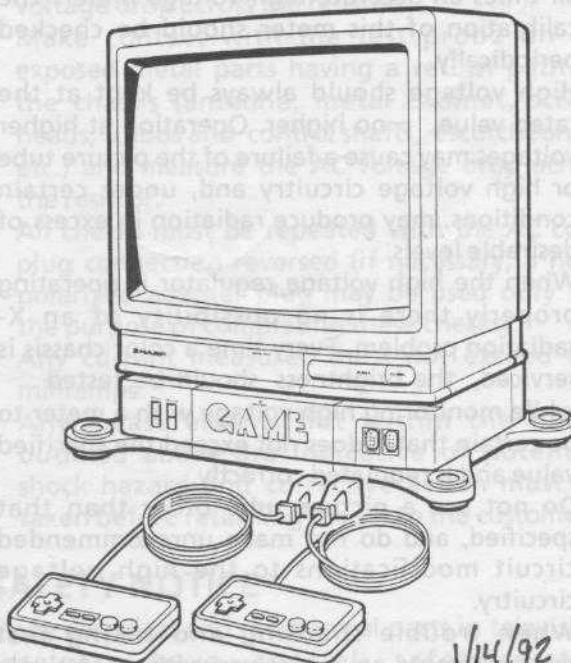


# SHARP SERVICE MANUAL

S99N919SV111/



## GAME TELEVISION SIGMA 9400 CHASSIS Chassis No. 19M1

## MODEL 19SV111

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

CARTRIDGE  
CONNECTOR

QSOCN7202CEZ2 \$440<sup>00</sup> f&L

2 CONTROLLERS RRMCG0683CESA \$230<sup>00</sup> f&L

## CONTENTS

	Page
• IMPORTANT SERVICE SAFETY PRECAUTION	2
• ELECTRICAL SPECIFICATIONS	3
• LOCATION OF USER'S CONTROLS	4
• REMOVAL OF CABINET	6
• INSTALLATION AND SERVICE INSTRUCTIONS	8
• TROUBLE SHOOTING TABLE	10
• CHASSIS LAYOUT	16
• PRINTED WIRING BOARD ASSEMBLIES	17
• BLOCK DIAGRAM	21
• SOLID STATE DEVICE BASE DIAGRAM	26
• SCHEMATIC DIAGRAM AND WAVEFORMS	28
• REPLACEMENT PARTS LIST	35
• PACKING OF THE SET	44

**SHARP ELECTRONICS CORPORATION**

Service Headquarters: Sharp Plaza, Mahwah, New Jersey 07430-2135 Phone: (201) 512-0055

# IMPORTANT SERVICE SAFETY PRECAUTION

(Continued)

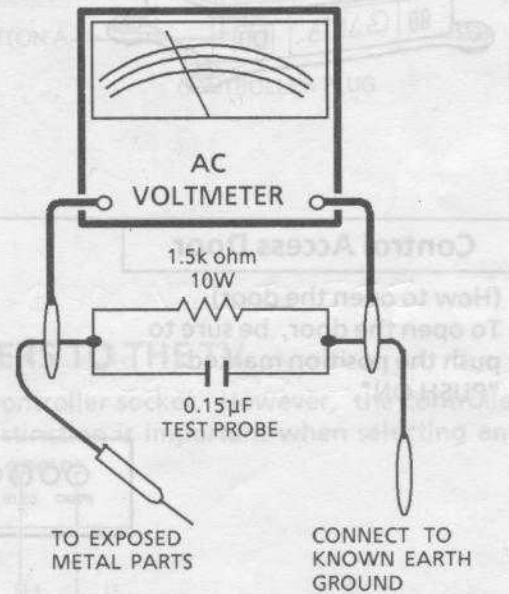
- Use an AC voltmeter having with 5000 ohm per volt, or higher, sensitivity to measure the AC voltage drop across the resistor.
- Make contact with the test probe on all exposed metal parts having a return path to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.

All checks must be repeated with the AC cord plug connection reversed (if necessary, a non-polarized adapter plug may be used only for the purpose of completing these checks).

Any current measured must not exceed 0.5 millamps.

Any measurements not within the limits outlined above are indicative of potential shock hazard and corrective action must be taken before returning the set to the customer.

safety characteristics are identified in this manual; electrical components having such features are identified by "Δ" and shaded areas in the Replacement Parts Lists and Schematic Diagrams. For continued protection, replacement parts must be identical to those used in the original circuit. The use of a substitute replacement parts which do not have the same safety characteristics as the factory recommended replacement parts shown in this service manual, may create shock, fire, X-radiation or other hazards.



## SAFETY NOTICE

Many electrical and mechanical parts in television receivers have special safety-related characteristics.

These characteristics are often not evident from visual inspection, nor can protection afforded by them be necessarily increased by using replacement components rated for higher voltage, wattage, etc.

Replacement parts which have these special

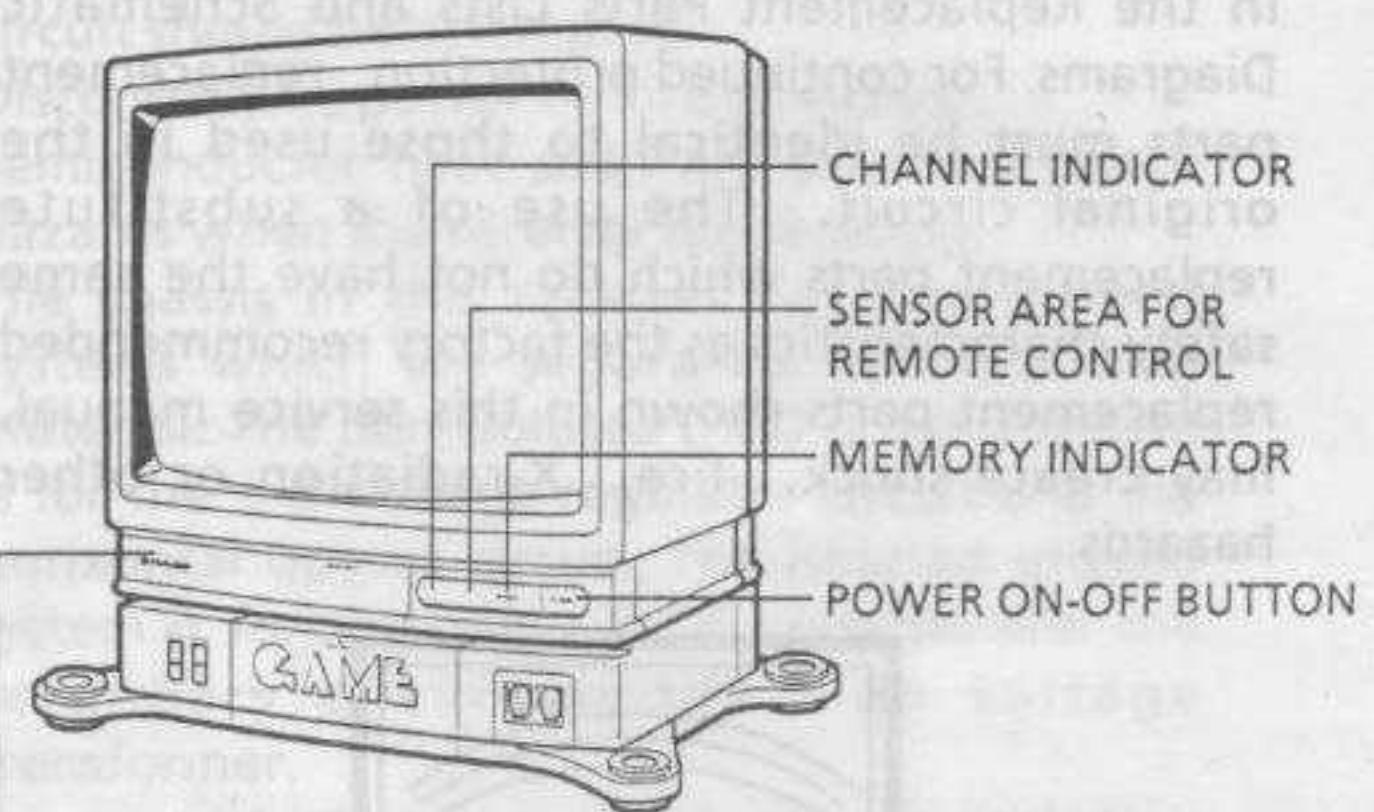
## ELECTRICAL SPECIFICATIONS

VHF ANTENNA INPUT IMPEDANCE	75 ohm Unbalanced
UHF ANTENNA INPUT IMPEDANCE	300 ohm Balanced
CONVERGENCE	Magnetic
FOCUS	Hi-Bi-Potential Electrostatic
AUDIO POWER OUTPUT RATING	1.2 W (at 10% distortion)
INTERMEDIATE FREQUENCIES	
Picture IF Carrier Frequency	45.75 MHz
Sound IF carrier Frequency	41.25 MHz
Color Sub-Carrier Frequency	42.17 MHz (Nominal)
PICTURE SIZE	Approx. 185 sq. in.
POWER INPUT	120 V AC 60Hz
POWER RATING	95 W
SPEAKER SIZE	4" PM, 0.52 oz. Mag.
VOICE COIL IMPEDANCE	8 ohm at 400 Hz
SWEEP DEFLECTION	Magnetic
TUNING RANGES	VHF-Channels 2 thru 13 UHF-Channels 14 thru 83 CATV Channels 1 thru 65, 95 thru 99 (EIA, Channel Plan)

Specifications are subject to change without prior notice.

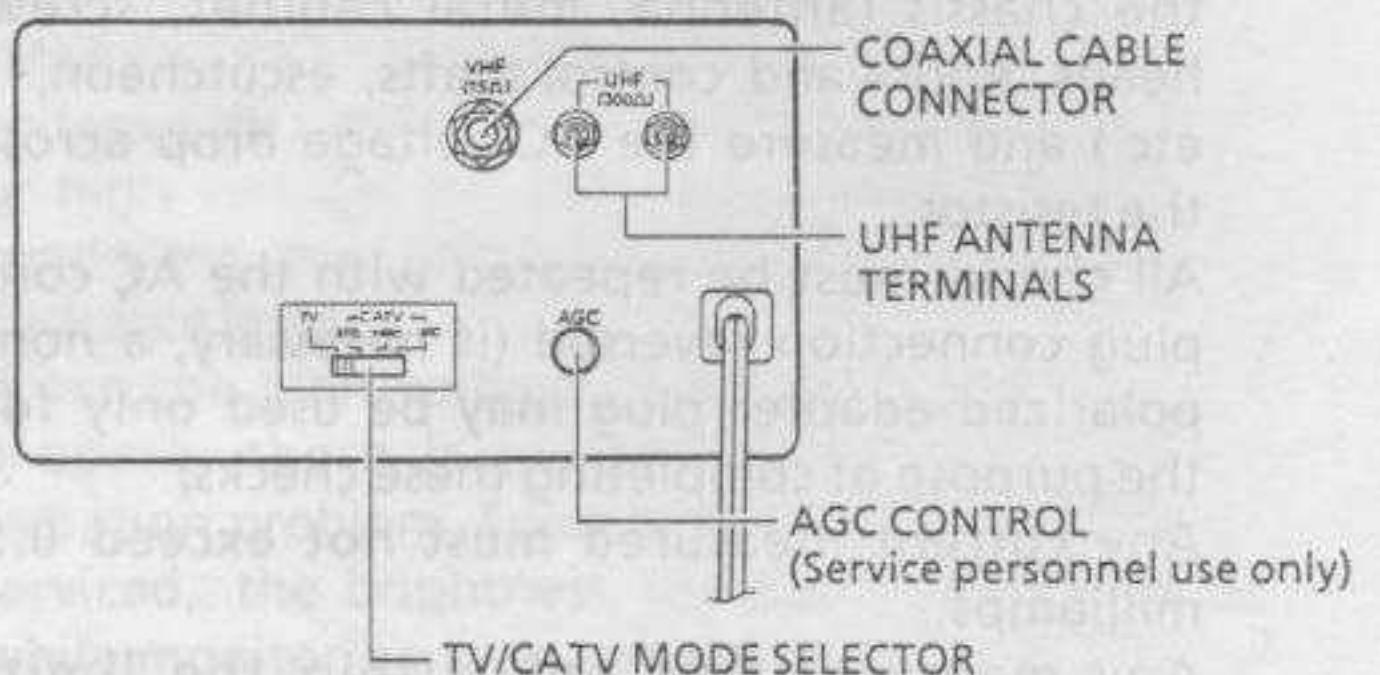
# LOCATION OF USER'S CONTROL (TV)

## Front



## Antenna Terminal Board

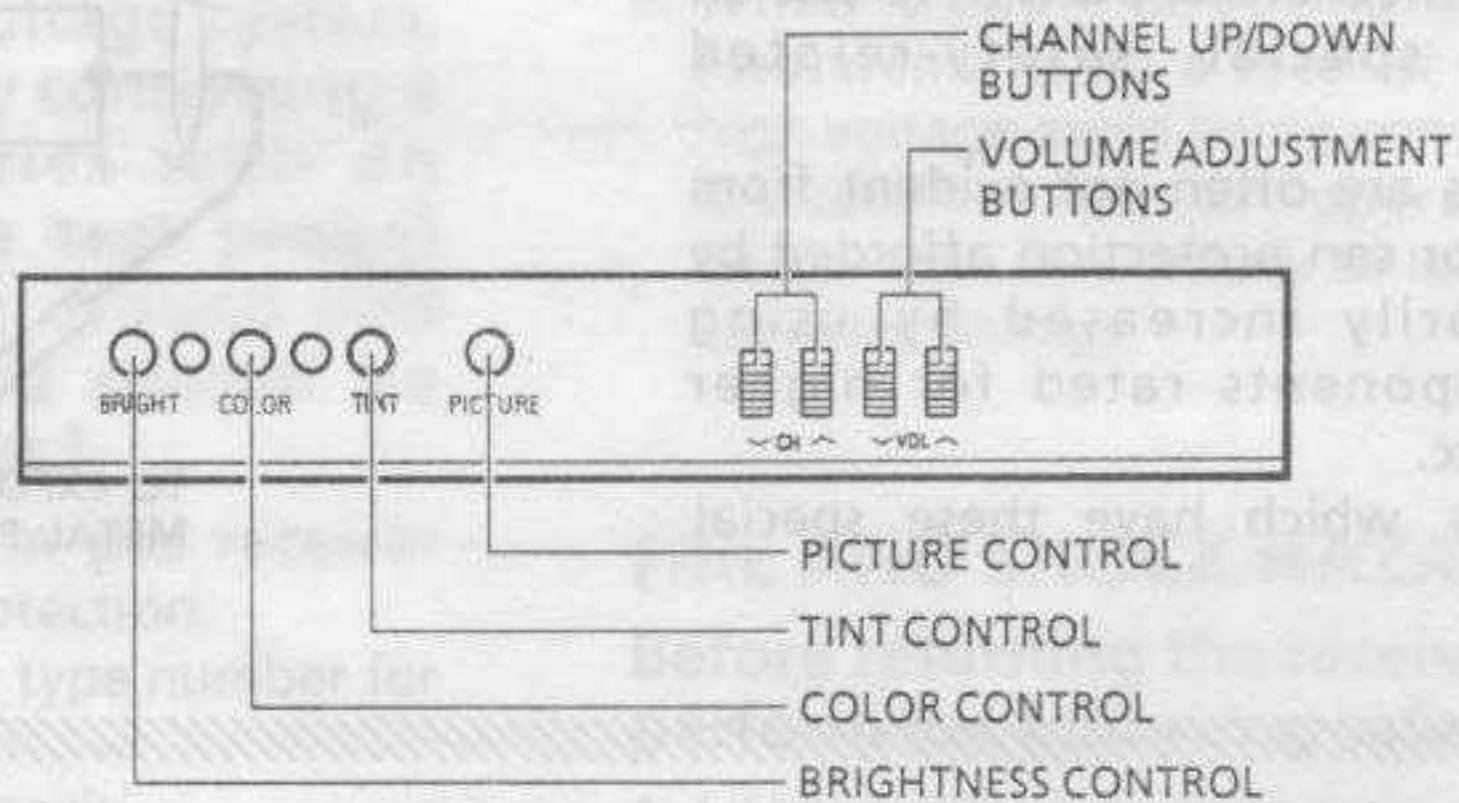
(Located on the rear of the cabinet)



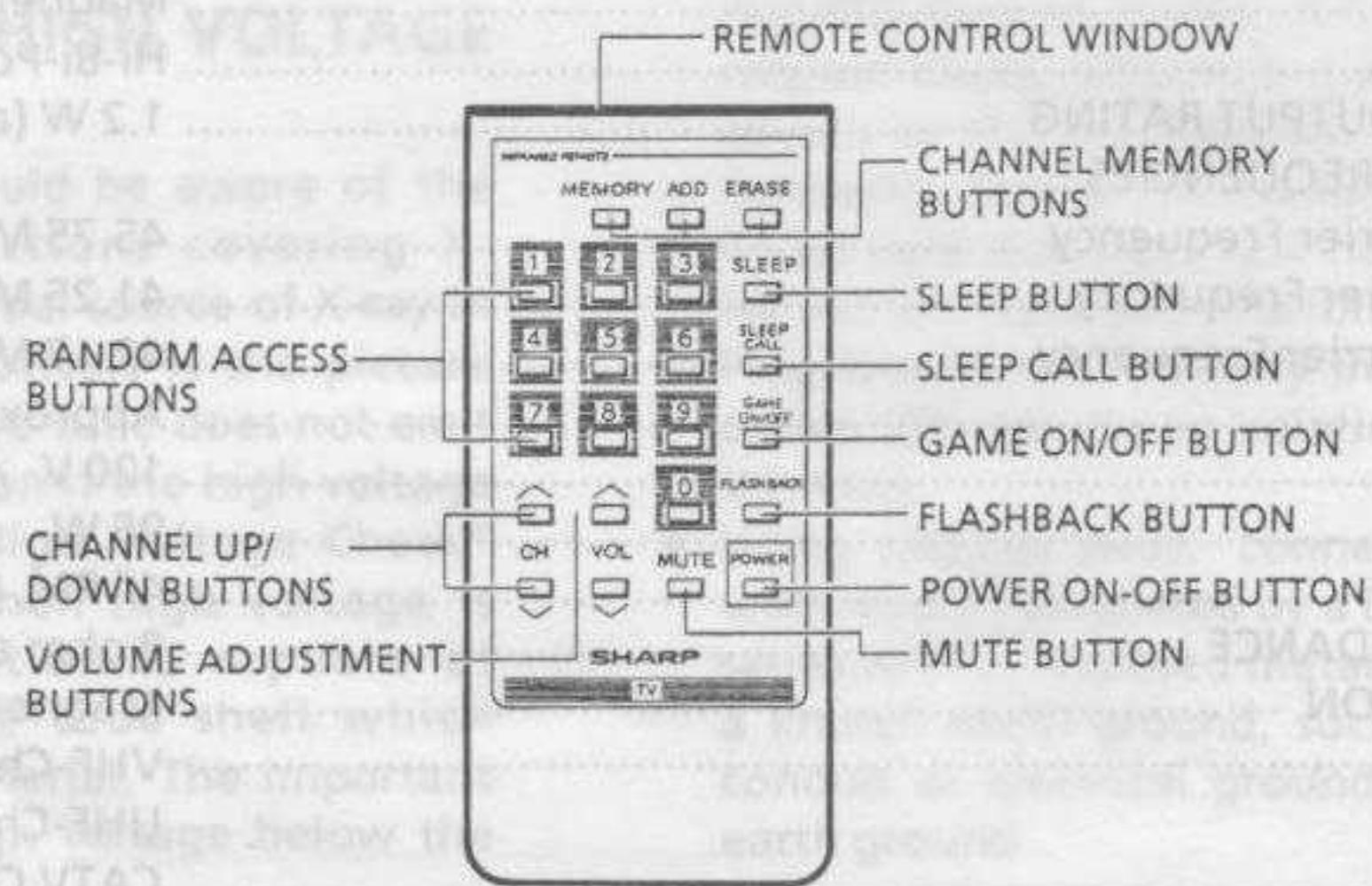
## Control Access Door

(How to open the door)

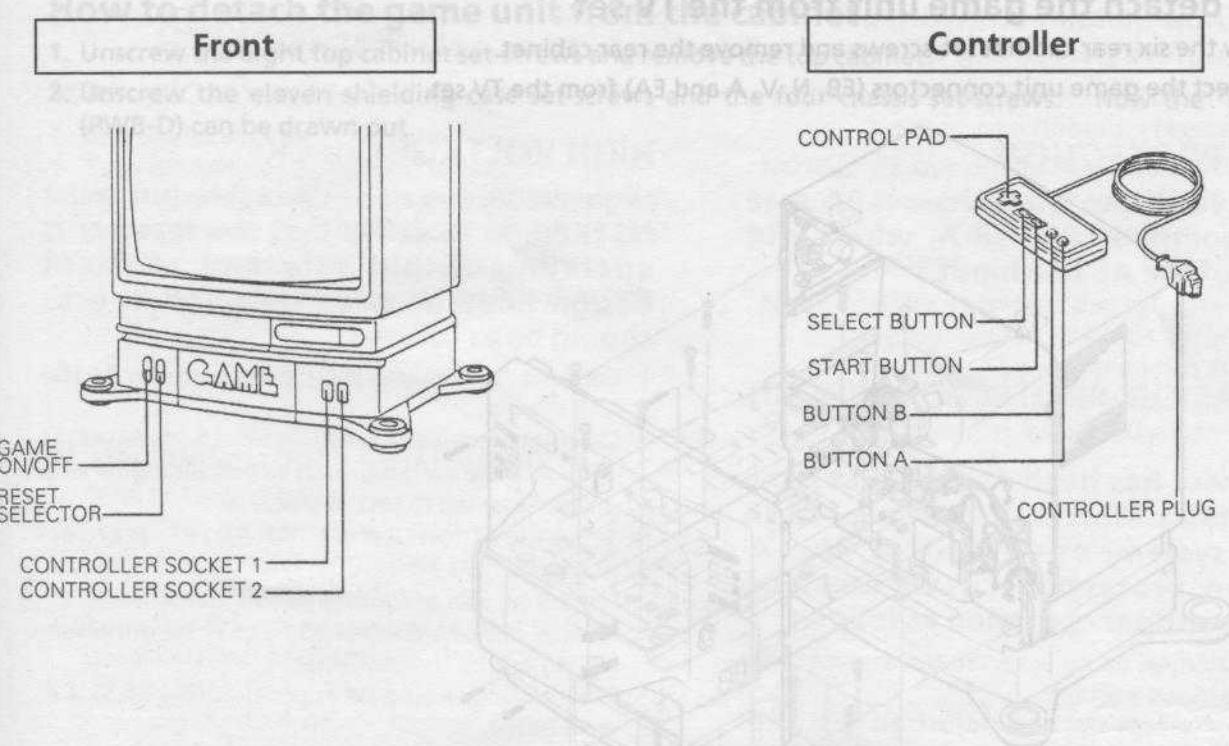
To open the door, be sure to push the position marked "PUSH ON".



## Infrared Remote Control

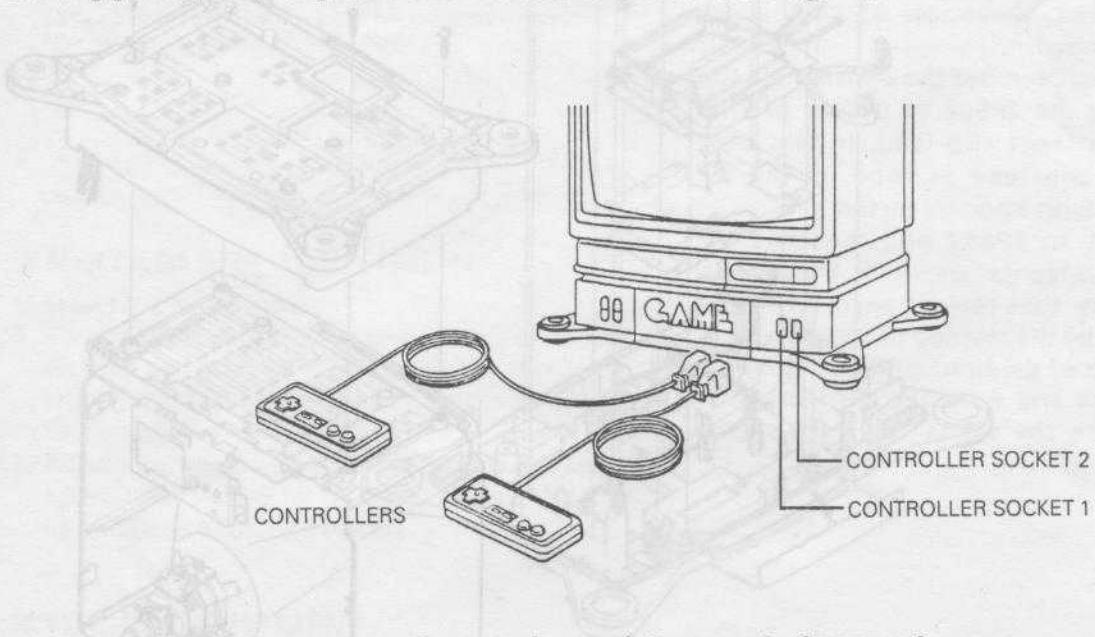


## LOCATION OF USER'S CONTROL (Continued) (GAME)



### CONNECTING THE CONTROLLERS TO THE TV

Both controllers are identical and may be connected to either controller socket. However, the controller connected to controller socket 1 becomes Controller 1. The distinction is important when selecting and starting games, since only Controller 1 is used to select and start games.



### Operation of Controls (GAME)

1. Turn the power on by pressing the POWER ON-OFF BUTTON on the set or on the Remote Control.
2. Set the TV mode by pressing the TV/GAME SELECTOR on the set or on the Remote Control.

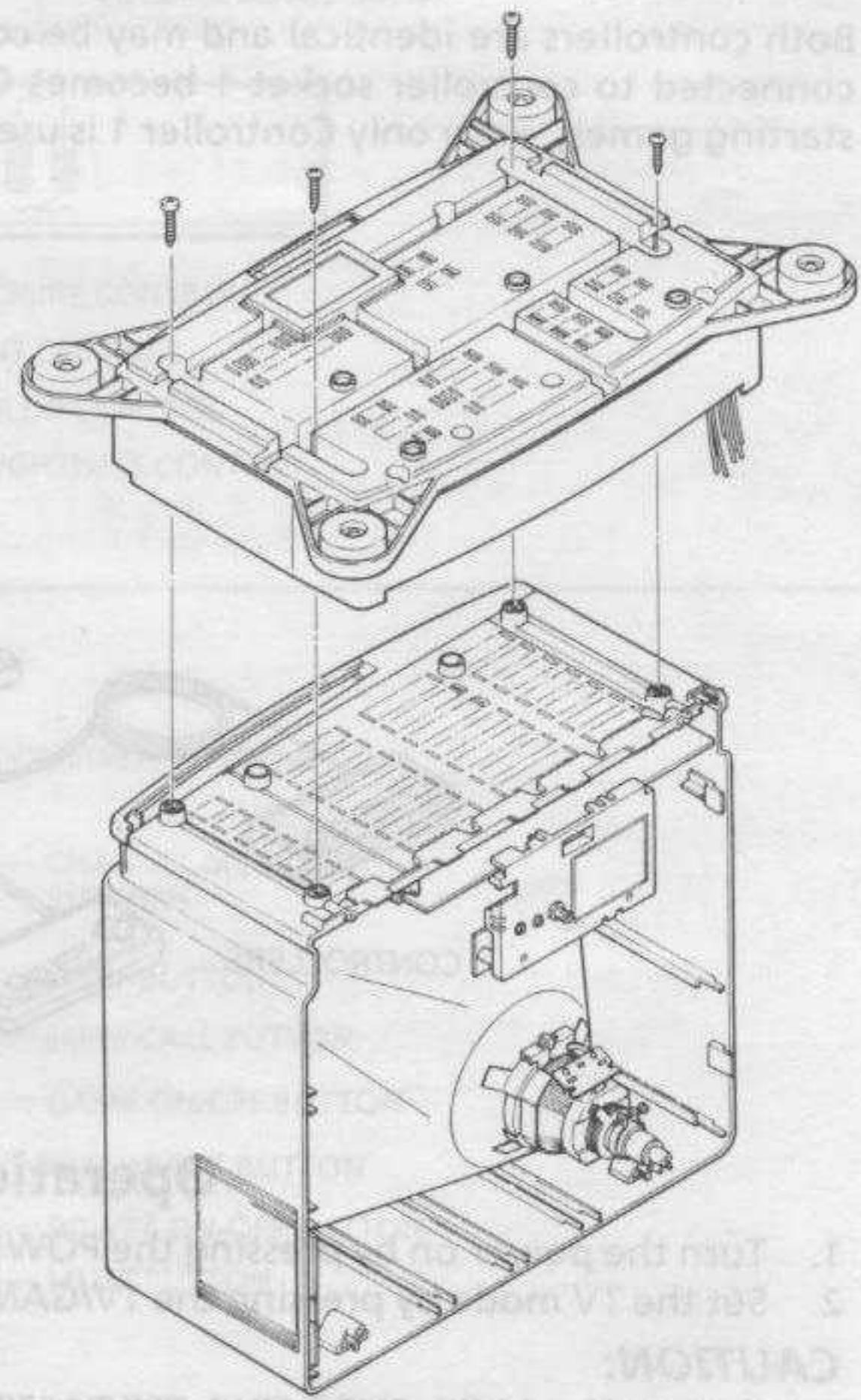
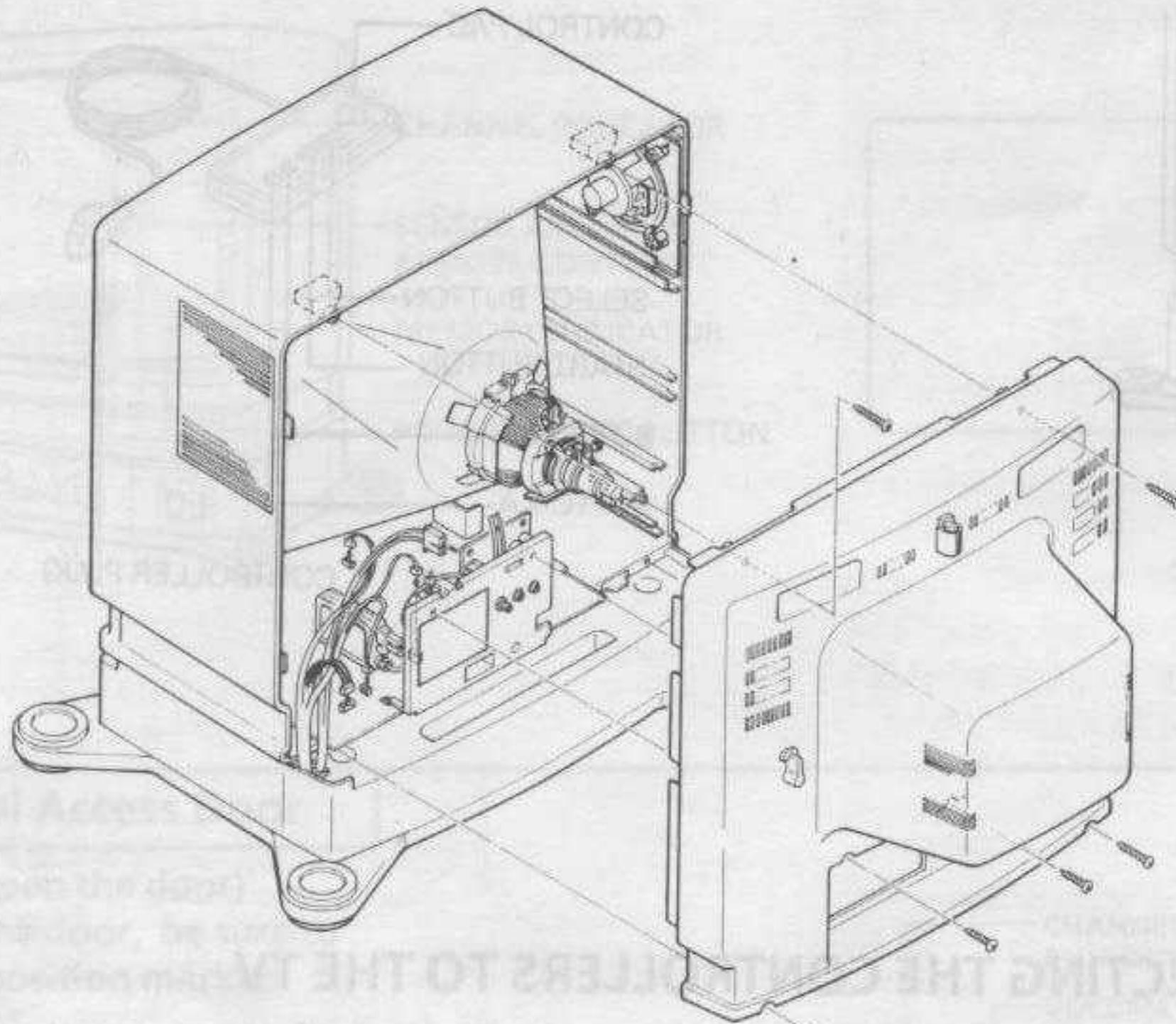
#### **CAUTION:**

**ALWAYS MAKE SURE THE TV/GAME SELECTOR IS SET THE TV MODE BEFORE INSERTING OR REMOVING A GAME PAK.**

## REMOVAL OF CABINET

### How to detach the game unit from the TV set

1. Unscrew the six rear cabinet set-screws and remove the rear cabinet.
2. Disconnect the game unit connectors (EB, N, V, A and EA) from the TV set.

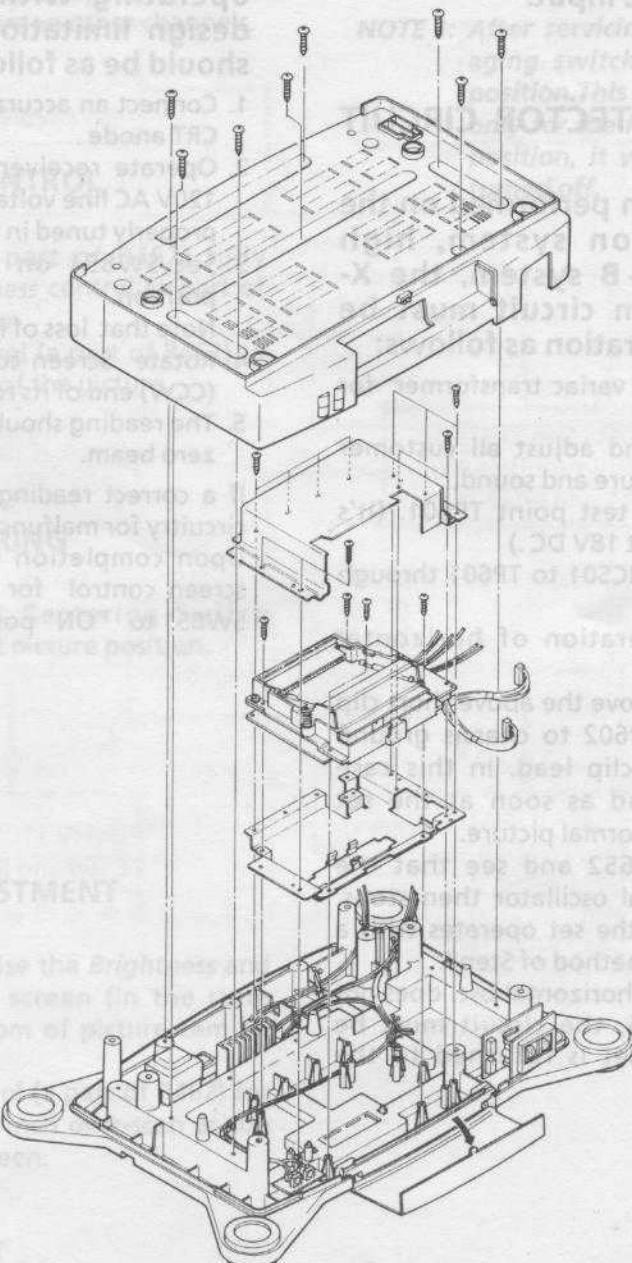


3. Place the TV set upside down.
4. Unscrew the four game unit set-screws from the TV set.  
Now the game unit can be detached from the TV set.

## REMOVAL OF CABINET (Continued)

### How to detach the game unit from the cabinet

1. Unscrew the eight top cabinet set-screws and remove the top cabinet.
2. Unscrew the eleven shielding case set-screws and the four chassis set-screws. Now the game PWB (PWB-D) can be drawn out.



### ■ VERTICAL SIZE ADJUSTMENT

1. Select a local channel.
2. Turn fully counter-clockwise the Brightness and Picture controls to dim screen (where the top and bottom of picture are not recognized).
3. Adjust Vertical size control (part of T652) approximately 1/8 to 1/4 of the distance between top and bottom of picture screen.

### ■ FOCUS ADJUSTMENT

1. Select a local channel.
2. Set Brightness and Picture controls at a normal viewing level.
3. Adjust Focus control (part of T652) for sharp scanning lines and/or sharp picture.

# INSTALLATION AND SERVICE INSTRUCTIONS

- Note:** (1) When performing any adjustments to resistor controls and transformers use non-metallic screwdriver or TV alignment tools.  
 (2) Before performing adjustment, TV set must be on at least 15 minutes.

## CIRCUIT PROTECTION

The receiver is protected by a 4.0A fuse (F701), mounted on PWB-A, wired into one side of the AC line input.

## X-RADIATION PROTECTOR CIRCUIT TEST

After service has been performed on the horizontal deflection system, high voltage system, or +B system, the X-Radiation protection circuit must be tested for proper operation as follows:

1. Apply 120V AC using a variac transformer for accurate input voltage.
2. Allow for warm up and adjust all customer controls for normal picture and sound.
3. Check the voltage of test point TP601. (It's voltage should be about 18V DC.)
4. Connect the pin (6) of IC501 to TP601 through a short clip lead.  
In this case, the operation of horizontal oscillator is stopped.
5. To start operation, remove the above short clip lead and touch the TP602 to chassis ground (TP603) with a short clip lead. In this case remove short clip lead as soon as the set operates again with a normal picture.
6. Connect TP651 to TP652 and see that the operation of horizontal oscillator then stops. Next, make sure that the set operates with a normal picture by the method of Step 5.
7. If the operation of the horizontal osc. does not stop in steps 4 and 6, the circuit must be repaired before the set is returned to the customer.

## HIGH VOLTAGE CHECK

High voltage is not adjustable but must be checked to verify that the receiver is operating within safe and efficient design limitations as specified checks should be as follows:

1. Connect an accurate high voltage meter to the CRT anode.
2. Operate receiver for at least 15 minutes at 120V AC line voltage, with strong air signal or a properly tuned in test signal.
3. Set SW851 on PWB-B to "OFF" (center) position.  
Note that loss of luminance will occur.
4. Rotate Screen control (on T652) to minimum (CCW) end of its rotation.
5. The reading should be approximately 26.5kV at zero beam.

If a correct reading cannot be obtained, check circuitry for malfunctioning components.  
Upon completion of voltage check, readjust screen control for proper operation and set SW851 to "ON" position.

3. Place the TV set upright.
  4. Unscrew the four screws which hold the front panel to the chassis.
- Note: the gear which can be detached from the TV set.

# INSTALLATION AND SERVICE INSTRUCTIONS

(Continued)

## FIELD ADJUSTMENT

### ■ RF-AGC ADJUSTMENT

1. Select a local channel.
2. Turn RF-AGC control (R214) fully clockwise.  
As a result noise appears on picture, then slowly turn the RF-AGC control (R214) counterclockwise until noise disappears.
3. Check that no noise appears on other channels.

**NOTE 1:** All field adjustments mentioned can be performed without test equipment.

**NOTE 2:** As this model has "Built in AFT", AFT is always in "ON" position. If AFT should be "OFF", short between TP1003 and TP1004.

**NOTE 3:** After servicing the set, check that the aging switch SW1801 is set at "OFF" position. This aging switch is to be used only for the factory inspection; at "ON" position, it won't allow the set to be turned off.

### ■ SUB-BRIGHTNESS CONTROL

1. Select a local channel.
2. Turn Picture control (a part of R462) fully clockwise and set Brightness control (a part of R462) at the center position.
3. Turn Sub-Brightness control (a part of R462) to obtain normal brightness of the picture.

### ■ HORIZONTAL CENTERING

1. Select a local channel.
2. Adjust the Horizontal Centering Switch (SW751) on PWB-C to best picture position.

### ■ VERTICAL SIZE ADJUSTMENT

1. Select a local channel.
2. Turn fully counterclockwise the Brightness and Picture controls to dim screen (in the state where the top and bottom of picture can be recognized.)
3. Adjust Vertical Size control (a part of R462) for approximately 1/8 to 1/4 inch over-scan at top and bottom of picture screen.

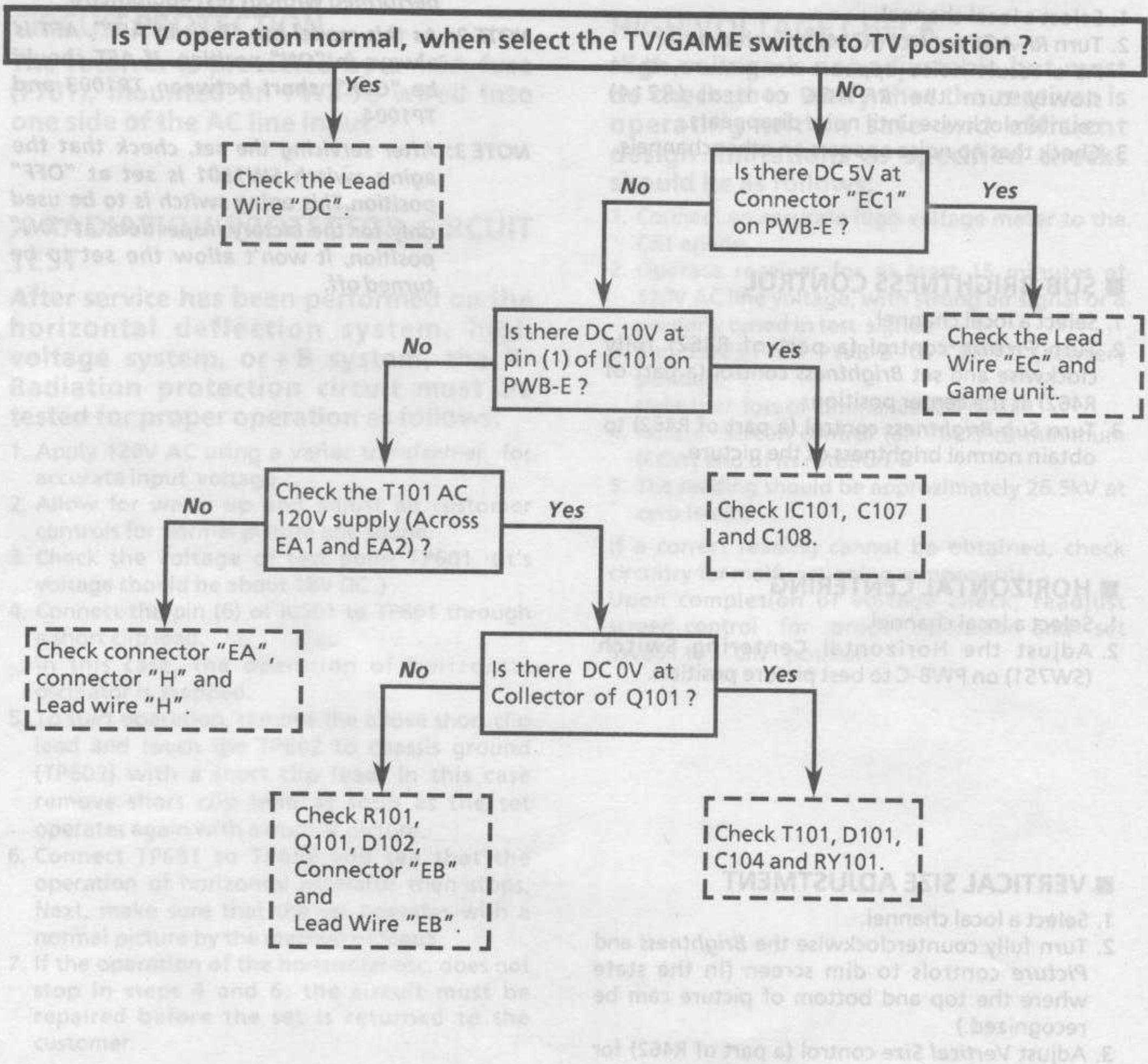
### ■ FOCUS ADJUSTMENT

1. Select a local channel.
2. Set Brightness and Picture controls at a normal viewing level.
3. Adjust Focus control (part of T652) for sharp scanning lines and/or sharp picture.

# TROUBLE SHOOTING TABLE

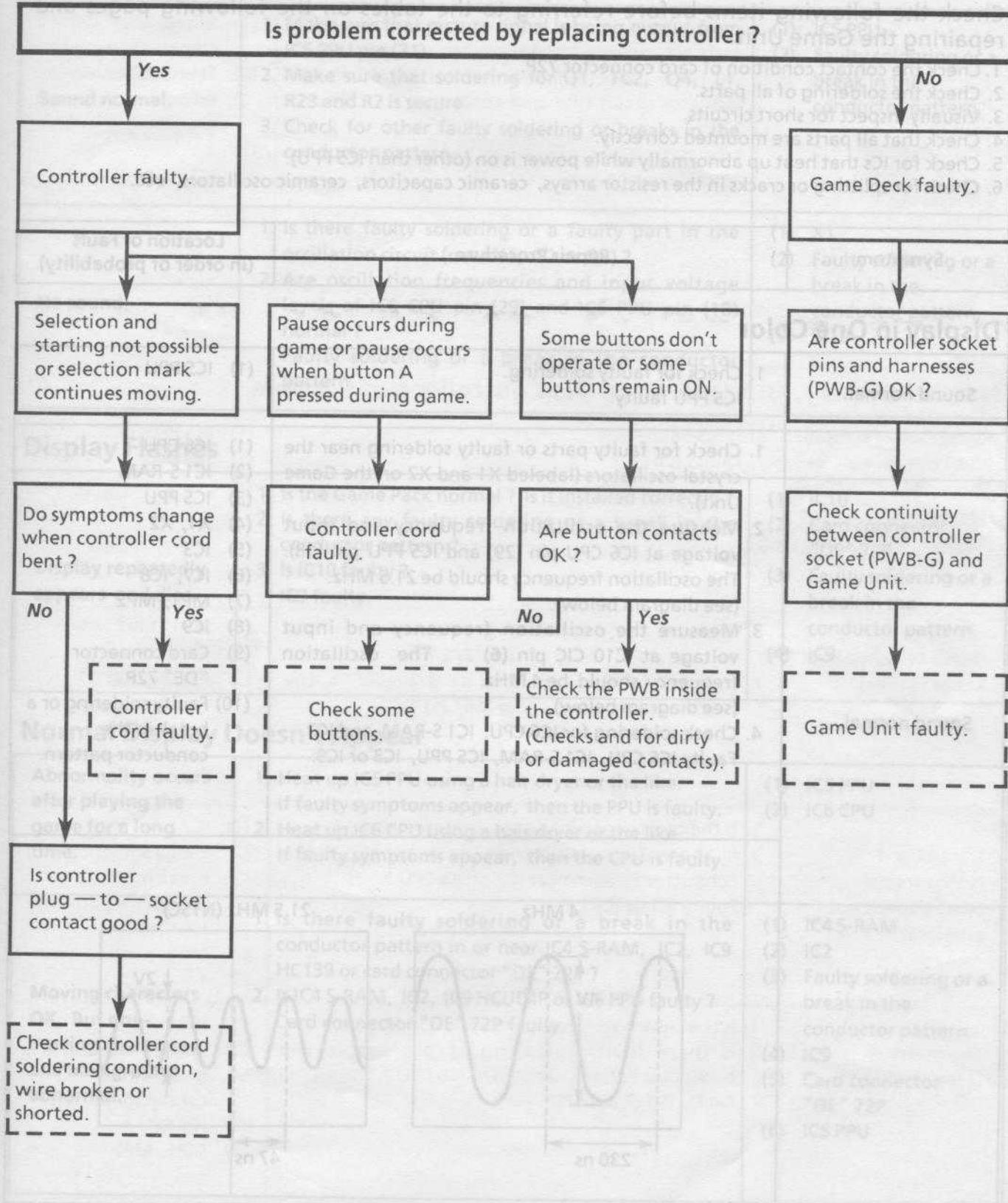
## Malfunctions not Traceable to Game Deck

### Display Fails to Appear (only noise)



## TROUBLE SHOOTING TABLE (Continued)

**Controller Doesn't Function.**



## TROUBLE SHOOTING TABLE (Continued)

### Malfunctions Traceable to Game Deck

#### \* Prior to replacing parts:

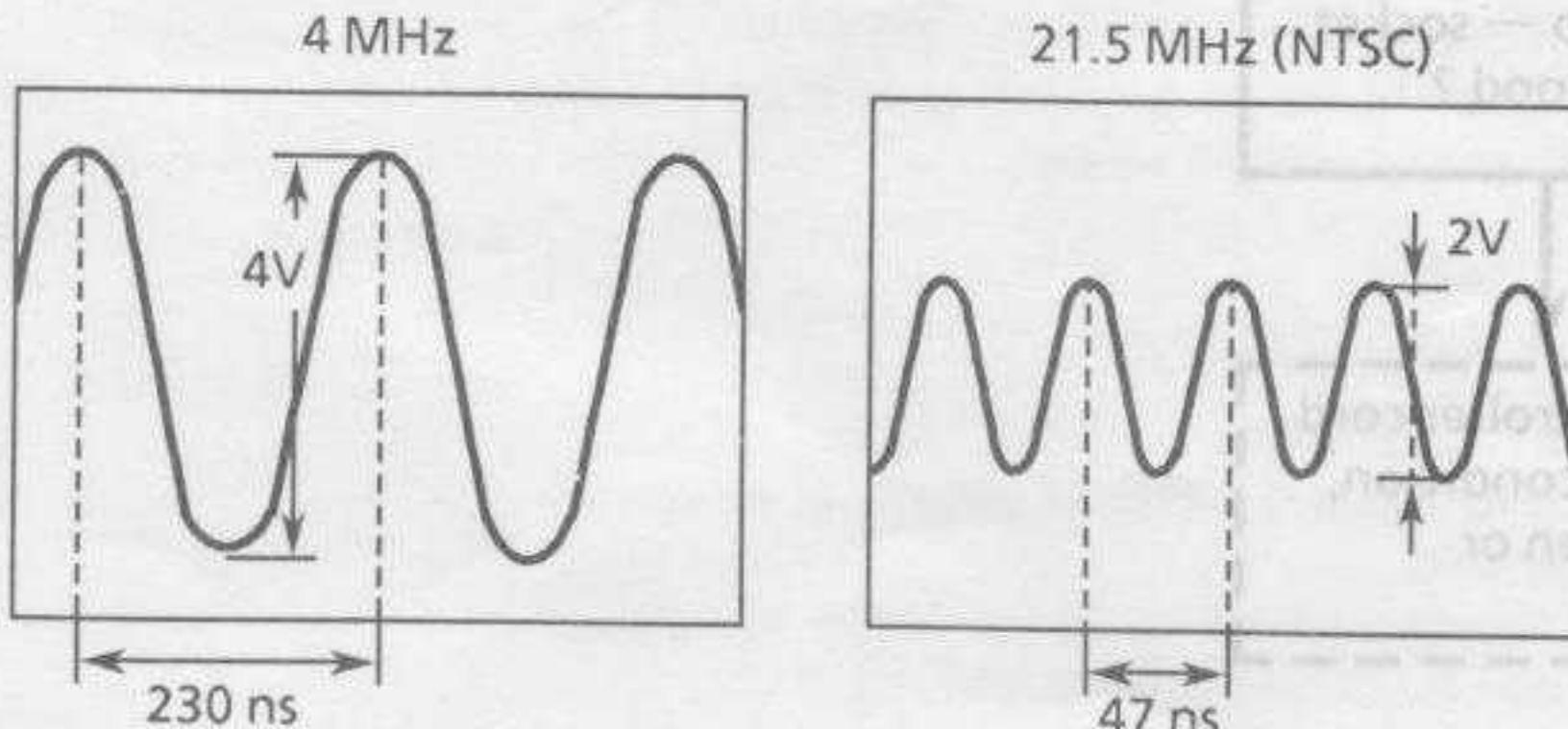
Check the following items before referring to the tables on the following pages and repairing the Game Unit.

1. Check the contact condition of card connector 72P.
2. Check the soldering of all parts.
3. Visually inspect for short circuits.
4. Check that all parts are mounted correctly.
5. Check for ICs that heat up abnormally while power is on (other than IC5 PPU).
6. Check for splitting or cracks in the resistor arrays, ceramic capacitors, ceramic oscillators, etc.

Symptom	Repair Procedure	Location of Fault (in order of probability)
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#### Display in One Color

Sound normal.	<ol style="list-style-type: none"> <li>1. Check for faulty soldering. IC5 PPU faulty.</li> </ol>	(1) IC5 PPU
	<ol style="list-style-type: none"> <li>1. Check for faulty parts or faulty soldering near the crystal oscillators (labeled X1 and X2 on the Game Unit).</li> <li>2. Measure the oscillation frequency and input voltage at IC6 CPU pin (29) and IC5 PPU pin (18). The oscillation frequency should be 21.5 MHz. (see diagram below).</li> <li>3. Measure the oscillation frequency and input voltage at IC10 CIC pin (6). The oscillation frequency should be 4 MHz. (see diagram below).</li> <li>4. Check soldering for IC6 CPU, IC1 S-RAM and IC3. Faulty IC6 CPU, IC1 S-RAM, IC5 PPU, IC3 or IC9.</li> </ol>	(1) IC6 CPU (2) IC1 S-RAM (3) IC5 PPU (4) X1, X2 (5) IC3 (6) IC7, IC8 (7) MP1, MP2 (8) IC9 (9) Card connector "DE" 72P (10) Faulty soldering or a break in the conductor pattern.
Sound normal.		



## TROUBLE SHOOTING TABLE (Continued)

Symptom (in order of probability)	Repair Procedure	Location of Fault (in order of probability)
<b>Display Black</b>		
Sound normal.	1. Make sure that picture signal is being output from IC5 PPU pin (21). 2. Make sure that soldering for Q1, FC2, Q4, L1, R23 and R2 is secure. 3. Check for other faulty soldering or breaks in the conductor pattern.	(1) IC5 PPU (2) Faulty soldering or a break in the conductor pattern. (3) IC9 HCU04P (4) IC6 CPU
No sound.	1. Is there faulty soldering or a faulty part in the oscillation circuit (near X1, Q2 or Q3) ? 2. Are oscillation frequencies and input voltage levels of IC6 CPU pin (29) and IC5 PPU pin (18) normal ? Faulty soldering or a break in the conductor pattern.	(1) X1 (2) Faulty soldering or a break in the conductor pattern. (3) IC10
<b>Display Flashes</b>		
Display repeatedly appears and dies.	1. Is the Game Pack normal ? Is it installed correctly ? 2. Is there any faulty soldering or a break in the conductor pattern ? 3. Is IC10 faulty ? IC9 faulty.	(1) IC10 (2) Card connector "DE" 72P (3) Faulty soldering or a break in the conductor pattern. (4) IC9
<b>Normal Display Doesn't Appear</b>		
Abnormality occurs after playing the game for a long time.	1. Heat up IC5 PPU using a hair dryer or the like. If faulty symptoms appear, then the PPU is faulty. 2. Heat up IC6 CPU using a hair dryer or the like. If faulty symptoms appear, then the CPU is faulty.	(1) IC5 PPU (2) IC6 CPU
Moving characters OK, But non-moving characters and background abnormal.	1. Is there faulty soldering or a break in the conductor pattern in or near IC4 S-RAM, IC2, IC9 HC139 or card connector "DE" 72P ? 2. Is IC4 S-RAM, IC2, IC9 HCU04P or IC5 PPU faulty ? Card connector "DE" 72P faulty.	(1) IC4 S-RAM (2) IC2 (3) Faulty soldering or a break in the conductor pattern. (4) IC9 (5) Card connector "DE" 72P (6) IC5 PPU

## TROUBLE SHOOTING TABLE (Continued)

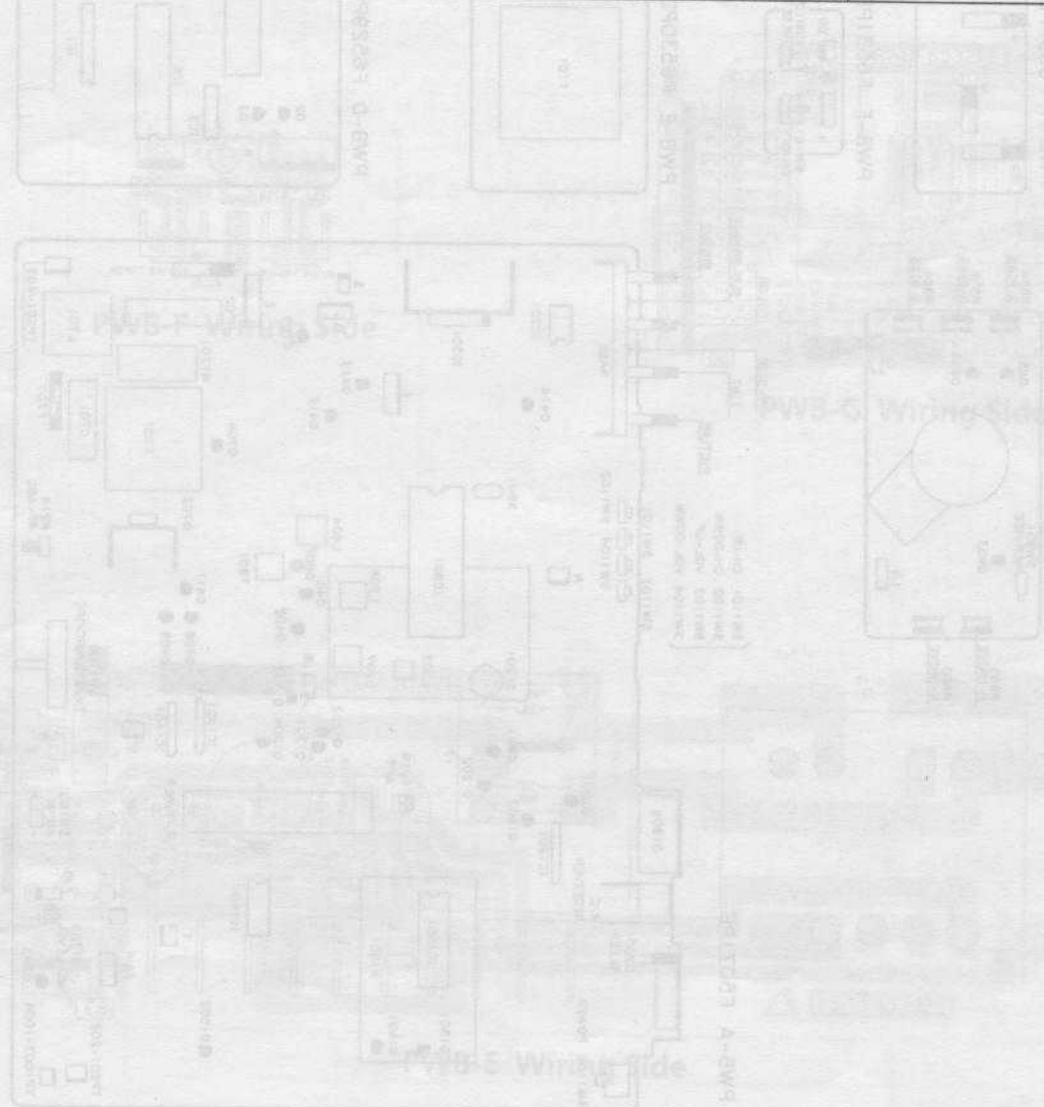
Symptom	Repair Procedure	Location of Fault (in order of probability)
<b>Normal Display Doesn't Appear</b>		
Poor or no color in picture.	<p>1. Check soldering and make sure that the correct parts are mounted and that they are mounted in the correct direction near resistor R2 and in the oscillator circuit (the area containing X1, Q2 and Q3). Adjust trimmer capacitor C50 and match to normal chroma frequency.</p>	(1) Misadjusted C50 trimmer capacitor. (2) Faulty soldering or erroneous mounting. (3) X1 (4) IC5 PPU
<b>Normal Display, But Operation Via Controller Not Possible</b>		
Game Select symbol does not appear, or is shaped abnormally if it does appear.	<p>1. Is IC5 PPU faulty ? Faulty IC6 CPU.</p> <p>2. The oscillation frequency should be 21 MHz.01</p>	(1) IC5 PPU (2) IC6 CPU
Game Select symbol keeps moving.	<p>1. Is there faulty soldering or a break in the conductor Pattern in MP1 or MP2 ? 2. Is there faulty soldering or a break in the conductor Pattern in IC7 or IC6 CPU ? Faulty IC7 or IC6 CPU.</p>	(1) MP1, MP2 (2) C7 (3) IC6 CPU
Controller I is inoperable (Game Select not possible).	<p>1. Is the controller harness securely connected ? 2. Is there faulty soldering or a break in the conductor Pattern near IC7 or IC6 CPU ? Faulty IC7 or IC6 CPU.</p>	(1) IC7 (2) Faulty soldering or a break in the conductor pattern. (3) IC6 CPU (4) MP1, MP2
Controller II is inoperable	<p>1. Is the controller harness securely connected ? 2. Is there faulty soldering or a break in the conductor Pattern near IC8 or IC6 CPU ? Faulty IC8 or IC6 CPU.</p>	(1) IC8 (2) Faulty soldering or a break in the conductor pattern. (3) IC6 CPU (4) MP1, MP2

## TROUBLE SHOOTING TABLE (Continued)

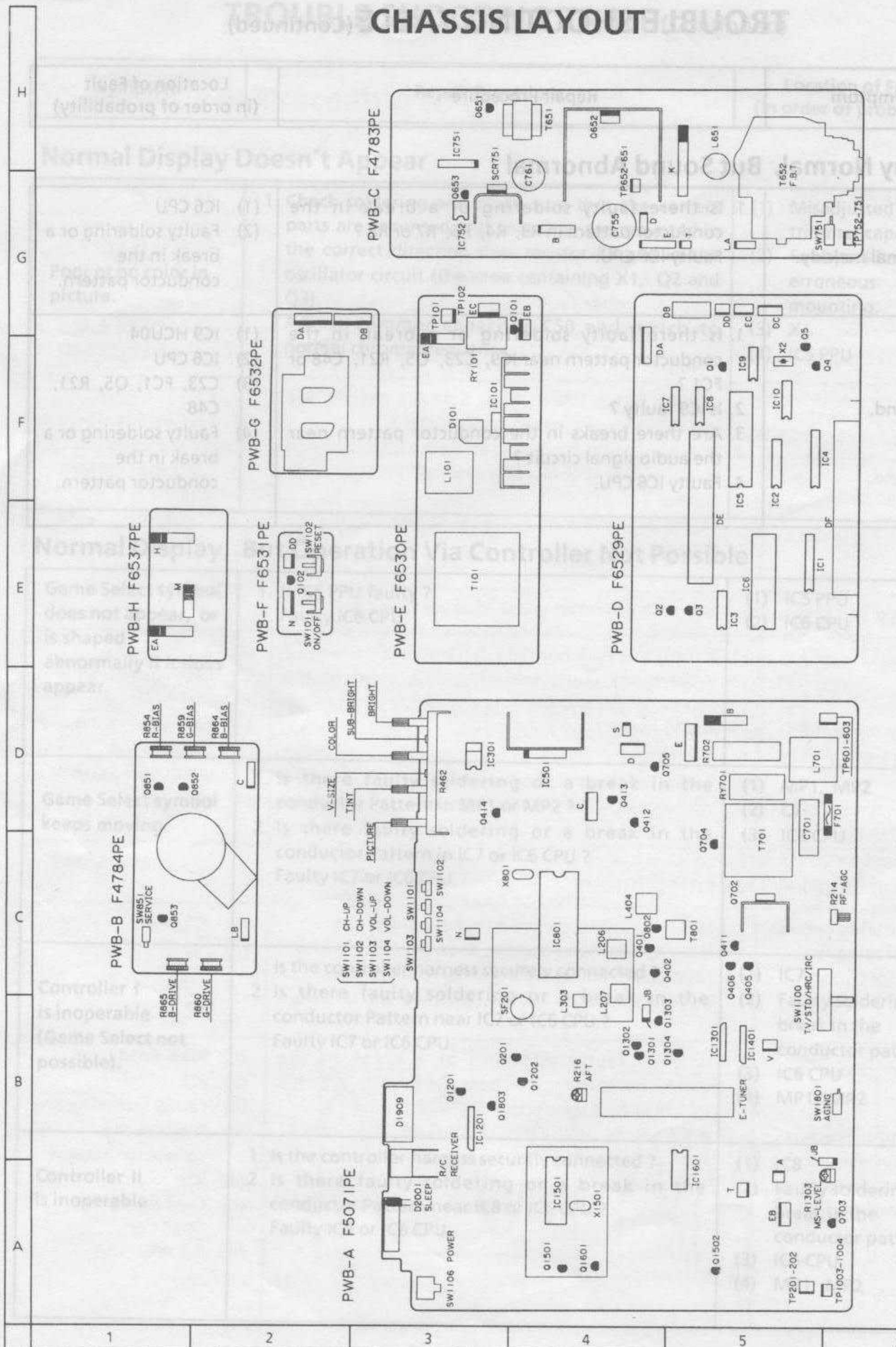
Symptom	Repair Procedure	Location of Fault (in order of probability)
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### Display Normal, But Sound Abnormal

Abnormal melody.	<p>1. Is there faulty soldering or a break in the conductor pattern in R3, R4, R6, R7 or R8 ? Faulty IC6 CPU.</p>	(1) IC6 CPU (2) Faulty soldering or a break in the conductor pattern.
No sound.	<p>1. Is there faulty soldering or a break in the conductor pattern near IC9, C23, Q5, R21, C48 or FC1 ?  2. Is IC9 faulty ?  3. Are there breaks in the conductor pattern near the audio signal circuit ?  4. Faulty IC6 CPU.</p>	(1) IC9 HCU04 (2) IC6 CPU (3) C23, FC1, Q5, R21, C48 (4) Faulty soldering or a break in the conductor pattern.



# CHASSIS LAYOUT



(beuniuno) PRINTED WIRING BOARD ASSEMBLIES

H

G

F

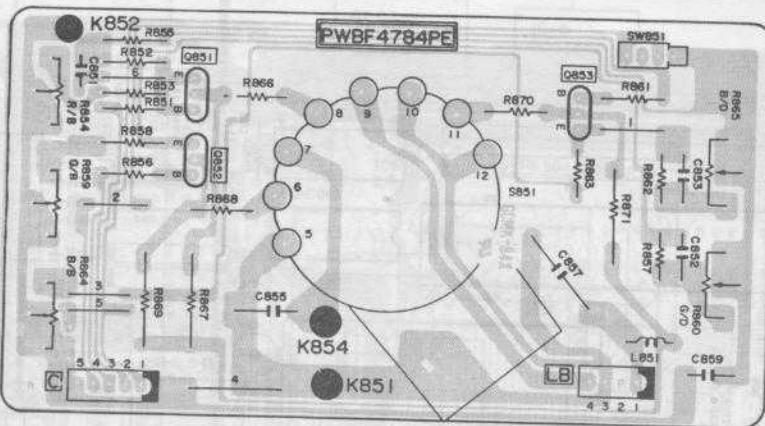
E

D

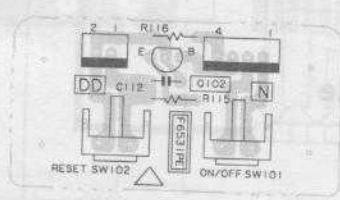
C

B

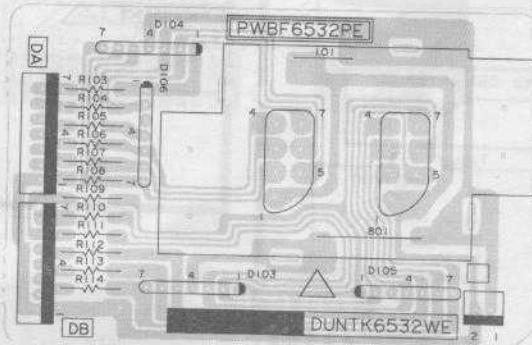
A



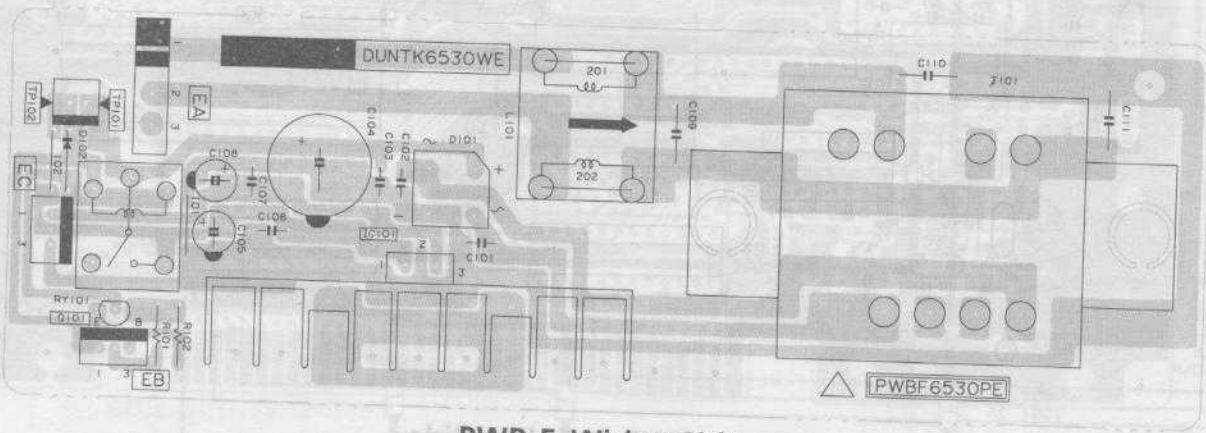
PWB-B Wiring Side



PWB-F Wiring Side



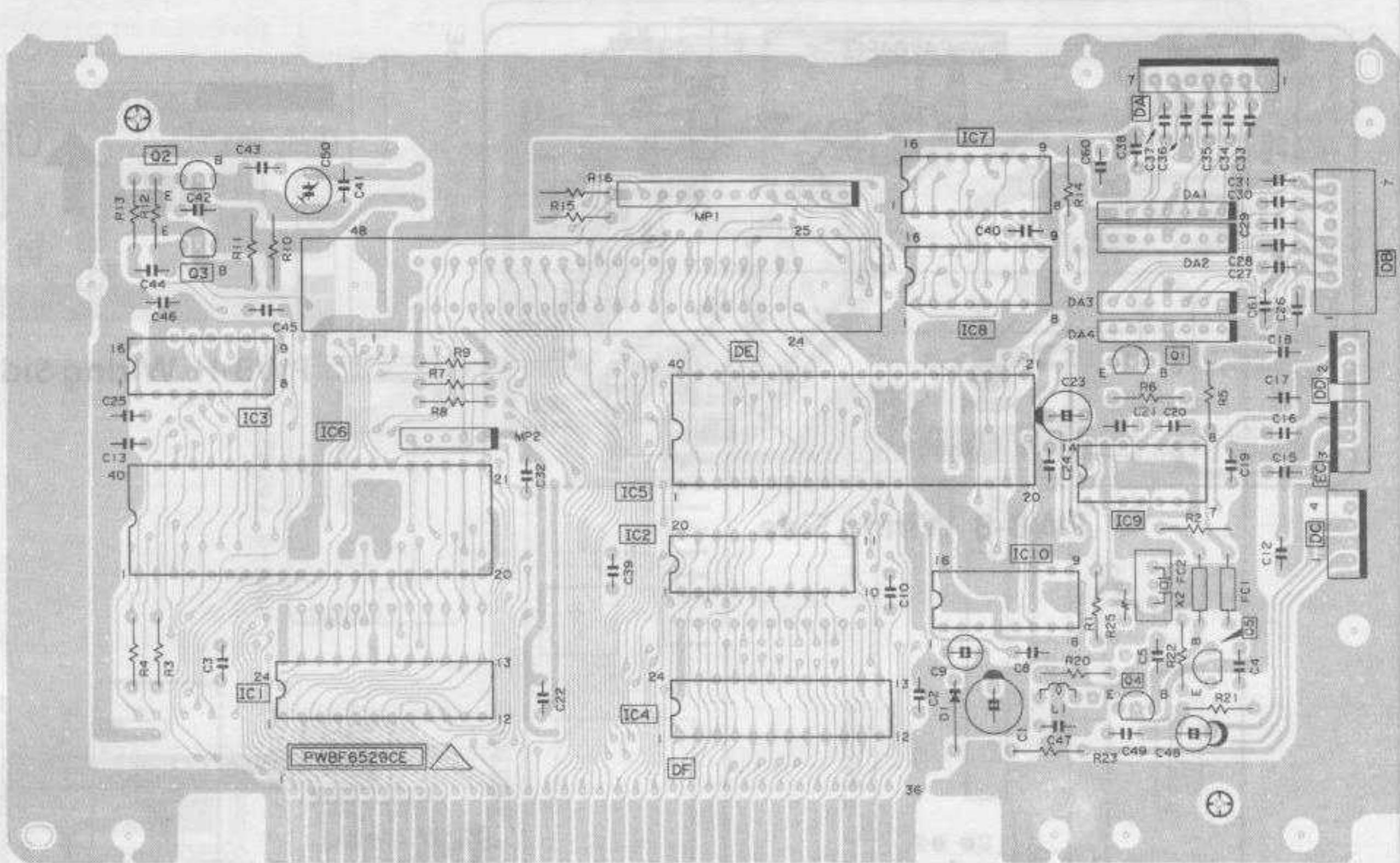
PWB-G Wiring Side



PWB-E Wiring Side

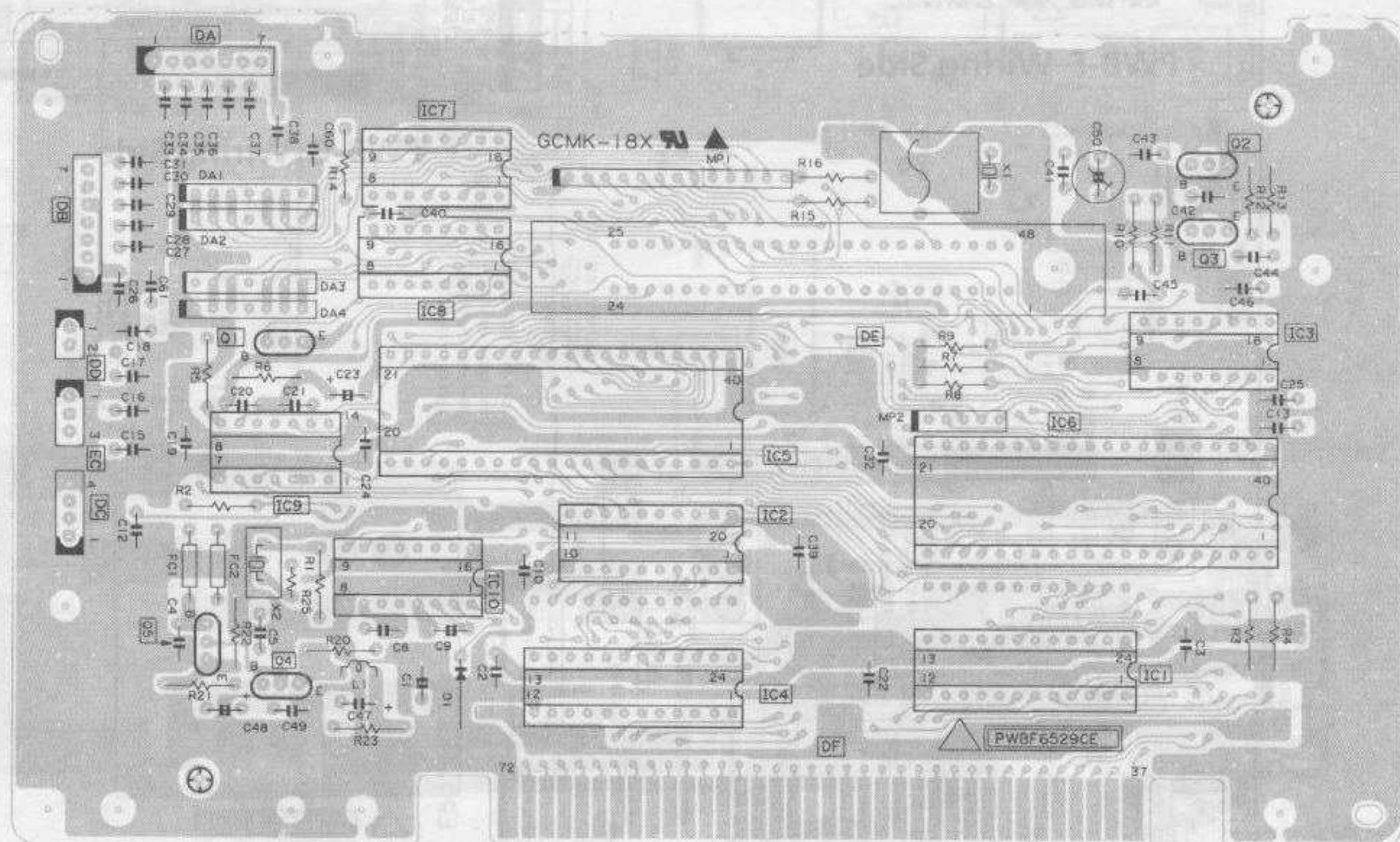
# PRINTED WIRING BOARD ASSEMBLIES (Continued)

H  
G  
F  
E



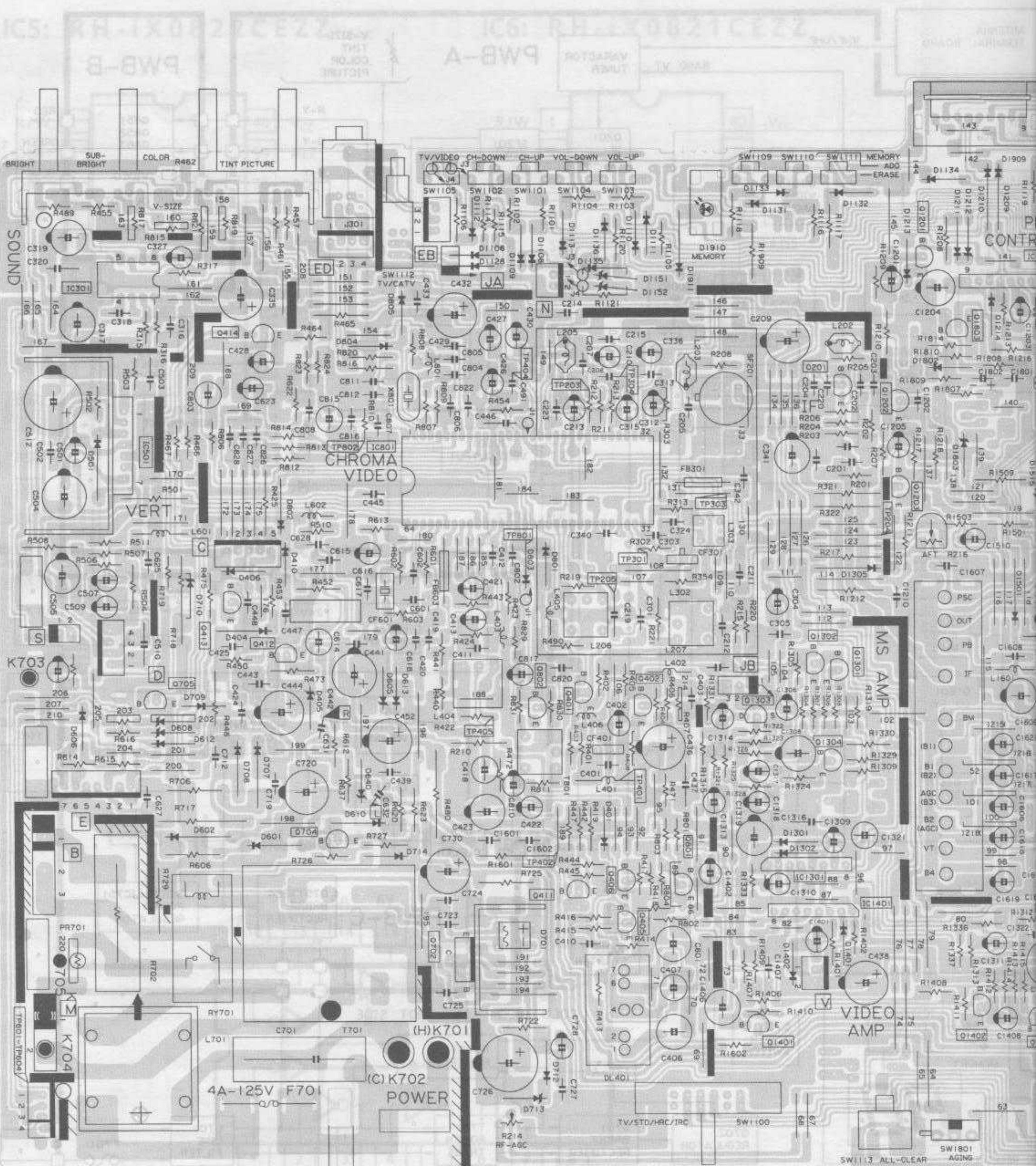
**PWB-D Parts Side**

D  
C  
B  
A



**PWB-D Solder Side**

# PRINTED WIRING BOARD ASSEMBLIES (Continued)



PWB-A Wiring Side

## IMPORTANT SERVICE SAFETY PRECAUTION

- Service work should be performed only by qualified service technicians who are thoroughly familiar with all safety checks and servicing guidelines which follow:

### **WARNING**

1. For continued safety, no modification of any circuit should be attempted.
2. Disconnect AC power before servicing.
3. Semiconductor heat sinks are potential shock hazards when the receiver is operating.
4. The chassis in this receiver has two ground systems which are separated by insulation material. The non-isolated (hot) ground system is for the +B voltage regulator circuit and the horizontal output circuit. The isolated ground system is for the low +B DC voltages and the secondary circuit of the high voltage transformer.

To prevent electrical shock use an isolation transformer between the line cord and power receptacle, when servicing this chassis.

### **SERVICING OF HIGH VOLTAGE SYSTEM AND PICTURE TUBE**

When servicing the high voltage system, remove the static charge by connecting a 10k ohm resistor in series with an insulated wire (such as a test probe) between the picture tube ground and the anode lead. (AC cord should be disconnected from AC outlet.)

1. Note that the picture tube in this receiver employs integral implosion protection.
2. Replace with tube of the same type number for continued safety.
3. Do not lift picture tube by the neck.
4. Handle the picture tube only when wearing shatterproof goggles and after discharging the high voltage anode completely.

### **X-RADIATION AND HIGH VOLTAGE LIMITS**

1. All service personnel should be aware of the procedures and instructions covering X-radiation. The only potential source of X-ray in current solid state TV receivers is the picture tube. However, the picture tube does not emit measurable X-Ray radiation if the high voltage is as specified in the "High Voltage Check" instructions. It is only when high voltage is excessive that X-radiation is capable of penetrating the picture tube shell which includes lead in glass material. The important precaution is to keep high voltage below the maximum level specified.

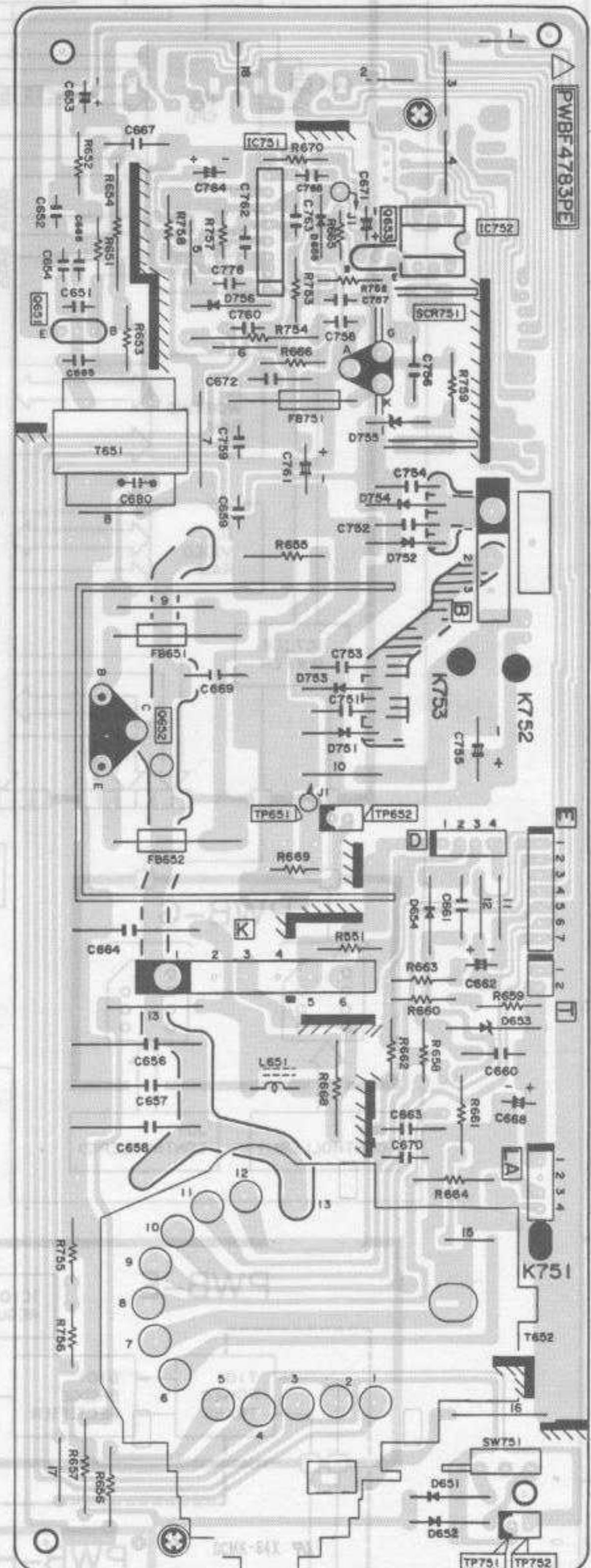
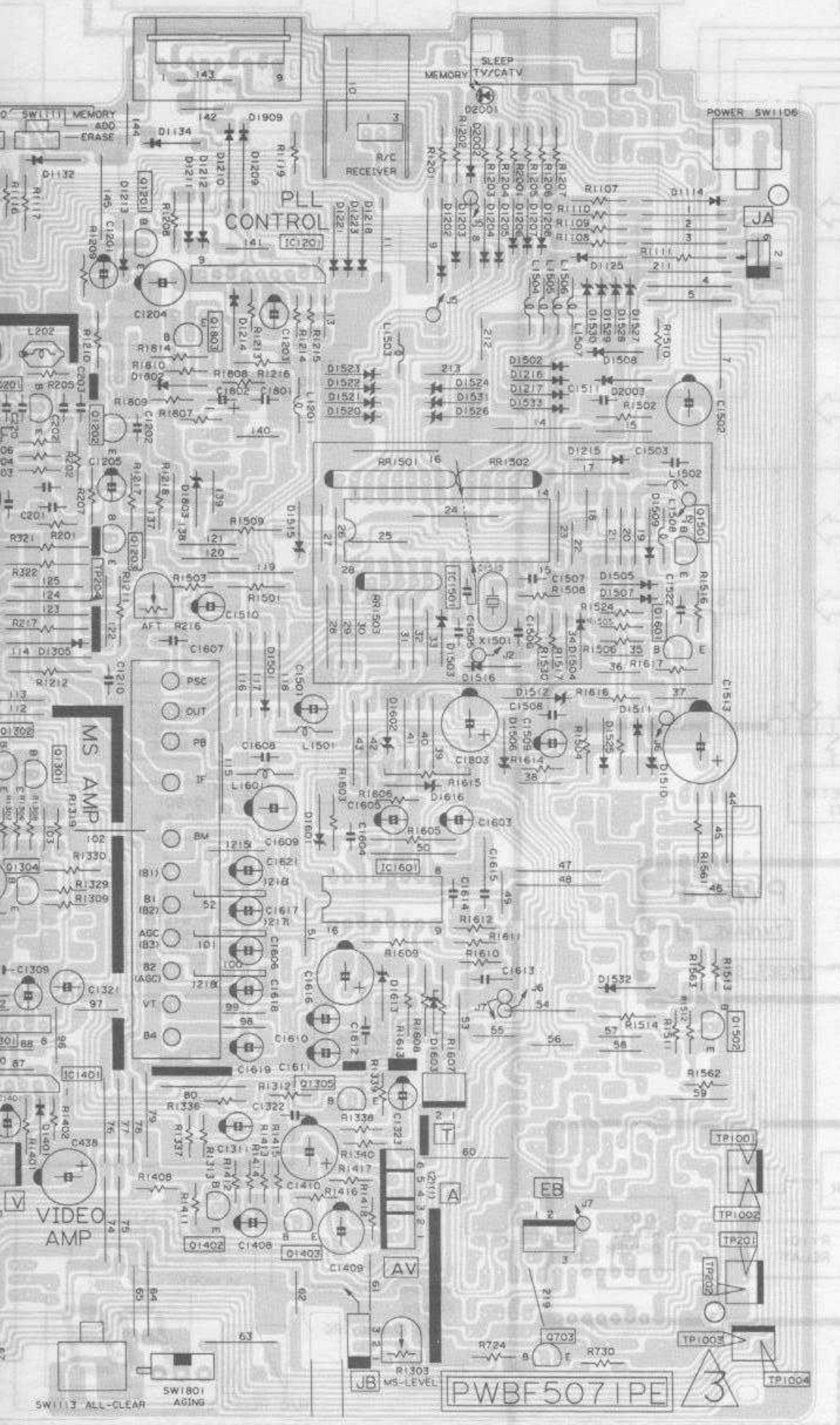
2. It is essential that servicemen have available at all times an accurate high voltage meter. The calibration of this meter should be checked periodically.
3. High voltage should always be kept at the rated value — no higher. Operation at higher voltages may cause a failure of the picture tube or high voltage circuitry and, under certain conditions, may produce radiation in excess of desirable levels.
4. When the high voltage regulator is operating properly there is no possibility of an X-radiation problem. Every time a color chassis is serviced, the brightness should be tested while monitoring high voltage with a meter to be certain that it does not exceed the specified value and is regulated correctly.
5. Do not use a picture tube other than that specified, and do not make unrecommended circuit modifications to the high voltage circuitry.
6. When trouble shooting and taking test measurements on a receiver with excessively high voltage, avoid being unnecessarily close to the receiver. Do not operate the receiver longer than is necessary to locate the cause of excessive voltage.

### **FIRE AND SHOCK HAZARD CHECKS**

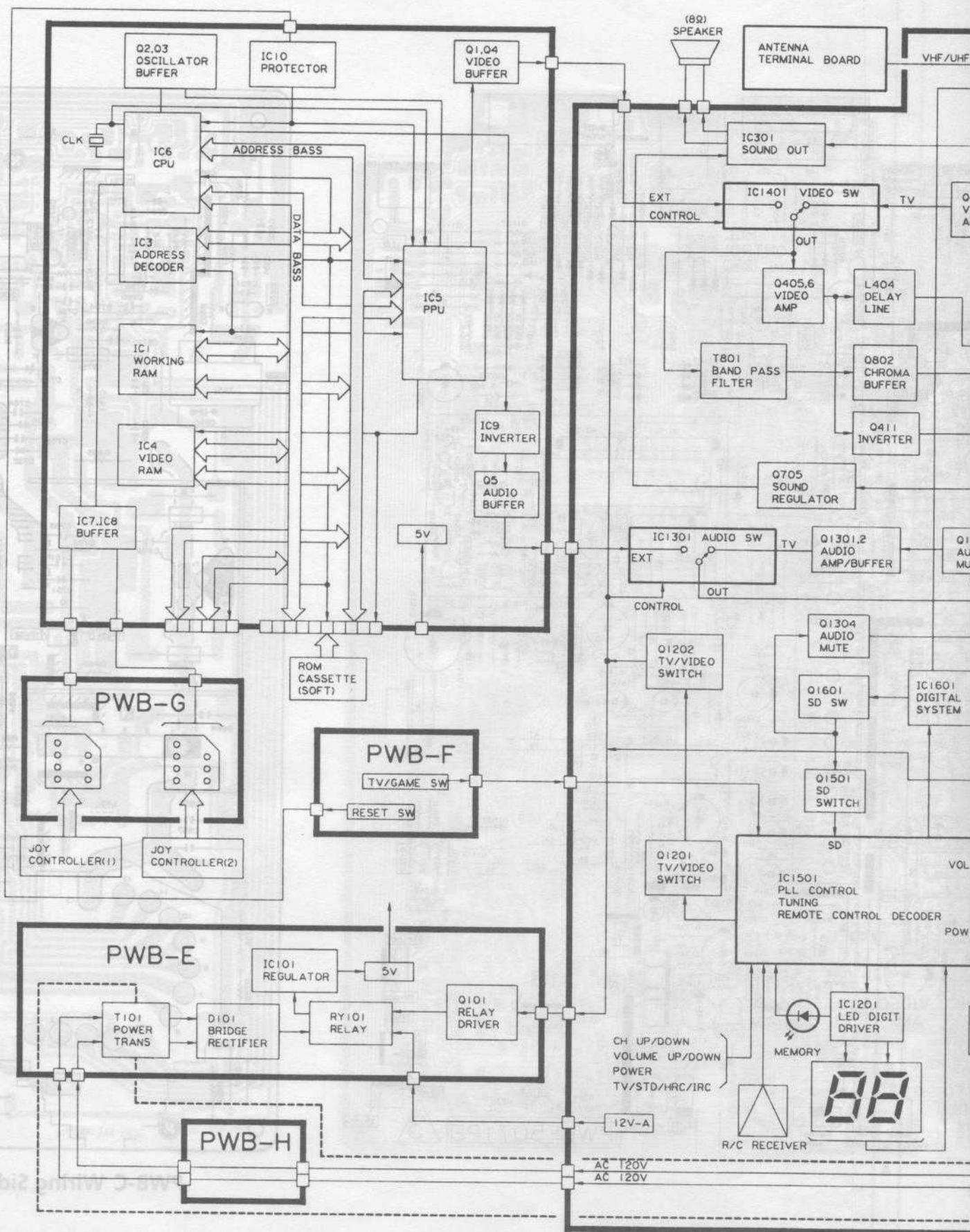
Before returning the receiver to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched, and check that hardware is not lodged between the chassis and other metal parts in the receiver.
2. Inspect all protective devices such as non-metallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, check for current leakage in the following manner:
  - Plug the AC cord directly into a 120 volt AC outlet, (Do not use an isolation transformer for this test).
  - Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15μF capacitor in series with all exposed metal cabinet parts and a known earth ground, such as an electrical conduit or electrical ground connected to an earth ground.

## BLOCK DIAGRAM

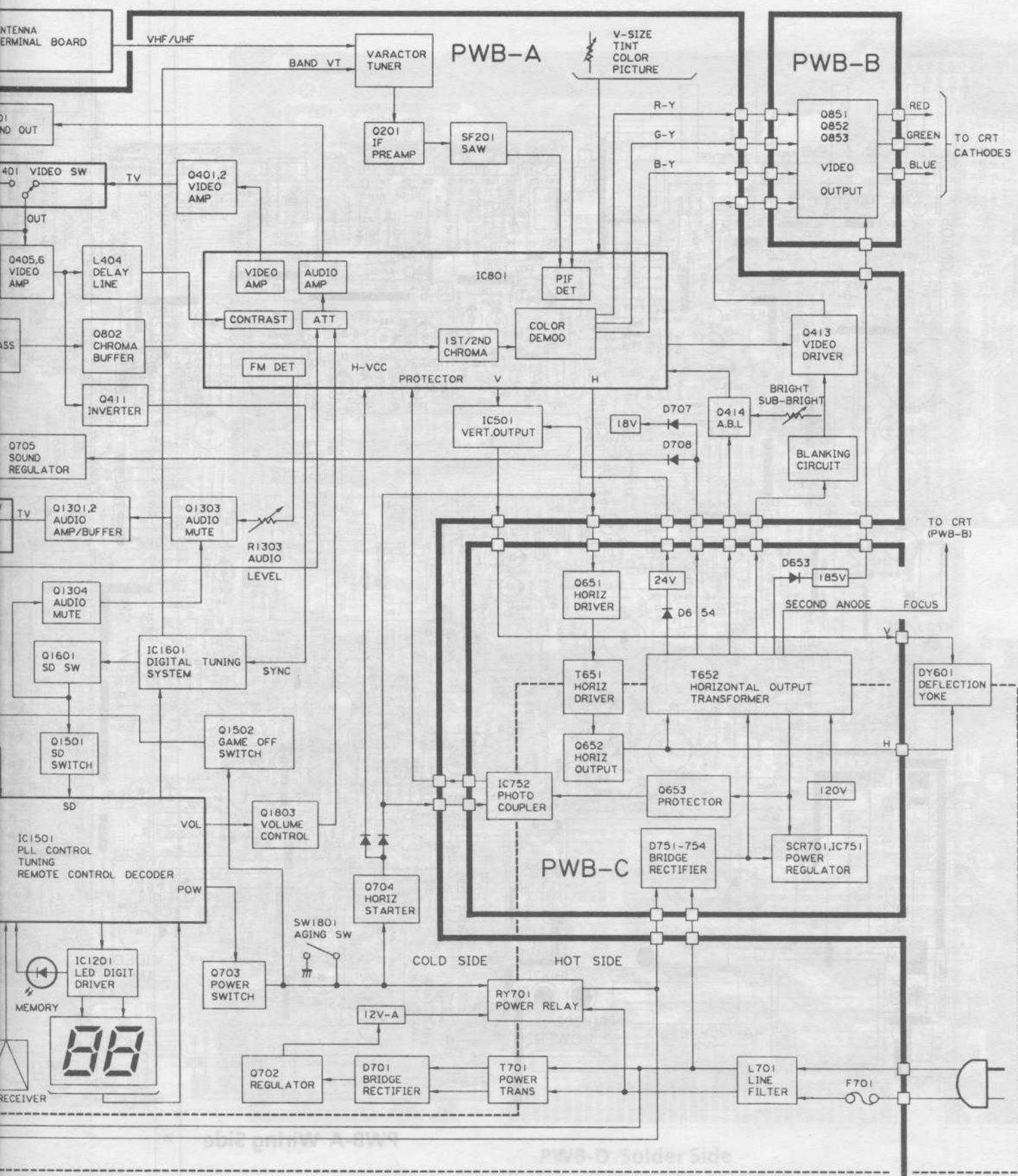


# BLOCK DIAGRAM



1 2 3 4 5 6 7

(beunitpo) 2318M32A 98A08 EINIGE STATIONEN)



## BLOCK DIAGRAM (Continued)

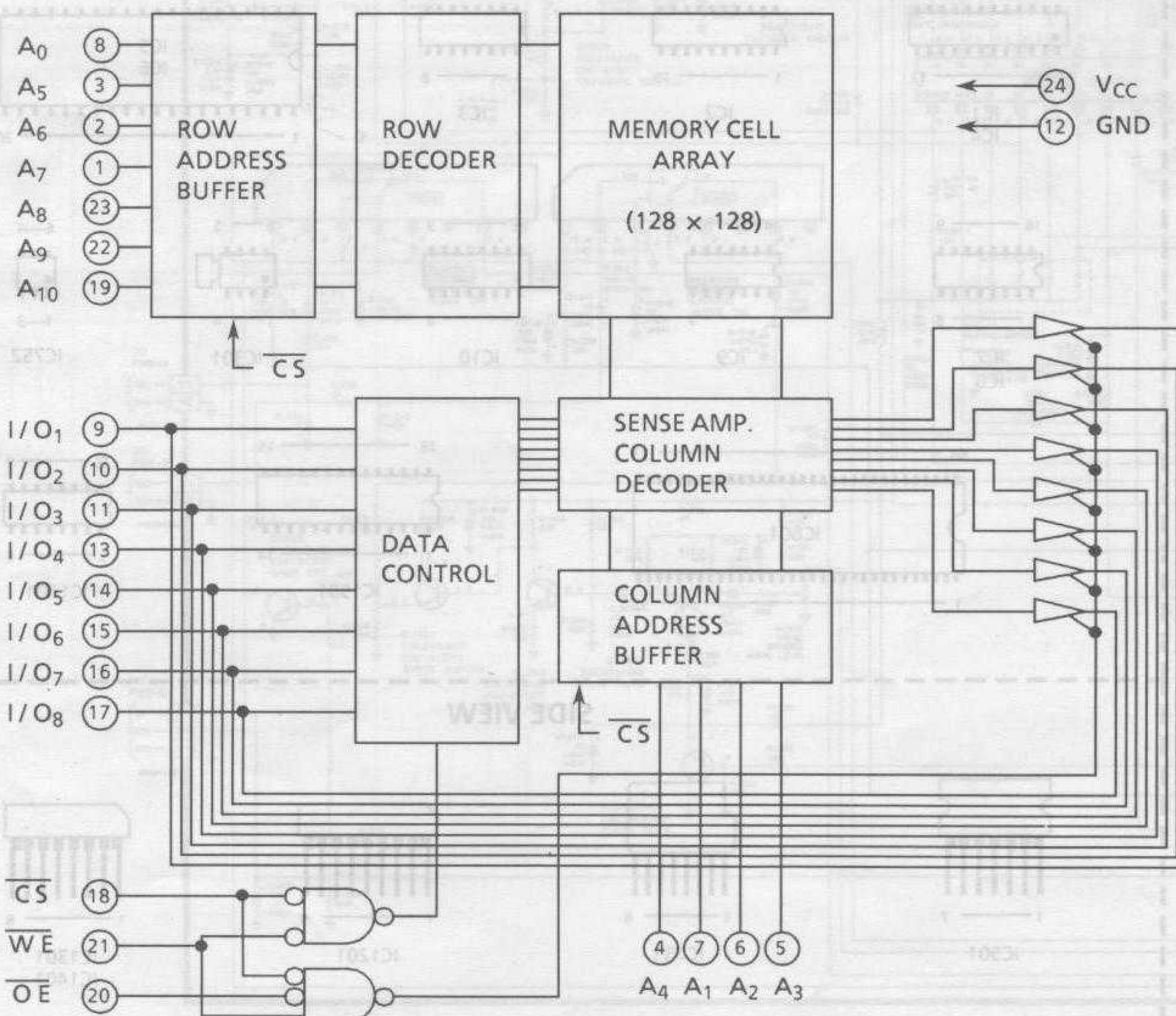
### IC1 and IC4: RH-iX1245CEZZ

#### PINS ARRANGEMENT

Pin	Function
A <sub>0</sub> ~ A <sub>1</sub>	Address Input
CS	Chip Select
OE	Output Enable
WE	Write Enable
I/O <sub>1</sub> ~ I/O <sub>8</sub>	Data Input / Output
V <sub>CC</sub>	Power
GND	Ground

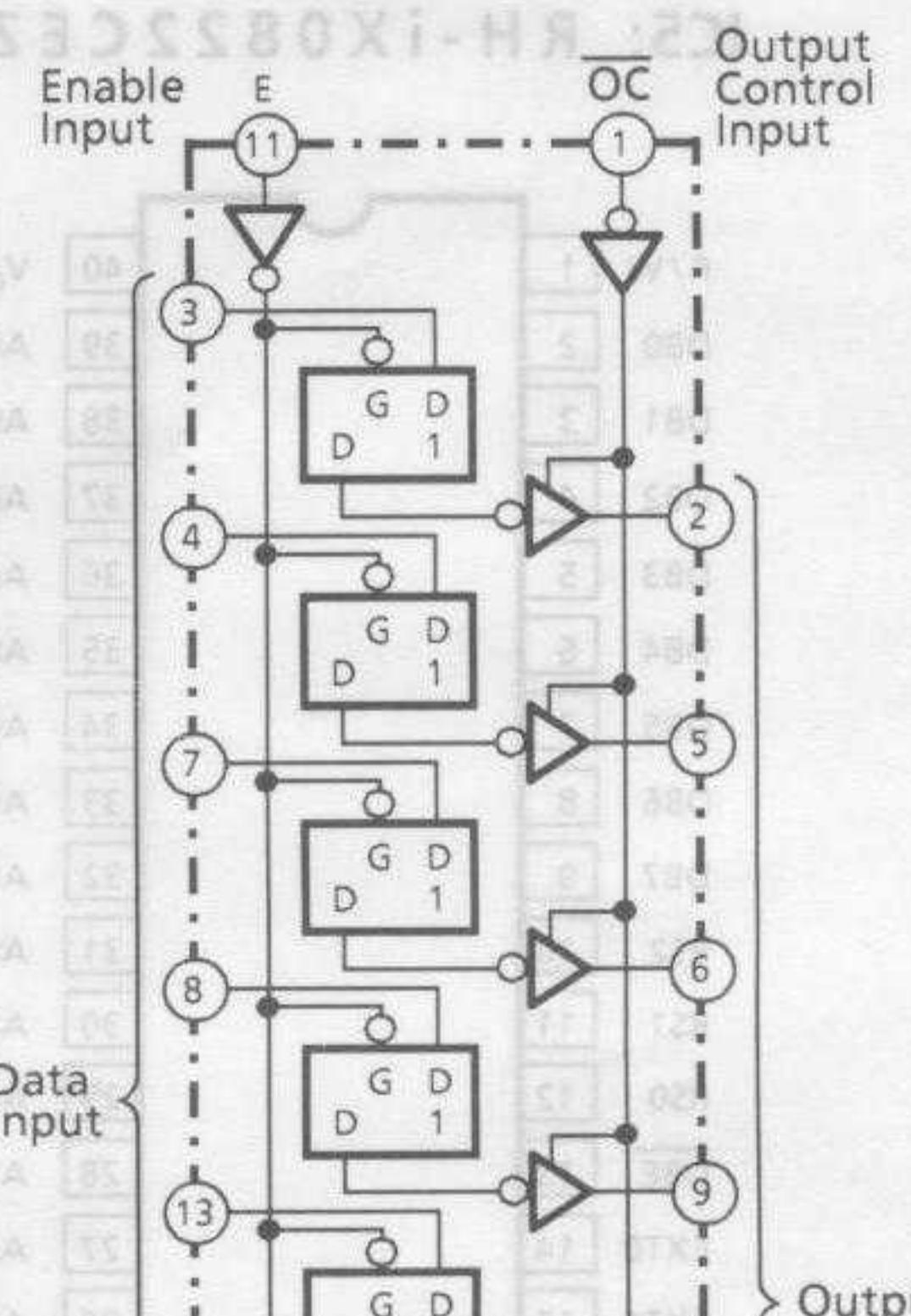
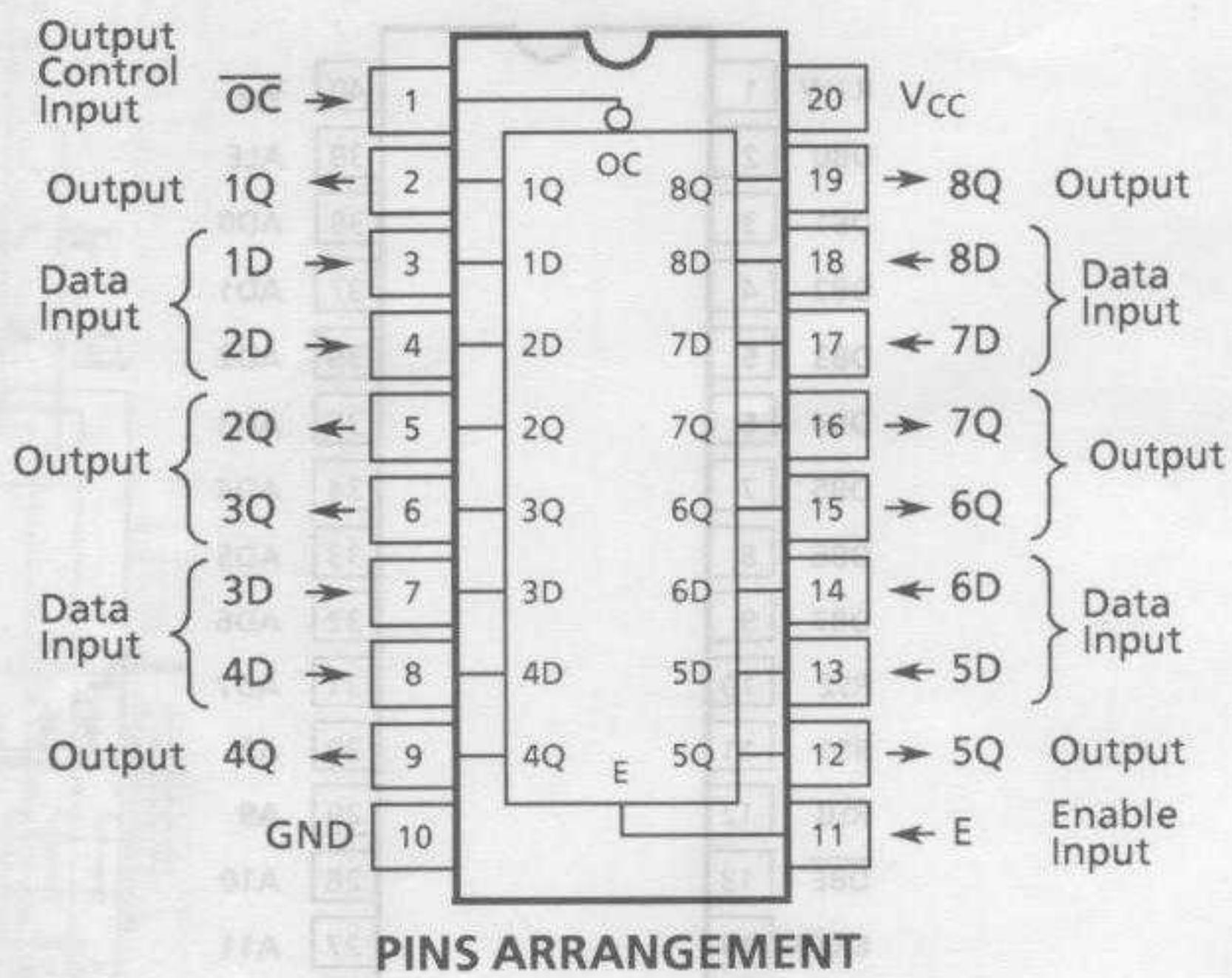
A <sub>7</sub>	1	24	V <sub>CC</sub>
A <sub>6</sub>	2	23	A <sub>8</sub>
A <sub>5</sub>	3	22	A <sub>9</sub>
A <sub>4</sub>	4	21	WE
A <sub>3</sub>	5	20	OE
A <sub>2</sub>	6	19	A <sub>10</sub>
A <sub>1</sub>	7	18	CS
A <sub>0</sub>	8	17	I/O <sub>8</sub>
I/O <sub>1</sub>	9	16	I/O <sub>7</sub>
I/O <sub>2</sub>	10	15	I/O <sub>6</sub>
I/O <sub>3</sub>	11	14	I/O <sub>5</sub>
GND	12	13	I/O <sub>4</sub>

#### BLOCK DIAGRAM

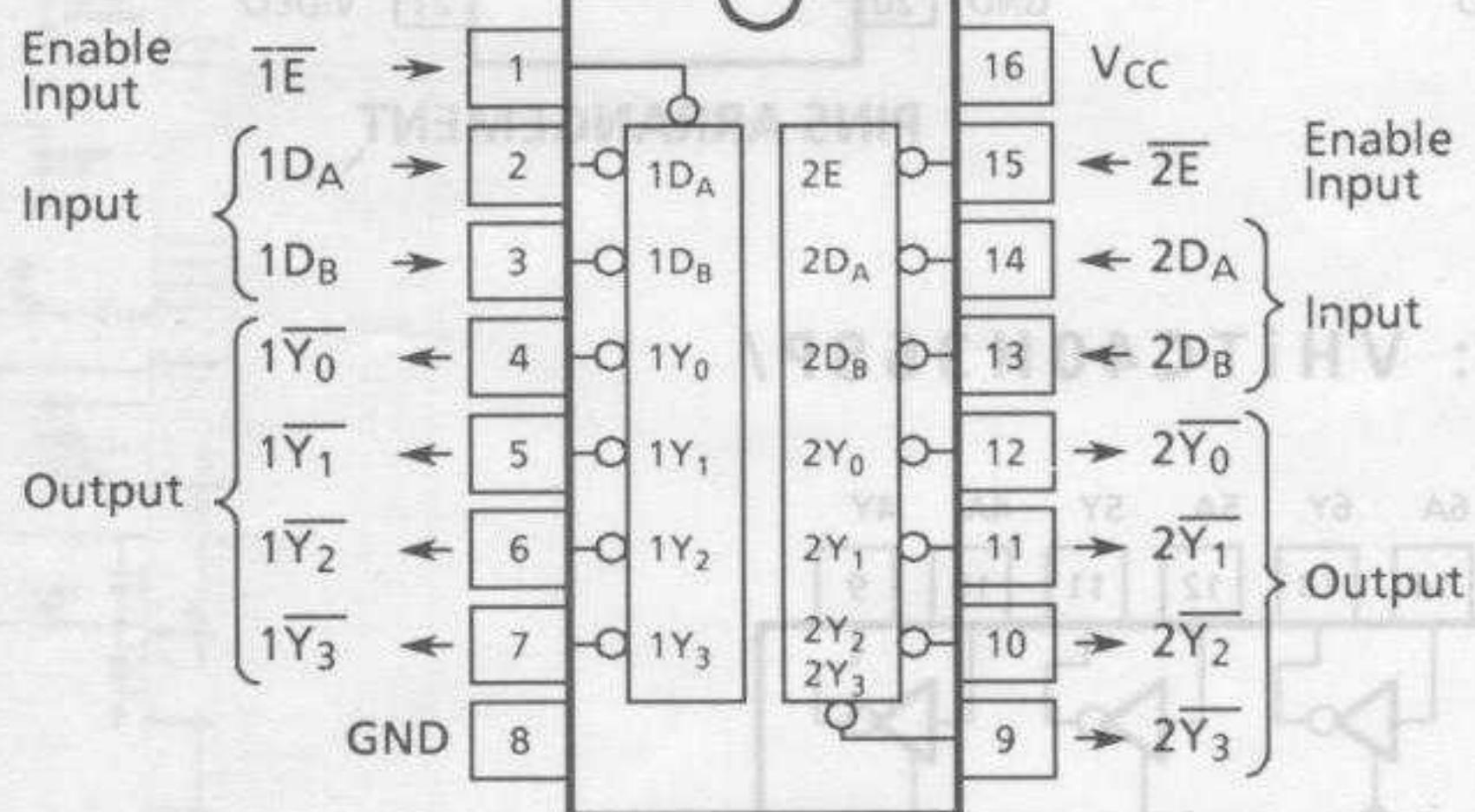


## BLOCK DIAGRAM (Continued)

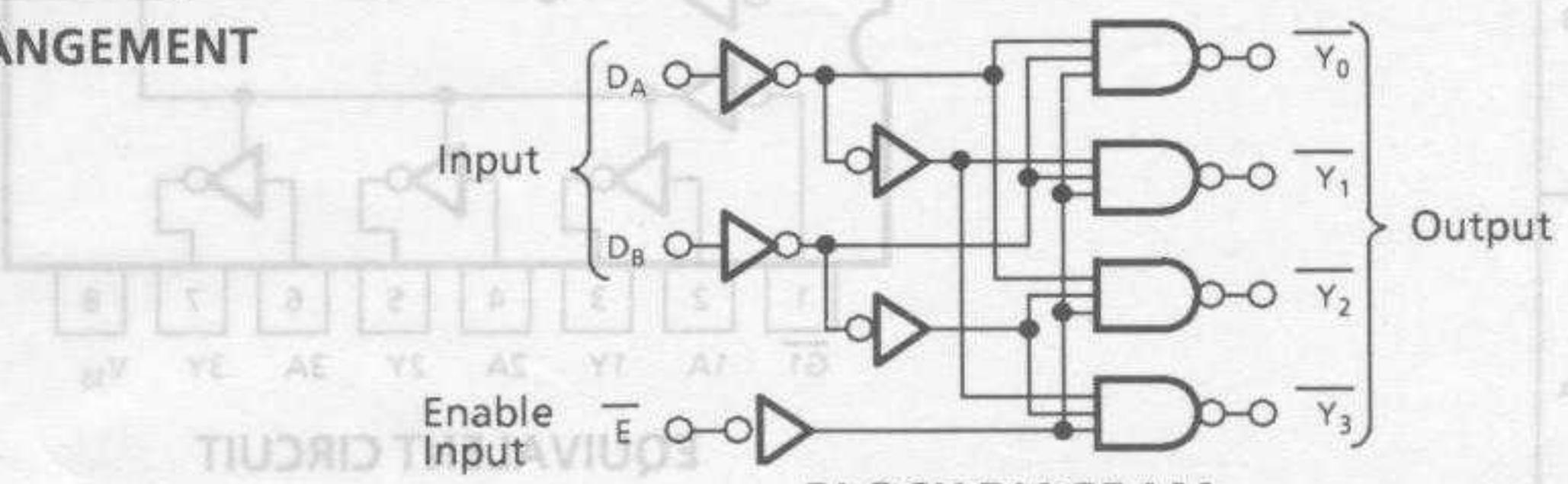
**IC2: RH-iX0666CEZZ**



**IC3: RH-iX0341CEZZ**

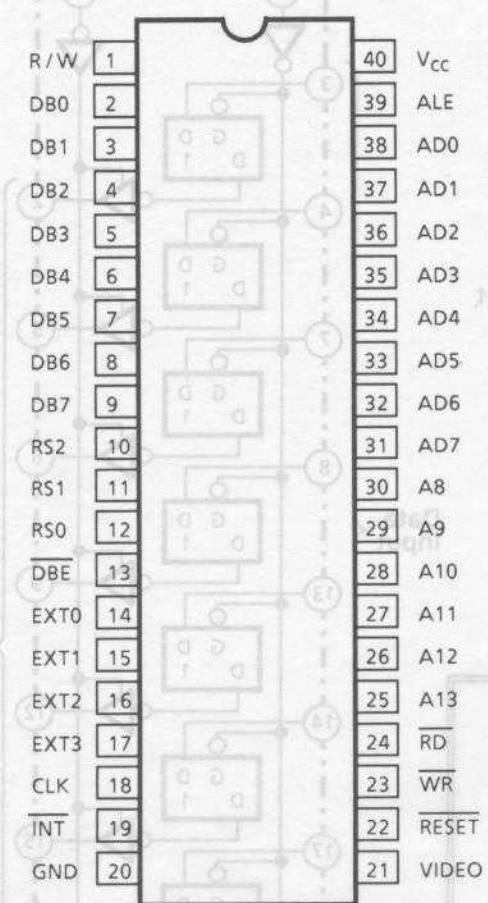


**PINS ARRANGEMENT**



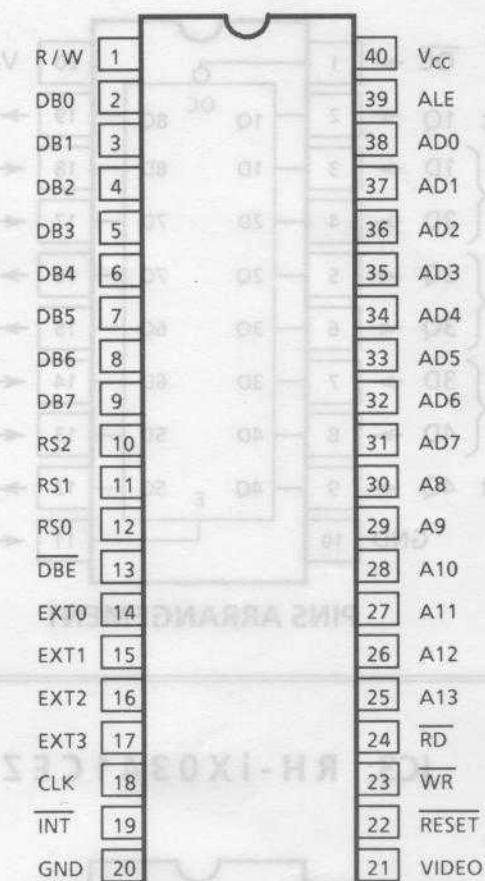
## BLOCK DIAGRAM (Continued)

**IC5: RH-iX0822CEZZ**



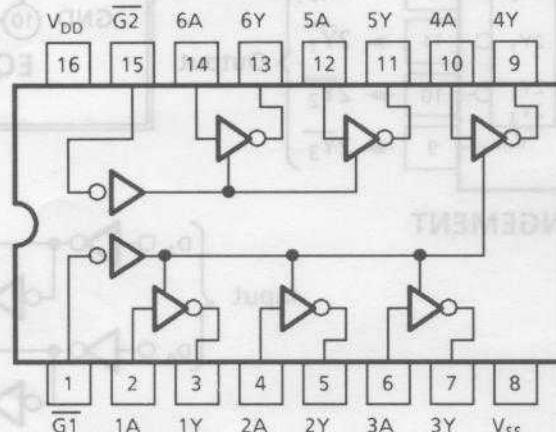
**PINS ARRANGEMENT**

**IC6: RH-iX0821CEZZ**



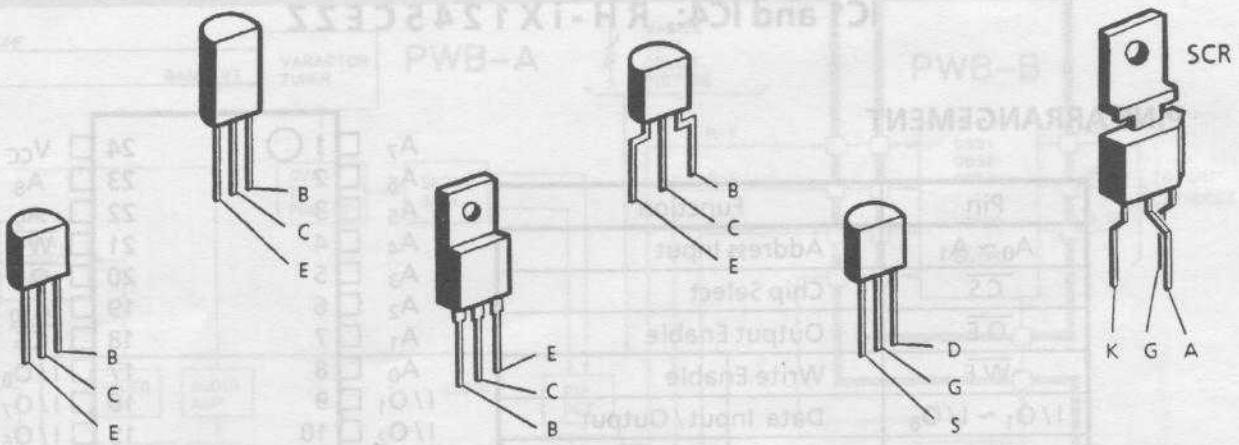
**PINS ARRANGEMENT**

**IC7 and IC8: VHITC40H368P/**

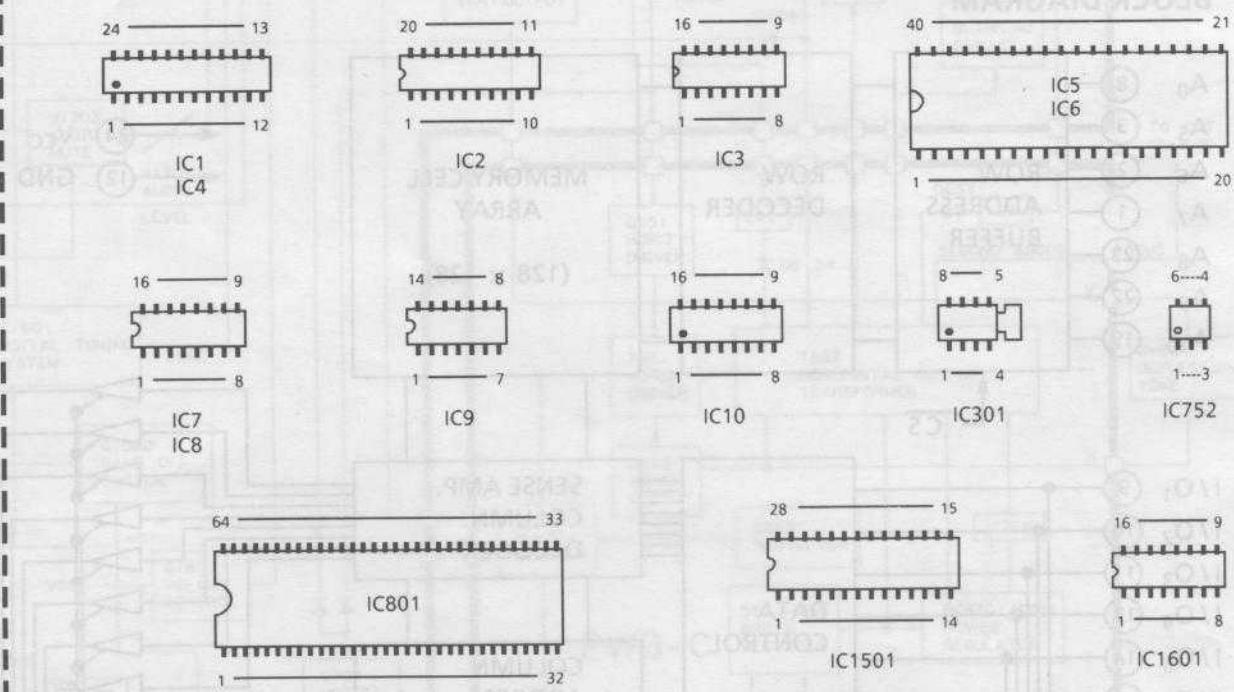


**EQUIVALENT CIRCUIT**

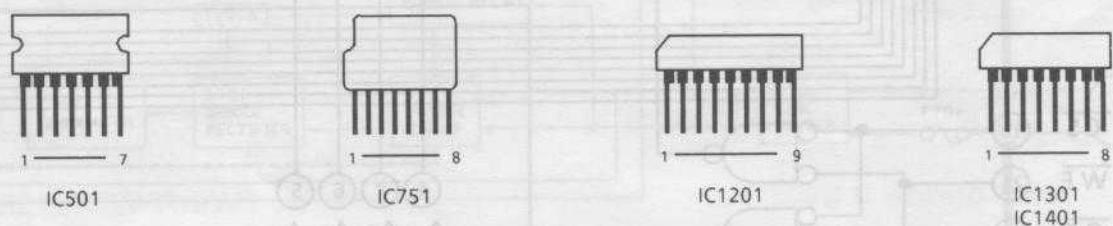
# SOLID STATE DEVICE BASE DIAGRAM



TOP VIEW



SIDE VIEW



**Memo****NOTE:**

1. The unbalance ratio of the current transformer is M:1 M
2. All resistors are 100 ohms
3. All capacitors are 100 pF
4. (G) indicates ground connection
5.  $\frac{1}{2}$  indicates half wave rectification
6.  $\downarrow$  indicates inductor

**VOLTAGE**

1. All DC voltages are connected to the common line voltage. The normal value is 110 V.
2. All voltage signals, except the output signal, are AC signals.

△ AN

▲ MA

This circuit improves the performance of the previous circuits.

# DESCRIPTION OF SCHEMATIC DIAGRAM

S-RIAM

**NOTE:**

1. The unit of resistance "ohm" is omitted (K:1000 ohms, M:1 Meg ohm).
2. All resistors are 1/8 watt, unless otherwise noted.
3. All capacitors are  $\mu\text{F}$ , unless otherwise noted P: $\mu\mu\text{F}$ .
4. (G) indicates  $\pm 2\%$  tolerance may be used.
5.  $\perp$  indicates line isolated ground.
6.  $\downarrow$  indicates hot ground.

**VOLTAGE MEASUREMENT CONDITIONS:**

1. All DC voltages are measured with AC voltmeter connected between points indicated and chassis ground, line voltage set at 120V AC and all controls set for normal picture unless otherwise indicated.
2. All voltages measured with  $1000\mu\text{V}$  B & W or Color signal,

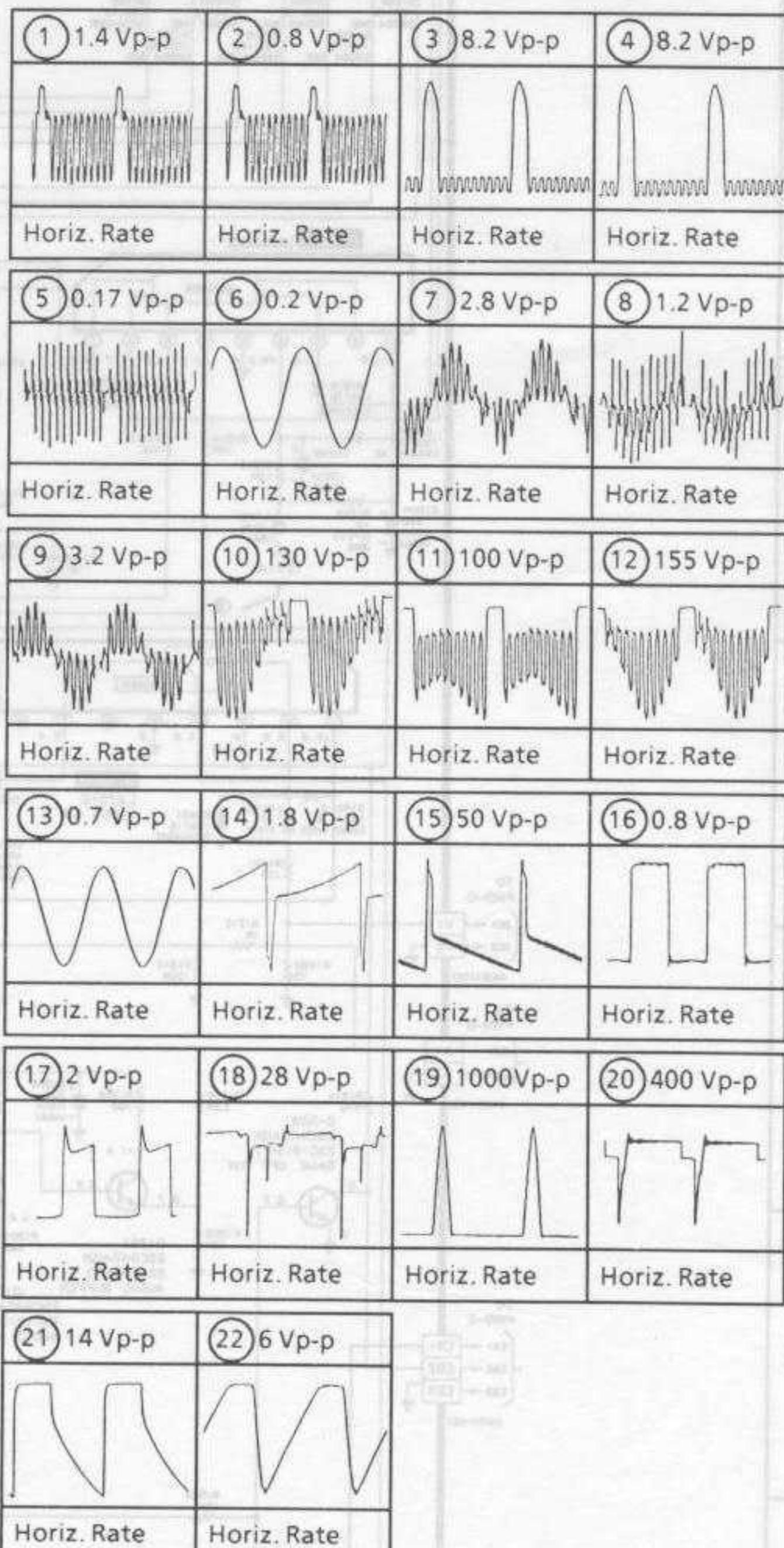
**▲ AND SHADED (■) COMPONENTS** = SAFETY RELATED PARTS.

**▲ MARK** = X-RAY RELATED PARTS.

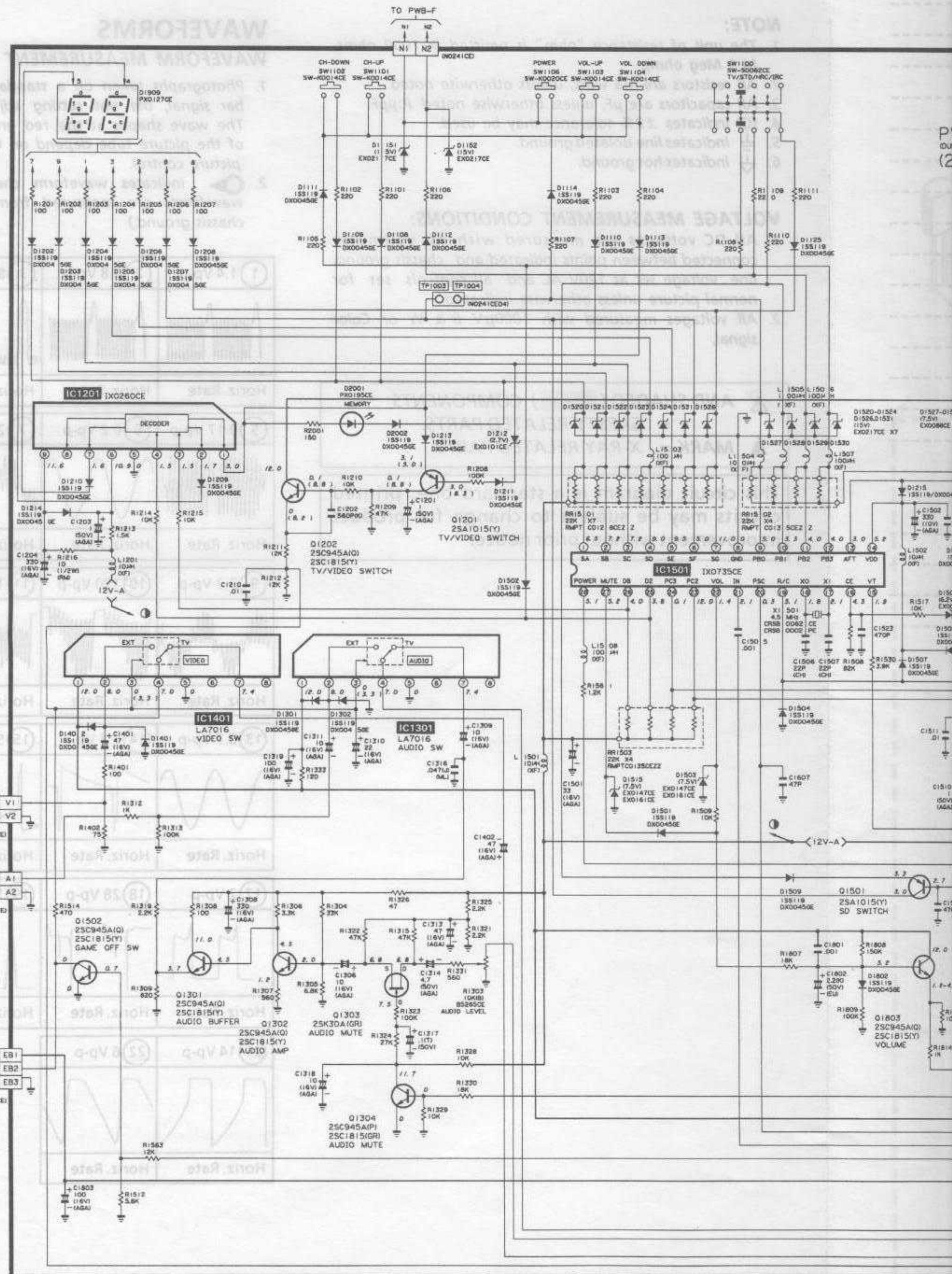
This circuit diagram is a standard one, printed circuits may be subject to change for product improvement without prior notice.

**WAVEFORMS****WAVEFORM MEASUREMENT CONDITIONS:**

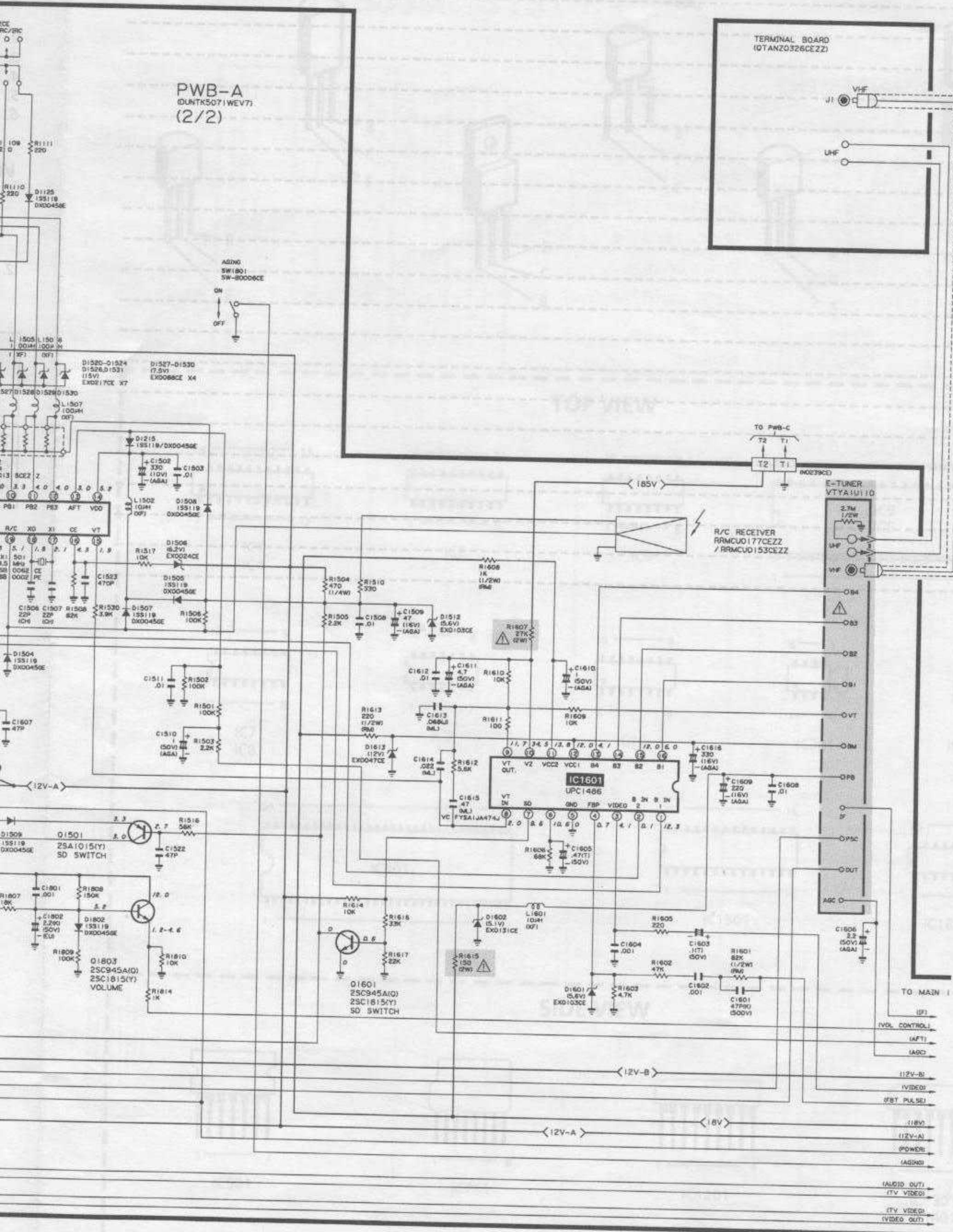
1. Photographs taken on a standard gated rainbow color bar signal, the tint setting adjusted for proper color. The wave shapes at the red, green and blue cathodes of the picture tube depend on the tint, color level and picture control.
2. indicates waveform check points (See chart, waveforms are measured from point indicated to chassis ground.)



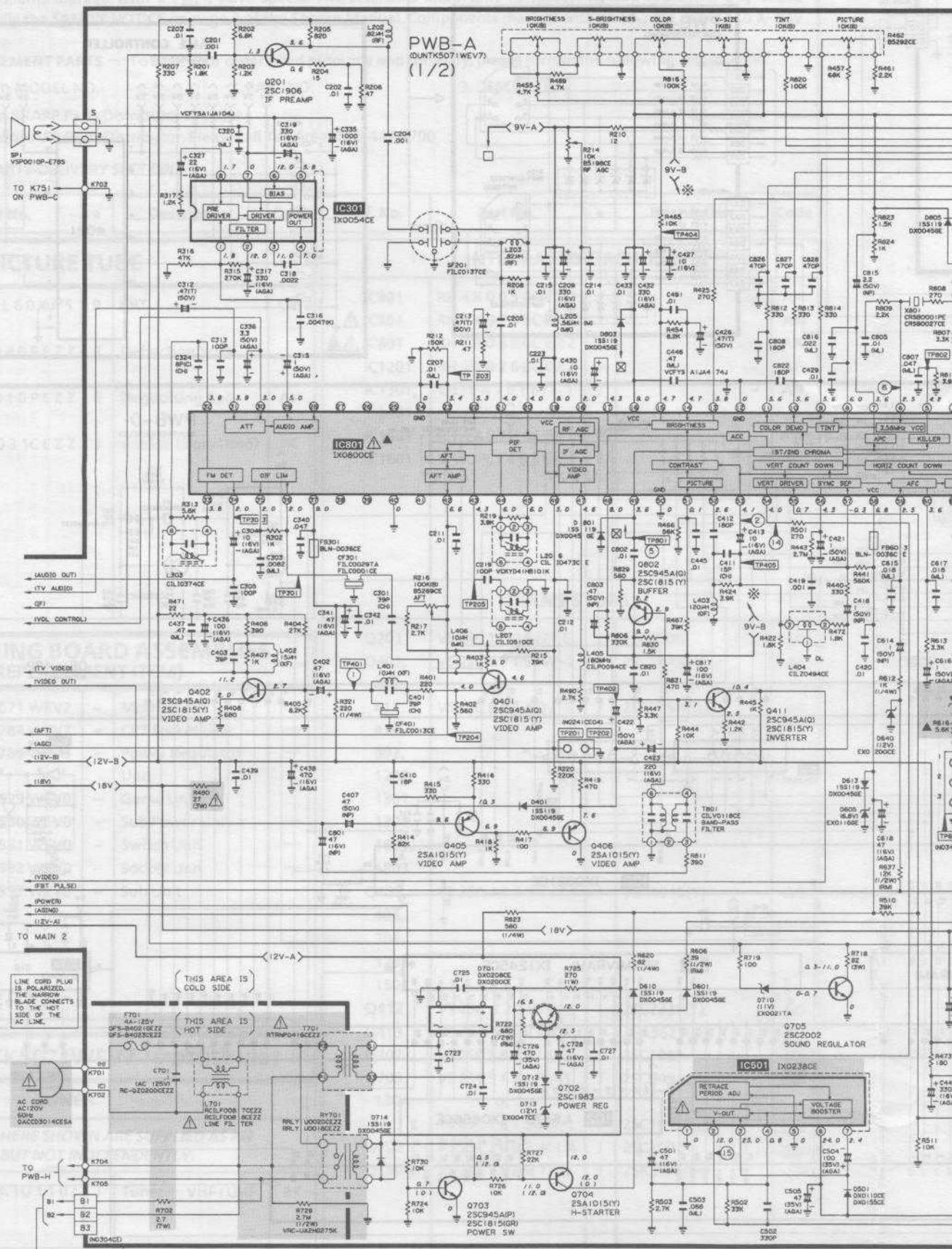
## MAIN-2 CIRCUIT



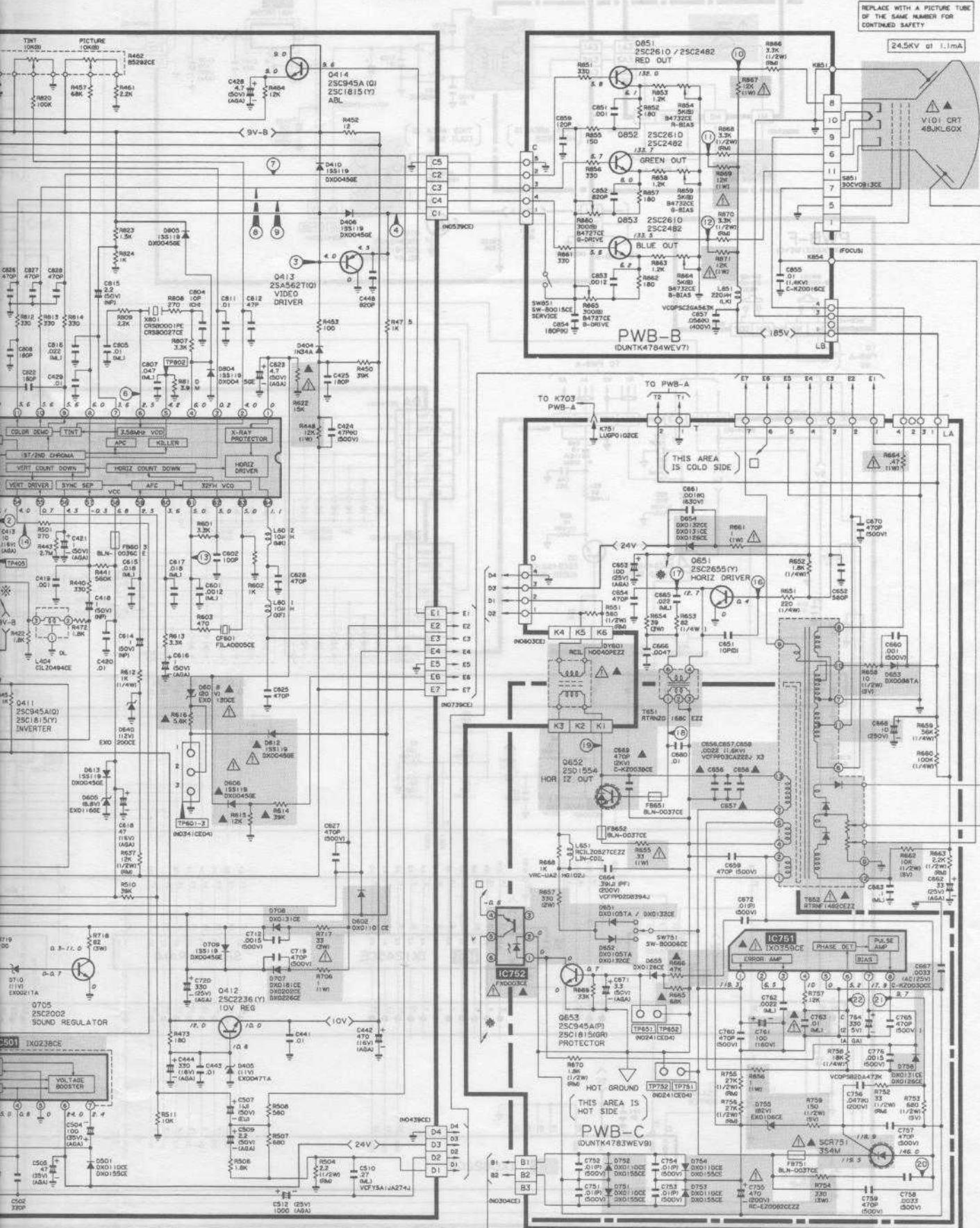
This circuit diagram is a standard one, printed circuits may be subject to change for product improvement without prior notice.



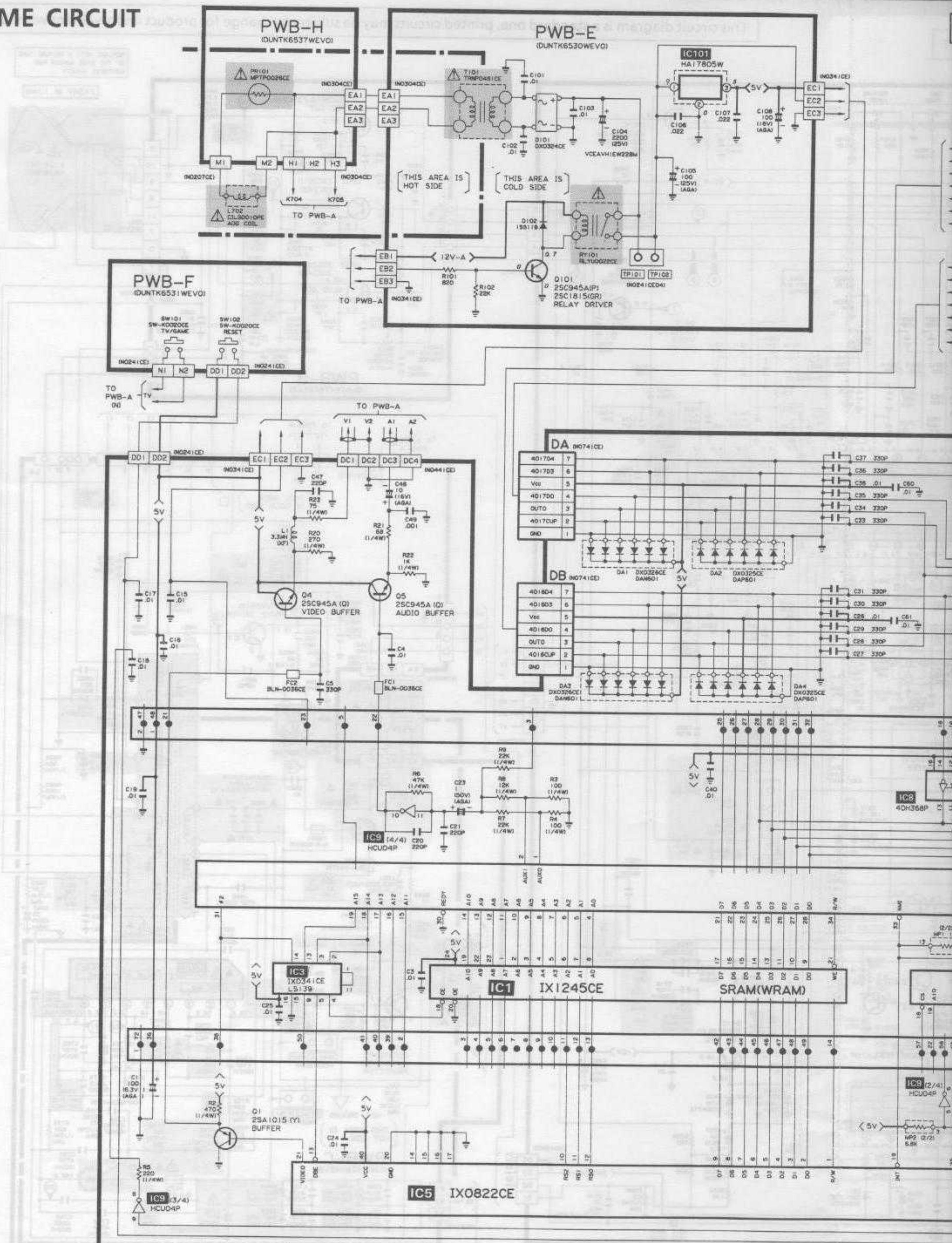
## **MAIN-1 CIRCUIT**



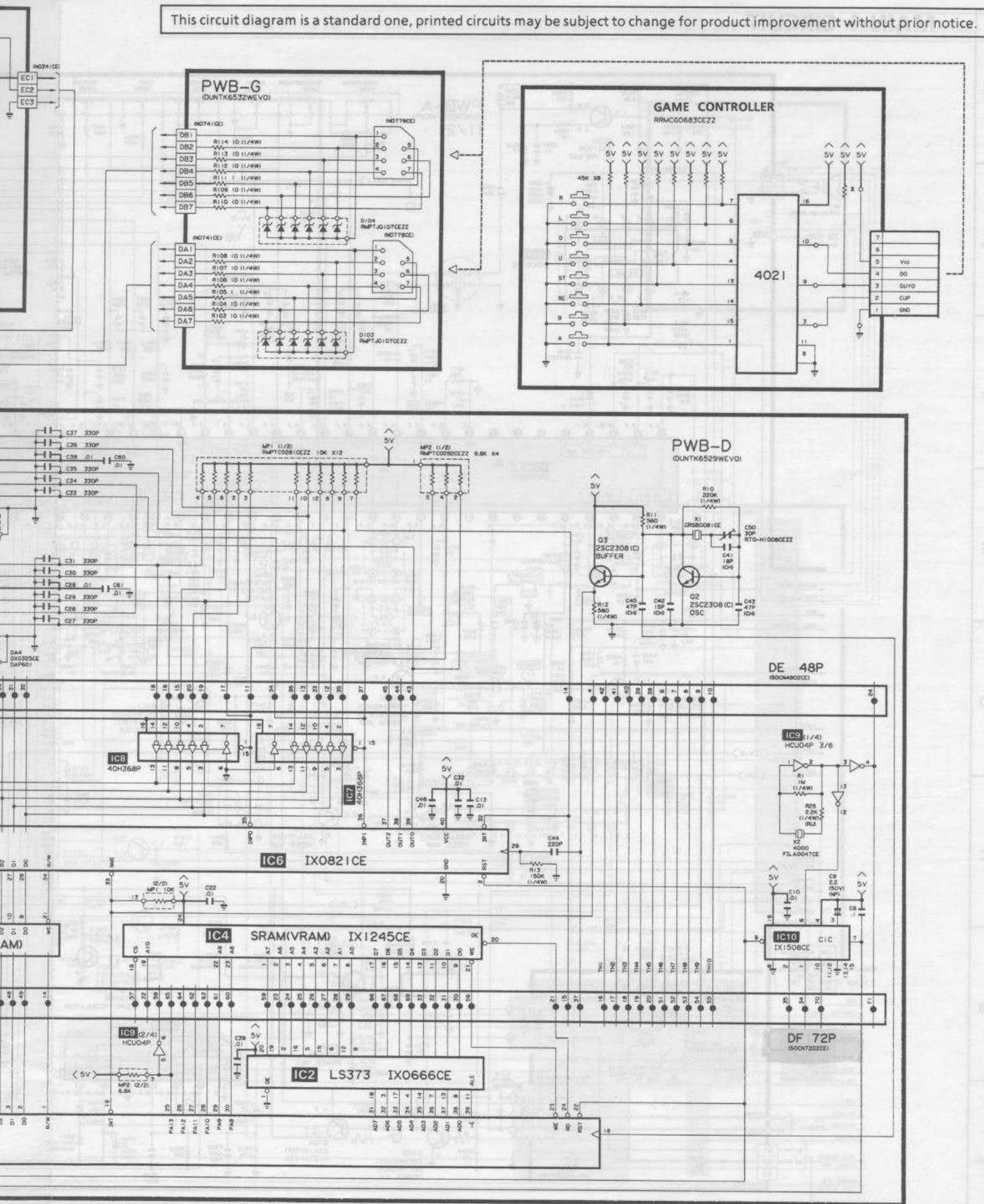
This circuit diagram is a standard one, printed circuits may be subject to change for product improvement without prior notice.



## GAME CIRCUIT



This circuit diagram is a standard one, printed circuits may be subject to change for product improvement without prior notice.



# REPLACEMENT PARTS LIST

**SAFETY NOTE** — Components marked with a (Δ) have special characteristics important to safety. Before replacing any these components, read carefully the SAFETY NOTICE on page 3 of the Service Manual. Components marked with an (▲) are related to X-Ray Protection circuit.

**HOW TO ORDER REPLACEMENT PARTS** — To have your order filled promptly and correctly, please furnish the following information:

1. MODEL NO.      2. PART NO.      3. DESCRIPTION

Contact your nearest SHARP Parts Distributor to order.

For location of SHARP Parts Distributor, Please call Toll-Free; 800-447-4700

★ MARK: SPARE PARTS-DELIVERY SECTION

Ref. No.	Part No.	*	Description	Code	Ref. No.	Part No.	*	Description	Code
<b>PICTURE TUBE</b>									
▲△ V101	VB48JKL60X/*S	R	CRT	CM	IC301	RH-iX0054CEZZ	J		AK
▲△ DY601	RCILH0040PEZZ	R	Deflection Yoke		△ IC501	RH-iX0238CEZZ	J		AK
△ L702	RCILG0010PEZZ	R	Degaussing Coil	AV	▲△ IC801	RH-iX0800CEZZ	J		AX
	PSPAG0031CEZZ	J	Wedge (3 pcs Used)	AC	IC1201	RH-iX0260CEZZ	J		AF
					IC1301, 1401	VHILA7016//1	J		AH
					IC1501	RH-iX0735CEZZ	J		AW
					IC1601	VHUPC1486C-1	J		AK
<b>PRINTED WIRING BOARD ASSEMBLIES (NOT REPLACEMENT ITEM)</b>									
PWB-A	DUNTK5071WEV7	-	Mother Unit	—	Q201	VS2SC1906//1E	J	2SC1906	AC
PWB-B	DUNTK4784WEV7	-	CRT Socket Unit	—	Q401, 402,	VS2SC1815YW-1	J	2SC1815(Y)	AB
PWB-C	DUNTK4783WEV9	-	Power Regulator Unit	—	411, 414,	or VS2SC945AQ/-1	J	2SC945A(Q)	AB
PWB-D	DUNTK6529WEV0	-	Game Unit	—	802, 1202,				
PWB-E	DUNTK6530WEV0	-	Sub Power Unit	—	1301, 1302,				
PWB-F	DUNTK6531WEV0	-	Switch Unit	—	1601, 1803				
PWB-G	DUNTK6532WEV0	-	Socket Unit	—	Q405, 406, 704,	VS2SA1015Y/1E	J	2SA1015(Y)	AC
PWB-H	DUNTK6537WEV0	-	Sub Unit	—	1201, 1501				
					Q412	VS2SC2236Y/-1	J	2SC2236(Y)	AD
					Q413	VS2SA562TO/-1	J	2SA562T(O)	AD
					Q702	VS2SC1983//2	J	2SC1983	AF
					Q703, 1304	VS2SC945AP/-1	J	2SC945A(P)	AB
						or VS2SC1815GW-1	J	2SC1815(GR)	AB
					Q705	VS2SC2002-K1A	J	2SC2002	AC
					Q1303	VS2SK30AG//2E	J	2SK30A(GR)	AD
<b>PWB-A DUNTK5071WEV7 MOTHER UNIT</b>									
<b>TUNER</b>									
<b>NOTE: THE PARTS HERE SHOWN ARE SUPPLIED AS AN ASSEMBLY BUT NOT INDEPENDENTLY.</b>									
△	VTUVTYA1U110/	J	Tuner—VHF/UHF	BK					



Ref. No.	Part No.	*	Description	Code	Ref. No.	Part No.	*	Description	Code
<b>COILS</b>									
L202, 203	VP - RFR 82K 0000	J	0.82μH	AB	C209, 317,	VCEAGA1CW337M	J	330 16V Electrolytic	AC
L205	VP - MKR 56M 0000	J	0.56μH	AB	319,				
L206	RCiLi0473CEZZ	J	PIF Detector	AD	432,				
L207	RCiLi0510CEZZ	J	AFT	AF	444,				
L303	RCiLi0374CEZZ	J	Sound Detector	AD	1204,				
L401, 601, 1201, 1501, 1502, 1601	VP - XF100K 0000	J	10μH	AB	1308, 1616				
L402	VP - XF150K 0000	J	15μH	AB	C335	VCEAGA1CW108M	J	1000 16V Electrolytic	AD
L403	VP - OF121K 0000	J	120μH	AC	C407, 801	VCE 9AA1CW476M	J	47 16V (N.P.) Electrolytic	AC
L404	RCiLZ0494CEZZ	J	Delay Line	AH	C418, 614	VCE 9AA1HW105M	J	1 50V (N.P.) Electrolytic	AB
L405	RCiLP0094CEZZ	J	180MHz Filter	AB	C423, 1609	VCEAGA1CW227M	J	220 16V Electrolytic	AC
L406, 602	VP - MK100K 0000	J	10μH	AB	C424, 1601	VCC SPA 2HL 470 K	J	47p 500V Ceramic	AA
△ L701	RCiLF0087CEZZ or RCiLF0088CEZZ	J	Line Filter	AL	C438, 442	VCEAGA1CW477M	J	470 16V Electrolytic	AC
L1503   1508	VP - XF101K 0000	J	100μH	AK AB	C504	VCEAGA1VW107M	J	100 35V Electrolytic	AC
					C505	VCEAGA1VW476M	J	47 35V Electrolytic	AB
					C512	VCEAGA1EW108M	J	1000 25V Electrolytic	AD
					C627, 719	VCK YPA 2HB 471K	J	470p 500V Ceramic	AA
					△ C701	RC - QZ 020 DCEZZ	J	0.1 AC125V UL Spec.	AE
					C712	VCK YPA 2HB 152 K	J	0.0015 500V Ceramic	AA
CF301	RFiLC0029TAZZ or RFiLC0001CEZZ	J	Sound Take-Off	AD	C720	VCEAGA1EW337M	J	330 25V Electrolytic	AC
CF401	RFiLC0013CEZZ	J	4.5MHz Trap	AE	C726	VCEAGA1VW477M	J	470 35V Electrolytic	AD
CF601	RFiLA0005CEZZ	J	503kHz	AF	C803	VCE9 AA1HW474M	J	0.47 50V (N.P.) Electrolytic	AC
<b>FILTERS</b>									
SF201	RFiLC0137CEZZ	J	Surface Acoustic Wave Filter	AH	C815	VCE9 AA1HW225M	J	2.2 50V (N.P.) Electrolytic	AB
CF301	RFiLC0029TAZZ or RFiLC0001CEZZ	J	Sound Take-Off	AD	C817, 1319, 1803	VCEAGA1CW107M	J	100 16V Electrolytic	AB
CF401	RFiLC0013CEZZ	J	4.5MHz Trap	AE	C1502	VCEAGA1AW337M	J	330 10V Electrolytic	AB
CF601	RFiLA0005CEZZ	J	503kHz	AF					
<b>TRANSFORMERS</b>									
△ T701 T801	RTRNP0416CEZZ RCiLV0118CEZZ	J	Power Transformer Band Pass Filter	AV AD					
<b>CONTROLS</b>									
R214	RVR - B 5198CEZZ	J	10k(B) RF-AGC	AC					
R216	RVR - B 5269CEZZ	J	100k(B) AFT	AB					
R462	RVR - B 5292CEZZ	J	10k(B) Brightness/ 10k(B) Sub-Bright./ 10k(B) Color/ 1k(B) Vert. Size/ 10k(B) Tint/ 10k(B) Picture	AK					
R1303	RVR - B 5265CEZZ	J	10k(B) Audio Level	AB					

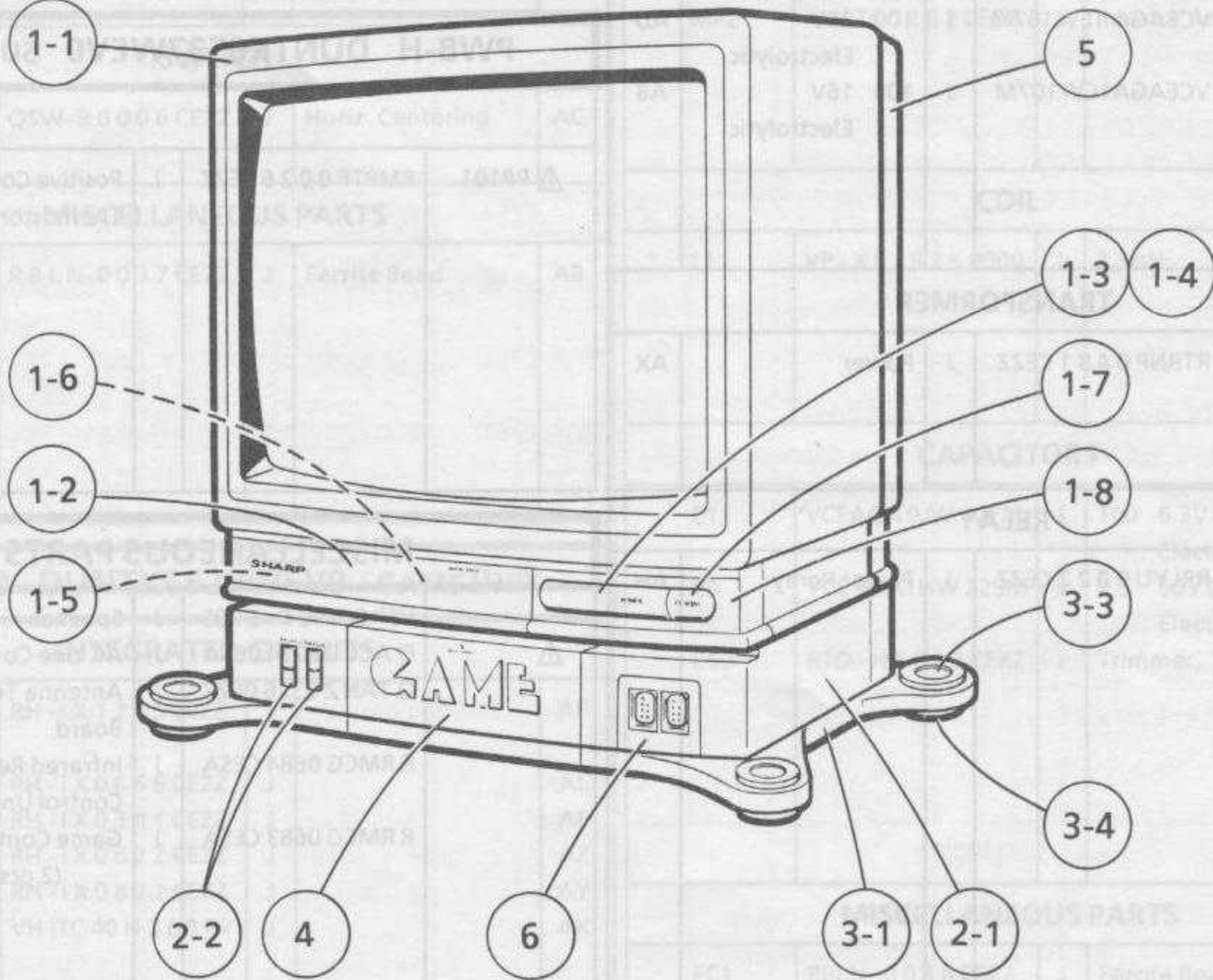
Ref. No.	Part No.	*	Description	Code	Ref. No.	Part No.	*	Description	Code
<b>RESISTORS</b>									
▲ R448	VRS-VV3AB123J	J	12k 1W Oxide Film	AA	Q851, 852, 853	VS2SC2482 // -1 or VS2SC2610 / -1E	J	2SC2482 2SC2610	AD AD
▲ R480	VRS-VV3LB270J	J	27 3W Oxide Film	AB					
▲ R614	VRD-RA2BE393J	J	39k 1/8W Carbon	AA					
▲ R615	VRD-RA2BE123J	J	12k 1/8W Carbon	AA					
▲ R616	VRD-RA2BE562J	J	5.6k 1/8W Carbon	AA					
▲ R622	VRD-RA2BE153J	J	15k 1/8W Carbon	AA					
▲ R702	VRW-KV3NC2R7K	J	2.7 7W Cement	AC					
▲ R706	VRN-VV3AB1R0J	J	1 1W Metal Coating	AA					
▲ R717	VRS-VV3LB330J	J	33 3W Oxide Film	AB					
R718	VRS-VV3LB820J	J	82 3W Oxide Film	AB					
R725	VRS-VV3AB271J	J	270 1W Oxide Film	AA					
▲ R729	VRC-UA2HG275K	J	2.7M 1/2W Solid	AA					
▲ R1607	VRS-VV3DB273J	J	27k 2W Oxide Film	AA					
▲ R1615	VRS-VV3DB151J	J	150 2W Oxide Film	AA					
RR1501	RM PTC0128CEZZ	J	22k x 7 Resistor Array	AB					
RR1502, 1503	RM PTC0135CEZZ	J	22k x 4 Resistor Array	AB					
<b>SWITCHES AND RELAY</b>									
SW1100	QSW-S0062CEZZ	J	TV/STD/HRC/IRC	AG	▲ R867, ▲ 869, ▲ 871	VRS-VU3AB123J	J	12k 1W Oxide Film	AA
SW1101, 1102, 1103, 1104	QSW-K0014CEZZ	J	Channel Up, Channel Down, Volume Up, Volume Down	AC					
SW1106	QSW-K0020CEZZ	J	Power	AD					
SW1801	QSW-B0006CEZZ	J	Aging	AC					
▲ RY701	RR LYU0020CEZZ or RR LYU0018CEZZ	J	Power Relay	AK					
				AL					
<b>MISCELLANEOUS PARTS</b>									
▲ F701	QFS-B4023CEZZ or QFS-B4021GEZZ	J	Fuse — 4A 125V AC	AC	S851	QSOCV0913CEZZ	J	Socket — CRT	AK
	QFS HD1002CEZZ	J	Fuse Holder — F701 (2 used)	AD AA					
FB301, 603	RBLN-0036CEZZ	J	Ferrite Bead	AB					
	RRMCU0177CEZZ or RRMCU0153CEZZ	J	Remote Control Receiver	AN AR					
<b>PWB-B DUNTK4784WEV7 CRT SOCKET UNIT</b>									
<b>TRANSISTORS</b>									
<b>COIL</b>									
					L851	VP-LK221K0000	J	220μH	AC
<b>CONTROLS</b>									
					R854 859, 864 R860, 865	RVR-B4732CEZZ RVR-B4727CEZZ	J	5k(B) Red Bias, Green Bias, Blue Bias 300(B) Green Drive, Blue Drive	AC AC
<b>CAPACITORS</b>									
					C855 C857	RC-KZ0016CEZZ VCQ-PSC2GA563K	J	0.01 1.4kV Ceramic 0.056 400V Polypro Film	AC AB
<b>RESISTORS</b>									
<b>SWITCH</b>									
					SW851	QSW-B0015CEZZ	J	Service (Cut-off)	AC
<b>MISCELLANEOUS PART</b>									

Ref. No.	Part No.	*	Description	Code	Ref. No.	Part No.	*	Description	Code
<b>PWB-C DUNTK4783WEV9 POWER REG. UNIT</b>									
<b>INTEGRATED CIRCUITS</b>									
▲△ IC751 ▲△ IC752	RH-iX0359CEZZ RH-FX0003CEZZ	J		AL AK	C653	VCEAGA1EW 107M	J	100 25V Electrolytic	AD
<b>TRANSISTORS</b>									
Q651 △ Q652 Q653	VS 2SC 2655 Y/-1 VS 2SD 1554 //1E VS 2SC 945A P/-1 or VS 2SC 1815 GW-1	J	2SC2655 2SD1554 2SC945A(P) 2SC1815(GR)	AE AL AB AB	▲△ C656, ▲△ 657, ▲△ 658 C659, 757, 759, 760, 765 C660 C661 C664 △ C667 △ C668 ▲△ C669 C670 C672, 751 754 △ C755 C756 C758 △ C761 ▲△ C763 C764 C776	VCF PPD 3CA 222 J VCF PPD 2 DB 394 J RC-KZ 0030 CEZZ VCEAAA 2EW 106M RC-KZ 0038 CEZZ VCK YPU 2HB 471 K VCK YPB 2HE 103 P RC-EZ 0082 CEZZ VCQ PSB 2DA 473 K VCK YPA 2HB 332 K VCEAAH2CW 107M VCQYSH 1HM 103 K VCEAGA1EW 337M VCK YPA 2HB 152 K	J J J J J J J J J J J J J J J J	0.0022 1.6kV Metallized Polyester VCK YPA 2HB 471 K Ceramic 0.001 500V Ceramic 0.001 630V Polypro Film 0.39 200V Metallized Polyester 0.0033 AC125V Ceramic 10 250V Electrolytic 470p 2kV Ceramic 470p 500V Ceramic 0.01 500V Ceramic 470 200V Electrolytic 0.047 200V Polypro Film 0.0033 500V Ceramic 100 160V Electrolytic 0.01 50V Mylar 330 25V Electrolytic 0.0015 500V Ceramic	AD AD AA AA AA AB AB AE AD AD AD AB AB AB AQ AB AB AB AB AB AB AB AA AC AA
<b>DIODES</b>									
△ D651, △ 652 △ D653 △ D654 D655 △ D751 △ D754 △ D755 △ D756 △△ SCR751	RH-DX 0105 TAZZ or RH-DX 0132 CEZZ RH-DX 0086 TAZZ RH-DX 0132 CEZZ or RH-DX 0126 CEZZ or RH-DX 0131 CEZZ RH-DX 0126 CEZZ RH-DX 0110 CEZZ or RH-DX 0155 CEZZ RH-EX 0106 CEZZ RH-DX 0131 CEZZ or RH-DX 0126 CEZZ VHS 3S4 M / LB1E	J J J J J J J J J J J J J J J J J	TVR1J EU-1A RH1S EU-1A TVR1G(TP) EU-1 TVR1G(TP) S5277G DS135C-AT Zener Diode, 82V EU-1 TVR1G(TP) Silicon Controlled Rectifier	AD AC AC AC AC AC AC AC AC AB AB AC AC AC AC AK	<b>COIL</b>				
L651	RCiLZ0527CEZZ	J	Linearity Coil	AF					
<b>TRANSFORMERS</b>									
△ T651 △△ T652	RTRNZ0168CEZZ RTRNF1482CEZZ	J	Horizontal Driver Horizontal Output	AH BD					

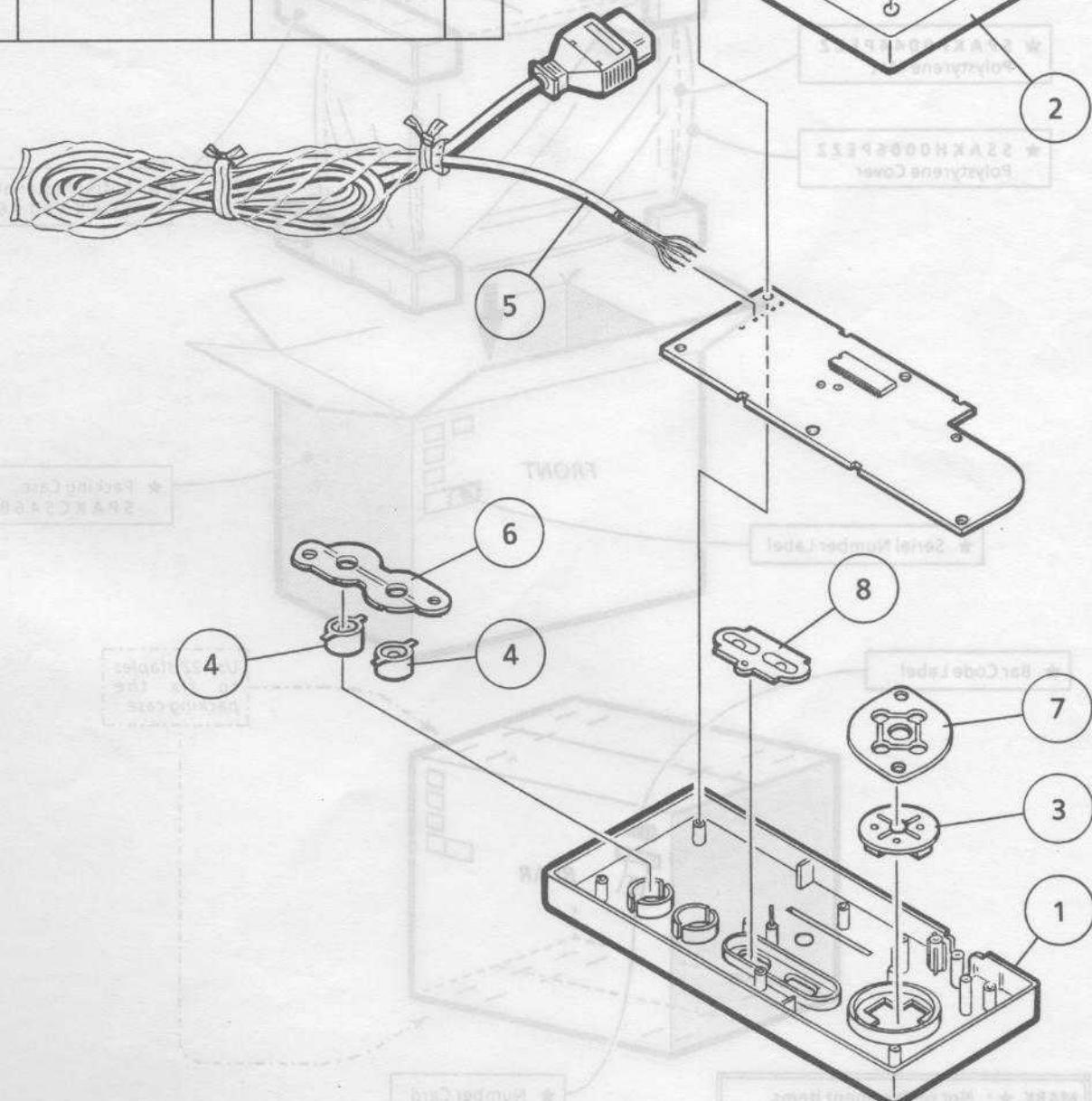
Ref. No.	Part No.	*	Description	Code	Ref. No.	Part No.	*	Description	Code
<b>RESISTORS</b>									
R654	VRS - VV3LB390J	J	39 3W Oxide Film	AB	Q1	VS 2SA1015Y/-1	J	2SA1015(Y)	AC
△ R655	VRN - VV3ABR33J	J	0.33 1W Metal Coating	AA	Q2, 3	VS 2SC2308C/-1	J	2SC2308	AB
△ R656,	VRN - VV3AB1R0J	J	1 1W Metal Coating	AA	Q4, 5	VS 2SC945AQ/-1	J	2SC945A(Q)	AB
△ 661									
△ R657	VRS - VV3DB331J	J	330 2W Oxide Film	AA					
△ R658	VRS - SV2HC100J	J	10 1/2W FR Oxide Film	AA					
△ R662	VRS - SV2HC103J	J	10k 1/2W FR Oxide Film	AA					
△ R664	VRN - VV3ABR47J	J	0.47 1W Metal Coating	AA	DA1, 3	RH-DX0326CEZZ	J	Diode Array	AK
△△ R665	VRD - RA2BE683J	J	68k 1/8W Carbon	AA	DA2, 4	RH-DX0325CEZZ	J	Diode Array	AK
△△ R666	VRD - RA2BE473J	J	47k 1/8W Carbon	AA					
△ R754	VRS - VV3LB331J	J	330 3W Oxide Film	AB					
△ R759	VRS - SV2HC151J	J	150 1/2W FR Oxide Film	AA					
<b>SWITCH</b>									
SW751	QSW-B0006CEZZ	J	Horiz. Centering	AC					
<b>MISCELLANEOUS PARTS</b>									
FB651, 652, 751	RBLN-0037CEZZ	J	Ferrite Bead	AB					
<b>PWB-D DUNTK6529WEV0 GAME UNIT</b>									
<b>INTEGRATED CIRCUITS</b>									
IC1, 4	RH-iX1245CEZZ	J		AP					
IC2	RH-iX0666CEZZ	J		AL					
IC3	RH-iX0341CEZZ	J		AF					
IC5	RH-iX0822CEZZ	J		AZ					
IC6	RH-iX0821CEZZ	J		AY					
IC7, 8	VHITC40H368P/	J		AK					
IC9	VHITCHU04P-1	J		AE					
IC10	RH-iX1508CEZZ	J		AL					
<b>TRANSISTORS</b>									
<b>DIODES</b>									
<b>PACKAGED CIRCUIT</b>									
X1	RCRSB0081CEZZ	J	Crystal	AH					
X2	RFLA0047CEZZ	J		AG					
MP1	RMPTC0281CEZZ	J	Resistor Array	AE					
MP2	RMPTC0282CEZZ	J	Resistor Array	AC					
<b>COIL</b>									
L1	VP-XF3R3K0000	J	3.3μH	AB					
<b>CAPACITORS</b>									
C1	VCEAGA0JW107M	J	100 6.3V Electrolytic	AA					
C9	VCE9AA1HW225M	J	2.2 50V (N.P) Electrolytic	AB					
C50	RTO-H1008CEZZ	J	Trimmer, 30p	AC					
<b>MISCELLANEOUS PARTS</b>									
FC1, 2	RBLN-0036CEZZ	J	Ferrite Bead	AB					

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code					
<b>PWB-E DUNTK6530WEV0 SUB POWER UNIT</b>														
<b>INTEGRATED CIRCUIT</b>														
IC101	VH1HA17805W-1	J		AD	<b>PWB-F DUNTK6531WEV0 SWITCH UNIT</b>									
<b>TRANSISTOR</b>														
Q101	VS2SC945A(P) / -1 or VS2SC1815GW-1	J	2SC945A(P) 2SC1815(GR)	AB	SW101, 102	QSW-K0020CEZZ	J	TV/GAME, RESET	AD					
<b>DIODES</b>														
D101	RH-DX0324CEZZ	J		AC	<b>PWB-G DUNTK6532WEV0 SOCKET UNIT</b>									
D102	VHD1SS119// -1	J	1SS119	AB	<b>DIODES</b>									
<b>CAPACITORS</b>														
C104	VCE AVH1EN228M	J	2200 25V Electrolytic	AE	D103, 104	RMPTJ0107CEZZ	J	Zener Diode Array	AE					
C105	VCEAGA1EW107M	J	100 25V Electrolytic	AD	<b>SOCKET</b>									
C108	VCEAGA1CW107M	J	100 16V Electrolytic	AB		QSOCN0778CEZZ	J	Socket (Game Controller)	AF					
<b>TRANSFORMER</b>														
△ T101	RTRNP0481CEZZ	J	Power	AX	<b>PWB-H DUNTK6537WEV0 SUB UNIT</b>									
<b>RELAY</b>														
△ RY101	RRLYU0022CEZZ	J	Power Relay	AH	△ PR101	RMPTP0026CEZZ	J	Positive Coefficient Thermistor	AF					
<b>MISCELLANEOUS PARTS</b>														
A-E B-E C-E D-E														
△	VSP0010P-E78S Q ACC D3014 CESA Q TANZ0326CEZZ	J	Speaker—8 ohm AC Line Cord Antenna Terminal Board	AU AH AS										
△	R RMCG0684CESA R RMCG0683CESA	J	Infrared Remote Control Unit Game Controller (2 pcs)	BX AX										

Ref. No.	Part No.	*	Description	Code	Ref. No.	Part No.	*	Description	Code
<b>CABINET PARTS</b>									
1	CCABA 2096 WEV0	R	Cabinet —Front	BV	3	CCABB 2088 WEV0	R	Cabinet Complete —Bottom (Game)	BT
1-1	Not Available	-	Cabinet —Front	-	3-1	Not Available	-	Cabinet —Bottom (Game)	-
1-2	GDORF0096 PEKA	R	Door	AP	3-2	GCOVA 0035 PEKA	R	Cover	AF
1-3	GMADT0046 PEKA	R	Window	AK	3-3	GLEGP 9001 PEKA	R	Leg, Top (4 pcs)	AE
1-4	H DECQ 0015 PESA	R	LED Decoration	AX	3-4	GLEGP 9002 PEKA	R	Leg, Bottom (4 pcs)	AF
1-5	H INDP 0026 PEKA	R	Indication Plate (in Door)	AE	4	GDORF 0093 PEKA	R	Door	AS
1-6	H INDP 0051 PEKA	R	Indication Plate (in Door)	AG	5	GCABB 2031 PEKA	R	Cabinet —Rear	BQ
1-7	J BTN -0043 PEKD	R	Button, Power	AF	6	GCOVA 0034 PEKA	R	Socket Cover	AK
1-8	H PNLC 0038 PEKJ	R	Panel	AS					
2	CCABA 2095WEV0	R	Cabinet Complete —Top (Game)	BK					
2-1	Not Available	-	Cabinet —Top (Game)	-					
2-2	J BTN -0059 PEKA	R	Button, Select	AK					



Ref. No.	Part No.	★	Description	Code
<b>RRMCG0683CESA GAME CONTROLLER</b>				
1	95J56-6106-C	J	Controller Cabinet, Top (W/ Controller Overlay)	AL
2	95J56-7578-C	J	Controller Cabinet, Bottom	AE
3	95J56-7579-A	J	Control Pad Actuator	AC
4	95J56-0899-B	J	A/B Button Actuator	AA
5	95J56-7598-C	J	Controller Cable (W/ 7P Plug)	AX
6	95J56-0900-A	J	A/B Button Contact	AD
7	95J56-8233-C	J	Control Pad Contact	AE
8	95J56-8235-A	J	Select/Start Contact	AC
9	95J56-W326-A	J	Screw, 2×8	AA



# PACKING OF THE SET

## ● Setting positions of the knobs

Brightness control	5 / 10
Color control	5 / 10
Tint control	Best position
Picture control	10 / 10
TV / CATV switch	TV
Aging switch	OFF
Cassette Holder	Release

