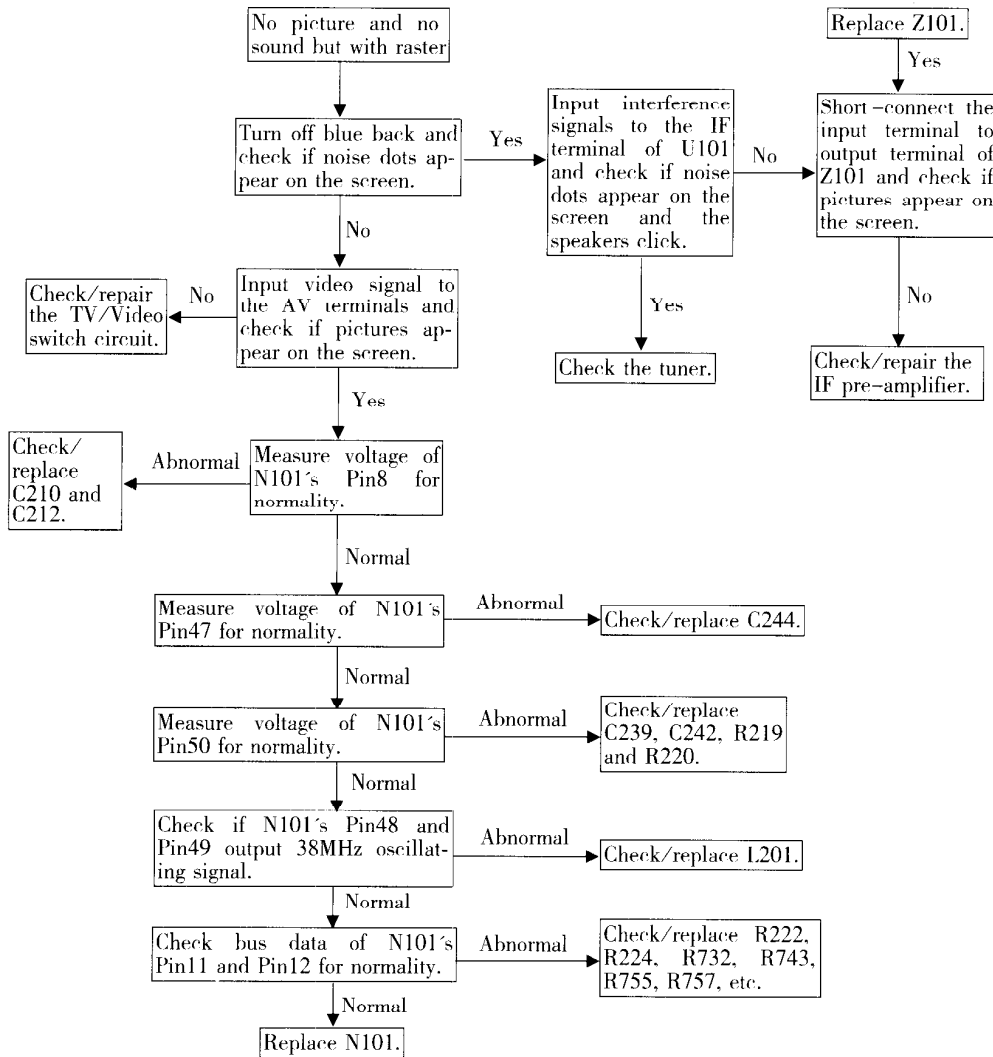
4. Horizontal/Vertical Scan Circuit

4.1 No raster but with sound



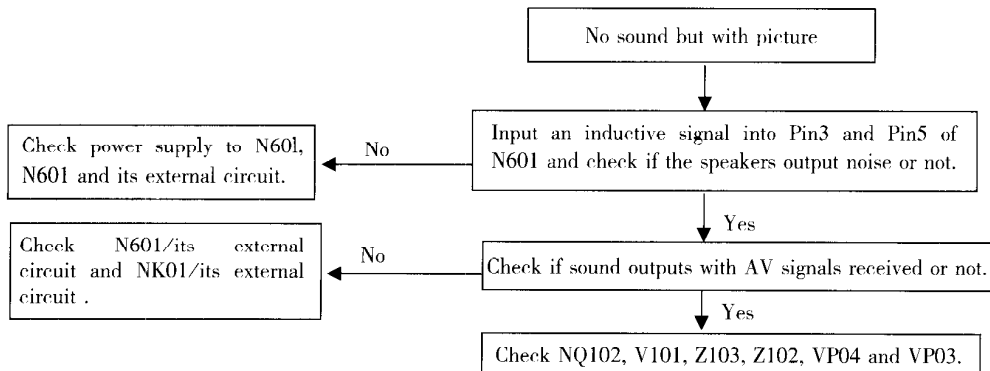
TROUBLESHOOTING FLOW CHARTS (continued)

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

PARTS LIST (continued)

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

PARTS LIST (continued)

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

PARTS LIST (continued)

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

PARTS LIST (continued)

Position	Parts	Type
R245	Metal film resistor	RJ14-0.25W-4.7K Ω F
R310	Metal oxide film resistor	RY21-0.5W-220 Ω J
R443A	Metal oxide film resistor	RY21-0.5W-15K Ω J
R555	Metal oxide film resistor	RY21-0.5W-47K Ω J
R323	Metal oxide film resistor	RY21-1W-220 Ω J
R443	Metal oxide film resistor	RY21-1W-1K Ω J
R446	Metal oxide film resistor	RY21-2W-2.2K Ω J
R581	Metal oxide film resistor	RY21-2W-2.2K Ω J
R581A	Metal oxide film resistor	RY21-2W-2.2K Ω J
R537	Metal oxide film resistor	RY21-2W-27 Ω J
R525	Metal oxide film resistor	RY21-2W-68 Ω J
R404	Metal oxide film resistor	RY21-2W-330 Ω J
R141	Metal oxide film resistor	RY21-2W-15K Ω J
R551	Metal oxide film resistor	RY21-2W-15K Ω J
R552	Metal oxide film resistor	RY21-2W-15K Ω J
R568	Metal oxide film resistor	RY21-2W-22K Ω J
R571	Metal oxide film resistor	RY21-2W-39K Ω J
R565	Metal oxide film resistor	RY21-3W-2.4 Ω J
R565A	Metal oxide film resistor	RY21-3W-2.4 Ω J
R525A	Metal oxide film resistor	RY21-3W-33K Ω J
R520	Solid resistor	RS11-0.5W-120K Ω K
R520	Glass glazed resistor	RI40-0.5W-120K Ω K
R521	Solid resistor	RS11-0.5W-120K Ω K
R521	Glass glazed resistor	RI40-0.5W-120K Ω K
R524	Wirewound resistor	RXC4-6W-15 Ω J
R435	Wirewound resistor	RXC4-6W-8.2 Ω K
R502	Wirewound resistor	RXC6-H3-10W-2.2 Ω J
RF569	Fuse resistor	RF10-2W-1 Ω J
RF569	Fuse resistor	RF11-2W-1 Ω J
RF481	Fuse resistor	RF11-2W-2.7 Ω J
RM04A	Glass glazed resistor	VR68-2M7J/232224413275
RM04A	Glass glazed resistor	RI81-1W-2.7M Ω J
RP551	Glass glazed potentiometer	WI06-2Y-0.125W-2K Ω -A
RT501A	Thermistor	PH96709-7 Ω /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 μ FM
C216	Aluminum electrolytic capacitor	CD110X-16V-47 μ FM
C777	Aluminum electrolytic capacitor	CD110X-16V-47 μ FM
CV19	Aluminum electrolytic capacitor	CD110X-16V-47 μ FM
C195	Aluminum electrolytic capacitor	CD110X-16V-100 μ FM
C212	Aluminum electrolytic capacitor	CD110X-16V-100 μ FM
CV23	Aluminum electrolytic capacitor	CD110X-16V-220 μ FM
C122	Aluminum electrolytic capacitor	CD110X-16V-470 μ FM
C250	Aluminum electrolytic capacitor	CD110X-16V-470 μ FM
C500	Aluminum electrolytic capacitor	CD110X-16V-470 μ FM
C538	Aluminum electrolytic capacitor	CD110X-16V-470 μ FM
C574	Aluminum electrolytic capacitor	CD110X-16V-470 μ FM
C226	Aluminum electrolytic capacitor	CD110X-16V-1000 μ FM
C564	Aluminum electrolytic capacitor	CD110X-16V-1000 μ FM
C303	Aluminum electrolytic capacitor	CD110X-25V-470 μ FM
C199	Aluminum electrolytic capacitor	CD110X-25V-1000 μ FM
C306	Aluminum electrolytic capacitor	CD110X-25V-1000 μ FM
C565	Aluminum electrolytic capacitor	CD110X-25V-2200 μ FM
C565	Aluminum electrolytic capacitor	CD110X-25V-2200 μ FM
C403	Aluminum electrolytic capacitor	CD110X-35V-47 μ FM
C302	Aluminum electrolytic capacitor	CD110X-35V-100 μ FM
C563	Aluminum electrolytic capacitor	CD110X-35V-1000 μ FM
C242	Aluminum electrolytic capacitor	CD110-50V-0.47 μ FM
C244	Aluminum electrolytic capacitor	CD110-50V-0.47 μ FM
C256	Aluminum electrolytic capacitor	CD110-50V-0.47 μ FM
C711	Aluminum electrolytic capacitor	CD110-50V-0.47 μ FM
C208	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C230	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C235B	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C236	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C236B	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C321	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C572	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C800	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C808	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
CV12	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
CV13	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
C131	Aluminum electrolytic capacitor	CD110-50V-2.2 μ FM
CV17	Aluminum electrolytic capacitor	CD110-50V-2.2 μ FM
C141	Aluminum electrolytic capacitor	CD110-50V-4.7 μ FM
C304	Aluminum electrolytic capacitor	CD110-50V-4.7 μ FM

PARTS LIST (continued)

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

PARTS LIST (continued)

Position	Parts	Type
C192	Polyester film capacitor	CL21X-50V-0.22 μ FK
C194	Polyester film capacitor	CL21X-50V-0.22 μ FK
C220	Polyester film capacitor	CL21X-50V-0.22 μ FK
C222	Polyester film capacitor	CL21X-50V-0.47 μ FK
C437	Polyester film capacitor	CL21X-50V-0.47 μ FK
C308	Polyester film capacitor	CL12-100V-0.033 μ FK
C307	Polyester film capacitor	CL12-100V-0.1 μ FK
C442	Polypropylene capacitor	CBB13-400V-0.33 μ FJ
C442	Polypropylene capacitor	CBB13-400V-0.33 μ FJ
C516A	Polypropylene capacitor	CBB13-630V-0.022 μ FJ
C501	Polypropylene capacitor	MKP3355-275V-0.1 μ FM
C502	Polypropylene capacitor	MKP3355-275V-0.1 μ FM
C435	Polypropylene capacitor	CBB81-1.6KV-7200PFJ
C435	Polypropylene capacitor	CBB81-1.6KV-7200PFJ
L104	Fixed inductor	LCB0606-1 μ HJ
L202	Fixed inductor	LGB0606-10 μ HK
L204	Fixed inductor	LGB0606-10 μ HK
L705	Fixed inductor	LGB0606-10 μ HK
L287	Fixed inductor	LGB0606-15 μ HK
LV01	Fixed inductor	LGB0606-22 μ 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 μ 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 Ω J
R912	Carbon film resistor	RT14-0.25W-1K Ω J
R910	Carbon film resistor	RT14-0.25W-2.7K Ω J
R917	Carbon film resistor	RT15-0.5W-1.2K Ω J
R917	Carbon film resistor	RY21-1W-1.2K Ω J
R918	Carbon film resistor	RT15-0.5W-1.2K Ω J
R918	Carbon film resistor	RY21-1W-1.2K Ω J
R919	Carbon film resistor	RT15-0.5W-1.2K Ω J
R919	Carbon film resistor	RY21-1W-1.2K Ω J
R914	Metal oxide film resistor	RY21-2W-18K Ω J
R915	Metal oxide film resistor	RY21-2W-18K Ω J
R916	Metal oxide film resistor	RY21-2W-18K Ω 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 μ FM
C907	Aluminum electrolytic capacitor	CD110-50V-0.47 μ FM
C904	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
C905	Aluminum electrolytic capacitor	CD110-50V-22 μ FM
C908	Aluminum electrolytic capacitor	CD110X-250V-22 μ FM
C908	Aluminum electrolytic capacitor	UVR2F220MHA1AA
L901	Fixed inductor	LGB0606-10 μ 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 μ FJ
CB12	Polyester film capacitor	CL21X-50V-0.1 μ FJ
CB17	Polyester film capacitor	CL21X-50V-0.1 μ FJ
CB48	Polyester film capacitor	CL21X-50V-0.1 μ FJ
CB51	Polyester film capacitor	CL21X-50V-0.1 μ FJ
CB50	Polyester film capacitor	CL21X-50V-0.22 μ FJ
CB23	Aluminum electrolytic capacitor	CD110-16V-22 μ FM
CB24	Aluminum electrolytic capacitor	CD110-16V-22 μ FM
CB46	Aluminum electrolytic capacitor	CD110-16V-47 μ FM
CB11	Aluminum electrolytic capacitor	CD110-16V-100 μ FM
CB13	Aluminum electrolytic capacitor	CD110-16V-100 μ FM
CB26	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
CB27	Aluminum electrolytic capacitor	CD110-50V-1 μ FM
CB16	Aluminum electrolytic capacitor	CD110-50V 3.3 μ FM
CB08	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB09	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB14	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB15	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB19	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB21	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB22	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB30	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
CB34	Aluminum electrolytic capacitor	CD110-50V-10 μ FM
LB06	Fixed inductor	LGB0606-1 μ HJ
LB03	Fixed inductor	LGB0606-15 μ HJ
LB09	Fixed inductor	LGB0606-22 μ HJ
LB05	Fixed inductor	LGB0606-68 μ HJ
LB01	Fixed inductor	LGB0606-100 μ HJ
LB02	Fixed inductor	LGB0606-100 μ HJ
LB04	Fixed inductor	LGB0606-100 μ 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

