

 **Commodore®**

# **SERVICE MANUAL**

**1940/1942  
COLOR MONITOR**

**SEPTEMBER 1993**

## **INTERNATIONAL EDITION**

**SERVICE POLICY AND PART NUMBER INFORMATION MAY VARY ACCORDING TO COUNTRY. SOME PARTS MAY NOT BE AVAILABLE IN ALL COUNTRIES.**

### **Commodore Business Machines, Inc.**

1200 Wilson Drive, West Chester, Pennsylvania 19380 U.S.A.

Commodore makes no express or implied warranties with regard to the information contained herein. The information is made available solely on an as is basis, and the entire risk as to completeness, reliability, and accuracy is with the user. Commodore shall not be liable for any damages in connection with the use of the information contained herein. The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty as to quality or suitability of such replacement part. Reproduction or use without express permission, of editorial or pictorial content, in any matter is prohibited.

This manual contains copyrighted and proprietary information. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Commodore Electronics Limited.

Copyright © 1993 by Commodore Electronics Limited.  
All rights reserved. Printed in KOREA.

# CONTENT

SPECIFICATIONS .....	1
SAFETY PRECAUTIONS .....	2
SERVICING PRECAUTION .....	3
CONNECTOR .....	7
ADJUSTMENT CONTROLS AND INSTALLING OR REMOVING A TILT/SWIVEL STAND .....	8
TROUBLE SHOOTING HINTS .....	10
FIELD ADJUSTMENT PROCEDURE .....	19
THEORY OF OPERATION .....	21
SCHEMATIC DIAGRAM .....	36
PARTLIST .....	37

## SPECIFICATIONS

CRT	13V 90 deflection angle in-Line
CRT-Pitch	0.39mm Dot matrix (1940) 0.28mm Dot matrix (1942)
Data-area display size	260 × 186mm
Vertical frequency	47-75Hz
Horizontal frequency	15.7KHz, 27.6~31.5KHz.
Signal Input	Analog : 0.7Vp-p, RGB positive
Power input	120VAC, 60Hz 1.0A 220-240VAC, 50Hz 500mA
Dimensions	368(H) × 325(W) × 376(D)
Weight	11.4Kg
Audio(Stereo)	input : 1Vp-p output : 1W
Power Consumption	75W

## SAFETY PRECAUTIONS

**CAUTION:** No modifications of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety check and servicing guidelines.

### SAFETY CHECK

Care should be taken while serving this analog color display because of the high voltage used in the deflection circuits. These voltages are exposed in such areas as the associated flyback and yoke circuits.

### FIRE & SHOCK HAZARD

- Insert an isolation transformer between the analog color display and AC power line before servicing chassis.
- In servicing, pay attention to original lead dress especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.
- All the protective devices must be reinstalled per original design.
- Soldering must be inspected for possible cold solder points, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign material.

### IMPLOSION PROTECTION

Picture tube in this monitor employs integral implosion protection system, but care should be taken to avoid damage and scratching during installation.

Use only same type replacement picture tubes.

**IMPORTANT SAFETY NOTICE :** There are special components used in Analog color displays which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-RADIATION, shock, fire or other hazards. Do not modify the original design without getting a written permission from DAEWOO ELECTRONICS CO. or this will void the original parts and labor warranty.

### X-RADIATION

**WARNING :** The only potential source of X-Radiation is the picture tube. However when the high voltage circuitry is operating properly, there is no possibility of an X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory recommended level.

**NOTE :** It is important to use an accurate, periodically calibrated high voltage meter.

- To measure the high voltage, use a high-impedance high-voltage meter. Connect(-) to chassis and (+) to the CRT anode button.
- Turn the Contrast & Brightness control fully counterclockwise.
- Measure the high voltage. The high voltage meter should indicate the following factory recommended level.
- If the upper meter indication exceeds the maximum level, immediate service is required to prevent the possibility of premature component failure.
- To prevent X-Radiation possibility, it is essential to use the specified picture tube.
- The nominal high voltage is 24KV or below, and must not exceed 25KV at zero beam current at rated voltage.

## SERVICING PRECAUTIONS

**CAUTION:** Before servicing instruments covered by this service manual and its supplements and addendums, read and follow the SAFETY PRECAUTIONS on page 2 of this manual.

**NOTE:** If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 2 of this manual, always follow the safety precautions.  
Remember: Safety First.

### GENERAL SERVICING PRECUTIONS

1. Always unplug the AC power cord from the AC power cord from the AC Power source before:
  - a. Removing or reinstalling any component, circuit board, module, or any other instrument assembly.
  - b. Disconnecting or reconnecting any electrical plug or other electrical connection.
  - c. Connecting a test substitute in parallel with an electrolytic capacitor in the instrument.

**CAUTION:** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in at explosion hazard.

- d. Discharging the picture tube anode.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc. ) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Discharge the picture tube anode only by: (a) first connecting one end of an insulated clip lead to the degaussing or line grounding system shield at the point where the picture tube socket ground lead is connected, and then (b) touching the other end of the insulated clip lead to the picture tube anode button, using an insulating handle to avoid personal contact with high voltage.
4. Do not any spray chemicals on or any or its assemblies.
5. Unless specified otherwise in this service manual, clean electrical contacts by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable nonabrasive applicator: 10% (by volume) Aceton and 90% (by volume) isopropyl alcohol (90% - 99% strength).

**CAUTION:** This is a flammable mixture. Unless specified otherwise in this service manual, lubrication of contacts is not required.

6. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.
7. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
8. Always connect the test instrument ground lead to the appropriate instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.
9. Use only the test fixtures specified in this service manual with this instrument.

**CAUTION:** Do not connect the test fixture ground strap to any heatsink in this instrument.

## ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be damaged easily by static electricity.

Such components commonly are called Electrostatically Sensitive (ES) Devices.

Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "antistatic" can generate enough electrical charges to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate enough electrical charges to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

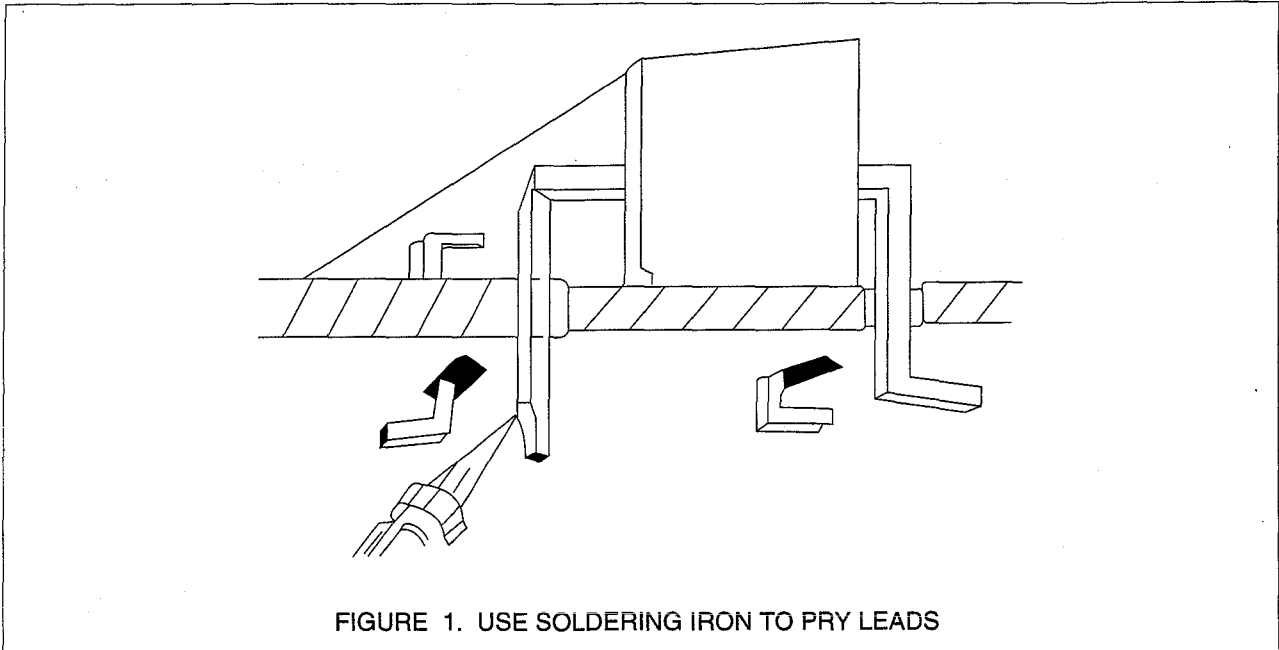
**CAUTION:** Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmful motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate enough static electricity to damage an ES device).

## GENERAL SOLDERING GUIDELINES

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within a 550°F-600°F (288°C-316°C) range.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a small wire-bristle (0.5 inch or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following soldering technique:
  - a. Allow the soldering iron tip to reach normal temperature (500°F to 600°F or 288°C to 316°C)
  - b. Hold the soldering iron tip and solder strand against the component lead until the solder melts.
  - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
  - d. Closely inspect the solder area and remove any excess or splashed solder wire-bristle brush.

**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.



## IC REMOVAL/REPLACEMENT

Some utilized chassis circuit boards have slotted holes through which the IC leads are inserted and then bent flat against the circuit foil. When holes are slotted, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 on the page under the title of general soldering guidelines.

### REMOVAL

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with desoldering braid) before removing the IC.

### REPLACEMENT

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the area).

## "SMALL-SIGNAL" DISCRETE TRANSISTOR REMOVAL/REPLACEMENT

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend the end of each of three leads remaining on the circuit board into a "U" shape.



3. Bend the replacement transistor leads into a "U" shape.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal-to-metal contact, then solder each connection.

### **Power IC, Transistor or Devices Removal/Replacement**

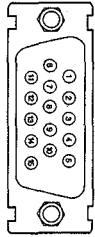
1. Heat and remove all solder from the device leads.
2. Remove the heatsink mounting screw(if applicable).
3. Insert new, device in circuit board.
4. Insert new device in circuit board.
5. Solder each device lead, and clip off excess lead.
6. Replace heatsink.

### **DIODE REMOVAL/REPLACEMENT**

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicularly to the circuit board.
3. Observing diode polarity, wrap each lead out of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect the solder joints of the two "original" leads on the circuit board copper side. If they are not shiny, reheat them and apply additional solder if necessary.

## CONNECTOR

SIGNAL CONNECTOR  
(Display Side)



PIN.NO.	SIGNAL
1	RED
2	GREEN
3	BLUE
4	NO CONNECTION
5	GND
6	RED RETURN
7	GREEN RETURN
8	BLUE RETURN
9	NO CONNECTION
10	DIGITAL GND
11	DIGITAL GND
12	NO CONNECTION
13	HORIZONTAL SYNC
14	VERTICAL SYNC
15	NO CONNECTION

## CAUTIONS FOR ADJUSTMENT AND REPAIR

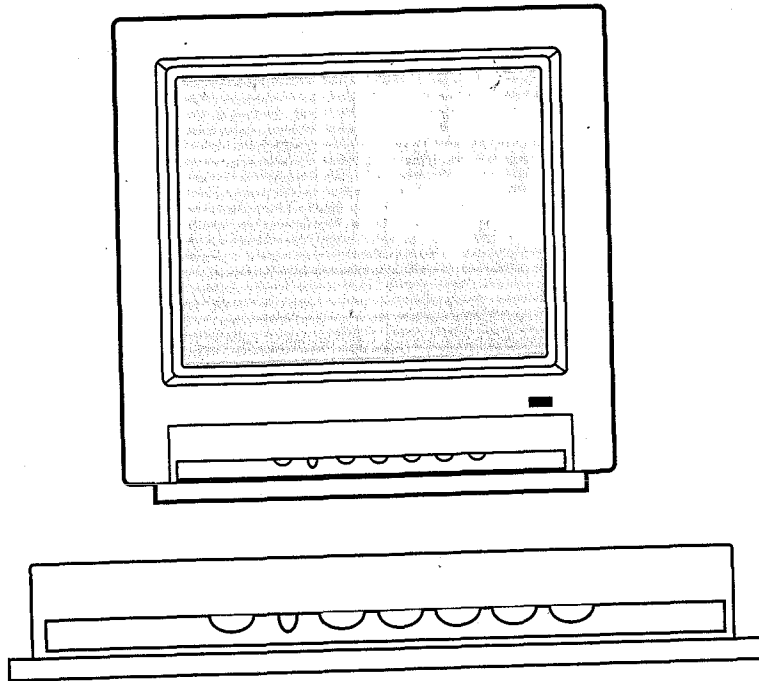
- Degaussing is always required when adjusting purity or convergence.
- Adjustment procedures at the factory use a white balance meter; procedures given in this manual rely on a visual check of white balance.
- Allow 20 minutes warm-up time for the display before checking or adjusting only electrical specification or function.
- Reform the leadwire after any repair work.

## CAUTION FOR SERVICING

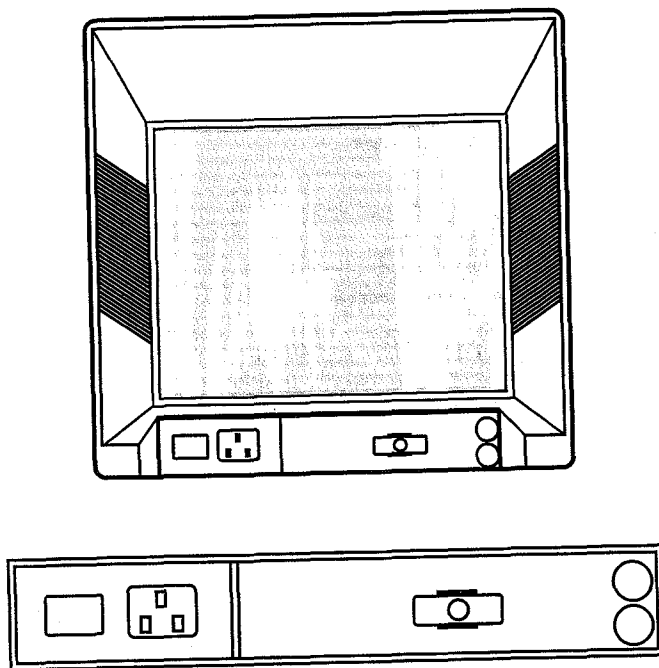
- In case of servicing or replacing CRT, high voltage sometimes remains in the anode of the CRT. Completely discharge high voltage before servicing or replacing CRT to prevent a shock to the serviceman.

# ADJUSTMENT CONTROLS AND INSTALLING OR REMOVING A TILT/SWIVEL STAND

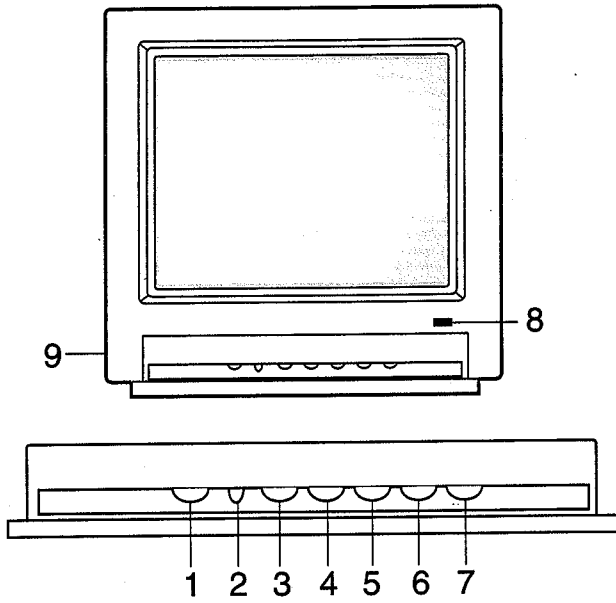
## 1. Installing the Tilt/Swivel Stand



## 2. Removing the Tilt/Swivel Stand.

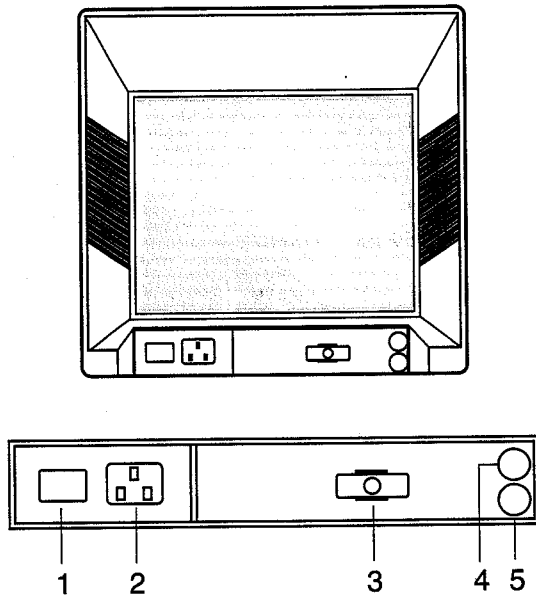


### 3. FONT MASK



1. VOLUME
2. H.WIDTH
3. VERTICAL SIZE
4. VERTICAL SHIFT
5. CONTRAST
6. BRIGHTNESS
7. H. PHASE
8. LED
9. PHONE JACK

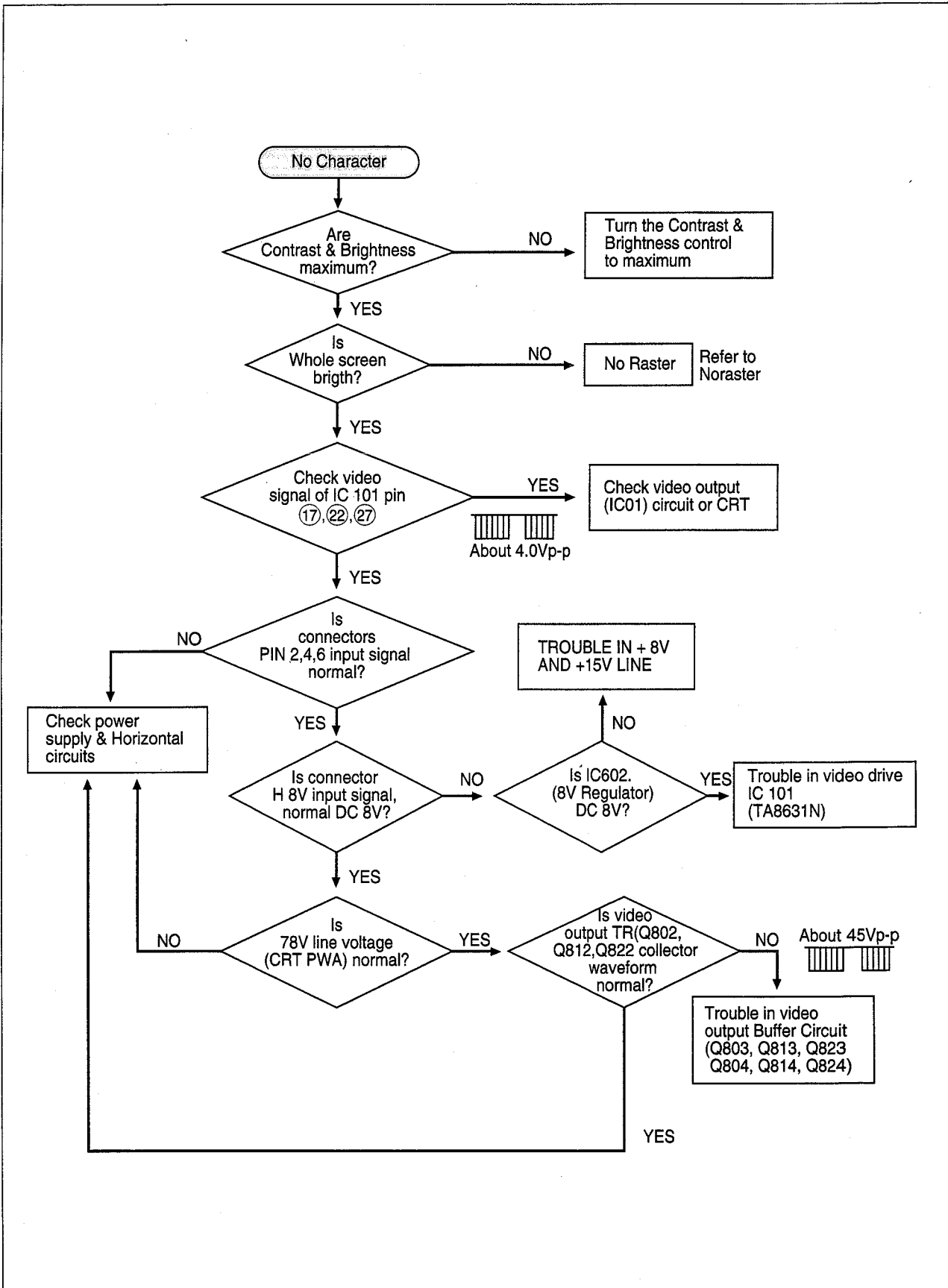
### 4. REAR COVER



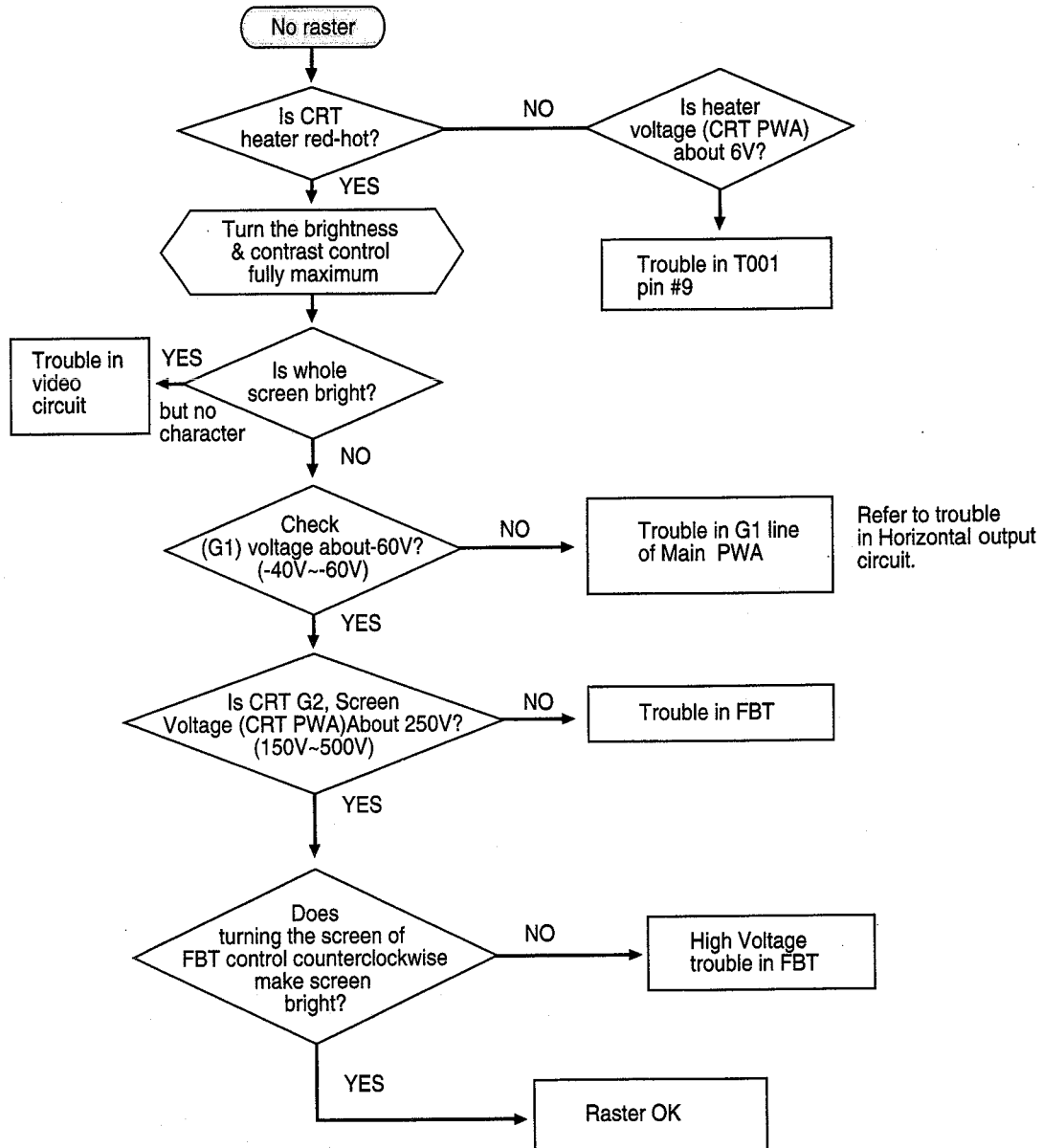
1. POWER SWITCH
2. POWER SOCKET
3. RGB CABLE
4. AUDIO-R
5. AUDIO-L

# TROUBLE SHOOTING HINTS

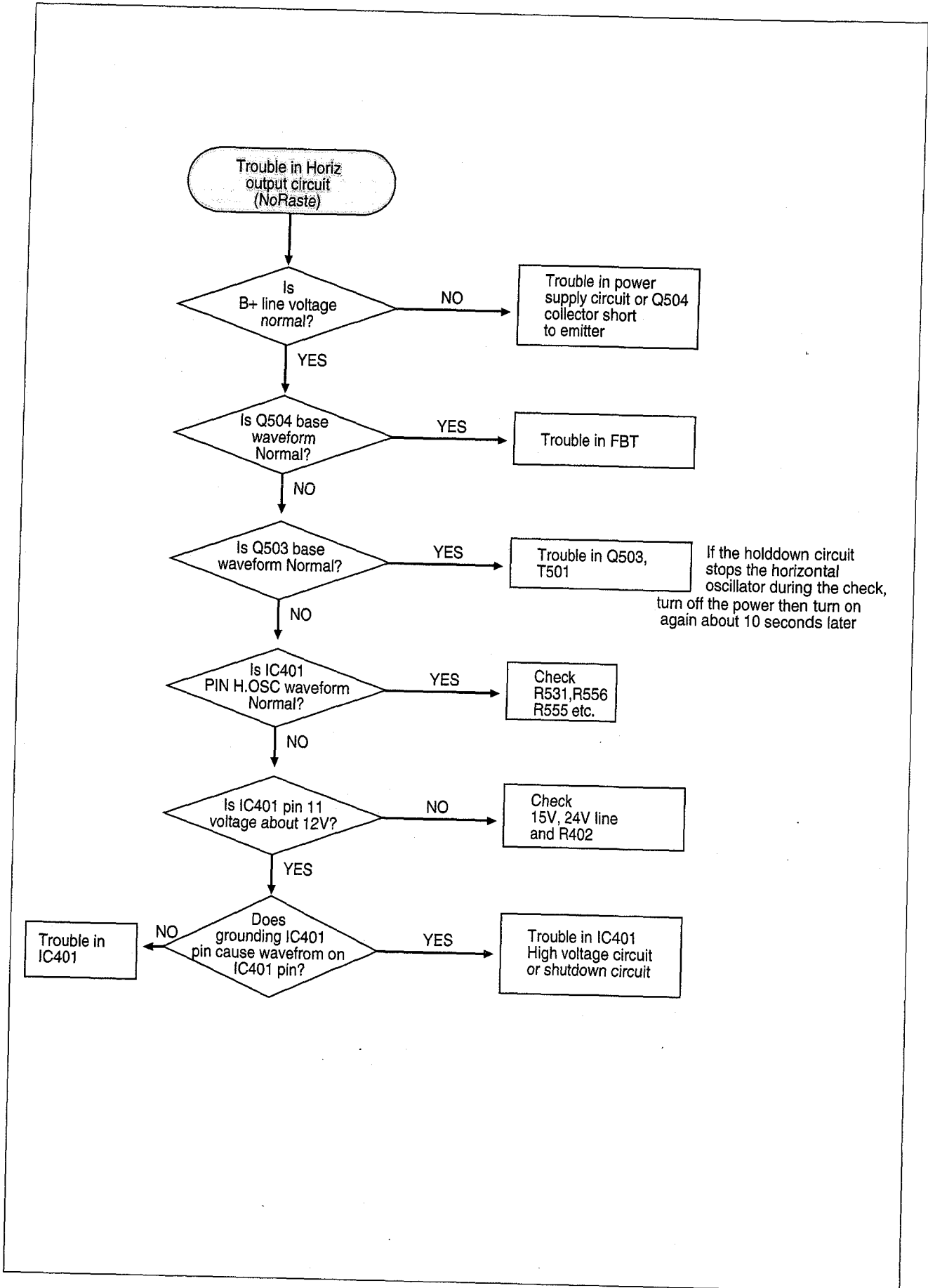
## 1. No Character



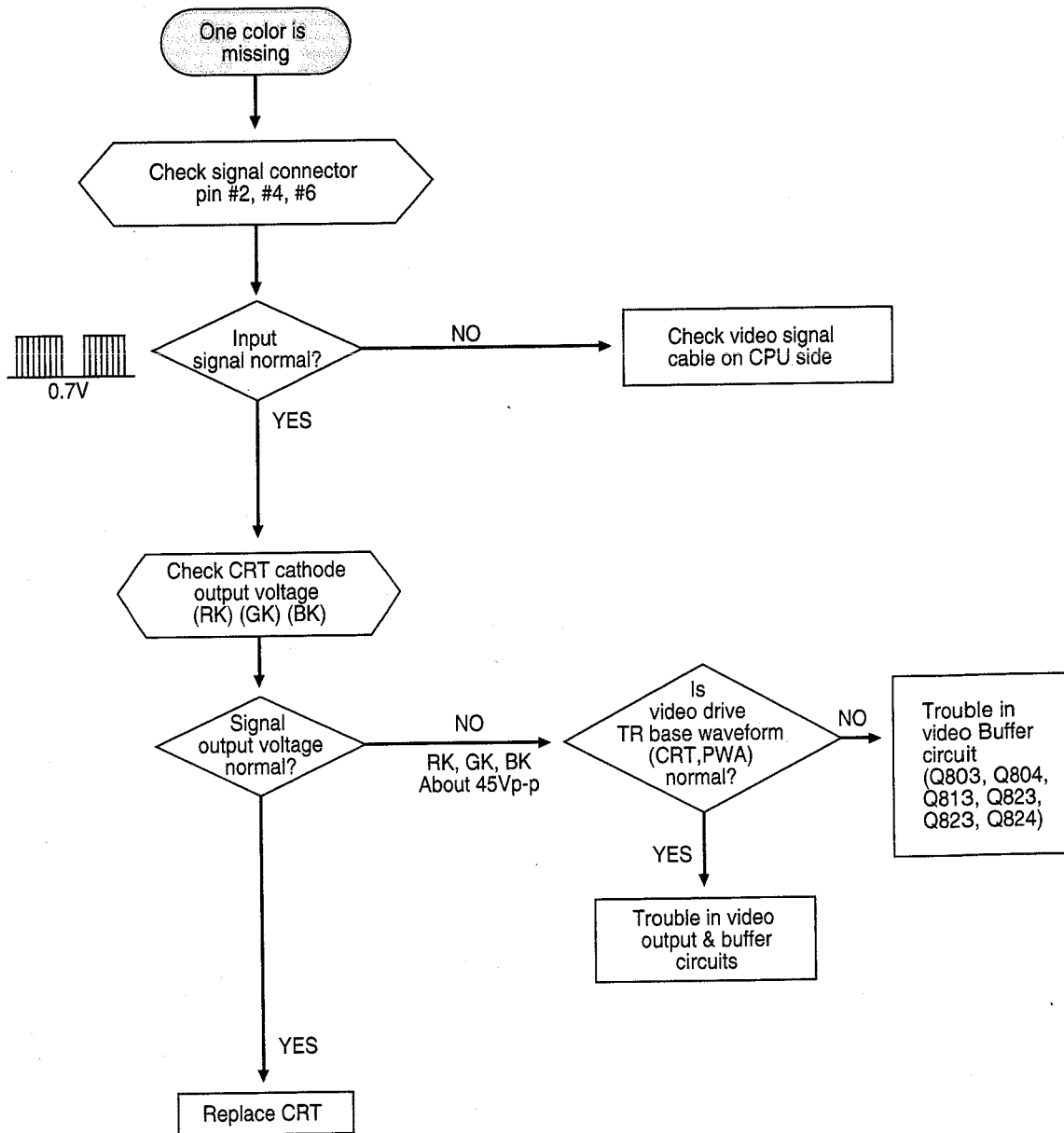
## 2. No Raster



### 3. Horizontal Output Circuit

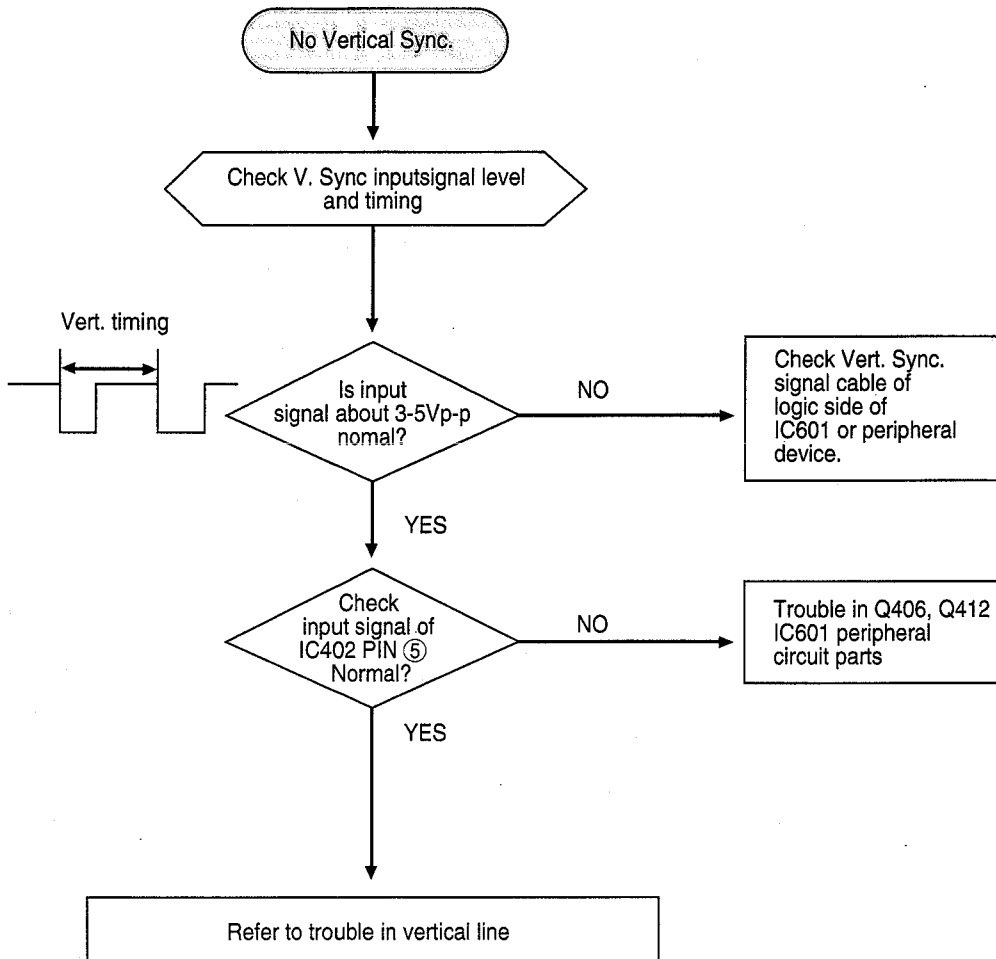


#### 4. A Missing Color

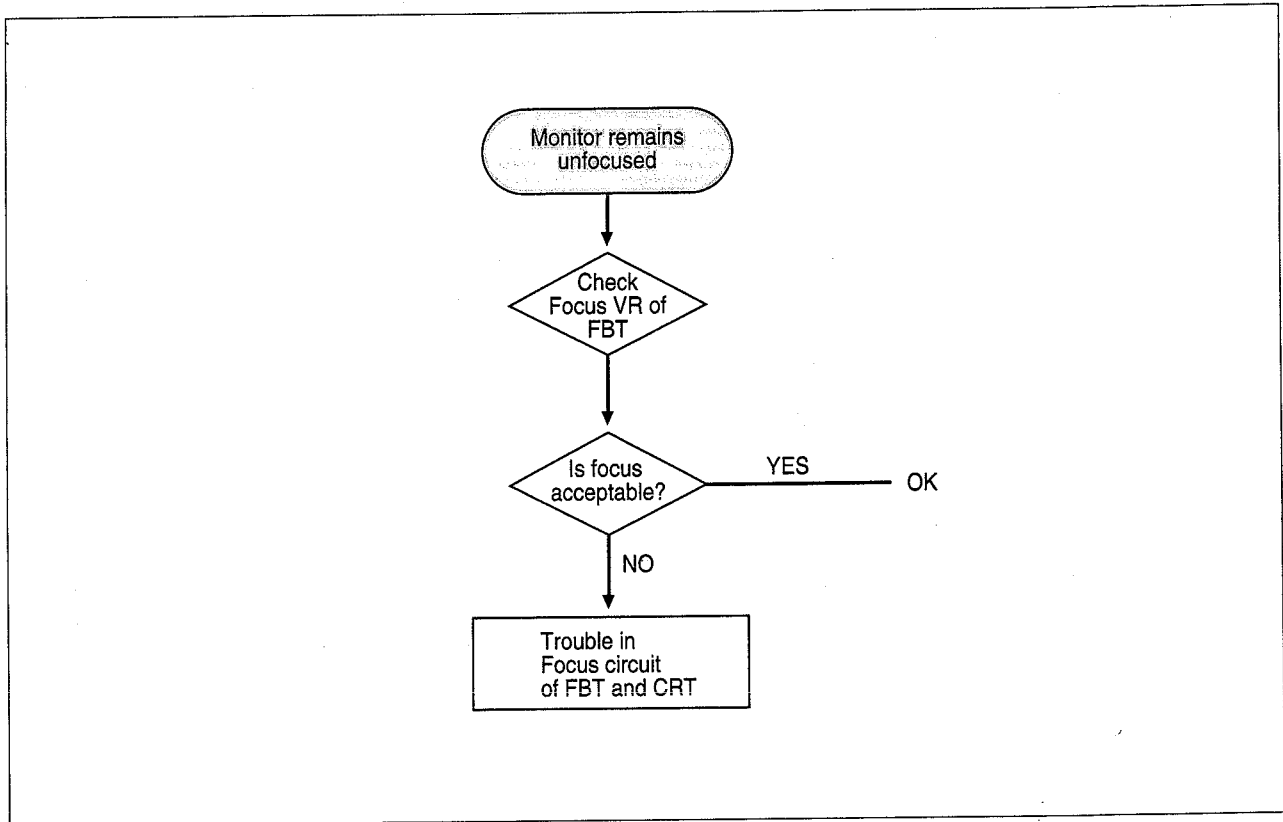




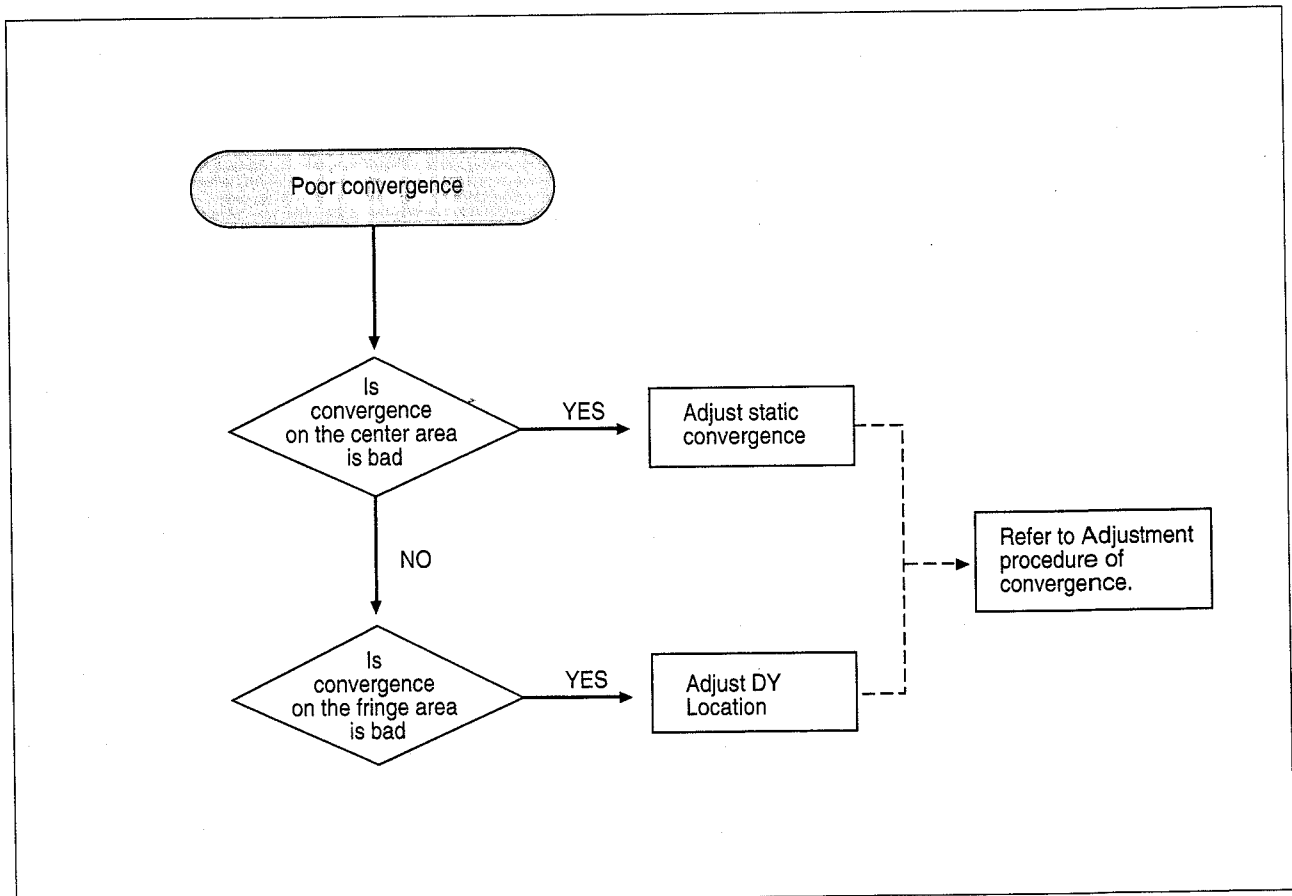
## 5.No Vertical Sync.



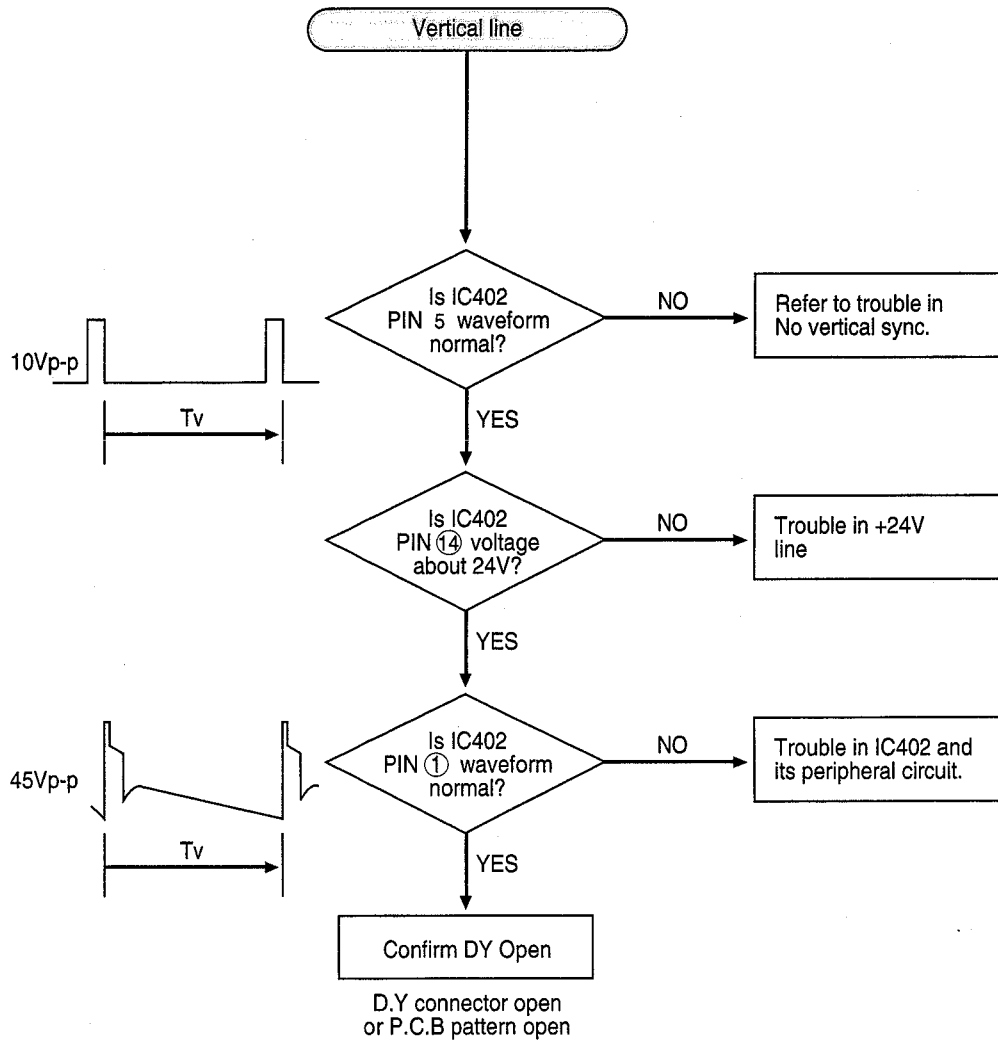
## 6.Focus



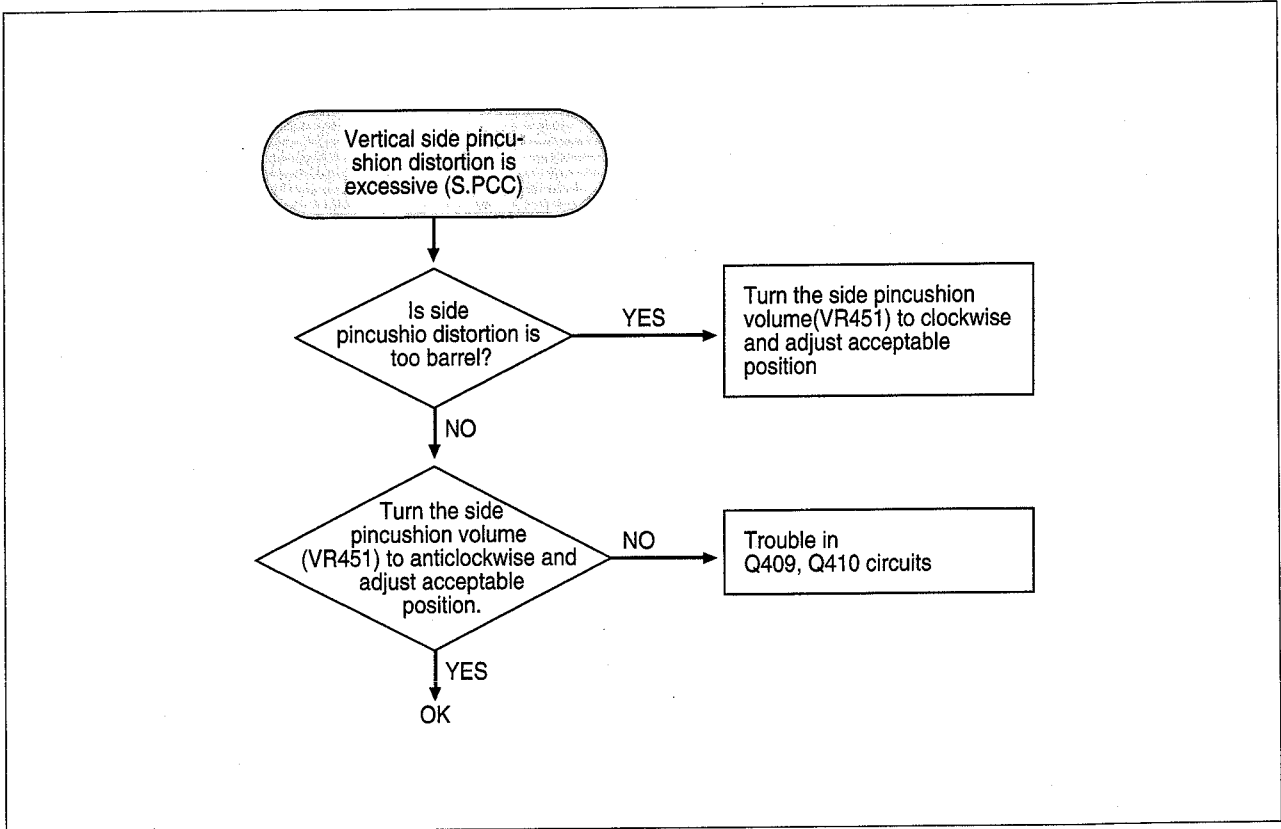
## 7. Convergence



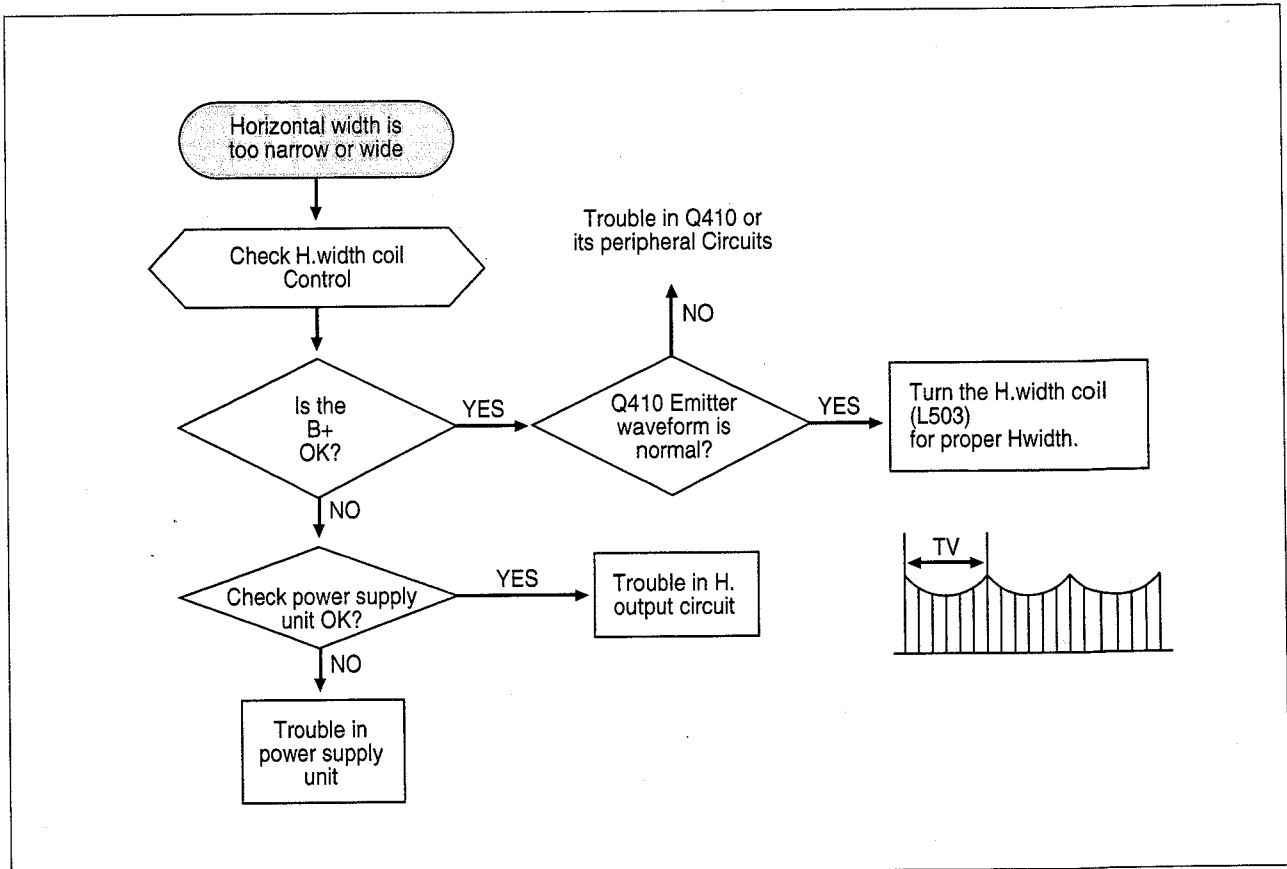
## 8. Vertical Line



### 8. Excess Side Pincushion compensation (S.PCC)

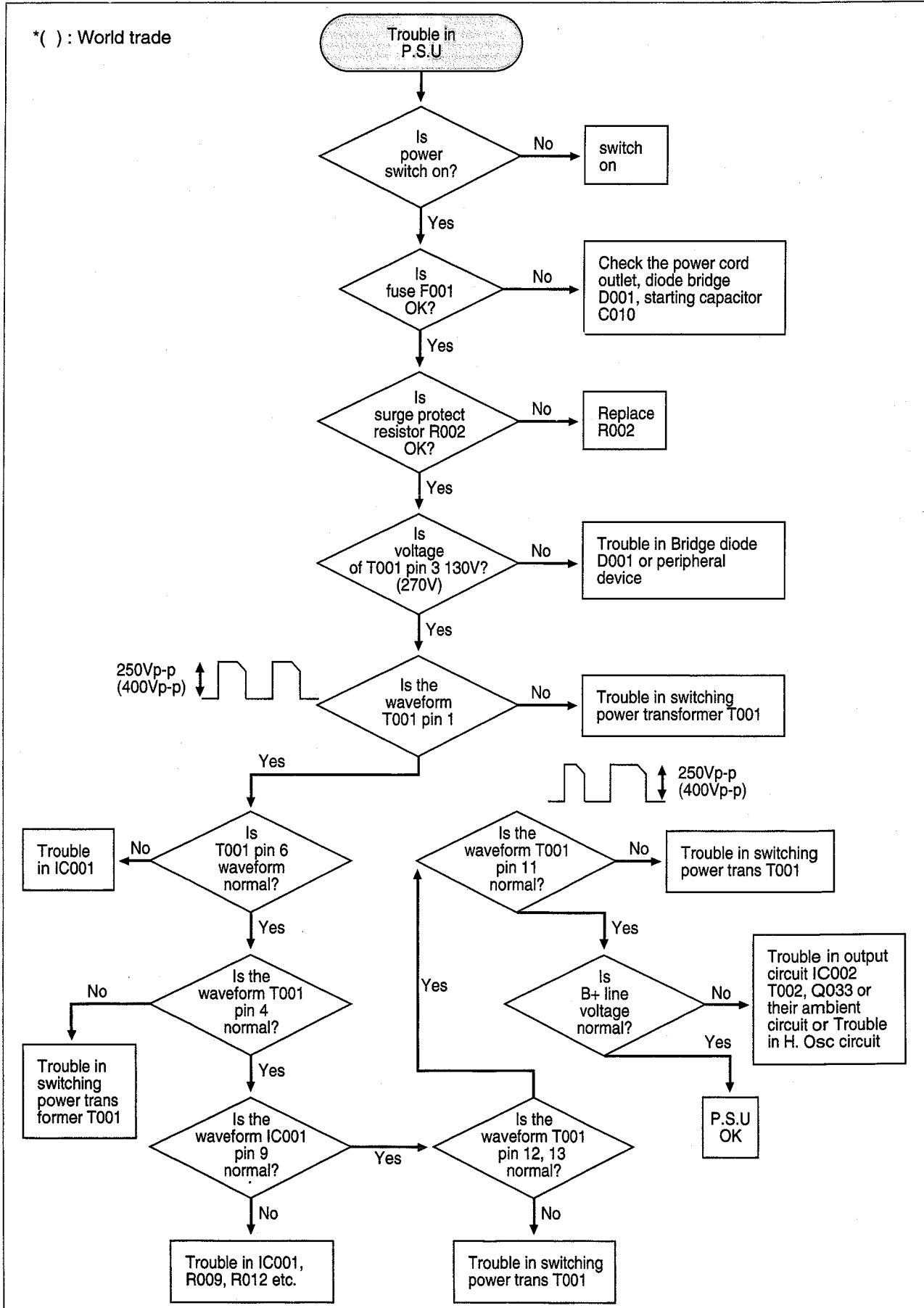


### 9. Horizontal Width



# 10. Power Supply Unit (P.S.U)

\*( ) : World trade



## FIELD ADJUSTMENT PROCEDURE

Use A-4000(COMMODORE PC) or equivalent.

### HORIZONTAL HOLD ADJUSTMENT

- 1) Connect electrolytic capacitor 1  $\mu$ F 50V between TP2 (+) and ground (-).
- 2) Apply the crosshatch pattern signal of NTSC hires/PAL hires (15.7KHZ) mode and adjust H. Hold 1 control VR508 to get the upright crosshatch pattern just after stopping the crosshatch pattern waving horizontally.
- 3) Apply DBL NTSC/DBL PAL(29.6KHZ) mode signal and adjust H. Hold 3 Control VR526 to get the upright crosshatch pattern just after stopping the crosshatch pattern waving horizontally.
- 4) Remove the 1  $\mu$ F 50V capacitor.

### HORIZONTAL PHASE (CENTERING) ADJUSTMENT

- 1) Adjust horizontal phase control VR904 to position the video display equidistant from the left and right edges of the illuminated raster when NTSC hires/PAL hires (15.7KHZ) mode signal is applied.
- 2) Adjust horizontal phase control 2 VR514 to position the video display equidistant from the left and right edges of the illuminated raster when DBL NTSC/DBL PAL (27.6 KHZ) mode signal is applied.

### HORIZONTAL SIZE ADJUSTMENT

- 1) Turn slug of H. Width Coil L503 Counterclockwise to decrease width, and clockwise to increase width for the specified width (approximately 260mm).

### VERTICAL SIZE ADJUSTMENT

#### A. WORLD TRADE MODEL

- 1) Adjust the vertical size Control VR905 until the specified vertical size display (about 186mm) is obtained when DBL PAL. Hires MODE with crosshatch pattern is applied.
- 2) Adjust the vertical size 4 Control VR412 until the specified vertical size display (about 186mm) is obtained when PAL. Hires MODE with crosshatch pattern is applied.
- 3) Adjust the vertical size 2 Control VR410 until the specified vertical size display (about 186mm) is obtained when EURO72 MODE with crosshatch pattern is applied.
- 4) Adjust the vertical size 3 Control VR411 until the specified vertical size display (about 180mm) is obtained when VGA 350 MODE with crosshatch pattern is applied.

#### B. UL/CSA MODEL

- 1) Adjust the vertical size Control VR905 until the specified vertical size display (about 186mm) is obtained when MSCAN AA MODE with crosshatch pattern is applied.
- 2) Adjust the vertical size 4 Control VR412 until the specified vertical size display (about 186mm) is obtained when NTSC. Hires MODE with crosshatch pattern is applied.
- 3) Adjust the vertical size 2 Control VR410 until the specified vertical size display (about 186mm) is obtained when EURO72 AA with crosshatch pattern is applied.
- 4) Adjust the vertical size 3 Control VR411 until the specified vertical size display (about 180mm) is obtained when VGA350 MODE with crosshatch pattern is applied.

### VERTICAL CENTER ADJUSTMENT

Adjust the vertical center control VR903 to center the character area.

### SIDE PINCUSHION ADJUSTMENT

Adjust the Side Pincushion Control VR451 for the optimum side pincushion.

### **FOCUS ADJUSTMENT**

- 1) Set brightness control to center and contrast control to maximum.
- 2) Display all "H" character pattern.
- 3) The optimum focus of the display is obtained by adjusting the focus control of FBT for best focus in which the center and corner are nearly same.

### **WHITE BALANCE ADJUSTMENT**

- 1) Turn the video gain controls of R and G counterclockwise, set the sub-contrast control VR103 at center position and adjust RGB bias controls R809, R819 and R829 close to the minimum position.
- 2) Turn the contrast control to maximum the Brightness Control at center position, and Sub-brightness control VR861 to center.
- 3) Input a black level signal
- 4) Adjust the screen control on FBT until the raster just appears.
- 5) Adjust the RGB bias control so that the raster shows white.
- 6) Adjust the screen control on FBT until the raster just disappears.
- 7) After inputting a white pattern signal, adjust the video gain control of R and G so that display area shows white.
- 8) Adjust the sub-control VR103 so that the Brightness is about 25ft-L.
- 9) After adjusting the white balance, rotate the contrast control from maximum to minimum and make sure that the white balance is not changed. If something is wrong, readjust the white balance.

### **STATIC CONVERGENCE ADJUSTMENT**

- 1) Apply a magenta crosshatch pattern on display.
- 2) Adjust the focus from the best overall focus on the display.  
Also adjust the brightness to desired condition.
- 3) Vertical red and blue lines are converged by varying the angle between the two tabs of the 4-pole magnets.
- 4) Horizontal red and blue lines are converged by varying the tabs together, keeping the angle between them constant.
- 5) Apply a white crosshatch pattern on display.
- 6) Vertical green and magenta lines are converged by varying the angle between the two tabs of the 6-pole magnets.
- 7) Horizontal green and magenta lines are converged by varying the tabs together, keeping the angle between them constant.

# THEORY OF OPERATION

## TABLE OF CONTENTS

1. General	22
2. Block Diagram	22
3. Video Processing Circuit	23
4. Mode Switching Circuit	26
5. Self Test Circuit	28
6. Deflection Circuit	29
7. X-Ray Protection Circuit	32
8. Power Supply Circuit	33

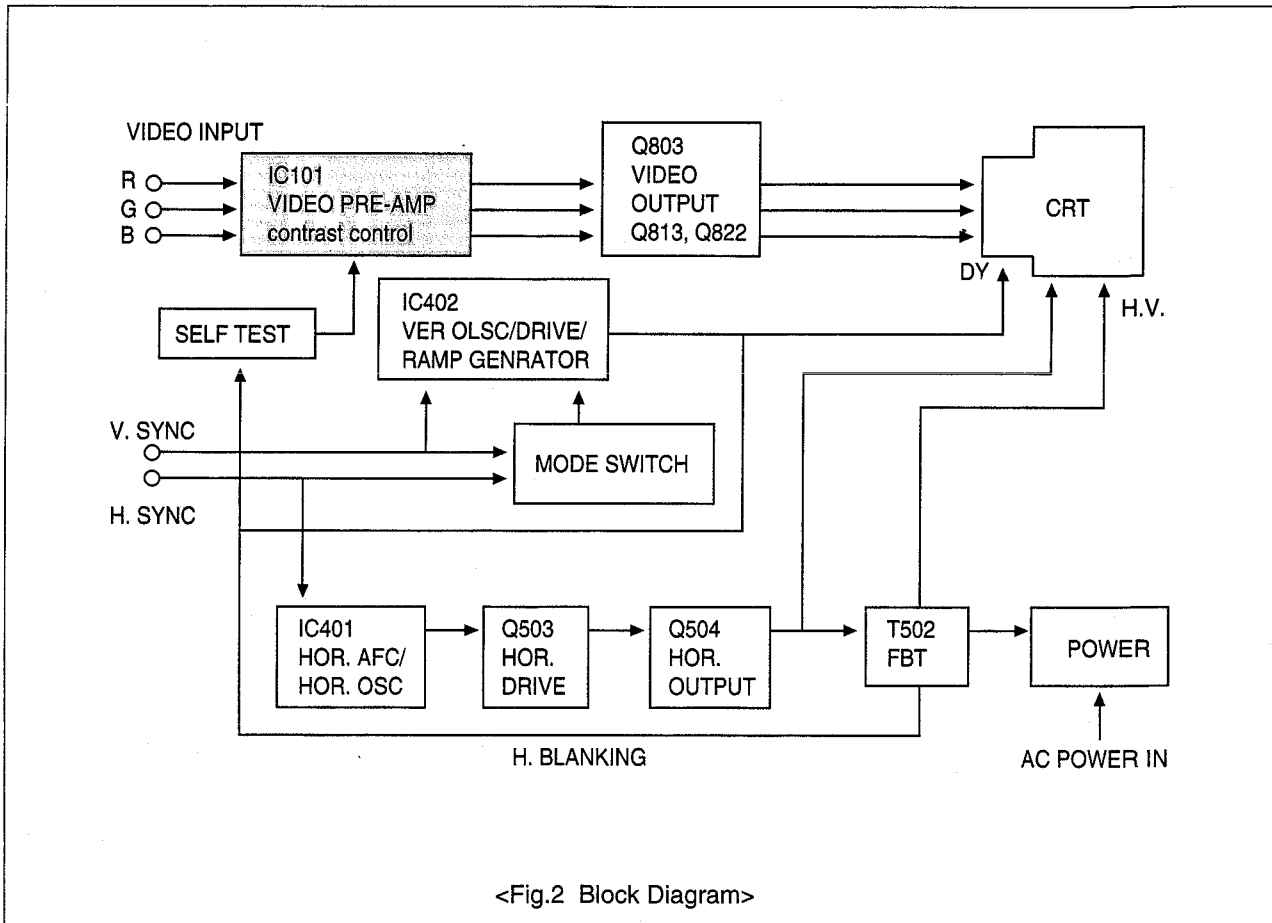


## 1. GENERAL

This Color Monitor automatically scans horizontal frequencies 15.7 KHz and 27.6~31.5 KHz, and all vertical frequencies between 47Hz and 75 Hz.

Mode switching is automatic and based on the polarity of horizontal and vertical sync and horizontal sync period. TAA1675A is used for vertical oscillation and deflection. Power supply circuit is a switching mode power supply And a chopper regulation circuit is used to maintain HV and horizontal display size constantly.

## 2. BLOCK DIAGRAM



### 3. VIDEO PROCESSING CIRCUIT

#### 3.1 Video Pramplifier

##### 3.1.1 Contrast Control

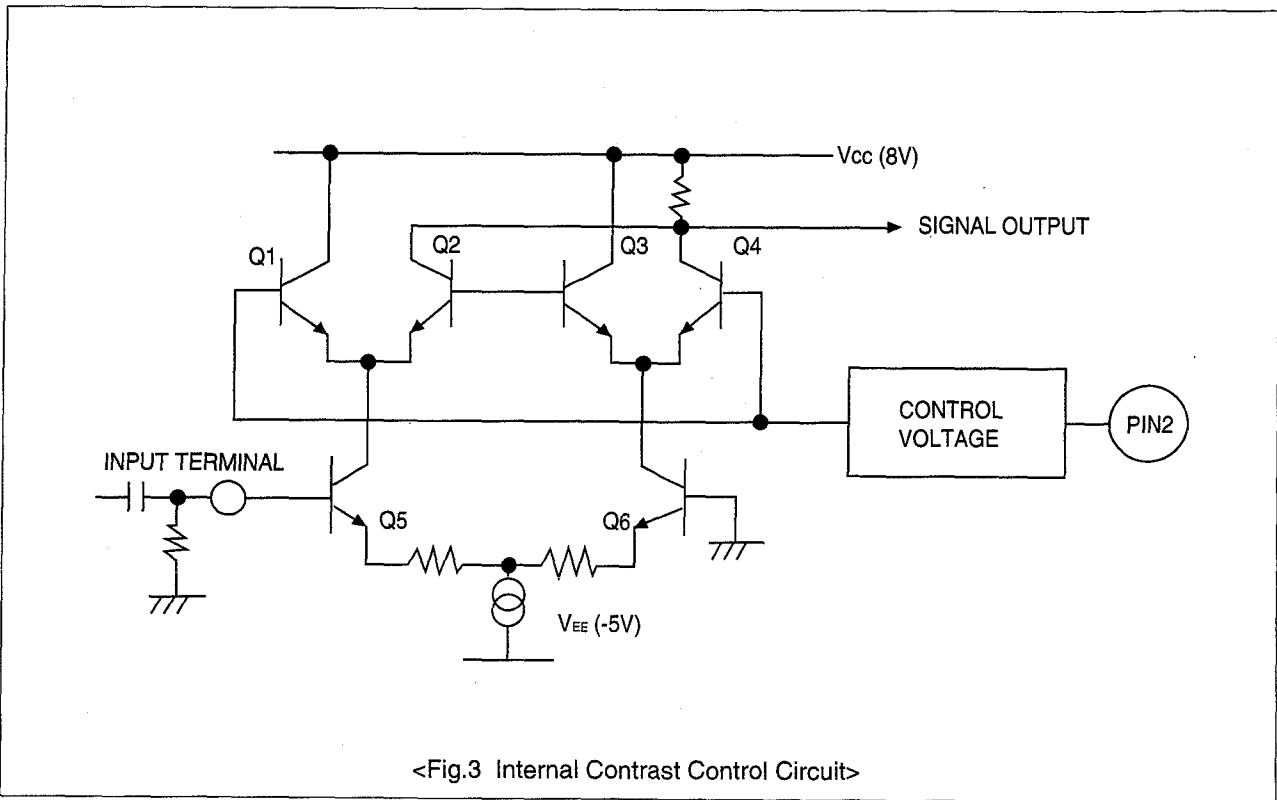
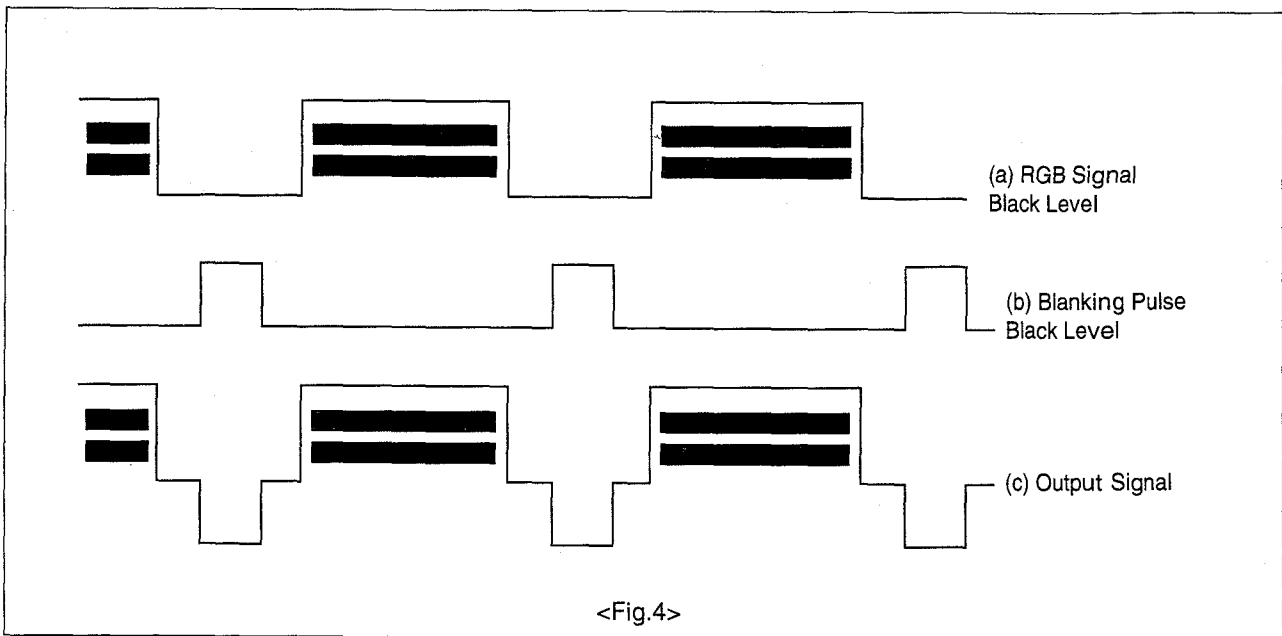


Fig.4 is an internal equivalent contrast control circuit of TA8631N. Current flowing in Q1, Q3 determined by voltage applied to the terminal 2 of TA8631N.

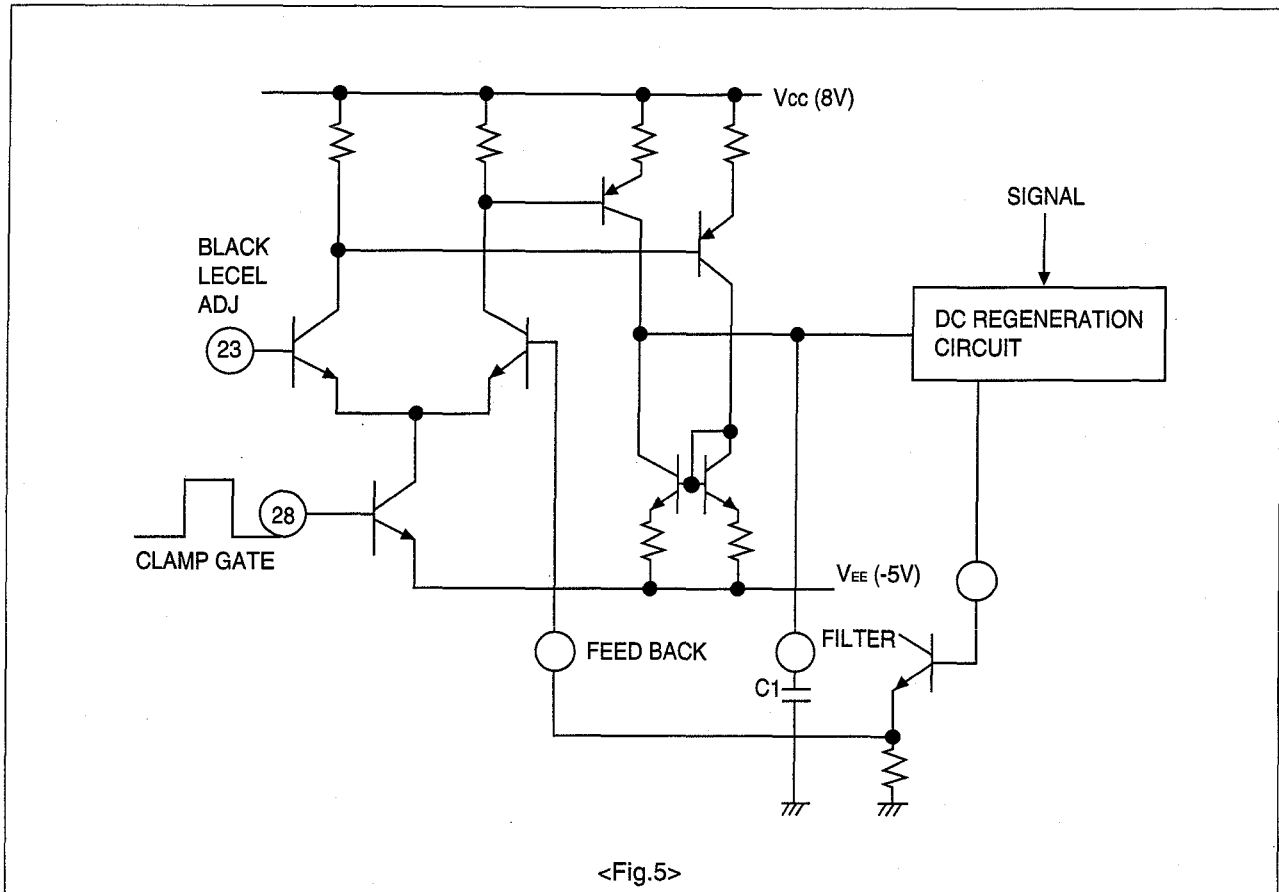
#### 3.1.2 Blanking

Blanking pulses make the retrace lines invisible by biasing the signal amplitude to black level during time the scanning circuits produce retraces.

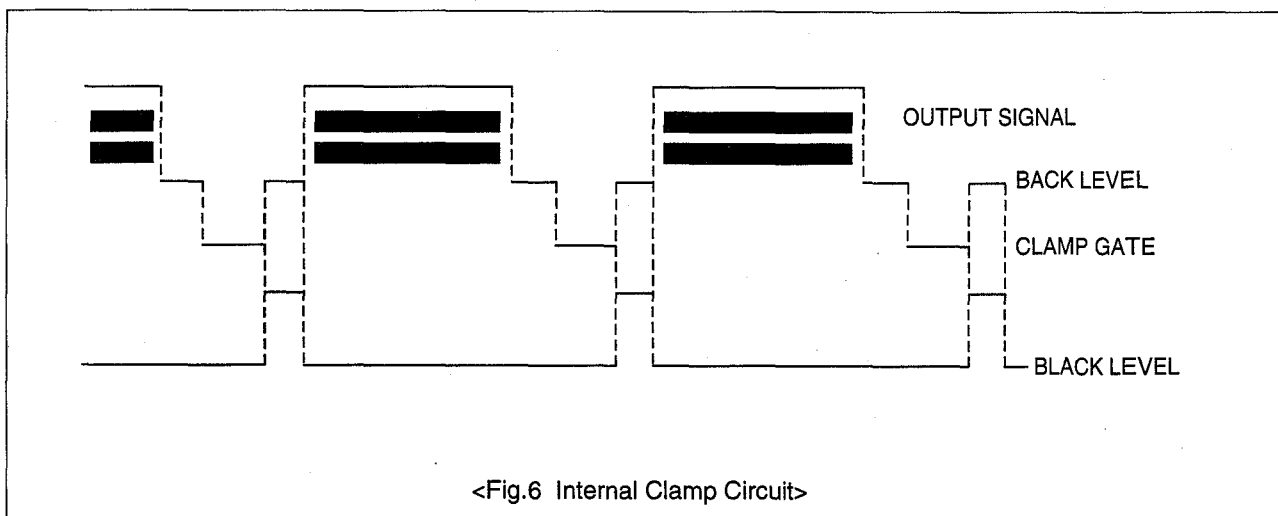


This amplitude of blanking pulse can be adjusted by voltage applied to terminal 20 of TA8631N.

### 3.1.3 Clamp Circuit

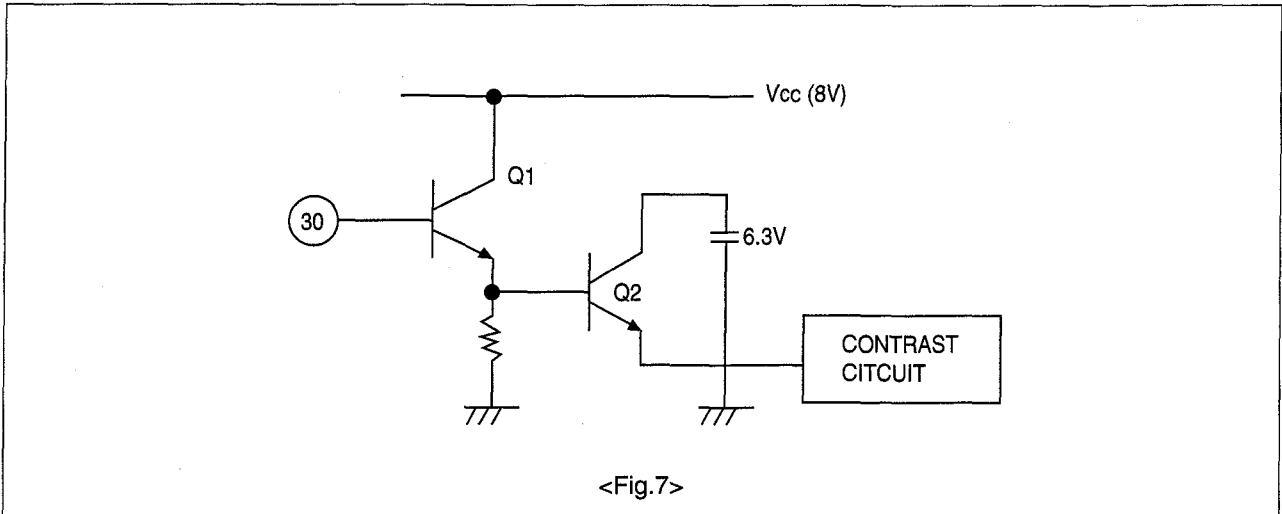


DC of output signal is determined to be the same voltage between feedback input terminal 28 of clamp gate period of time and terminal 23(black level ADJ.). C1 of filter terminal (Shown in Fig.6) keeps the information for 1 period of time.



### 3.1.4 ACL (Auto Current Limit) Circuit:

If excessive beam current flows to the CRT, it reduces the range of contrast. This circuit prevents the excessive current from flowing to the CRT.



If the voltage at terminal 30 is lower than 6.3V, Q2 is turned on. Therefore the range of contrast control is reduced by the received information.

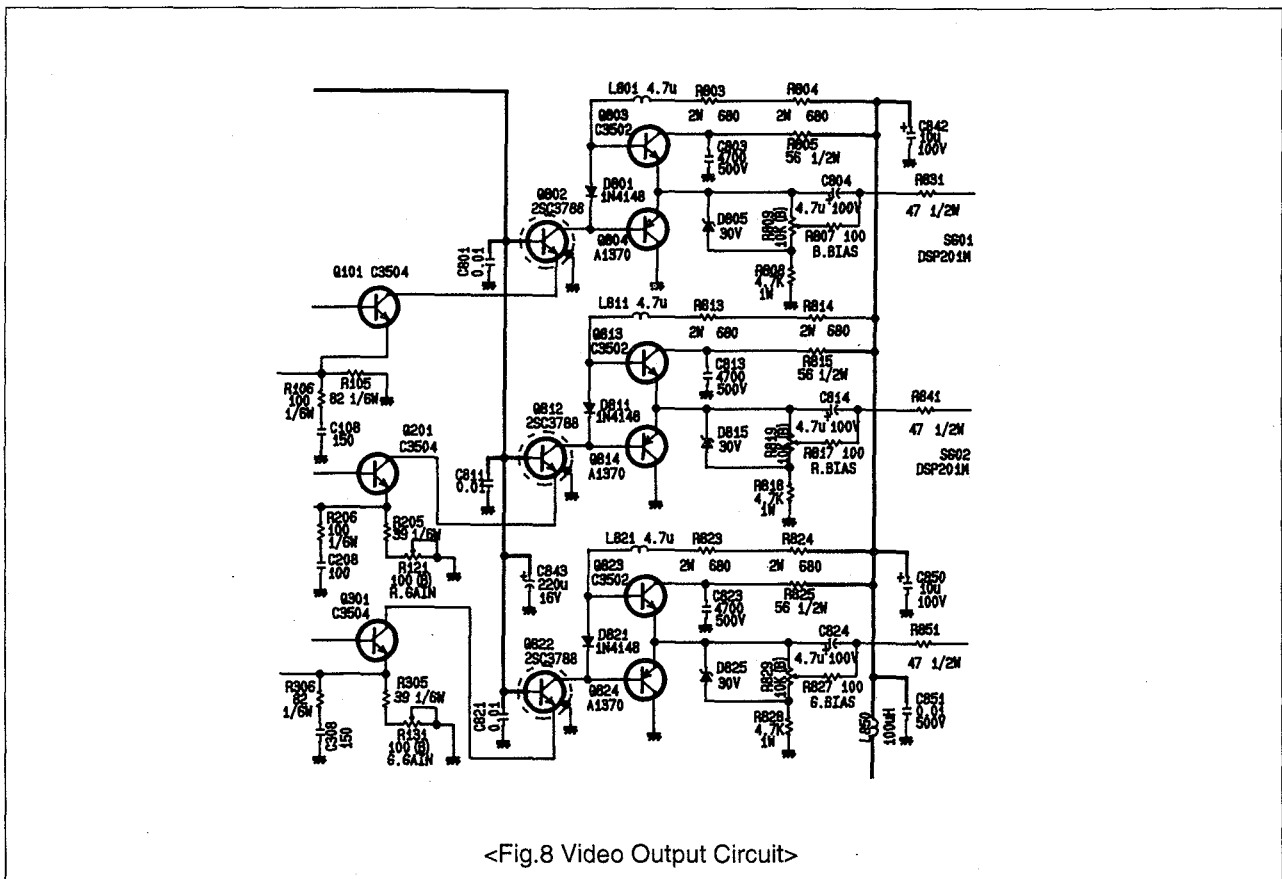
### 3.2 Video Output Circuit

RGB input signal (0.7Vp-p) of TA8631N in video Video preamplifier stage is amplified to about 3Vp-p. This will not change the polarity or input to the Q101, Q102 and Q103 of Main PCB.

L801 correct the frequency characteristics of the amplifier.

C804 blocks the DC component of the video output.

Video output buffers, Q803 and Q804 correct the frequency characteristics of the video output circuit.

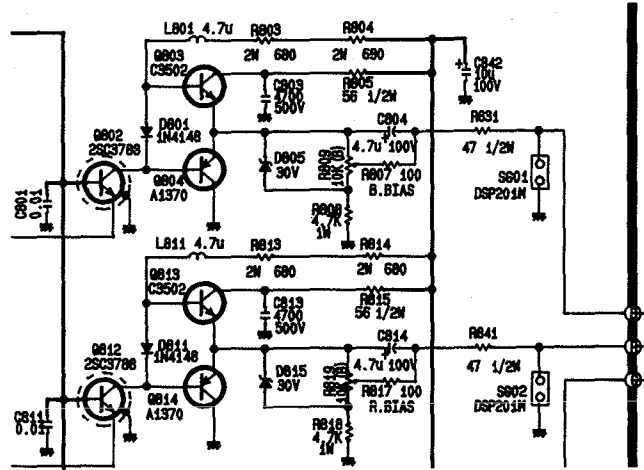


### 3.3 Clamping Circuit (Low Light Circuit)

This circuit controls the DC voltage at the CRT's cathodes.

Each cathode has a separate adjustment to allow display of pure white. R809 is aligned to get the exact grey under the minimum brightness.

D805 is clamping diodes for DC regeneration.



<Fig.8 Video Output Circuit>

## 4. Mode Switching Circuit

### 4.1 General

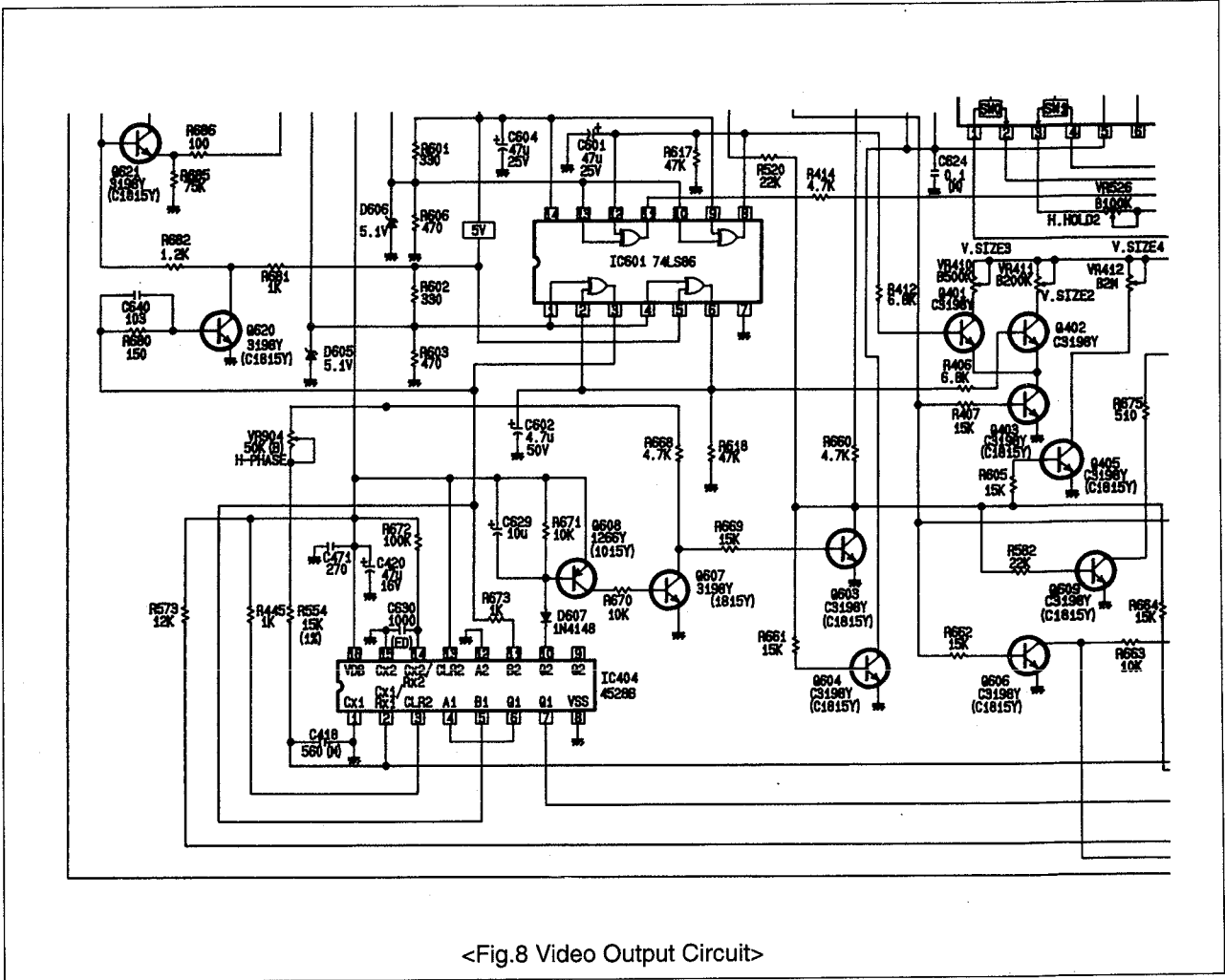
This circuit is to control the vertical size, horizontal hold and horizontal phase with mode changing. The vertical line mode is determined by the horizontal/vertical sync polarity, so the control signal is made utilizing the sync polarity.

### 4.2 Mode Polarity

The relations between the sync polarities and the line modes are as follows:

MODE SYNC	VGA 350 Lines	VGA 400 Lines	VGA 480 Lines	EURO 72 ECS	DBL NTSC AA
Horizontal	Positive	Negative	Negative	Negative	Negative
Vertical	Negative	Positive	Negative	Positive	Negative

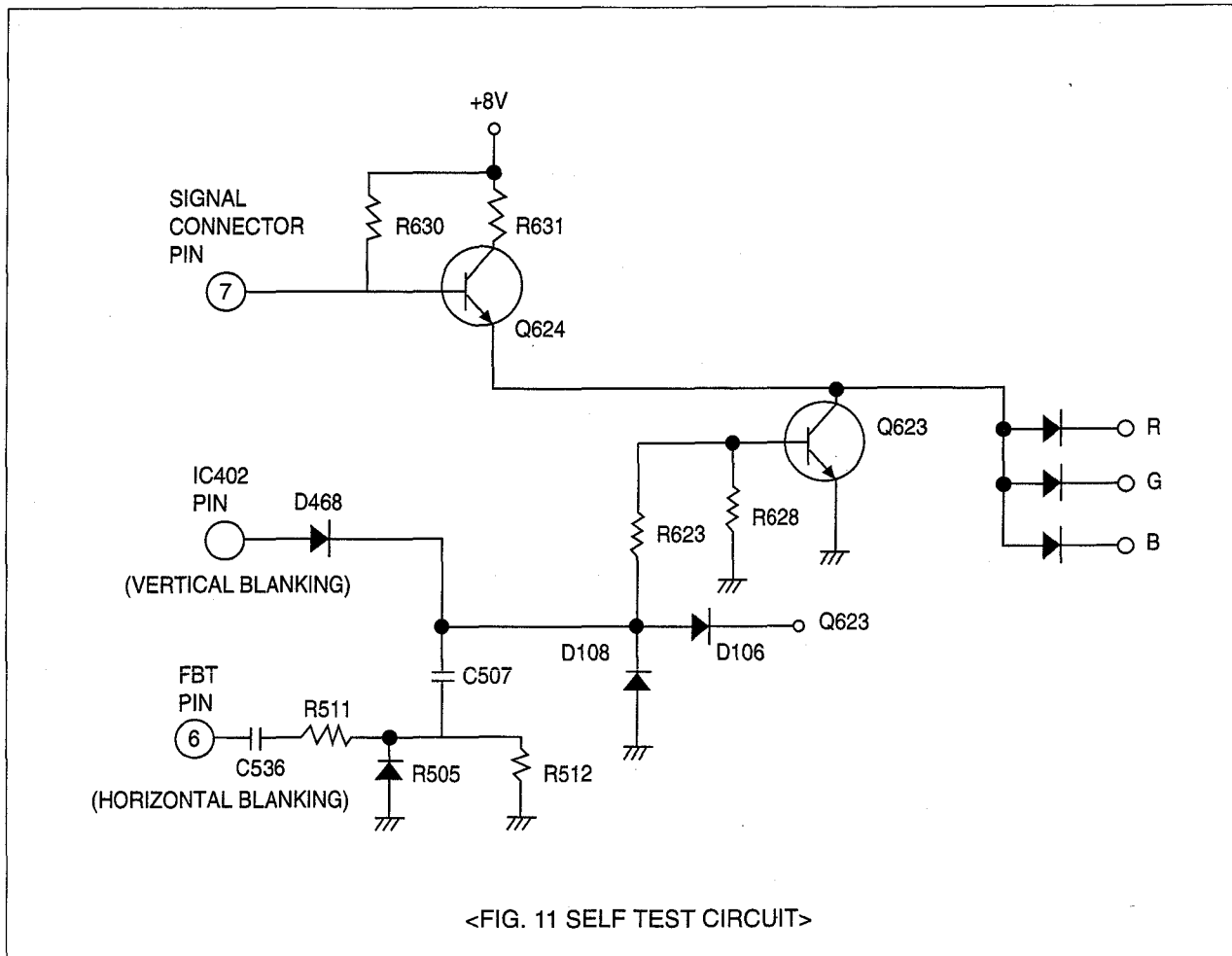
### 4.3 Mode Switching Circuit



Vertical size and linearity of VGA mode are determined by the horizontal and vertical sync polarity using exclusive or gate IC (IC601 74LS86). The polarity of each IC 601 pin is as follow:

PIN NO.	1	2	3	4	5	6	8	9	10	11	12	13
SYNC HIGH	H	H	L	H	H	H	H	H	H	L	H	H
LOW	L	L	L	L	H	L	L	H	L	L	L	L

## 5. Self Test Circuit



Self-test pattern should be available when the contrast control is rotated its maximum. With the signal cable disconnected, the display shows full white raster which should extends beyond the bezel at the top and bottom. The brightness should be uniform in the region extending from the screen center. With the brightness control detent, the brightness of the raster should be greater than 10 Ft-L.

## 6. Deflection Circuit

### 6.1 Vertical Deflection Circuit

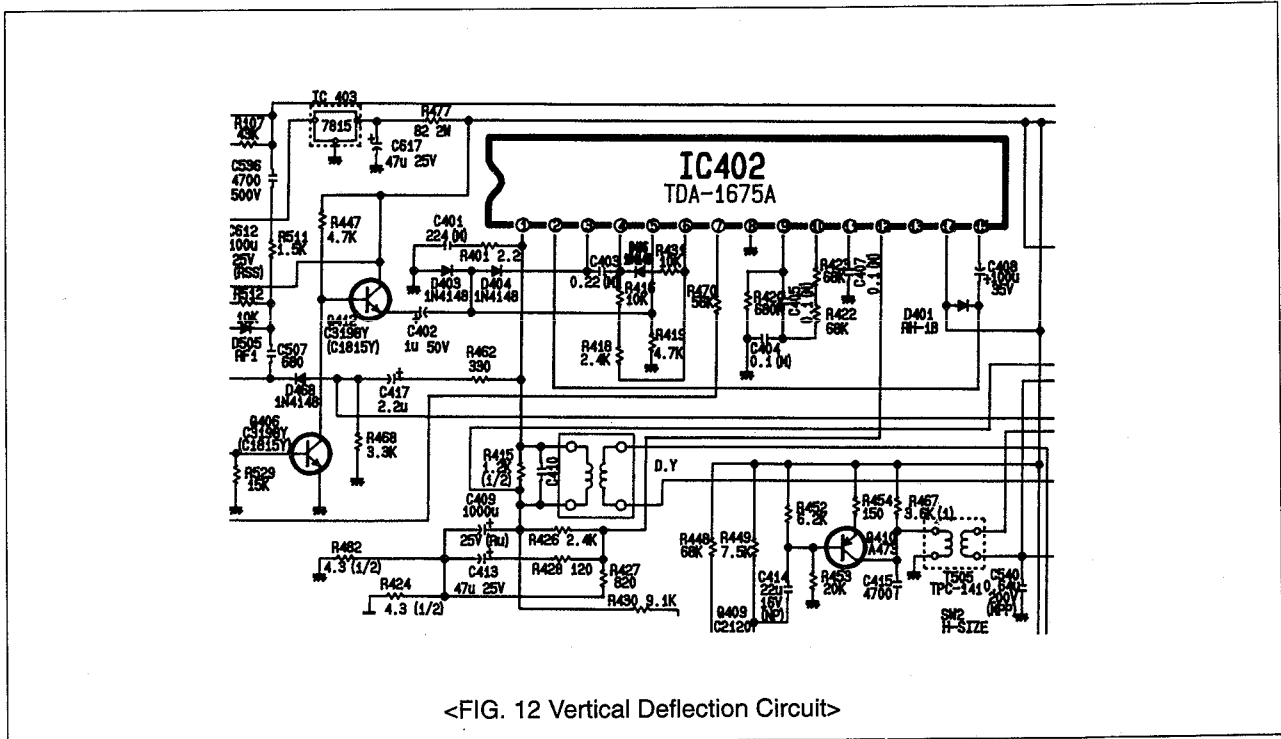


(Block Diagram)

Q406 : Polarity inversion of vertical synchronizing signal.

IC402 : Vertical oscillation, and Drive Amplifier.

Vertical ramp generator.



Q406 inverts the vertical sync pulse to develop a positive-going pulse at its collector.

The inverted signal synchronizes the vertical oscillator through pin 5 of IC 402 and pin 3 to cover wide pull in range.

The Vertical oscillator develops a sawtooth output at pin 4.

The oscillation time constant is determined by C403, R416 and R419.

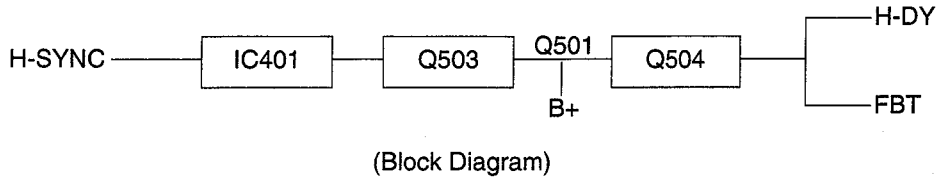
The Ramp wave is determined by C404, C405, R420 and R423.

C402 blocks the DC component of the vertical synchronizing signal.

D401, C408 and the flyback generator in pin 15 make voltage doubling.

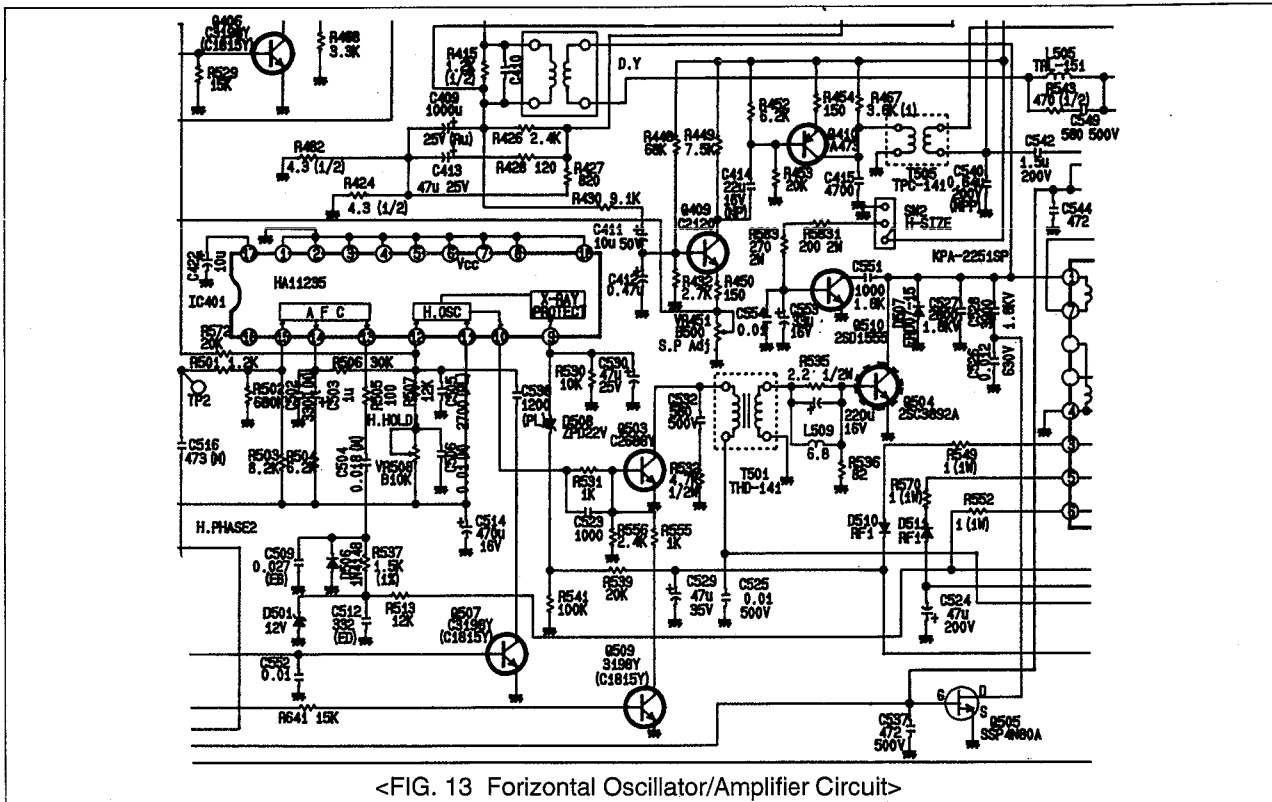


## 6-2. Horizontal Deflection Circuit



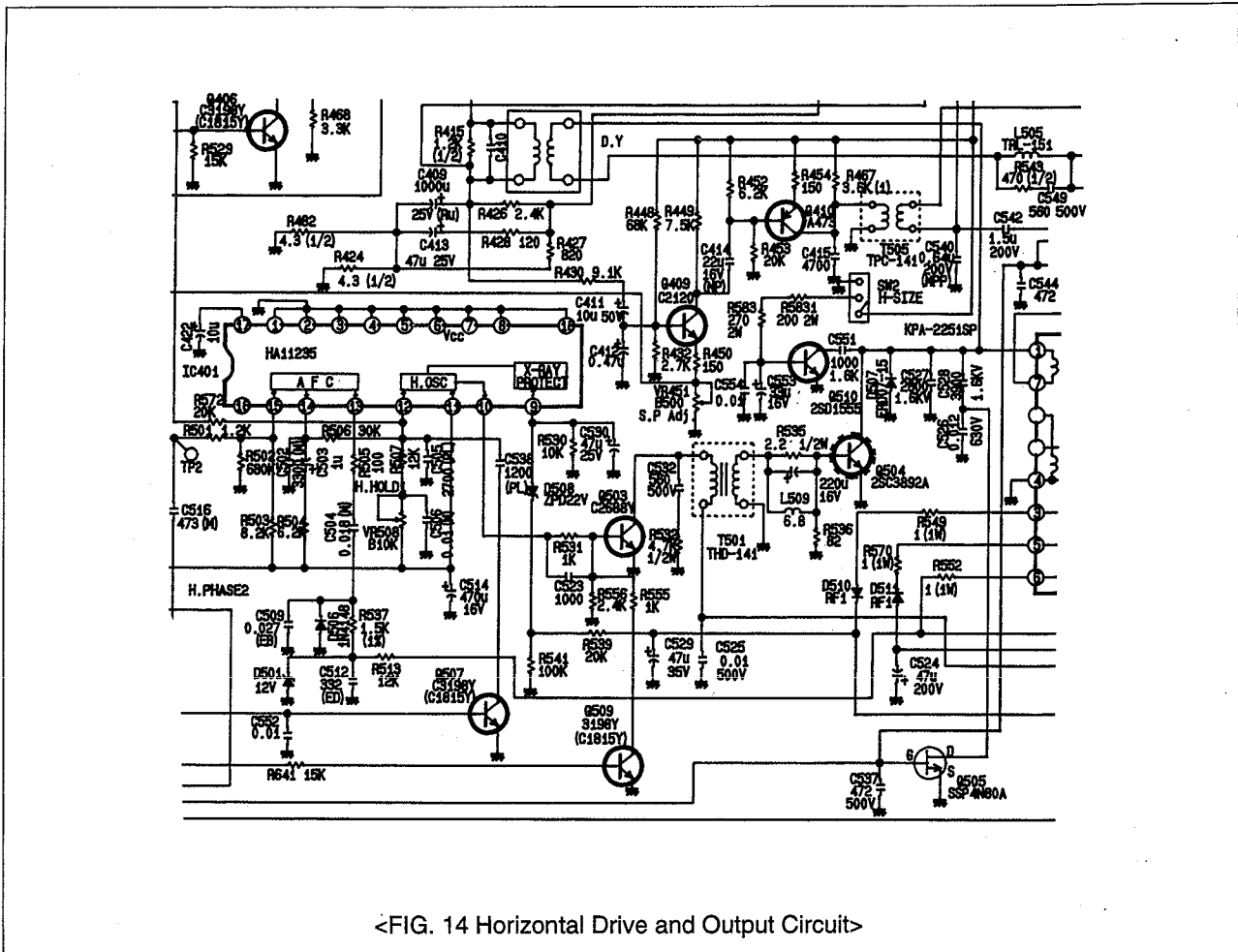
- IC401 : Horizontal Amplifier, AFC, OSC.
- Q503 : Horizontal Drive Transistor.
- T501 : Horizontal Drive Transformer.
- Q504 : Horizontal Output Transistor.

### 6.2.1 Horizontal Oscillation and Amplifier Circuit



Horizontal synchronizing signal is input into IC401 through pin 15. Automatic frequency control (AFC) circuit compares the synchronizing signal to feedback from the FBT to produce a correction voltage, an R-C network integrates the flyback pulse before applying the signal to pin 13 of IC401. the voltage to correct the horizontal frequency appears on pin 14 of IC401. C505, C506, R507, C538 and R508 (H-HOLD) set the operating frequency of the horizontal oscillator. The frequency decreases when the resistance of R508 is increased. The AC loop gain of the AFC circuit is determined by C503 and R504. The oscillator output waveform at pin 10 connects to the succeeding drive circuit.

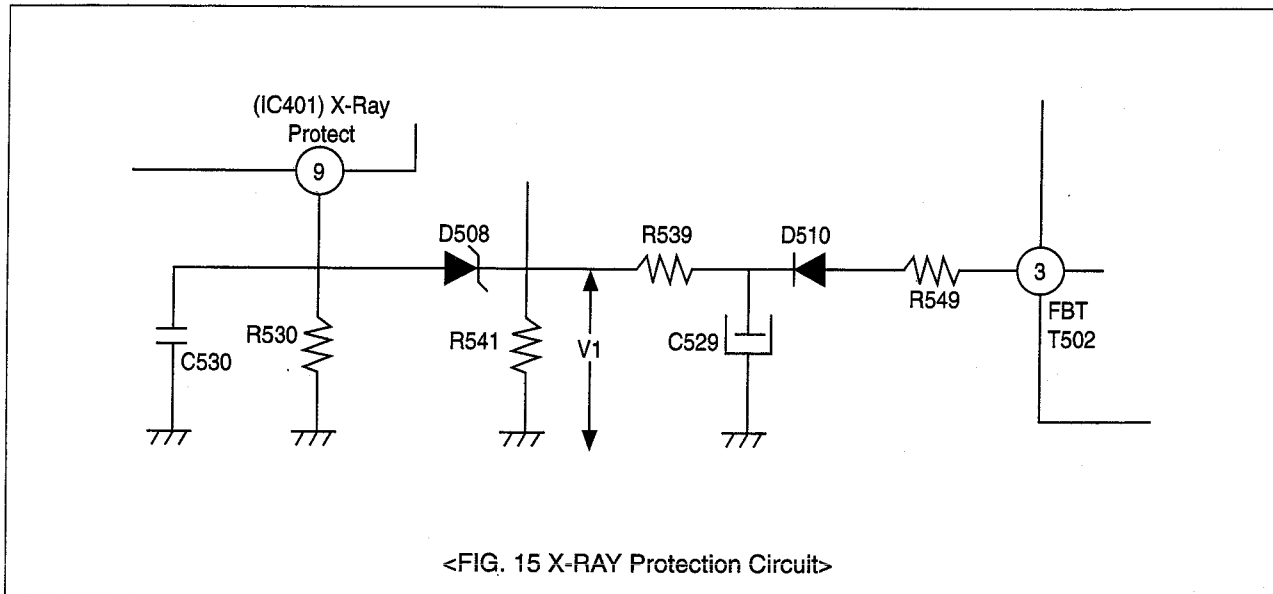
## 6.2.2 Horizontal Drive and Output Circuit



The horizontal oscillator output from terminal 10 of IC401 feeds the base of H. driver amplifier transistor Q503. The amplified output passes through the drive transformer into the horizontal output transistor Q504. The horizontal drive circuit generates a large drive current of the horizontal output transistor Q504. The power to the collector of Q504 comes from B+ and the primary coil of the drive transformer. Although the base current of Q503 is in phase with the collector current, the voltage waveforms are out of phase. The collector current is cut off and the collector voltage rises when the base voltage reaches zero. When the collector current rapidly drops off, retrace capacitors C526, C527 and C528 damp out high frequency ringing caused by the drive transformer. Excessive ringing may reduce the drive current or cause abnormal oscillations, thereby destroying the horizontal output transistor. Horizontal drive transformer steps up the current to sufficient levels to drive Q504. The horizontal output transistor switches with the pulse voltage supplied by the horizontal drive transformer and drives the deflection coil with a sawtooth current waveform.

## 7. X-RAY Protection Circuit

The X-Ray protection circuit senses the CRT's high voltage or beam current and stops the horizontal oscillator if excessive voltage or current exists. The circuit operates if the high voltage exceeds specifications by about 20%.



The Pin 3 Winding of the flyback transformer supplies current to the protection circuit. D510 rectifies the current before it is applied to the R539. This DC current is divided by R539 and R541. In case of normal operation, the voltage V1 is lower than the D508's breakdown voltage. When the high voltage exceeds specifications by about 20%, voltage V1 exceeds D508's breakdown voltage.

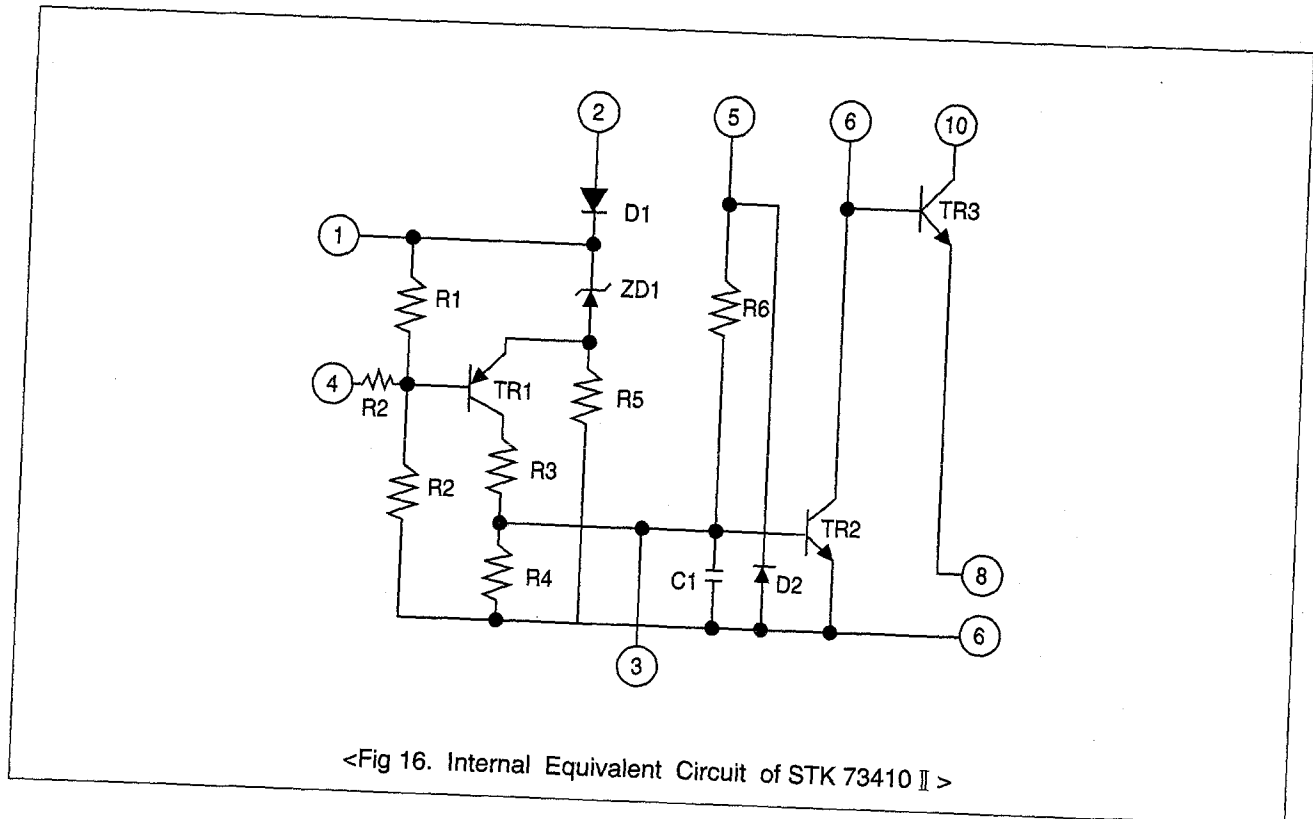
If for any reason the horizontal oscillation output is stopped and the shut down circuit functions, turn off the power and turn it on again after about 10 seconds later.

## 8. Power Supply Circuit

The power supply circuit consist of SMPS and chopper.

Variations in AC input voltage and load control the operating frequency and duty cycle.

SMPS is much more favorable than the series regulator for the higher efficiency in the aspects of the thermal dissipation by the power loss in itself, the wide regulation range, the simple construction and the light weight. This power supply can handle the wide input voltage variation from 90V to 137V AC for UL/CSA models and from 180V to 265V AC for world trade models.



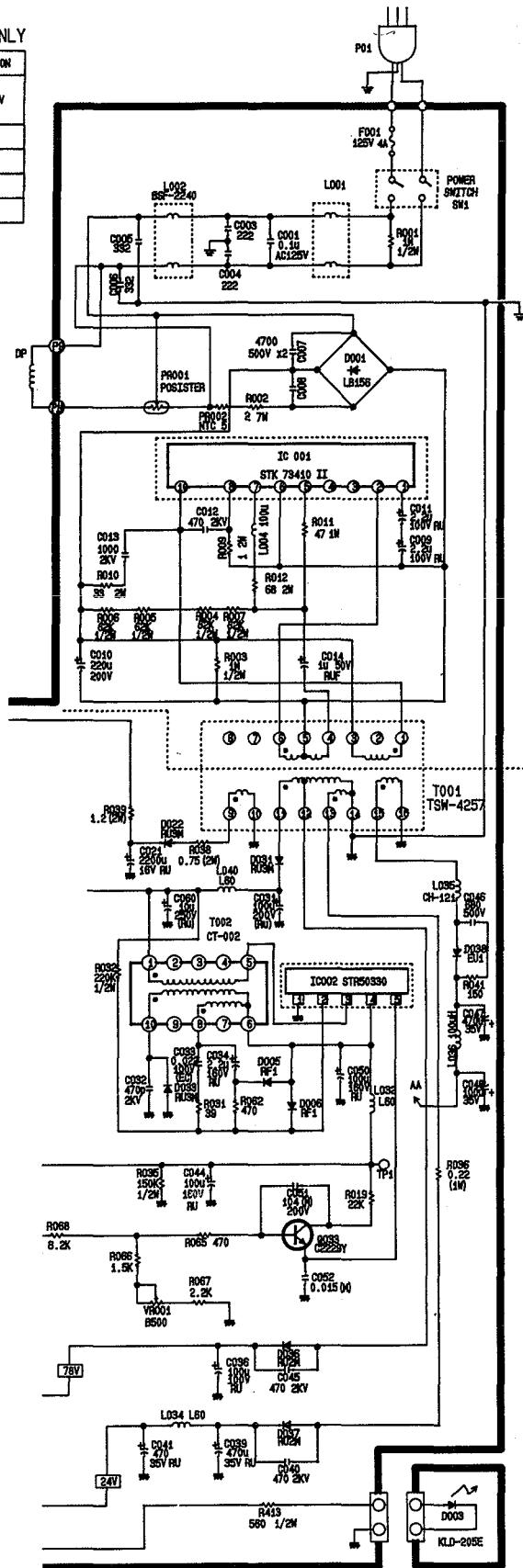
TR3 of IC001 functions as a switch and while on, stores energy in the winding 1-3 of T001. The stored energy is taken from the output winding 1-3 of T001 while TR3 is off. The output voltage is rectified by D031, D036 and D037 for main B+, 78Vdc, 24Vdc.

The output voltage is kept constant by balance between the energy supplied to the Winding 1-3 (which is controlled by on-time of TR3) and that taken from the 5-6.

- 1) When the power switch is turned on, the AC input voltage rectified and smoothed by D001, C010 and supplied to the terminal 3 of T001. The starting current flows to TR3 to turn it on.
- 2) when TR3 is turned on, the start pulses are induced to the coils of 7-5, allowing the collector current to increase the base current.
- 3) Current also flows through the winding 5-6. The voltage rectified by D1 is applied to the base of TR1, thereby turning off the TR1, and also turning off TR2 and TR3.
- 4) The output current flows into the secondary winding of T001 while TR3 is being kept off.
- 5) The kick pulse of output current from the secondary, winding is induced into the winding 7-5, thus turning on TR3 once again.

POWER SUPPLY WORLD TRADE ONLY

LOC.	DESCRIPTION	LOC.	DESCRIPTION
R012	2W 100	C007	4700p 1KV
C013	470 2KV	C008	2 ohm
F001	250V 2.5A	R039	LF-2030
R002	10W 3.3	L002	LF-1015
C010	220 400V	L001	
C002	0.47u AC250V		



The voltage is regulated controlling the positive bias of TR1.

A larger collector current is required to turn off TR2 if the base is fully biased.

Therefore, more energy is stored by the primary winding of 1-3 of T001. The collector current of TR3 required to turn off TR2 is reduced when the above gate is slightly biased, and less energy is stored in the winding 4-2.

The voltage (comparative to the output voltage) induced while TR3 is being kept off is rectified via D1, and it is used by the voltage regulator.

When the output voltage is raised by an increase in the input voltage or a decrease in the load, the emitter voltage of TR1 rises to turn off TR1 so as to take down the voltage at the base of TR2, thus TR2 is turned off and base voltage of TR3 is decreased.

Hence the energy stored in the winding 1-3 is reduced and the output voltage is in turn lowered.

When the output voltage of TR1 is decreased, a larger collector current through TR3 turns on TR1 and TR2.

Consequently more energy is stored in the winding 1-3 which increased the output voltage.

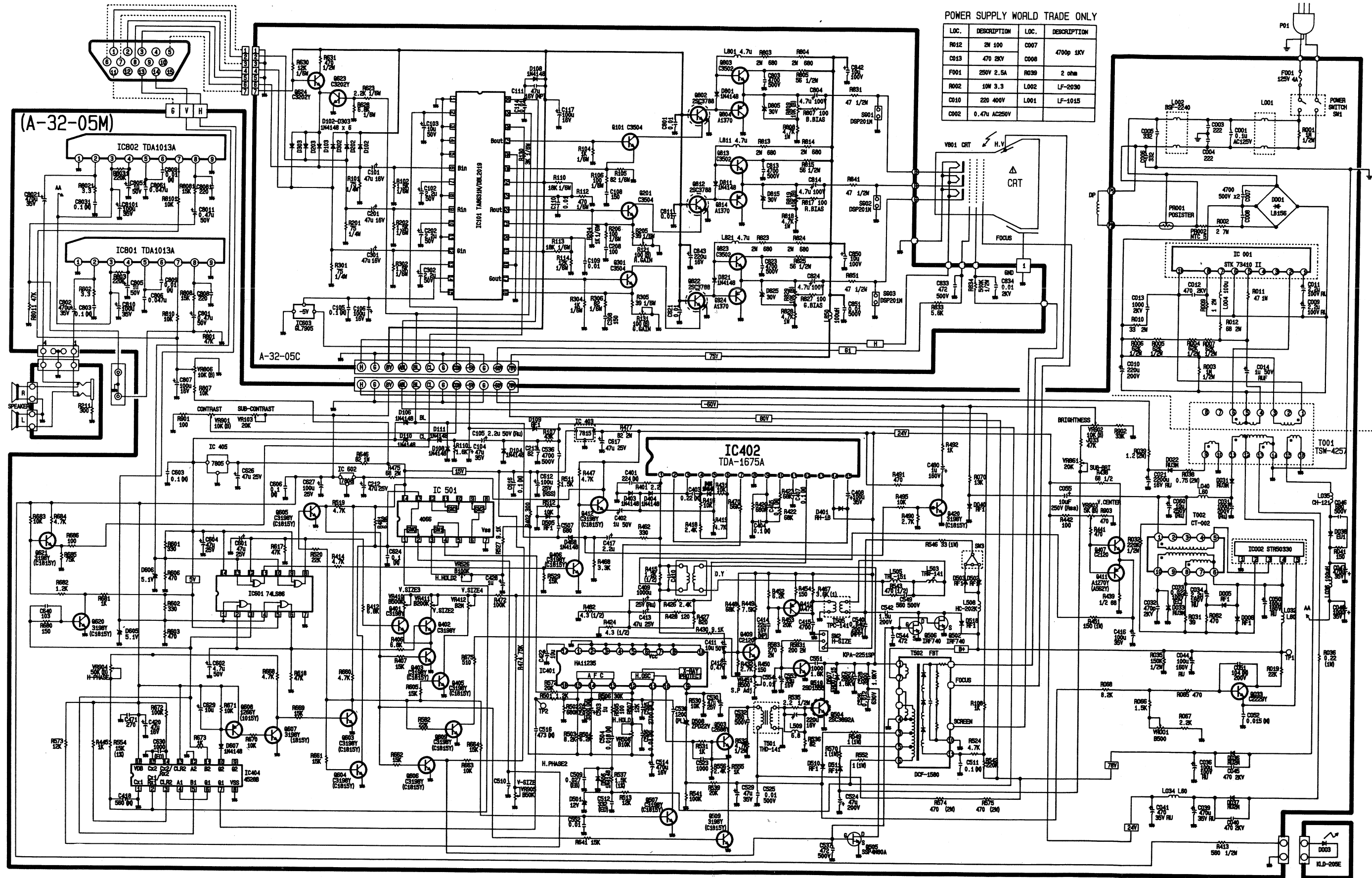
And horizontal scanning frequency of this chassis is from 15KHz to 31KHz. To satisfy this condition, scan B+ have to be varied according to horizontal scanning frequency.

For varying bias voltage, this chassis has regulation circuit, so called chopper method.

And horizontal scanning feedback voltage controls chopper output. As a result, it can make suitable scan B+ even though horizontal scanning frequency changed.

Horizontal Frequency	B+
31.5 KHz	103 V
29.6 KHz	95 V
27.6 KHz	85 V
15.7 KHz	54 V

**SAFETY PRECAUTIONS**



# PART LIST

## A. MAIN BOARD

\*NOTE : \* Mark : X-RAY RADIATION RELATED PAARTS  
 ! Mark : SAFETY RELATED PARTS  
 @ Mark : CRITICAL PARTS

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
!	GND-1	9970710036	CRT GND ASS'Y	8/0.12-16TA+YFH800-1=543	
!@	V001	5MG0000018	COIL DEGAUSSING	5045	
!* @	V801	9979600224	CRT (0.28MM)	M34KXG30X34(CA) (ORION)	UL/CSA
		9979600225	CRT (0.39MM)	M34JZT30X34(CA) (ORION)	UL/CSA
		9979600228	CRT (0.28MM)	M34KXG30X34(CE) (ORION)	
		9979600229	CRT (0.39MM)	M34JZT30X34(CE) (ORION)	
		9979600233	CRT (0.28MM)	M34KXG32X34 (ORION)	S/HEMI.
		9979600232	CRT (0.39MM)	M34JZT32X34 (ORION)	S/HEMI.
		9979600159	CRT (0.28MM)	M34KDZ30X78 (HITACHI)	
		9979600187	CRT (0.39MM)	M34JMZ30X78 (HITACHI)	
A		8P-07026RD	WIRE LEAD	AWG22 7/0.26 RD 1007	
B		8W-07026RD	WIRE LEAD	AWG22 7/0.26 RD 1015	
A1		9970710020	CONNECTOR AS	SIN21T-1.8+1015#22=110	
BB1		9970720036	CONN ASS'Y	5264-02+TUBE+1007=300	
CC1		9970740009	CONN ASS'Y	5264-045395-03+1007=200	
AA		4859233320	CONN WAFER	5267-12A	
BB		4859232320	CONN WAFER	5267-02A	
CC		4859232520	CONN WAFER	5267-04A	
DD		4859232420	CONN WAFER	5267-03A	
!	DP	4859237520	CONN WAFER	YW396-03	
!	DY	4859240020	CONN WAFER	YFW500-05	
	EA01	9976300009	JACK EAR PPHONE	HCY-352W-ST	
!* @	F001	5FDGB2522L	FUSE GRASS TUBE	DEMKO TL 2.5A 250V MF 51	
		5F1GB4021L	FUSE GRASS TUBE	UL/CAS TL 4A 125V MF51	UL/CSA
	F001A	4857415000	FUSE CLIP	BSP3-H T0.4 SN 5.2	
!	PR001	DPTH451C26	POSISTOR	PTH451262BG180N270	
		DPTH451BG8	POSISTOR	PTH451C06BG080N140	UL/CSA
	PR002	DKL13L005-	THERMISTOR	KL13L005	
	R001	RD-2Z105J-	R CARBON	1/2 1M OHM J	
!	R002	RX10T339J-	R CEMENT	10W 3.3 OHM J	
		RX07T209J-	R CEMENT	7W 2 OHM J	UL/CSA
	R003	RD-2Z105J	R CARBON	1/2 1M OHM J	
	R004	RD-2Z623J-	R CARBON	1/2 62K OHM J	
	R005	RD-2Z623J-	R CARBON	1/2 62K OHM J	
	R006	RD-2Z623J-	R CARBON	1/2 62K OHM J	
	R007	RD-2Z623J-	R CARBON	1/2 62K OHM J	
	R009	RS02Y109J-	R M-OXIDE	2W 1 OHM J	
	R010	RS02Y330J-	R M-OXIDE	2W 33 OHM J	
	R011	RS01Y470J-	R M-OXIDE	1W 47 OHM J	
	R012	RS02Y101J-	R M-OXIDE	2W 100 OHM J	
		RS02Y680J-	R M-OXIDE	2W 68 OHM J	UL/CSA
	R019	RD-4Z223J-	R CARBON	1/4 22K OHM J	
	R031	RD-4Z390J-	R CARBON	1/4 39 OHM J	
	R032	RD-2Z224J-	R CARBON	1/2 220K OHM J	



LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
R035		RD-2Z154J	R CARBON	1/2 150K OHM J	UL/CSA
R036		RS01Y228J	R M-OXIDE	1W 0.22W OHM J	
R038		RS02Y758J	R M-OXIDE	FILM 2W 0.75 OHM J	
R039		RS02Y209J	R M-OXIDE	2W 2 OHM J	
		RS02Y129J	R M-OXIDE	2W 1.2 OHM J	
R041		RD-4Z151J	R CARBON	1/4 150 OHM J	
R062		RD-4Z471J	R CARBON	1/4 470 OHM J	
R065		RD-4Z471J	R CARBON	1/4 470 OHM J	
R066		RD-4Z181J	R CARBON	1/4 180 OHM J	
R067		RD-4Z332J	R CARBON	1/4 3.3K OHM J	
R068		RD-4Z822J	R CARBON	1/4 8.2K OHM J	
R070		RD-4Z123J	R CARBON	1/4 12K OHM J	
R107		RD-4Z433J	R CARBON	1/4 43K OHM J	
R108		RD-4Z102J	R CARBON	1/4 1K OHM J	
R110		RD-4Z162J	R CARBON	1/4 1.6K OHM J	
R401		RD-4Z229J	R CARBON	1/4 2.2 OHM J	
R402		RD-4Z301J	R CARBON	1/4 300 OHM J	
R406		RD-4Z682J	R CARBON	1/4 6.8K OHM J	
R407		RD-4Z153J	R CARBON	1/4 15K OHM J	
R412		RD-4Z682J	R CARBON	1/4 6.8K OHM J	
R413		RD-2Z561J	R CARBON	1/2 560 OHM J	
R414		RD-4Z472J	R CARBON	1/4 4.7K OHM J	
R415		RD-2Z122J	R CARBON	1/2 1.2K OHM J	
R416		RD-4Z103J	R CARBON	1/4 10K OHM J	
R418		RD-4Z242J	R CARBON	1/4 2.4K OHM J	
R419		RD-4Z472J	R CARBON	1/4 4.7K OHM J	
R420		RD-4Z684J	R CARBON	1/4 680K OHM J	
R422		RD-4Z683J	R CARBON	1/4 68K OHM J	
R423		RD-4Z683J	R CARBON	1/4 68K OHM J	
R424		RD-2Z439J	R CARBON	1/2 4.3 OHM J	
R426		RD-4Z242J	R CARBON	1/4 2.4K OHM J	
R427		RD-4Z821J	R CARBON	1/4 820 OHM J	
R428		RD-4Z121J	R CARBON	1/4 120 OHM J	
R430		RD-4Z912J	R CARBON	1/4 9.1K OHM J	
R431		RD-4Z103J	R CARBON	1/4 10K OHM J	
R432		RD-4Z272J	R CARBON	1/4 2.7K OHM J	
R438		RD-2Z680J	R CARBON	1/2 68 OHM J	
R439		RD-2Z680J	R CARBON	1/2 68 OHM J	
R441		RD-4Z471J	R CARBON	1/4 470 OHM J	
R442		RD-4Z101J	R CARBON	1/4 100 OHM J	
R445		RD-4Z102J	R CARBON	1/4 1K OHM J	
R447		RD-4Z472J	R CARBON	1/4 4.7K OHM J	
R448		RD-4Z683J	R CARBON	1/4 68K OHM J	
R449		RD-4Z752J	R CARBON	1/4 7.5K OHM J	
R450		RD-4Z151J	R CARBON	1/4 150 OHM J	
R451		RS01Y151J	R M-OXIDE	1W 150 OHM J	
R452		RD-4Z622J	R CARBON	1/4 6.2K OHM J	
R453		RD-4Z203J	R CARBON	1/4 20K OHM J	
R454		RD-4Z151J	R CARBON	1/4 150 OHM J	
R460		W581GY1005	WIRE JUMPER	AWG22 1/0.65 SN 10	
R462		RD-4Z331J	R CARBON	1/4 330 OHM J	
R467		RS02Y362J	R M-OXIDE	2W 3.6K OHM J	
R468		RD-4Z332J	R CARBON	1/4 3.3K OHM J	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
R470		RD-4Z563J-	R CARBON	1/4 56K OHM J	
R471		W581GY1005	WIRE JUMPER	AWG22 1/0.65 SN 10	
R472		RD-4Z104J-	R CARBON	1/4 100K OHM J	
R474		RD-4Z753J-	R CARBON	1/4 75K OHM J	
@ R475		RS02Y680J-	R M-OXIDE	2W 68 OHM J	
@ R477		RS02Y820J-	R M-OXIDE	2W 82 OHM J	
R481		RD-4Z682J-	R CARBON	1/4 6.8K OHM J	
R482		RD-4Z439J-	R CARBON	1/4 4.3K OHM J	
R490		RD-4Z272J-	R CARBON	1/4 2.7K OHM J	
R491		RD-4Z471J-	R CARBON	1/4 470 OHM J	
R492		RD-4Z102J-	R CARBON	1/4 1K OHM J	
R495		RD-4Z103J-	R CARBON	1/6 10K OHM J	
R501		RD-4Z122J-	R CARBON	1/4 1.2K OHM J	
R502		RD-4Z684J-	R CARBON	1/4 680K OHM J	
R503		RD-4Z822J-	R CARBON	1/4 8.2K OHM J	
? R504		RD-4Z622J-	R CARBON	1/4 6.2K OHM J	
R505		RD-4Z101J-	R CARBON	1/4 100 OHM J	
R506		RD-4Z303J-	R CARBON	1/4 30K OHM J	
R507		RD-4Z123J-	R CARBON	1/4 12K OHM J	
R511		RD-4Z152J-	R CARBON	1/4 1.5K OHM J	
R512		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R513		RD-4Z123J-	R CARBON	1/4 12K OHM J	
R519		RD-4Z472J-	R CARBON	1/4 4.7K OHM J	
R520		RD-4Z223J-	R CARBON	1/4 22K OHM J	
R524		RD-4Z472J-	R CARBON	1/4 4.7K OHM J	
R527		RD-4Z912J-	R CARBON	1/4 9.1K OHM J	
R529		RD-4Z153J-	R CARBON	1/4 15K OHM J	
* R530		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R531		RD-4Z102J-	R CARBON	1/4 1K OHM J	
R532		RD-2Z472J-	R CARBON	1/2 4.7K OHM J	
R535		RD-2Z229J-	R CARBON	1/2 2.2 OHM J	
R536		RD-4Z820J-	R CARBON	1/4 82 OHM J	
R537		RD-4Z152J-	R CARBON	1/4 1.5K OHM J	
* R539		RD-4Z203J-	R CARBON	1/4 20K OHM J	
* R541		RD-4Z104J-	R CARBON	1/4 100K OHM J	
R542		RD-4Z224J-	R CARBON	1/4 220K OHM J	
R543		RD-2Z471J-	R CARBON	1/2 470 OHM J	
R545		RD-2Z471J-	R CARBON	1/2 470 OHM J	
R546		RS01Y330J-	R M-OXIDE	1W 33 OHM J	
* R549		RS01Y109J-	R M-OXIDE	1W 1 OHM J	
R552		RS01Y109J-	R M-OXIDE	1W 1 OHM J	
R554		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R555		RD-4Z102J-	R CARBON	1/4 1K OHM J	
R556		RD-4Z242J-	R CARBON	1/4 2.4K OHM J	
R570		RS01Y109J-	R M-OXIDE	1W 1 OHM J	
R571		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
R572		RD-4Z203J-	R CARBON	1/4 20K OHM J	
R573		RD-4Z123J-	R CARBON	1/4 12K OHM J	
@ R574		RS02Y471J-	R M-OXIDE	2W 470 OHM J	
@ R575		RS02Y471J-	R M-OXIDE	2W 470 OHM J	
R582		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R583		RS02Y271J-	R M-OXIDE	2W 270 OHM J	
R584		RS02Y201J-	R M-OXIDE	2W 200 OHM J	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
R601		RD-4Z331J-	R CARBON	1/4 330 OHM J	
R602		RD-4Z331J-	R CARBON	1/4 330 OHM J	
R603		RD-4Z471J-	R CARBON	1/4 470 OHM J	
R605		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R606		RD-4Z471J-	R CARBON	1/4 470 OHM J	
R617		RD-4Z473J-	R CARBON	1/4 47K OHM J	
R618		RD-4Z473J-	R CARBON	1/4 47K OHM J	
R641		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R646		RS01Y820J-	R CARBON	1W 82 OHM J	
R660		RD-4Z472J-	R CARBON	1/4 4.7K OHM J	
R661		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R662		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R663		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R664		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R666		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
R667		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
R668		RD-4Z472J-	R CARBON	1/4 4.7K OHM J	
R669		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R670		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R671		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R672		RD-4Z104J-	R CARBON	1/4 100K OHM J	
R673		RD-4Z102J-	R CARBON	1/4 1K OHM J	
R675		RD-4Z682J-	R CARBON	1/4 6.8K OHM J	
R680		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R681		RD-4Z102J-	R CARBON	1/4 1K OHM J	
R682		RD-4Z122J-	R CARBON	1/4 1.2K OHM J	
R683		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R684		RD-4Z472J-	R CARBON	1/4 4.7K OHM J	
R685		RD-4Z753J-	R CARBON	1/4 75K OHM J	
R686		RD-4Z101J-	R CARBON	1/4 100 OHM J	
R801		RD-4Z473J-	R CARBON	1/4 47K OHM J	
R802		RD-4Z339J-	R CARBON	1/4 3.3 OHM J	
R803		RD-4Z224J-	R CARBON	1/4 220K OHM J	
R807		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R808		RD-4Z153J-	R CARBON	1/4 15K OHM J	
R810		RD-4Z103J-	R CARBON	1/4 10K OHM J	
R901		RD-4Z101J-	R CARBON	1/4 100 OHM J	
R902		RD-4Z333J-	R CARBON	1/4 33K OHM J	
R903		RD-4Z471J-	R CARBON	1/4 470 OHM J	
R8011		RD-4Z473J-	R CARBON	1/4 47K OHM J	
R8021		RD-4Z339J-	R CARBON	1/4 3.3 OHM J	
R8031		RD-4Z224J-	R CARBON	1/4 220K OHM J	
R8081		RD-4Z152J-	R CARBON	1/4 15K OHM J	
R8101		RD-4Z103J-	R CARBON	1/4 10K OHM J	
!	C001	CL1UC3474M CLYL2E104K	C LINE ACROSS C LINE ACROSS	0.47MF 1J(UCVSNDF/SV)+Q/O 250V 0.1MF K	UL/CSA
!	C003	CH1FDF222M	C CERA AC	DE7100 2200PF M VA1-KC	
!	C004	CH1FDF222M	C CERA AC	DE7100 2200PF M VA1-KC	
!	C005	CCXB3G332M	C CERA AC	DE7120F 3300PF M VA1-KC	
!	C006	CCXB3G332M	C CERA AC	DE7120F 3300PF M VA1-KC	
!	C007	CCXF3A472Z CCXF2H472Z	C CERA C CERA	HIKF 1KV 4700PF Z HIKF 500V 4700PF Z	UL/CSA

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
C008		CCXF3A472Z	C CERA	HIKF 1KV 4700PF Z	
		CCXF2H472Z	C CERA	HIKF 500V 4700PF Z	UL/CSA
C009		CEXE2A229C	C ELECTRO	100V 2.2MF RU	
I@ C010		CEXA2G221G	C ELECTRO	400V 220MF LSS	
		CEXM2D221C	C ELECTRO	200V 220MF FUF	UL/CSA
C011		CEXE2A229C	C ELECTRO	100V 2.2MF RU	
C012		CBXB3D471K	C CERA	HIKB 2KV 470PF Z	
C013		CBXB3D471K	C CERA	HIKB 2KV 470PF Z	
		CBXB3D102K	C CERA	HIKB 2KV 1000PF Z	UL/CSA
C014		CEXD1H109G	C ELECTRO	50V 1MF RUF	
C021		CEXF1C222C	C ELECTRO	16V 2200MF RUS	
C031		CEXE2D101C	C ELECTRO	200V 100MF RU	
C032		CBXB3D471K	C CERA	HIKB 2KV 470PF K	
C033		CMXM2A223J	C MYLAR	100V 0.022MF EU	
C034		CEXE2C229C	C ELECTRO	160V 2.2MF RU	
C036		CEXE2A101C	C ELECTRO	100V 100MF RU	
C039		CEXE1V471C	C ELECTRO	35V 470MF RU	
C040		CBXB3D471K	C CERA	HIKB 2KV 470PF K	
C041		CEXE1V471C	C ELECTRO	35V 470MF RU	
C044		CEXE2C101C	C ELECTRO	160V 100MF RU	
C045		CBXB3D471K	C CEAR	HIKB 2KV 470PF K	
C046		CCXB2H681K	C CERA	HIKB 500V 680PF K	
C047		CEXE1V471C	C ELECTRO	35V 470MF RU	
C048		CEXE1V101C	C ELECTRO	35V 100MF RU	
C050		CEXE2C101C	C ELECTRO	160V 100MF RU	
C051		CMXF2D104J	C MYLAR	200V 0.1MF MPP J	
C052		CMXM2A153J	C MYLAR	100V 0.015MF J	
C055		CEXF2E100C	C ELECTRO	250V 10MF RUS	
C060		CEXE2D100C	C ELECTRO	200V 10MF RU	
C104		CEXE1V470A	C ELECTRO	35V 47MF RS	
C105		CEXE1H229C	C ELECTRO	50V 2.2MF RU	
C212		CEXE1E470C	C ELECTRO	25V 47MF RU	
C213		CXCH1H820J	C CERA	CH 50V 82PF J	
C401		CMXM2A224J	C MYLAR	100V 0.22MF J	
C402		CEXE1H109A	C ELECTRO	50V 1MF RS	
C403		CMXM2A224J	C MYLAR	100V 0.22MF J	
C404		CMXM2A104J	C MYLAR	100V 0.1MF J	
C405		CMXM2A104J	C MYLAR	100V 0.1MF J	
C407		CMXM2A104J	C MYLAR	100V 0.1MF J	
C408		CEXE1V101A	C ELECTRO	35V 100MF RS	
C409		CEYE1E102C	C ELECTRO	25V 1000MF RU	
C411		CEXE1H100A	C ELECTRO	50V 10MF RS	
C412		CEXE1H478A	C ELECTRO	50V 0.47MF RS	
C413		CEXF1E470A	C ELECTRO	25V 47MF RS	
C414		CMXD1C220F	C ELECTRO	16V 22MF RND	
C415		CCXB1H472K	C CERA	HIKB 50V 4700PF K	
C416		CEXE1V101A	C ELECTRO	35V 100MF RS	
C417		CEXE1H229A	C ELECTRO	50V 2 2MF RS	
C418		CCXB1H561K	C CERA	HIKB 50V 560PF K	
C420		CEXF1C470V	C ELECTRO	16V 47MF RSS	
C422		CEXE1H100A	C ELECTRO	50V 10MF RS	
C428		CCXE1H109A	C ELECTRO	50V 1MF RS	
C471		CCXB1H271K	CX CERA	HIKB 50V 270PF K	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
C480		CEXE2C109C	C ELECTRO	160V 1MF RU	
C481		CEXE1H109A	C ELECTRO	50V 1MF RS	
C502		CMXB2A332J	C MYLAR	100V 3300PF EU J	
C503		CEXE1H109A	C ELECTRO	50V 1MF RS	
C504		CMXB2A183J	C MYLAR	100V 0.018MF J (ED)	
! C505		CMXE2A272J	C MYLAR	100V 2700PF J (PL)	
C506		CMXB2A103J	C MYLAR	100V 0.01MF (EU)	
C507		CCXB1H681K	C CERA	HIKB 50V 680PF K	
C509		CMXB2A273J	C MYLAR	100V 0.027MF EU J	
C511		CMXB2A104J	C MYLAR	100V 0.1MF J	
C512		CCXB2A332J	C MYLAR	100V 3300PF EU J	
C514		CEXF1C471V	C ELECTRO	16V 470MF RSS	
C516		CMXB2A473J	C MYLAR	100V 0.047MF J	
C523		CCXB1H102K	C CERA	HIKB 50V 1000PF K	
C524		CEXE2D470C	C ELECTRO	200V 47MF RU	
C525		CCXB2H103K	C CERA	HIKB 500V 0.01MF K	
! * @ C526		CMXE2J123J	C MYLAR	630V 0.012MF J PL	
! * @ C527		CMXH3C282J	C MYLAR	1.6KV 2800PF J BUP	
! * @ C528		CMXH3C392J	C MYLAR	1.6KV 3900PF J BUP	
* C529		CEXE1V470A	C ELECTRO	35V 47MF RS	
* C530		CEXE1E470A	C ELECTRO	25V 47MF RS	
C532		CCXB2H561K	C CERA	HIKB 500V 560PF K	
C536		CCXF2H472Z	C CERA	HIKF 500V 4700PF Z	
C537		CCXB1H472K	C CERA	HIKB 50V 4700PF K	
! C538		CMXB2A122J	C MYLAR	100V 1200PF EU	
! * @ C540		CMXF2D564J	C MYLAR	200V 0.56MF MPP	
! * @ C542		CMXF2D155J	C MYLAR	200V 1.5MF MPP	
C544		CCXB1H472K	C MYLAR	HIKB 50V 4700PF K	
C549		CCXB2H561K	C MYLAR	HIKB 500V 560PF K	
C550		CCXB2H152K	C CERA	HIKB 500V 1500PF K	
! * C551		CMXH3C102J	C MYLAR	1.6KV 100PF BUP J	
C552		CMXF1H103Z	C CERA	HIKB 50V 0.01MF Z	
C553		CEXE1C330A	C ELECTRO	16V 33MF RS	
C554		CCXF1H103Z	C CERA	HIKB 50V 0.01MF Z	
C601		CEXE1E470A	C ELECTRO	25V 47MF RS	
C602		CEXE1H479A	C ELECTRO	50V 4.7MF RS	
C603		CMXM2A104J	C MYLAR	100V 0.1MF J	
C604		CEXE1E470A	C ELECTRO	25V 47MF RS	
C606		CMXM2A104J	C MYLAR	100V 0.1MF J	
C612		CEXF1E101V	C ELECTRO	25V 100MF RS	
C616		CMXM2A104J	C MYLAR	100V 0.1MF J	
C617		CEXE1E470A	C ELECTRO	25V 47MF RS	
C624		CMXM2A104J	C MYLAR	100V 0.1MF J	
C626		CMXE1E470A	C ELECTRO	25V 47MF RS	
C627		CEXF1E101V	C ELECTRO	25V 100MF RSS	
C629		CEXE1H100A	C ELECTRO	50V 10MF RS	
C630		CCXB2A102J	C MYLAR	100V 1000PF J	
C640		CCXF1H104Z	C ELECTRO	HIKF 50V 0.1MF Z	
C641		W581GY7595	WIRE JUMPER	AWG22 1/0.65 SN 7.5	
C801		CEXE1H478A	C ELECTRO	50V 0.47MF RS	
C802		CEXE1V471A	C ELECTRO	35V 470MF RS	
C803		CMXM2A104J	C MYLAR	100V 0.1MF J	
C805		CEXE1H109A	C ELECTRO	50V 1MF RS	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
C806		CCXF1H473Z	C CERA	HIKF 50V 0.047MF Z	
C807		CEXE1C101A	C ELECTRO	16V 100MF RS	
C808		CCXB1H221K	C CERA	HIKF 50V 330PF Z	
C809		CMXM2A103J	C MYLAR	100V 0.01MF J	
C810		CEXF1V101V	C ELECTRO	50V 100MF RSS	
C8011		CEXE1H478A	C ELECTRO	50V 0.04MF RS	
C8021		CEXE1V471A	C ELECTRO	35V 470MF RS	
C8031		CMXM2A104J	C MYLAR	100V 0.1MF J	
C8051		CEXE1H109A	C ELECTRO	50V 1MF RS	
C8061		CCXF1H473Z	C CERA	HIKF 50V 0.047MF Z	
C8081		CCXB1H221K	C CERA	HIKB 50V 220PF K	
C8091		CMXM2A103J	C MYLAR	100V 0.01MF J	
C8101		CEXF1V101V	C ELECTRO	50V 100MF RSS	
!	L001	5PTLF1015-	FILTER LINE	TLF-1015 (USING UL/CAS DELETE)	
!	L002	5PTLF2030-	FILTER LINE	TLF-2030	
		5PBSF2240-	FILTER LINE	BSF-2240	UL/CSA
	L004	5MC0000004	COIL CHOKE	CH-101	
	L032	5MC0000027	COIL CHOKE	L-60 (60UH)	
	L034	5MC0000027	COIL CHOKE	L-60 (60UH)	
	L035	5MC241K046	COIL CHOKE	CH-241K	
	L036	5MC0000004	COIL CHOKE	CH-101	
	L040	5MC0000027	COIL CHOKE	L-60 (60UH)	
!*	L503	5MW0000033	COIL WIDTH	TRW-140	
!*	L505	CMH0000046	COIL H-LINEARITY	TRL-151T	
	L508	5MC0000006	COIL CHOKE	HC-202K	
	L509	58Z689J023	COIL PEAKING	PL-6R8J (6.8UH J)	
!	IC001	1STK734102	IC	STK73410II	
	IC001A	9977015900	HEAT SINK A	A1050P-H24 T2.0	
	IC001C	7173301411	SCREW TAPPTITE	TT2 BIN 3X14 MFZN	
	IC001E	9975826700	LABEL CAUTION		
	IC002	1STR50330-	IC	STR50330	
*	IC401	1DBL2009--	IC	DBL2009	
	IC402	1TDA1675A-	IC	TDA1675A	
	IC402A	9977015700	HEAT SINK V	A1050P-H24 T1.0	
	IC402B	7173300811	SCREW TAPPTITE	TT2 BIN 3X8 MFZN	
	IC403	1GL7815---	IC	GL7815	
	IC404	1GD4528B--	IC	GD4528B	
	IC405	1GL7805---	IC	GL7805	
	IC501	1GD4066B--	IC	GD4066B	
	IC601	1GD74HCT86	IC	GD74HCT86	
	IC602	1GL7808---	IC	GL7808	
	IC801	1TDA1013A-	IC	TDA1013A	
	IC802	1TDA1013A-	IC	TDA1013A	
	Q033	TZTC3206Y-	TR	KTC3206Y	
	Q401	TZTC3198Y-	TR	KTC3198Y	
	Q402	TZTC3198Y-	TR	KTC3198Y	
	Q403	TZTC3198Y-	TR	KTC3198Y	
	Q405	TZTC3198Y-	TR	KTC3198Y	
	Q406	TZTC3198Y-	TR	KTC3198Y	
	Q407	TZTC3203Y-	TR	KTC3203Y	
	Q409	TZTC3203Y-	TR	KTC3203Y	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
		Q410	TZTA473Y--	TRE	KTA473Y
		Q411	TZTA1270Y-	TR	KTA1270Y
		Q412	TZTC3198Y-	TR	KTC3198Y
		Q502	T1RF740---	FET	IRF740
!		Q503	TKSC2688-0	TR	KSC2688-0
!*		Q504	T2SC3892A-	TR	2SC3892Y
		Q504A	9977015800	HEAT SINK A	A1050P-H24 T1.0
		Q504B	7178301011	SCREW TAPPTITE	TT2 WAS 3X10 MFZN
		Q505	TSSP4N80A-	FET	SSP4N80A
		Q506	T1RF740---	FET	IRF740
		Q507	TZTC3198Y-	TR	KTC3198Y
		Q509	TZTC3198Y-	TR	KTC3198Y
*		Q510	T2SD1883--	TR	2SD1883
		Q510A	T2SD1555--	TR	2SD1555
		Q603	TZTC3198Y-	TR	KTC3198Y
		Q604	TZTC3198Y-	TR	KTC3198Y
		Q605	TZTC3198Y-	TR	KTC3198Y
		Q606	TZTC3198Y-	TR	KTC3198Y
		Q607	TZTC3198Y-	TR	KTC3198Y
		Q608	TZTA1266Y-	TR	KTC1266Y
		Q609	TZTC3198Y-	TR	KTC3198Y
		Q620	TZTC3198Y-	TR	KTC3198Y
		Q621	TZTC3198Y-	TR	KTC3198Y
@		D001	DLB156---	DIODE	LB156
		D003	DKLG205E--	LED	KLG-205E 1X5 GREEN
		D005	DRF1-----	DIODE	RF-1
		D005A	DTVR1G----	DIODE	TVR1G
		D006	DRF1-----	DIODE	RF-1
		D006A	DTVR1G----	DIODE	TVR1G
		D022	DRU3M----	DIODE	RU3M
!@		D031	DRU3M----	DIODE	RU3M
		D033	DRU3M----	DIODE	RU3M
		D036	DRU2M----	DIODE	RU2M
		D037	DRU2M----	DIODE	RU2M
		D038		DIODE	EU1
		D040	DRF1-----	DIODE	RF-1
		D040A	DTVR1G----	DIODE	TVR1G
		D104	DZN4148---	DIODE	1N4148
		D106	DZN4148---	DIODE	1N4148
		D108	DZN4148---	DIODE	1N4148
		D109	DRF1-----	DIODE	RF-1
		D109A	DTVR1G----	DIODE	TVR1G
		D110	DZN4148---	DIODE	1N4148
		D111	DZN4148---	DIODE	1N4148
		D401	DRH1B----	DIODE	RH-1B
		D403	DZN4148---	DIODE	1N4148
		D404	DZN4148---	DIODE	1N4148
		D406	DZN4148---	DIODE	1N4148
		D468	DZN4148---	DIODE	1N4148
		D501	DDZ12BM---	DIODE ZENER	DZ12BM
		D502	DRF1-----	DIODE	RF-1
		D502A	DTVR1G----	DIODE	TVR1G

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
D503		DRF1-----	DIODE	RF-1	
D503A		DTVR1G----	DIODE	TVR1G	
D505		DRF1-----	DIODE	RF-1	
D505A		DTVR1G----	DIODE	TVR1G	
D506		DZN4148---	DIODE	1N4148	
!* D507		DERD07-15-	DIODE	ERD07-15	
* D508		DDZ22BM---	DIODE	DZ22BM	
* D510		DRF1-----	DIODE	RF-1	
D510A		DTVR1G----	DIODE	TBR1G	
D511		DRF1-----	DIODE	RF-1	
D511A		DTVR1G----	DIODE	TVR1G	
D518		DRF1-----	DIODE	RF-1	
D518A		DTVR1G----	DIODE	TVR1G	
D605		DDZ5R1B---	DIODE ZENER	DZ-5.1B	
D606		DDZ5R1B---	DIODE ZENER	DZ-5.1B	
D607		DZN4148---	DIODE	1N4148	
VR001		RV5221202-	R SEMI FIXED	V2K-5X2.5-6Y-PC-RP	
VR103		RV62212033	R SEMI FIXED	CET 689A 0.3W 20K OHM	
VR410		RV5221504-	R SEMI FIXED	V500K-5X2.5-6Y-PC-RP	
VR411		RV5221204R	R SEMI FIXED	V200K-5X2.5-6Y-PC-RP	
VR412		RV6221205C	R SEMI FIXED	CET 118C B2M OHM	
VR451		RV5221501-	R SEMI FIXED	V500-5X2.5-6Y-PC-RP	
VR508		RV5221103-	R SEMI FIXED	V10K-5X2.5-6Y-PC-RP	
VR514		RV5221503-	R SEMI FIXED	V50K-5X2.5-6Y-PC-RP	
VR526		RV5221104-	R SEMI FIXED	V100K-5X2.5-6Y-PC-RP	
VR806		5V1103016B	VR ROTARY	V012L-PHJ-20F-10KB	
VR861		RV5221203-	R SEMI FIXED	V20K-5X2.5-6Y-PC-RP	
VR901		5V1103016B	VR ROTARY	V012L-PHJ-20F-10KB	
VR902		5V1103017B	VR ROTARY	V012L-PHJ-20F-10KB (C.C)	
VR903		5V1503005B	VR ROTARY	V012L-PHJ-20F-B5K	
VR904		5V1503011B	VR ROTARY	V012L-PHJ-20F-50KB	
VR905		5V1104011B	VR ROTARY	V012L-PHJ-20F-100KB	
SW1		5S40202054	SW POWER PUSH	ME 5A-061 SPOT 250V 2.5A	
SW2		5S40202572	SW PUSH	KPA2251P 2C-2P	
SW3		5S90303001	SW LEVER	P12T21	
S1		4859232320	CONN WAFER	5267-02A	
S2		4859232320	CONN WAFER	5267-02A	
S2N		4859232420	CONN WAFER	5267-03A	
TA1		9979100001	BOARD JACK 2P	DA-9PF1	
TP1		4857416900	TERMINAL WARP	BSP1(SW) L=15MM	
TP2		4857416900	TERMINAL WARP	BSP1(SW) L=15MM	
!@ T001		5RM0000049	TRANS SMPS	TSW-4257	
! T002		5RP0000029	TRANS POWER	CT-002	
! T501		5RD0000051	TRANS DRIVE	THD-141	
* @ T502		5RH0000043	FBT	DCF-1580(E)	
T503		7173401011	SCREW TAPPTTIE	TT2 BIN 4X10 MFZN	
* T505		5RC0000009	TRANS SPC	TPC-140	



LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
J001		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J002		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J003		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J004		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J006		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J007		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J008		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J009		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J010		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J011		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J012		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J013		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J014		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J015		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J016		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J017		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J018		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J019		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J020		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J021		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J022		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J023		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J024		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J025		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J026		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J027		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J028		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J029		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J030		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J031		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J032		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J033		RD-4Z473J-	R CARBON FILM	1/4 47K OHM J	
J034		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J035		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J037		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J038		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J039		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J040		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J041		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J043		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J044		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J045		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J046		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J047		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J048		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J049		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J050		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J051		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J052		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J053		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J054		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J055		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J056		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
J057		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J058		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J059		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J060		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J062		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J063		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J064		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J065		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J066		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J067		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J068		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J069		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J070		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J071		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J072		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J073		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J074		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J075		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J076		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J077		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J078		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J079		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J080		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J081		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J082		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J083		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J084		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J085		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J086		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J087		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J088		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J089		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J090		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J091		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J092		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J093		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J094		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J095		W581GY7595	WIRE JUMPER	AWG22 1/0.65 GY 7.5	
J096		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J097		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J098		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	
J099		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J100		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J101		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J102		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J103		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J104		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J106		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J107		W581GY17J5	WIRE JUMPER	AWG22 1/0.65 GY 17.5	
J108		W581GY1505	WIRE JUMPER	AWG22 1/0.65 GY 15	
J110		W581GY1005	WIRE JUMPER	AWG22 1/0.65 GY 10	
J111		W581GY12J5	WIRE JUMPER	AWG22 1/0.65 GY 12.5	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
00010		9972012407	COVER FRONT	H.N HFA700 0L.747KG GY151A	
00010		2210809975	RESIN ABS	H.N HFA700 V22722 B R/BE	
00020		9979911100	RUBBER WASHER	RUBBER B.K 20X5.2 T2.0	
00030		9976011800	SPECIAL SCREW 5	5X24 SWRM+SPCC(T1.2) ZN	
00040		9972810500	DOOR	ABS IVR 0.03KG GY-117A	
00050		9974210602	KNOB VR	ABS BEG/1G6GY-210B	
00060		9974911202	BUTTON GREEN SW	ABS BEG QG GY-210B	
00010		2221080613	RESIN ABS	H.N 700 BEG V27571 GY210B	
00070		9974811002	BUTTON POWER SW	ABS BEG 3G GY-210G	
00080		4857920400	LOCK DOOR	TCB-1488MW	
00090		9973718400	GUIDE PCB R	ABS IVR 21G GY-117A	
00100		9973718500	GUIDE PCB L	ABS IVR 21G GY-117A	
00110		4856812001	TIE CABLE	NYLONOO DA100	
00120		7173401011	SWREW TAPPTITE	STT2 BIN 4X10 MFZN	
00130		9972710200	FOOT L	TMR-CA BLK	
00140		7173300811	SCREW TAPPTITE	TT2 BIN 3X8 MFZN	
00155		7171401011	SEREW TAPPTITE	TT2 PAN 4X10 MFZN	
00160		9975611003	BRAND 1410	AL 50.5X63.9X13.0	
00170		4856812200	WIRE SADALE	NYLON66	
00180		9973720500	SUPPORTER FBT	RUBBER	
00020		9973310501	BKT REAR	SBHG1-A 1X273X50	
00030		7402204010	WASHER TOOTHED	MR EXT TOOTH WH ZINC	
00040		7053400811	SCREW MACHINE	BIN 4X8 SW MFZN	
00050		7175300811	SCREW TAPPTITE	TT2 FLT 3X8 MFZN	
00060		7123300611	SCREW TAPPTITE	T2S BIN 3X5 MFZN	
00070		9973710002	HOLDER SIGNAL CABLE	SBHG1-A T1.0X15.26.5	
00080		7003301011	SCREW MACHINE	BIN 3X10 MFZN	
00090		9970790046	CABLE SIGNAL ASSY	15P+5264-3+5395-7=1600	
00100		9979200303	POWER RECEPTACLE AS	SK=15A+OP18 RING=160	
00105		9973916200	BKT FBT	SBHG1-A T1.2	
00010		9979800338	PCB MAIN	T1.6X330X247	

**B. CRT BOARD**

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
C101		CEXF1C470C	C ELECTRO	16V 47MH RUS	
C102		CEXE1H229C	C ELECTRO	50V 2.2MF RU	
C103		CEXE1H100C	C ELECTRO	50V 10MF RU	
C105		CMXM2A104J	C MYLAR	100V 0.1MF J	
C106		CEXF1C101C	C ELECTRO	16V 100MF RUS	
C108		CCXB1H151K	C CERA	HIKB 50V 150PF K	
		CCXB1H271K	C CERA	HIKB 50V 270PF K	UL/CSA
C109		CCXF1H103Z	C CERA	HIKF 50V 0.01MF Z	
C110		CCXF1H103Z	C CERA	HIKF 50V 0.01MF Z	
C111		CEXD1C470F	C ELECTRO	16V 47MF RND	
C117		CEXF1C101C	C ELECTRO	16V 100MF RUS	
C201		CEXF1C470C	C ELECTRO	16V 47MF RUS	
C202		CEXE1H229C	C ELECTRO	50V 2.2MF RU	
C208		CCXB1H101K	C CERA	HIKB 50V 100PF K	
		CCXB1H271K	C CERA	HIKB 50V 270PF K	ULCSA
C301		CEXF1C470C	C ELECTRO	16V 47MF RUS	
C302		CEXE1H229C	C ELECTRO	50V 2.2MF RU	
C308		CCXB1H121K	C CERA	HIKB 50V 120PF K	
		CCXB1H271K	C CERA	HIKB 50V 270PF K	UL/CSA
C801		CCXF1H103Z	C CERA	HIKB 50V 0.01MF Z	
C803		CCXF2H472Z	C CERA	HIKB 500V 4700PF Z	
C804		CEXE2A479C	C ELECTRO	100V 4.7MF RU	
C811		CCXF1H103Z	C CERA	HIKF 50V 0.01MF Z	
C813		CCXF2H472Z	C CERA	HIKB 500V 4700PF Z	
C814		CEXE2A479C	C ELECTRO	100V 4.7MF RU	
C821		CCXF1H103Z	C CERA	HIKF 50V 0.01MF Z	
C823		CCXF2H472Z	C CERA	HIKB 500V 4700PF Z	
C824		CEXE2A479C	C ELECTRO	100V 4.7MF RU	
C833		CCXB2H102K	C CERA	HIKB 500V 1000PF K	
C834		CEXB3D103P	C CERA	HIKE 2KV 0.01MF P	
C842		CEXE2A100C	C ELECTRO	100V 10MF RU	
C843		CEXF1C221C	C ELECTRO	16V 220MF RUS	
C850		CEXE2A100C	C ELECTRO	100V 10MF RU	
C851		CCXF2H103Z	C CERA	HIKB 500V 0.01MF Z	
R101		RD-4Z750J	R CARBON FILM	1/4 75 OHM J	
R102		RD-AZ152J	R CARBON FILM	1/6 1.5K OHM J	
R104		RD-AZ102J	R CARBON FILM	1/6 1K OHM J	
R105		RD-AZ820J	R CARBON FILM	1/6 82 OHM J	
		RD-AZ750J	R CARBON FILM	1/6 75 OHM J	UL/CSA
R106		RD-AZ101J	R CARBON FILM	1/6 100 OHM J	
		RD-AZ200J	R CARBON FILM	1/6 20 OHM J	UL/CSA
R110		RD-AZ183J	R CARBON FILM	1/6 18K OHM J	
R112		RD-AZ471J	R CARBON FILM	1/6 470 OHM J	
R113		RD-AZ183J	R CARBON FILM	1/6 18K OHM J	
R114		RD-AZ123J	R CARBON FILM	1/6 12K OHM J	
R130		RD-AZ302J	R CARBON FILM	1/6 3K OHM J	
R201		RD-4Z750J	R CARBON FILM	1/4 75 OHM J	
R202		RD-AZ152J	R CARBON FILM	1/6 1.5K OHM J	
R204		RD-AZ102J	R CARBON FILM	1/6 1K OHM J	
R205		RD-AZ390J	R CARBON FILM	1/6 39 OHM J	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
R206		RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
		RD-AZ200J-	R CARBON FILM	1/6 20 OHM J	UL/CSA
R301		RD04Z750J-	R CARBON FILM	1/4 75 OHM J	
R302		RD-AZ152J-	R CARBON FILM	1/6 1.5K OHM J	
R304		RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R305		RD-AZ390J-	R CARBON FILM	1/6 39 OHM J	
R306		RD-AZ820J-	R CARBON FILM	1/6 82 OHM J	
		RD-AZ200J-	R CARBON FILM	1/6 20 OHM J	UL/CSA
R623		RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
R528		RD-AZ682J-	R CARBON FILM	1/6 6/8K OHM J	
R630		RD-AZX123J-	R CARBON FILM	1/6 12K OHM J	
R631		RD-2Z471J-	R CARBON FILM	1/2 470 OHM J	
@ R803		RS02Y681J-	R METAL OXIDE	2W 680 OHM J	
@ R804		RS02Y681J-	R METAL OXIDE	2W 680 OHM J	
R805		RS-2Y560JF	R METAL OXIDE	1/2 56 OHM J	
R807		RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R808		RS01Y472J-	R METAL OXIDE	1W 4.7K OHM J	
@ R813		RS02Y681J-	R METAL OXIDE	2W 680 OHM J	
@ R814		RS02Y681J-	R METAL OXIDE	2W 680 OHM J	
R815		RS-2Y560JF	R METAL OXIDE	1/2 56 OHM J	
R817		RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R818		RS01Y472J-	R METAL OXIDE	1W 4.7K OHM J	
@ R823		RS02Y681J-	R METAL OXIDE	2W 680 OHM J	
@ R824		RS02Y681J-	R METAL OXIDE	2W 680 OHM J	
R825		RS-2Y560JF	R METAL OXIDE	1/2 56 OHM J	
R827		RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R828		RS01Y103J-	R METAL OXIDE	1W 4.7K OHM J	
R831		RC-2Z470J-	R CARBON COMP	1/2 47 OHM J	
R833		RD-2Z562J-	R CARBON FILM	1/2 5.6K OHM J	
R834		RD-2Z564J-	R CARBON FILM	1/2 560K OHM J	
R841		RC-2Z470J-	R CARBON COMP	1/2 47 OHM J	
R851		RD-2Z470J-	R CARBON COMP	1/2 47 OHM J	
R121		RV5221101-	R SEMI FIXED	RVM 639A 100 OHM B	
R131		RV5221101-	R SEMI FIXED	RVM 639A 100 OHM B	
R809		RV62211033	R SEMI FIXED	CET 689A 0.3W 10K OHM	
R819		RV62211033	R SEMI FIXED	CET 689A 0.3W 10K OHM	
R829		RV62211033	R SEMI FIXED	CET 689A 0.3W 10K OHM	
D102		DZN4148---	DIODE	1N4148	
D103		DZN4148---	DIODE	1N4148	
D108		DZN4148---	DIODE	1N4148	
D202		DZN4148---	DIODE	1N4148	
D203		DZN4148---	DIODE	1N4148	
D302		DZN4148---	DIODE	1N4148	
D303		DZN4148---	DIODE	1N4148	
D801		DZN4148---	DIODE	1N4148	
D805		DDZ30BM---	DIODE ZENER	DZ30BM	
D811		DZN4148---	DIODE	1N4148	
D815		DDZ30BM---	DIODE ZENER	DZ30BM	
D821		DZN4148---	DIODE	1N4148	
D825		DDZ30BM---	DIODE ZENER	DZ30BM	

LOC.	BUYER NO.	PART-CODE	PART-NAME	PART-DESC.	REMARK
Q101		T2SC3504E-	TR	2SC3504E	
Q201		T2SC3504E-	TR	2SC3504E	
Q301		T2SC3504E-	TR	2SC3504E	
Q623		TZTC3202Y-	TR	KTC3202Y	
Q624		TZTC3202Y-	TR	KTC3202Y	
!@ Q802		T2SC3788--	TR	2SC3788	
Q802A		9977010800	HEAT SINK D	A1050--H24 EK	
Q802B		7178301011	SCREW TAPPTITE	TT2 WAS 3X10 MFZN	
Q802C		9976410500	SHAFT	SWRM SN PLATE	
Q803		T2SC3502E-	TR	2SC3502E	
Q804		T2SA1370E-	TR	2SA1370E	
!@ Q812		T2SC3788--	TR	2SC3788	
Q812A		9977010800	HEAT SINK D	A1050--H24 EK	
Q812B		7178301011	SCREW TAPPTITE	TT2 WAS 3X10 MFZN	
Q812C		9976410500	SHAFT	SWRM SN PLATE	
Q813		T2SC3502E-	TR	2SC3502E	
Q814		T2SA1370E-	TR	2SA1370E	
!@ Q822		T2SC3788--	TR	2SC3788	
Q822A		9977010800	HEAT SINK D	A1050--H24 EK	
Q822B		7178301011	SCREW TAPPTITE	TT2 WAS 3X10 MFZN	
Q822C		9976410500	SHAFT	SWRM SN PLATE	
Q823		T2SC3502E-	TR	2SC3502E	
Q824		T2SA1370--	TR	2SA1370E	
L801		5CPX479K--	COIL PEAKING	4.7UH K	
L802		W581GY5095	WIRE JUMPER	AWG22 1/0.65 SN 5	
		5CN189N001	COIL BEAD	BLI-7.5A	UL/CSA
L811		5CPX479K--	CIOL PEAKING 4.7UH K		
L812		W581GY5095	WIRE JUMPER	AWG22 1/0.65 SN 5	
		5CN189N001	COIL BEAD	BLI-7.5A	UL/CSA
L821		5CPX479K--	CIOL PEAKING 4.7UH K		
L822		W581GY5095	WIRE JUMPER	AWG22 1/0.65 SN 5	
		5CN189N001	COIL BEAD	BLI-7.5A	UL/CSA
L850		5MC0000004	COIL CHOKE	CH-101	
! SG01		DSP201MSOB	SURGE PROTECTOR	DSP201M	
A		ZEW295804A	SPARK GAP	S-23 1KV (LEAD 4.5M/M)	
! SG02		DSP201MSOB	SURGE PROTECTOR	DSP201M	
A		ZEW295804A	SPARK GAP	S-23 1KV (LEAD 4.5M/M)	
! SG03		DSP201MSOB	SURGE PROTECTOR	DSP201M	
A		ZEW295804A	SPARK GAP	S-23 1KV (LEAD 4.5M/M)	
BM		99707C0001	CONN AS	5264-12+5395+1007#24=300	
GND		4857416100	PIN B TERM PRES	BDBP1	
IC101		1DBL2019--	IC	DBL2019	
A		1DA8631N--	IC	TA8631N	
IC603		17905-----	IC	GL7905	
SP01		4858302221	SPEAKER	1W 16 OHM P-300R	
SP02		4858302221	SPEAKER	1W 16 OHM P-300R	
S31N		9970720017	CONN AS	5264-02+T+1007 SHAP24=500	
S32N		9970720018	CONN AS	5264-02+T+1007 SHAP24=750	
V801C		9976300007	SOCKET CRT	S008626	