GDM-1937

SERVICE MANUAL

Chassis No. SCC-D05R-A

SPECIFICATIONS

Picture tube	0.30 mm aperture grill pitch 19 inches measured diagonally (19" visual) 90-degree deflection
Effective picture size	Approx. 384 x 290 mm (w/h) (15 1/4 x 11 1/2 inches)
Resolution	Horizontal : 320* to 1280 dots (*VGA mode) Vertical : 200* to 1024 lines (*VGA mode)
Display picture size	Approx. 360 x 270 mm (w/h) (14 1/4 x 10 3/4 inches) or Approx. 343 x 274 mm (w/h) (13 5/8 x 10 7/8 inches)
Deflection frequency	Horizontal : 30 to 71kHz Vertical : 50 to 120Hz
AC input voltage/current	100 to 120V, Max. 3.7A 220 to 240V, 2.0A
Dimensions	480 x 479 x 504.5 mm (w/h/d) (19 x 18 7/8 x 19 7/8 inches)
Weight	Approx. 32kg (70 lb 9 oz)
Supplied accessory	AC power cord (for 220 to 240V only)

Design and specifications are subject to change without notice.

– Continued on next page

MICROFILM

MULTISCAN® COLOR GRAPHIC DISPLAY MONITOR

SONY®

Detailed Timing Specifications of Preset-Type Models

Mode	1	2	3	4	5	6	7	8	9	10
Mode name	VGA* (Graphic)	VGA* (EGA Em)	VGA* (Text)	SPEA-Lo	STD-Lo	GE UNIQUE	SUN	STD Hi	Mac Hi	SPEA-Hi
Resolution (H × V)	640 × 480	640 × 350	720 × 400	800 × 600	1024 × 768	1024 × 768	1152 × 900	1280 × 1024	1152 × 870	1280 × 1024
Dot Clock (MHz)	25.175	25.175	28.322	33.75	64.00	75.00	92.94	108.18	100.00	120.24
Horizontal **										
Hor. freq. (kHz)	31.469	31.469	31.469	33.48	48.78	57.87	61.797	63.337	68.681	70.9
H-Total	31.778	31.778	31.778	29.867	20.50	17.28	16.182	15.789	14.560	14.11
H-Blanking	6.356	6.356	6.356	6.163	4.50	3.63	3.79	3.956	3.040	3.46
H-Front porch	0.636	0.636	0.636	0.474	1.00	0.32	0.31	0.407	0.320	0.13
H-Sync. width	3.813	3.813	3.813	3.793	1.50	1.92	1.377	1.701	1.280	1.2
H-Back porch	1.907	1.907	1.907	1.896	2.00	1.39	2.098	1.849	1.440	2.13
H-Active (μ sec)	25.422	25.422	25.422	23.704	16.00	13.65	12.40	11.832	11.520	10.65
Vertical										
Ver. freq. (Hz)	59.94	70.086	70.086	54	60.00	71.80	66	59.978	75.062	66.95
V-Total	525	449	449	620	813	806	937	1056	915	1059
V-Blanking	45	99	49	20	45	38	37	32	45	35
V-Front porch	10	37	12	1	3	3	2	3	3	1
V-Sync. width	2	2	2	3	3	6	4	3	3	3
V-Back porch	33	60	35	16	39	29	31	26	39	31
V-Active (Lines)	480	350	400	600	768	768	900	1024	870	1024
Sync	External	External	External	External	Internal	Internal	Internal	Internal	Internal	Internal
H-Polarity	(−)	(+)	(−)	(+)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
V-Polarity	(−)	(−)	(+)	(+)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

* **VGA does not include border area**

** **Recomended horizontal timing conditions:**

Horizontal front porch should be > 0.1 μ sec
Horizontal back porch should be > 1.5 μ sec
Horizontal blanking width should be > 3.5 μ sec

NEVER APPLY A POWER SUPPLY VOLTAGE MORE THAN AC150V IN A CONDITION IN WHICH THE DEGAUSS COIL HAS BEEN REMOVED.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL FOR SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL FOR SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

ATTENTION AUX COMPOSANTS RELATIFS À LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÈS PAR UNE TRAME ET PAR UNE MARQUE ⚠ SUR LES SCHÉMAS DE PRINCIPE, LES VUES EXPLOSÉES ET LES LISTES DE PIECES SONT D'UNE IMPORTANCE CRITIQUE POUR LA SÉCURITÉ DU FONCTIONNEMENT. NE LES REMPLACER QUE PAR DES COMPOSANTS SONY DONT LE NUMÉRO DE PIÉCE EST INDIQUÉ DANS LE PRÉSENT MANUEL OU DANS DES SUPPLÉMENTS PUBLIÉS PAR SONY. LES RÉGLAGES DE CIRCUIT DONT L'IMPORTANCE EST CRITIQUE POUR LA SÉCURITÉ DU FONCTIONNEMENT SONT IDENTIFIES DANS LE PRÉSENT MANUEL. SUIVRE CES PROCÉDURES LORS DE CHAQUE REMPLACEMENT DE COMPOSANTS CRITIQUES, OU LORSQU'UN MAUVAIS FONCTIONNEMENT EST SUSPECTÉ.

SAFETY CHECK-OUT
(US Model only)

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cords for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the B+ and HV to see if they are specified values. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
8. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC Leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOMs that are suitable. Nearly all battery operated digital multimeters that have a 2V AC range aresuitable. (See Fig. A)

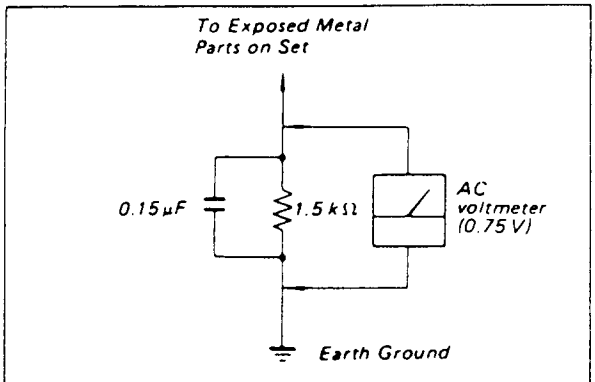


Fig. A. Using an AC voltmeter to check AC leakage.

TABLE OF CONTENTS

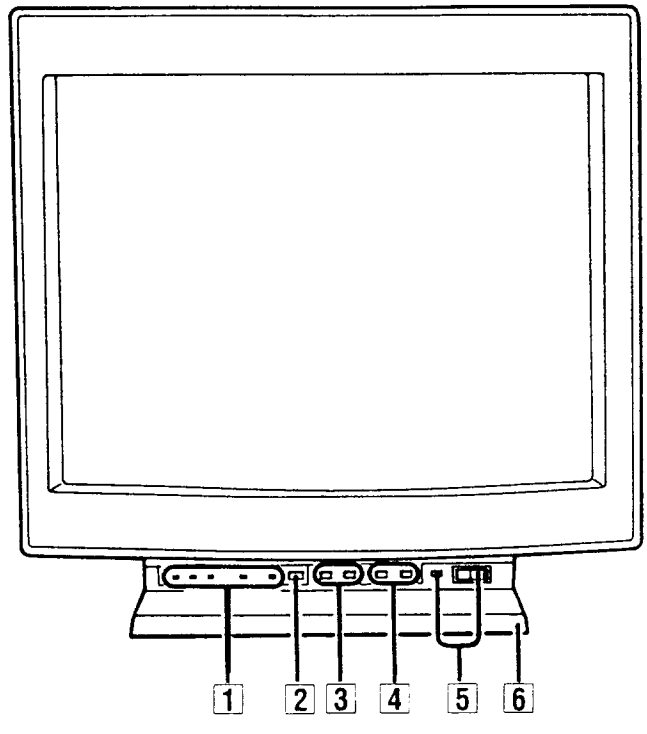
OVERVIEW

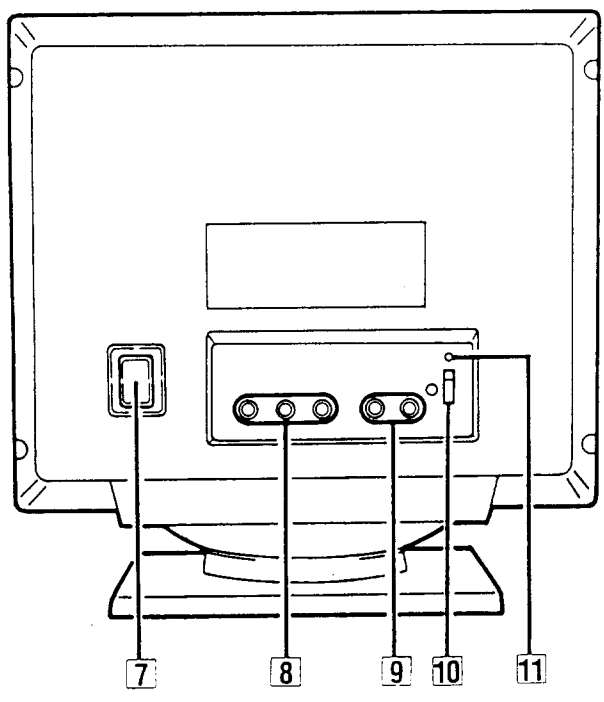
The Sony GDM-1937 is a multiscan-type Trinitron ™ color graphic display, that displays the video signals input from the connected computer with the optimum picture quality. It can input the wide range of video signals (30 to 71 kHz of horizontal scan and 50 to 120 Hz of vertical scan), and can be used with a variety of computers and workstations. Its new "Sony Display Memory System (SDMS)" automatically distinguish the type of input signals and provides an optimum display without any manual adjustment. It has factory-preset display values for 10 different types of signals (preset-type models) within the SDMS memory. The values for up to 15 types of signals can additionally be preset to the memory.

The Sony GDM-1937 is a result of Sony's 20-year commitment to the proprietary Emmy Award winning Trinitron and our engineering expertise.

SECTION 1
GENERAL

1-1. FUNCTION OF CONTROLS





[1] **Indicators**
One of the indicators that correspond to the adjustment item chosen by the SELECT button [2] lights up.
Adjustment by the ADJUST+/– buttons [3] is possible while the indicator is lit.
All indicators light up instantly (for about 0.25 seconds) when the stored conditions are cleared.

[2] **SELECT button**
Press to select the adjustment item so that the required indicator lights up.

[3] **ADJUST +/– buttons**
Adjust the item chosen by using the SELECT button [2].

[4] **◐ (contrast) +/– buttons**
Adjust the picture contrast.

[5] **Power switch and lamp**
Press the I side of the switch to turn on the power.
Press the ○ side to turn it off.

[6] **Swivel/Tilt stand**
The stand allows the angle of the screen to be adjusted by 90 degrees horizontally and by 15 degrees vertically.

[7] **AC IN connector**

[8] **VIDEO IN (video input) connectors (BNC)**
Accept RGB video signals (0.714Vp-p, positive).
When no external sync signal is applied, an internal sync signal (0.286Vp-p, negative) must be added to the G (green) signal.

Note

The optimum display may not be obtained when using computer or video board of high output level (approx.1.0Vp-p). In such a case, adjust the display by lowering the contrast, or use computer or video board of adequate output level.

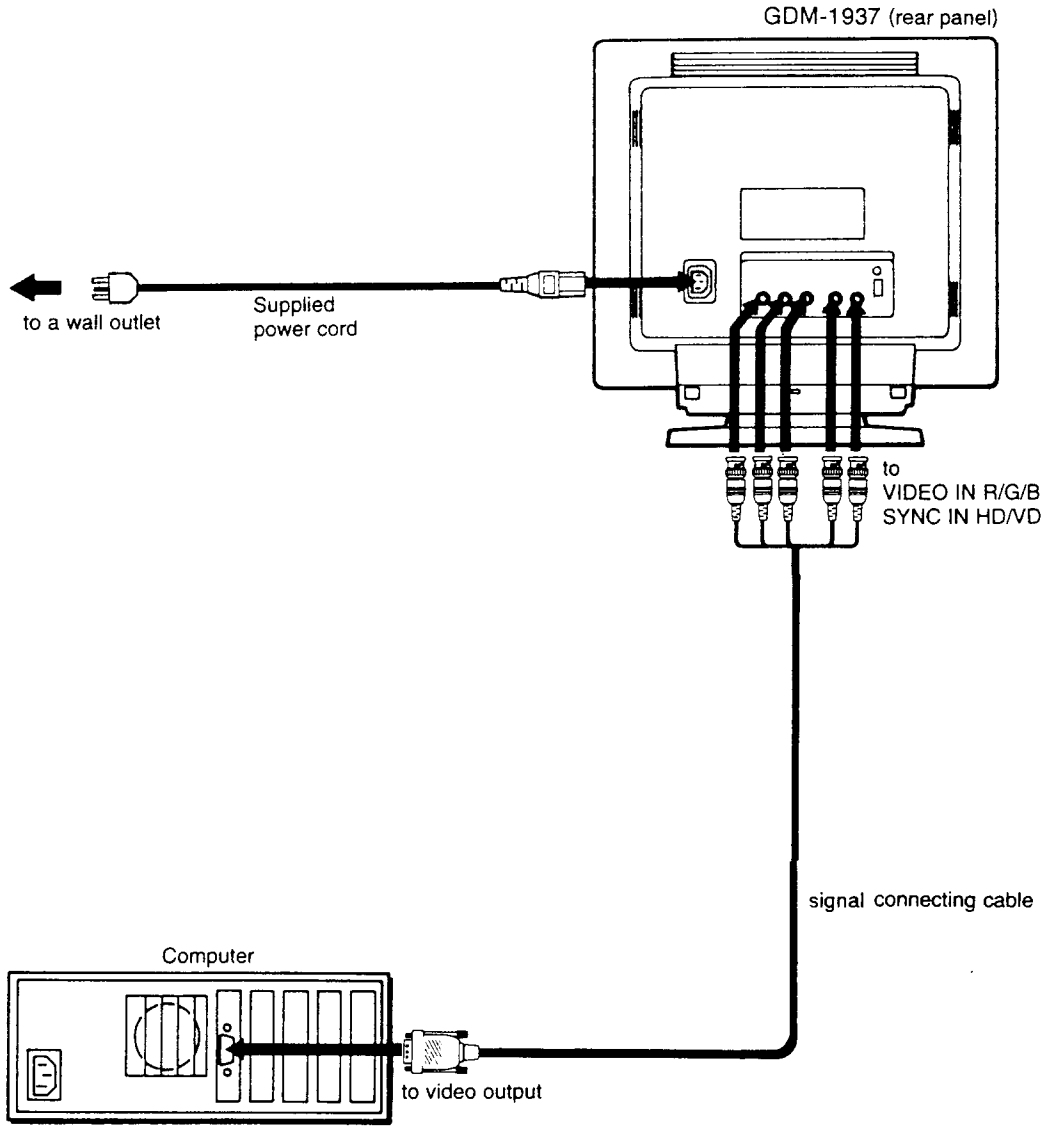
[9] **SYNC IN (sync input) connectors (BNC)**
Accept external sync signals (2 to 5Vp-p, positive or negative).
HD : for horizontal drive pulse or composite drive pulse
VD : for vertical drive pulse
When an external sync signal is applied, the monitor is switched automatically from the internal sync mode to the external sync mode. When the G signal contains the sync signal, however, the hue of the monitor may be changed. In this case, disconnect the external sync signal and apply the internal sync signal mode.

[10] **75Ω/2kΩ selector**
Switches the impedance of the SYNC IN connectors termination to 75Ω or to 2kΩ. When external sync signals are input, normally set this selector to the 75Ω position. If good synchronization cannot be obtained, set this selector to the 2kΩ position.

[11] **RESET button**
Press to clear every stored display condition for 15 different types of input signals.
Press the button while the power is turned on.

1-2. CONNECTIONS

Connect the computer using the signal connecting cable as shown.
When connecting with other cables, refer to the instruction manual supplied with the cable or the computer.



1-3. PRESET MODE

The Sony GDM-1937 adjusts automatically the display size and position to the optimum in accordance with the input signal of up to 24 different types.
It has factory-preset setting values for the 10 different types of signals. When a computer or a work station that issues such signal is connected, the optimum display is obtained without any manual adjustment (preset mode).
The factory-preset values and corresponding computer/work station models (called "preset-type models" in this manual) are as follows:

No.	Display (dots × lines)	Horizontal frequency	Vertical frequency	Scanning mode	Present Type Models
1	640 × 480	31.5 kHz	59.9 Hz	Non-interlace	VGA (Graphic)*
2	640 × 350	31.5 kHz	70.1 Hz	Non-interlace	VGA (EGA Emu)*
3	720 × 400	31.5 kHz	70.1 Hz	Non-interlace	VGA (Text)*
4	800 × 600	33.5 kHz	54.0 Hz	Non-interlace	SPEA-Lo
5	1024 × 768	48.8 kHz	60.0 Hz	Non-interlace	STD-Lo
6	1024 × 768	57.9 kHz	71.8 Hz	Non-interlace	GE UNIQUE
7	1152 × 900	61.8 kHz	66.0 Hz	Non-interlace	SUN
8	1280 × 1024	63.3 kHz	60.0 Hz	Non-interlace	STD Hi
9	1152 × 870	68.7 kHz	75.1 Hz	Non-interlace	Mac Hi
10	1280 × 1024	70.9 kHz	67.0 Hz	Non-interlace	SPEA-Hi

* VGA are trademark of International Business Machines Corporation.

- The buttons on the front panel allow manual adjustment when a signal from equipment other than the present-type models is input. Fifteen different manually adjusted conditions are stored in money, and called back when the same signal is input again so that the optimum display for the signal is obtained automatically.
- The type of input video signal is discriminated according to its signal specifications such as horizontal frequency or sync polarity. When the signal specifications of the input signals are almost similar however, these signals may not be discriminated as different.

1-4. ADJUSTMENT

When a computer or a work station of one of the preset-type models or equivalent is connected, no picture adjustment is necessary.
If you want to change the contrast, use the ◐ +/– buttons. You can, however, adjust the brightness, picture size and position and the convergence manually by following the procedure described below.

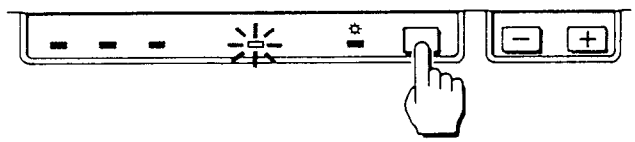
Procedure

When a computer or a work station other than one of the preset-type models is connected, proceed as follows to get the optimum picture.

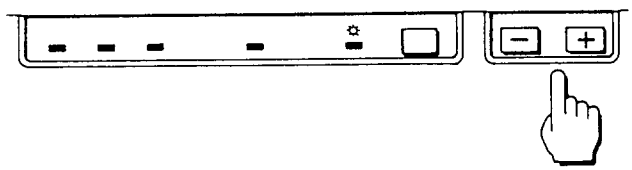
1 **Turn on the unit, and feed the video signal from the connected computer/work station.**

2 **Press the SELECT button to choose the adjustment item.**
The indicator corresponding to the selected item lights up.
When the power is turned on, the ☼ indicator is lit.
Pressing the SELECT button changes the item in the following order:
☼ → H-CENT → V-CENT → H-STAT → V-STAT

For what the indicators mean and how to make an adjustment, see the page 11.



3 **Observe the picture, and press the ADJUST+/– buttons while the target indicator is lit.**



If you do not press the SELECT button or the ADJUST+/– buttons within 5 seconds, the ☼ indicator lights up again.

What the indicators mean and how to adjust

Indicator that is lit	Meaning/How to adjust
☼	**Adjust the brightness of the picture.** Press ADJUST+ for more brightness. Press ADJUST– for less brightness.
H-CENT	**Adjust the horizontal position of the picture.** Press ADJUST+ to move the picture to the right. Press ADJUST– to move it to the left.
V-CENT	**Adjust the vertical position of the picture.** Press ADJUST+ to move the picture upward. Press ADJUST– to move it downward.
H-STAT	**Adjust the horizontal convergence.** Press ADJUST+ to move blue colors to the left and red colors to the right. Press ADJUST– to move blue colors to the right and red colors to the left. Adjust while observing the center of the picture.
V-STAT	**Adjust the vertical convergence.** Press ADJUST+ to move blue colors upward and red colors downward. Press ADJUST– to move blue colors downward and red colors upward. Adjust while observing the center of the picture.

The indicator blinks when .....

The limit value is achieved by pressing ADJUST+ or –.

When Adjustment Is Completed (Storing the Adjusted Condition)

When step 3 (on page 10) is completed, the adjusted display condition is stored in memory under the following conditions:

- When you select another adjustment item by pressing the SELECT button.
- When 5 seconds have elapsed after adjustment and the ☼ indicator is lit.

The upper 4 adjustment items listed below are stored for each different input signal of up to 15 types.
The lower 4 adjustment items are stored independently from the types of input signals.

Adjustment item	How stored
H-CENT (horizontal position) **V-CENT** (vertical centering)	**They are stored together with the type of the input signal.** The adjusted condition for up to 15 different input signals can be stored. The stored condition is called back from memory when the corresponding signal is input, and the optimum display is obtained for this signal.
◐ (contrast) ☼ (brightness) **H-STAT** (horizontal static convergence) **V-STAT** (vertical static convergence)	**They are stored independently from the input signal.** Normally adjust the convergence when red and blue colors are shifted due to the direction of the unit, or by being affected by the terrestrial magnetism.

When the 16th condition is stored

The condition stored first is replaced by the 16th.
Care should be taken when a number of different conditions are to be stored.

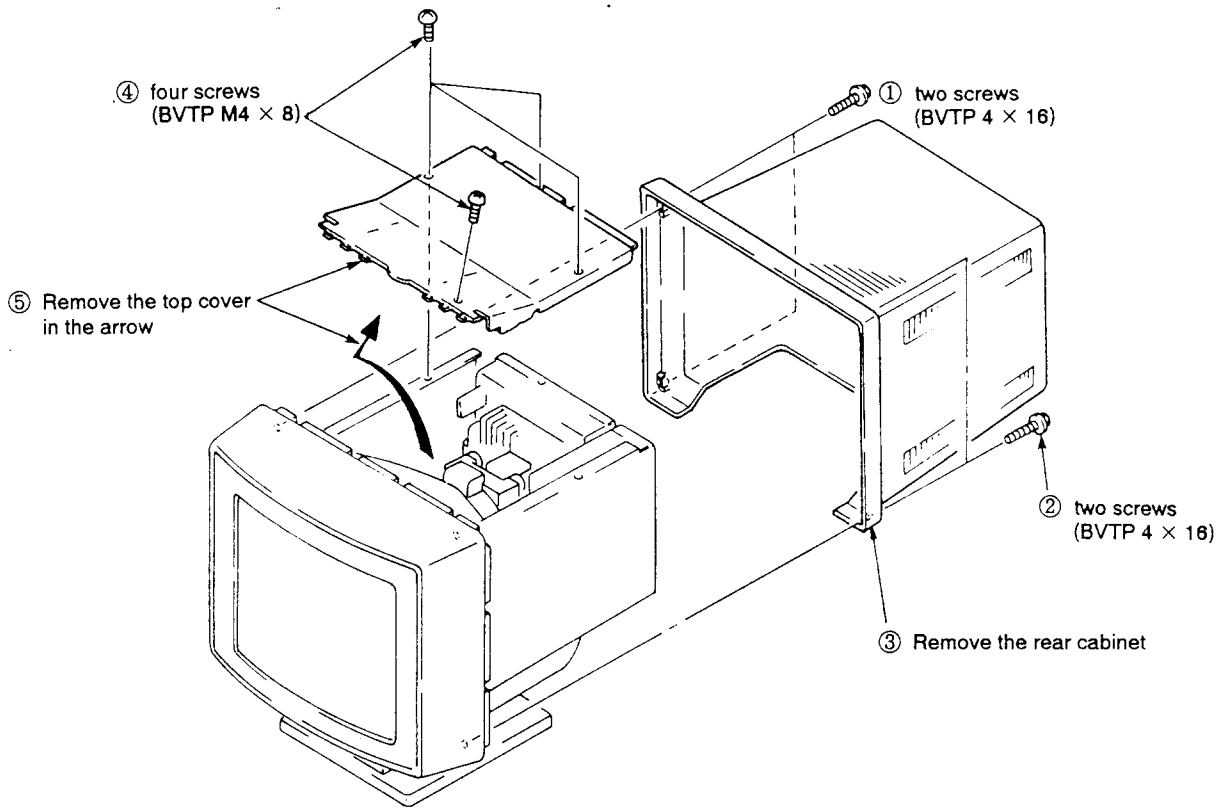
If you modify the condition for the preset-type models

It also will be stored in memory. When called back from memory, priority is given to the modified condition. When the stored conditions are cleared, the factory-preset conditions return.

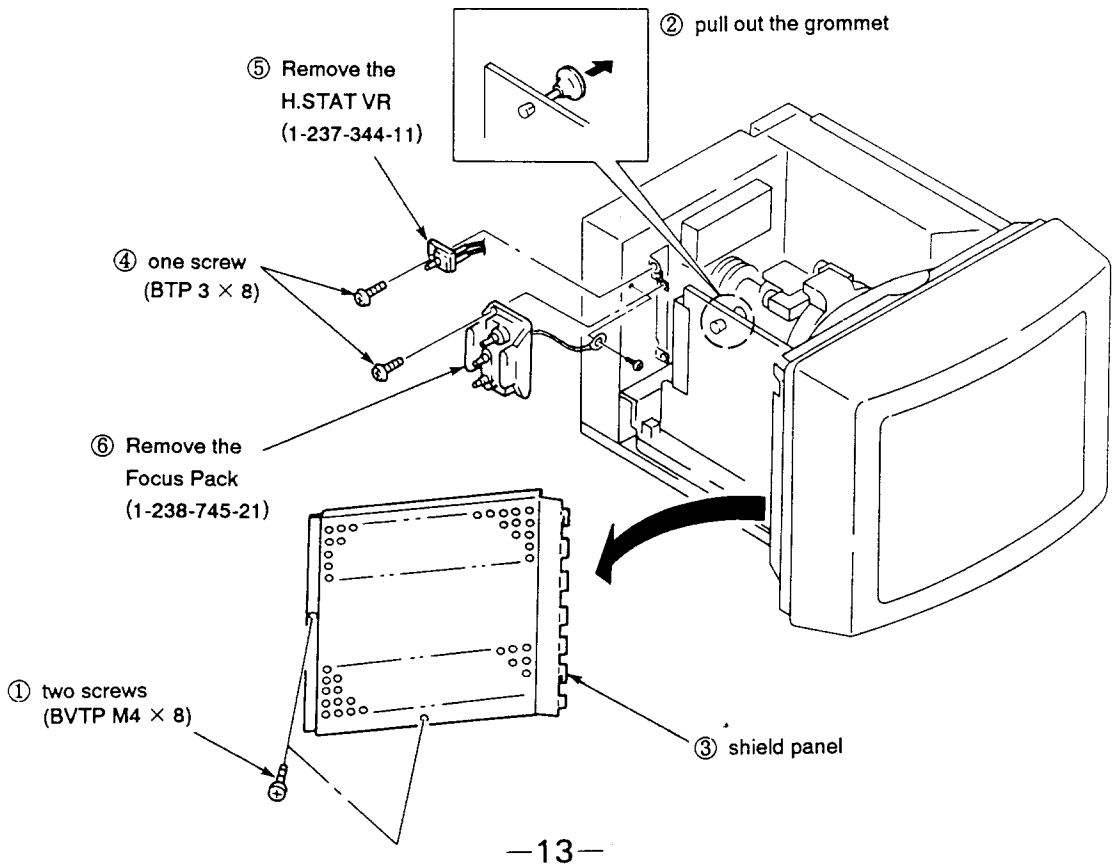
SECTION 2
DISASSEMBLY

Numbers in circles present procedure to do

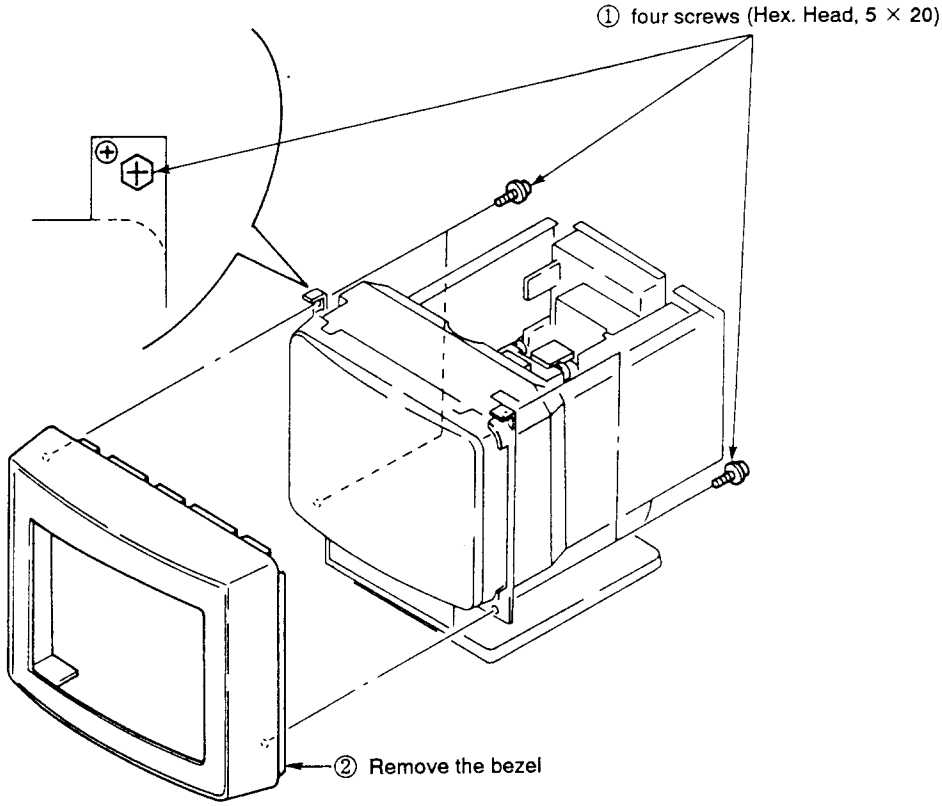
2-1. REAR CABINET AND TOP COVER REMOVAL



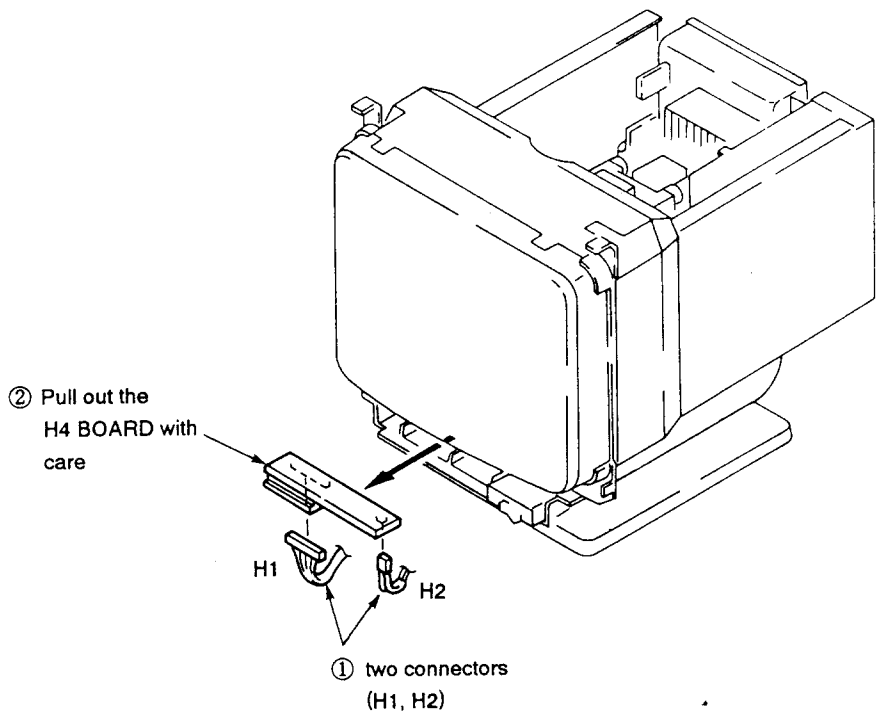
2-2. H-STAT VR AND FOCUS PACK REMOVAL



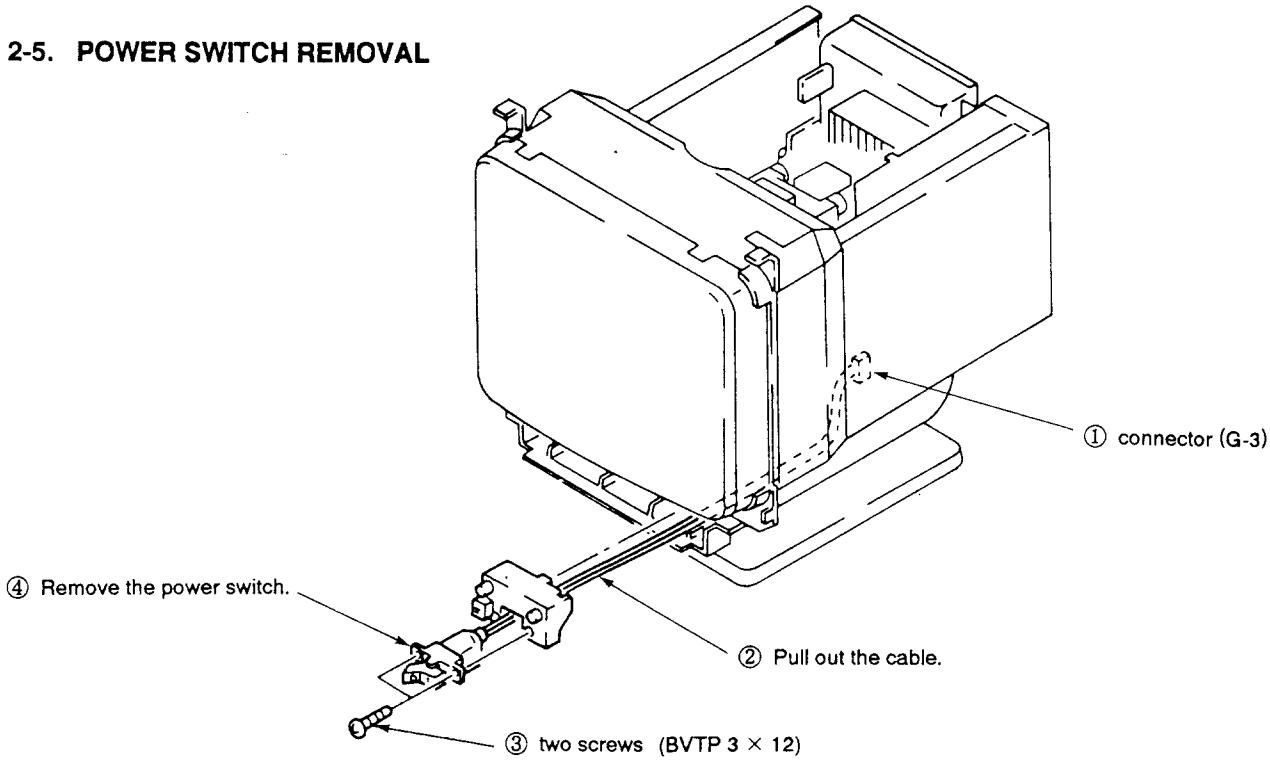
2-3. BEZEL REMOVAL



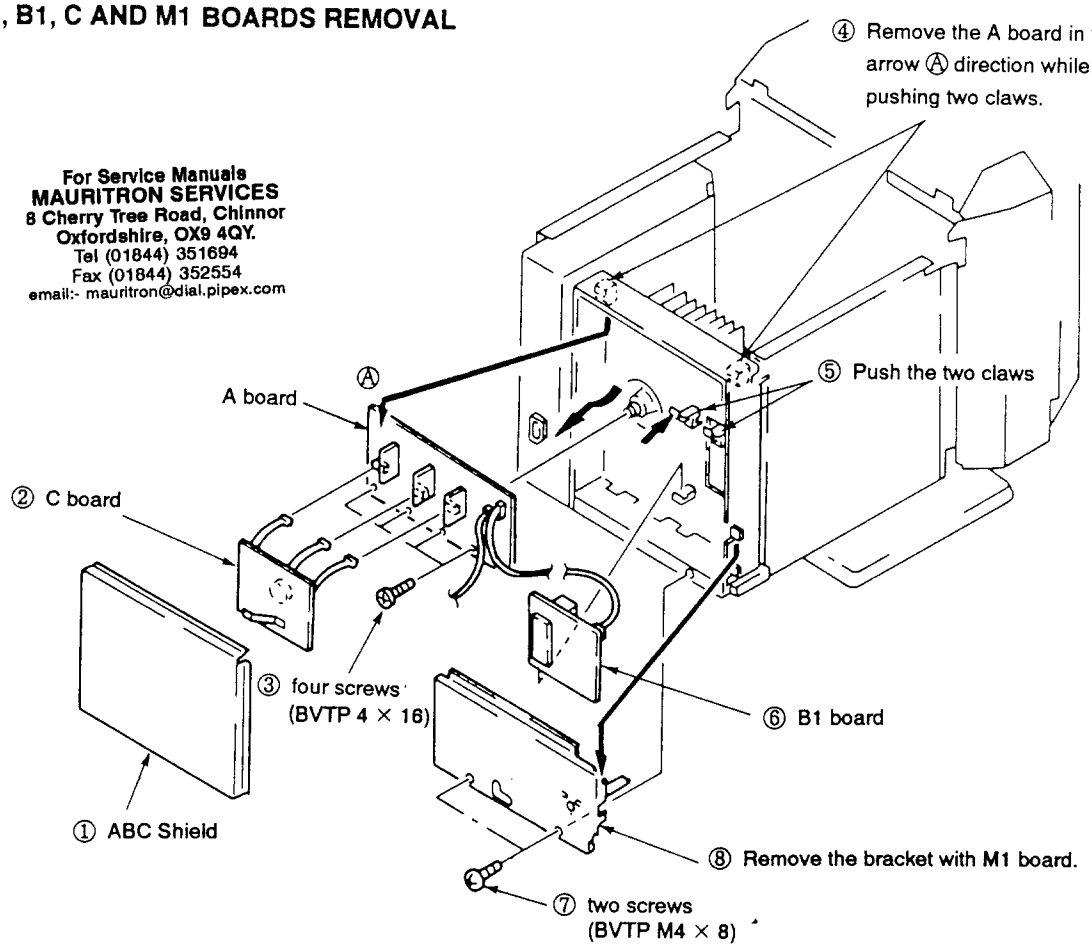
2-4. H4 BOARD REMOVAL



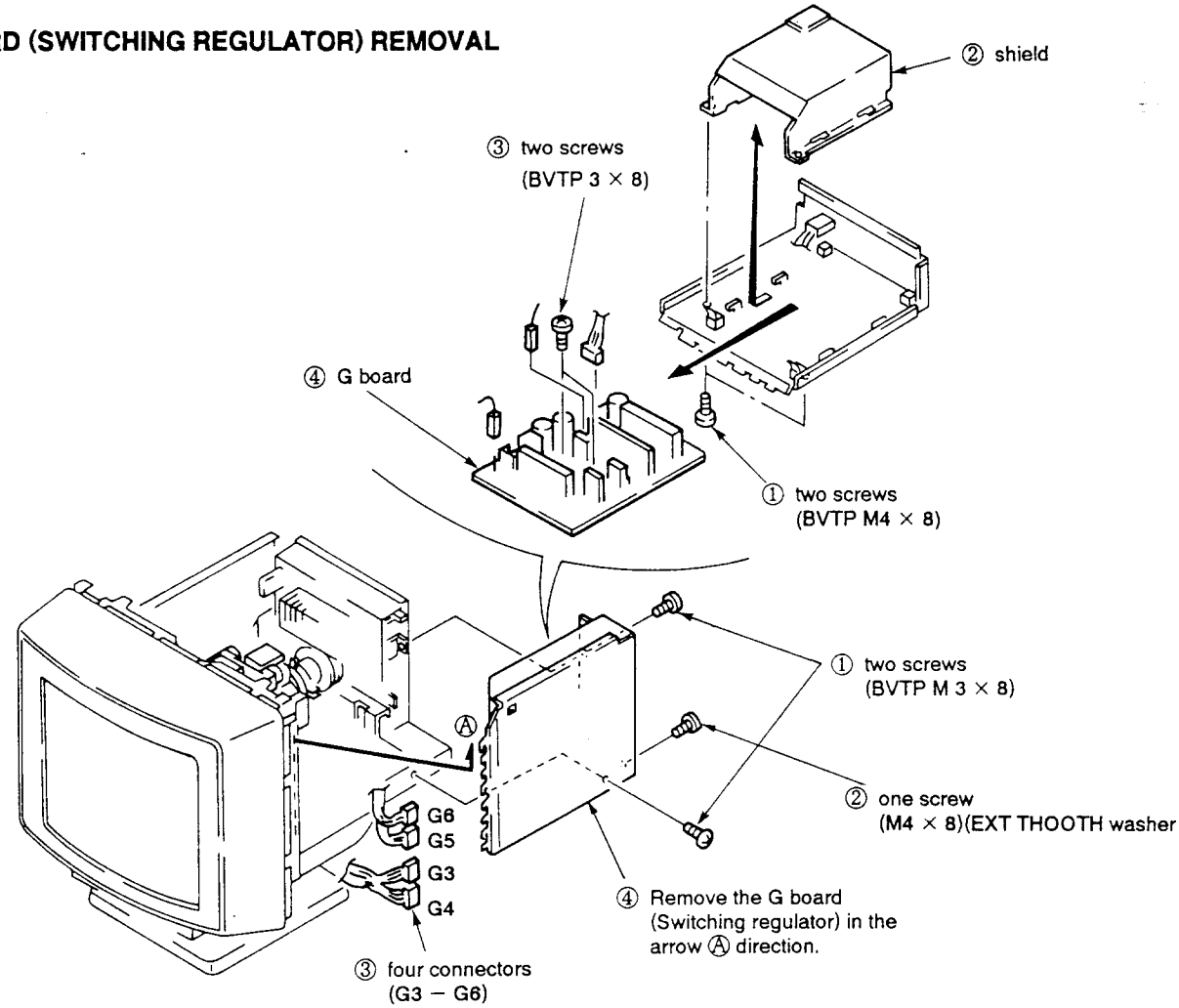
2-5. POWER SWITCH REMOVAL



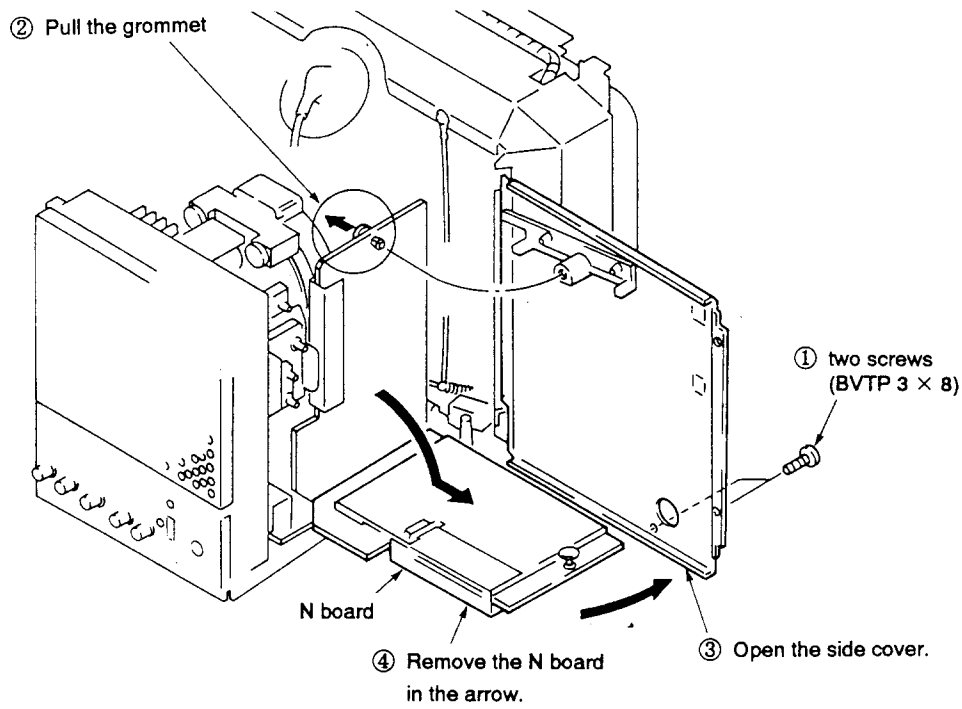
2-6. A, B1, C AND M1 BOARDS REMOVAL



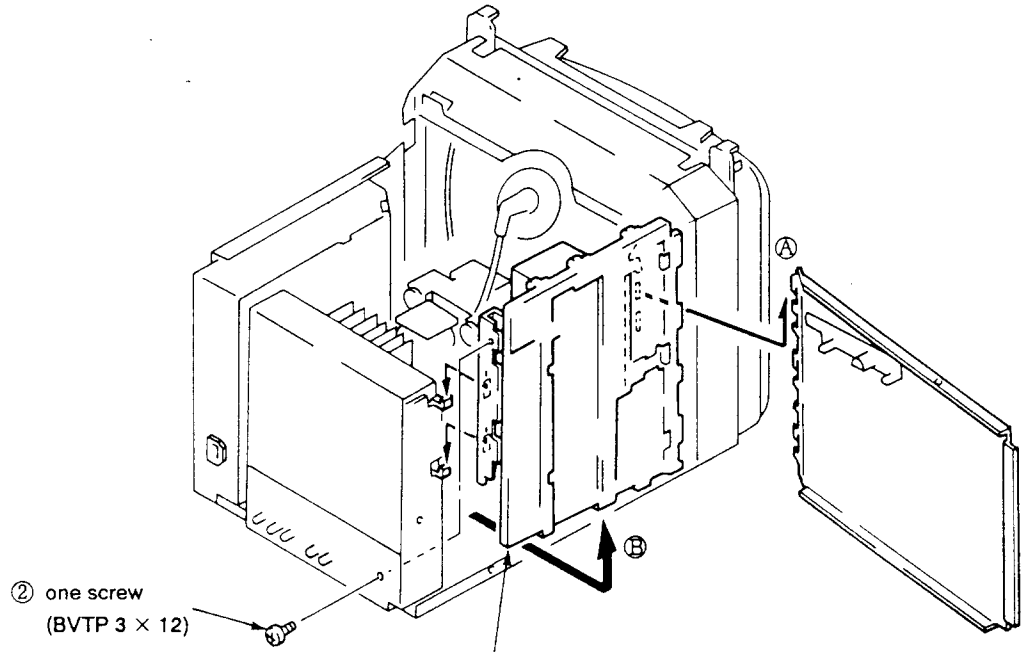
2-7. G BOARD (SWITCHING REGULATOR) REMOVAL



2-8. N BOARD REMOVAL

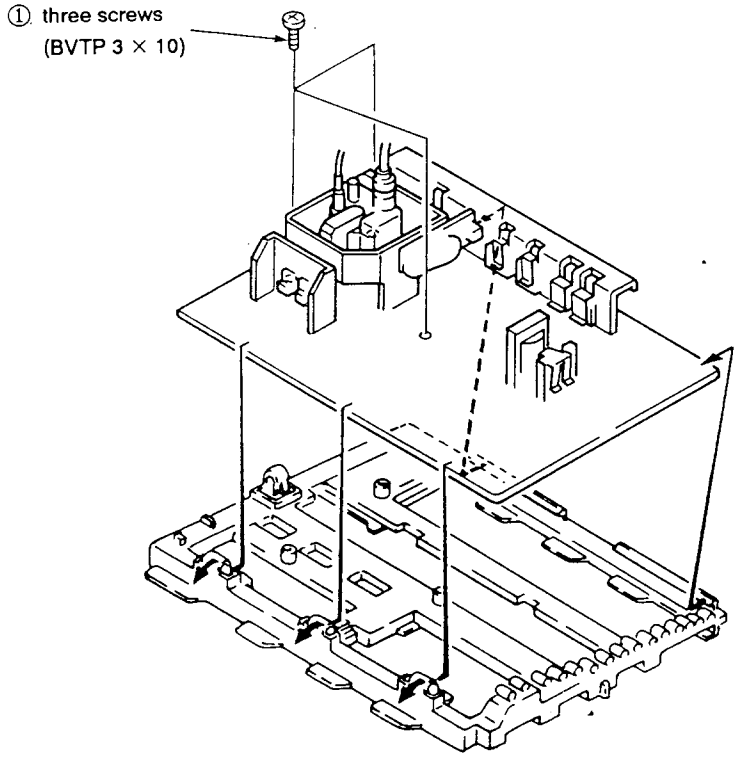


2-9. D3 BOARD SERVICE POSITION

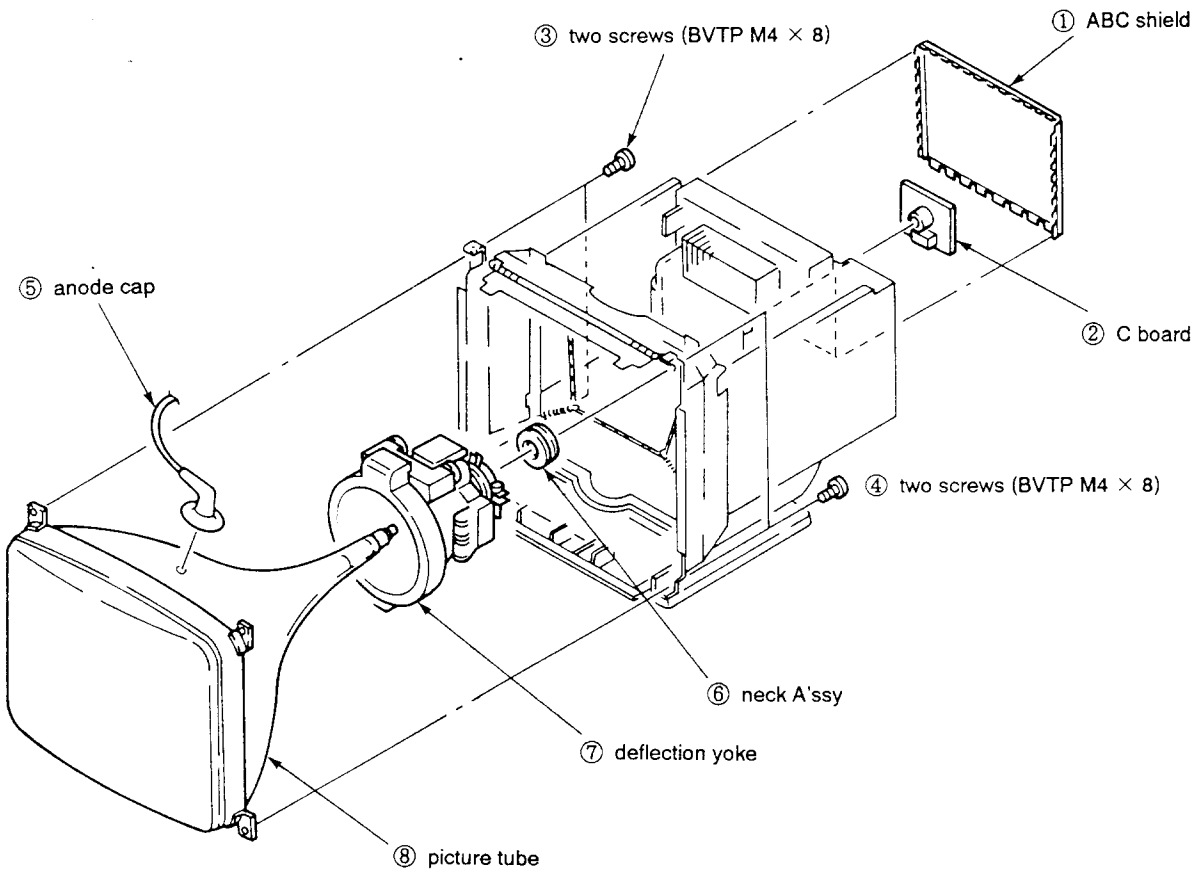


Note: Before pulling out D3 board, remove five clampers showed in 2-11-3 and 2-11-4 (①–⑤)

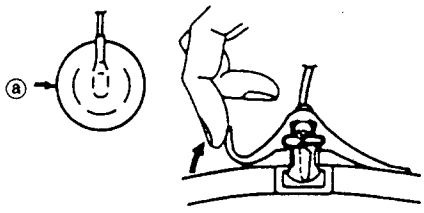
● D3 board Bracket Removal



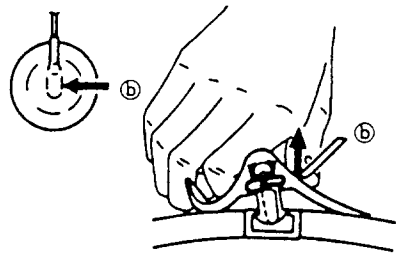
2-10. PICTURE TUBE REMOVAL



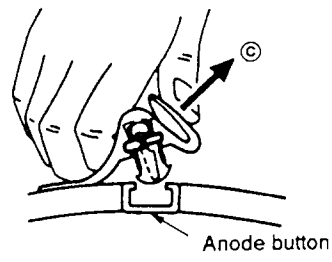
- **REMOVAL OF ANODE-CAP**
- **REMOVING PROCEDURES**



① Turn up one side of the rubber cap in the direction indicated by the arrow ⓐ.



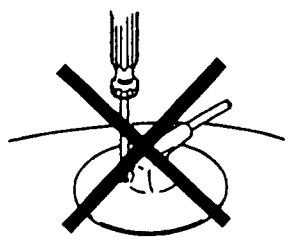
② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ⓑ.

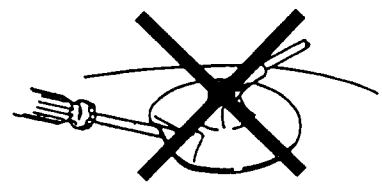


③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow ⓒ.

- **HOW TO HANDLE AN ANODE-CAP**

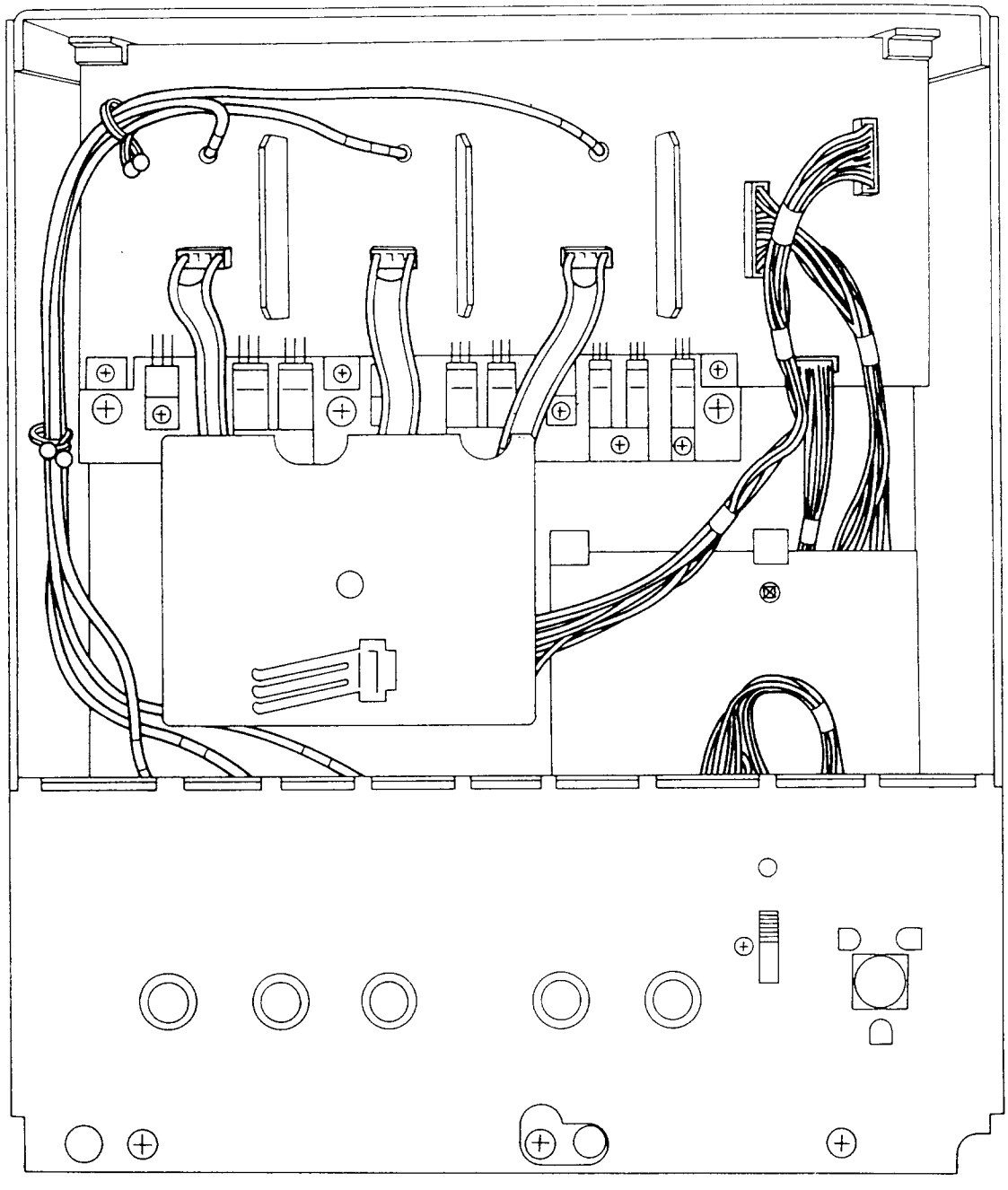
① Don't damage the surface of anode-cap with sharp objects.
② Don't press the rubber too hard or you may damage the inside of the anode-cap !
A metal fitting called a shatter-hook terminal is built into the rubber.
③ Don't turn the foot of the rubber over too hard !
The shatter-hook terminal will stick out and may damage the rubber.



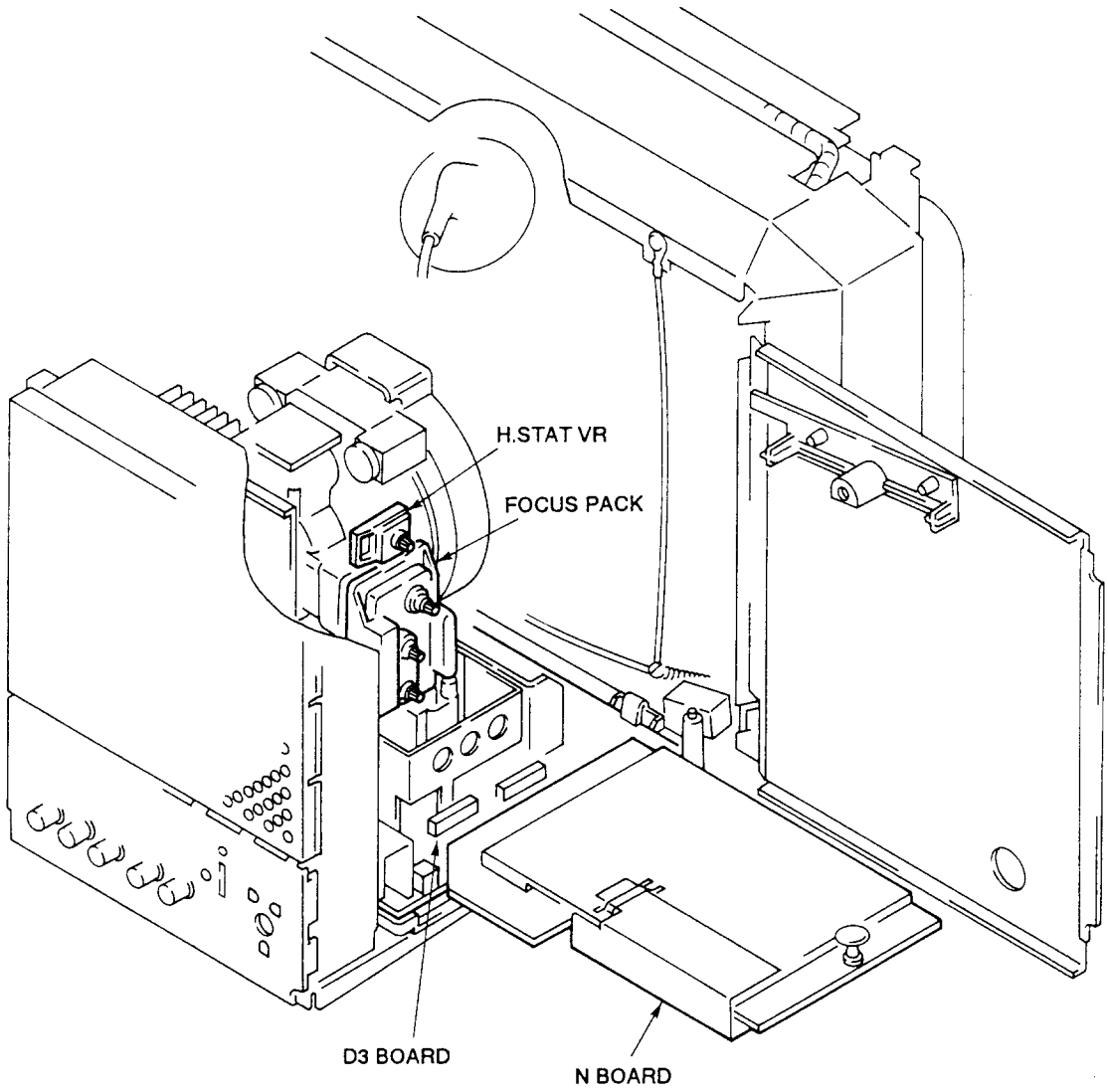


2-11. WIRING HARNESS LAYOUT

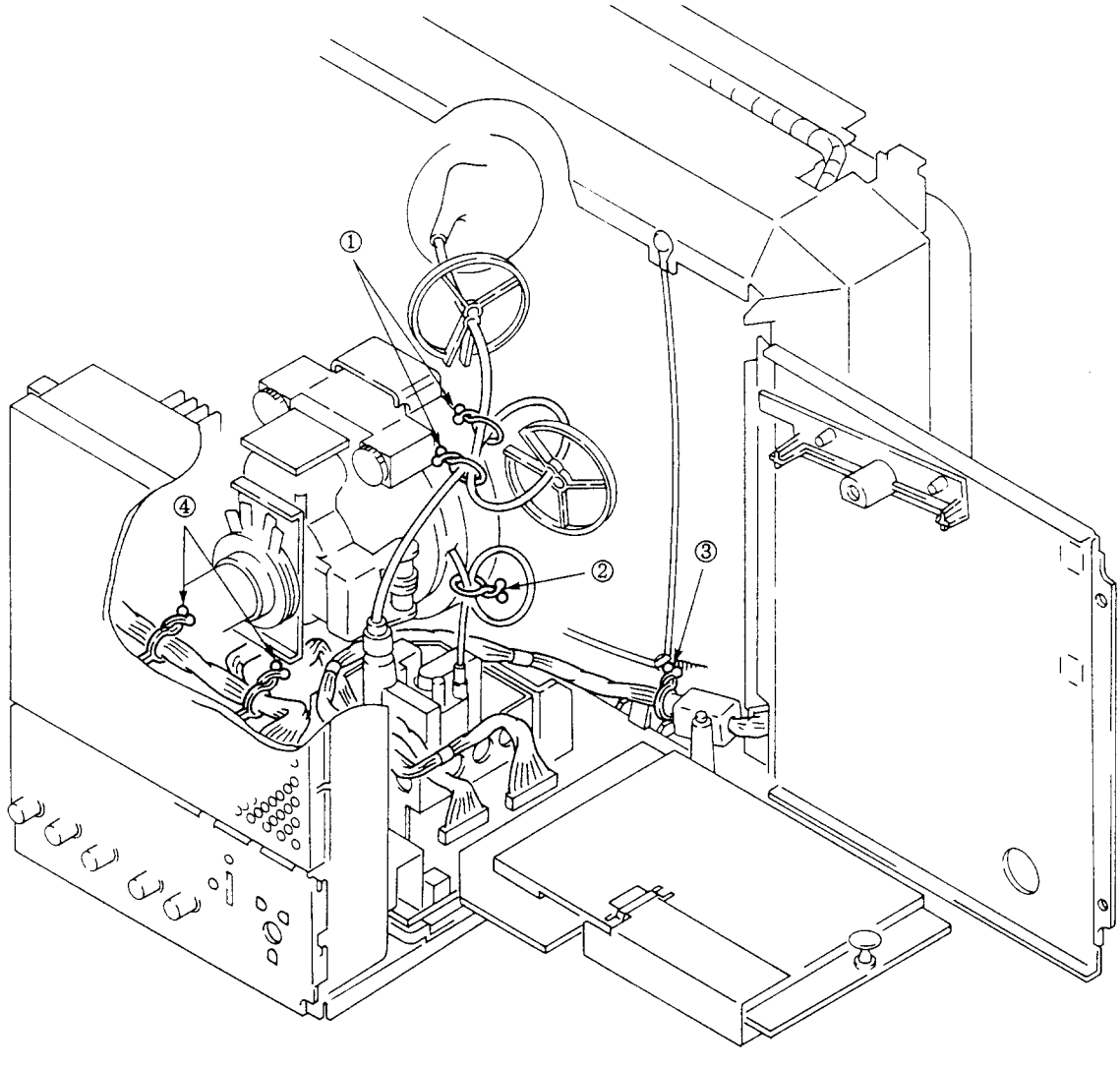
2-11-1. A, B1, C AND M1 BOARD



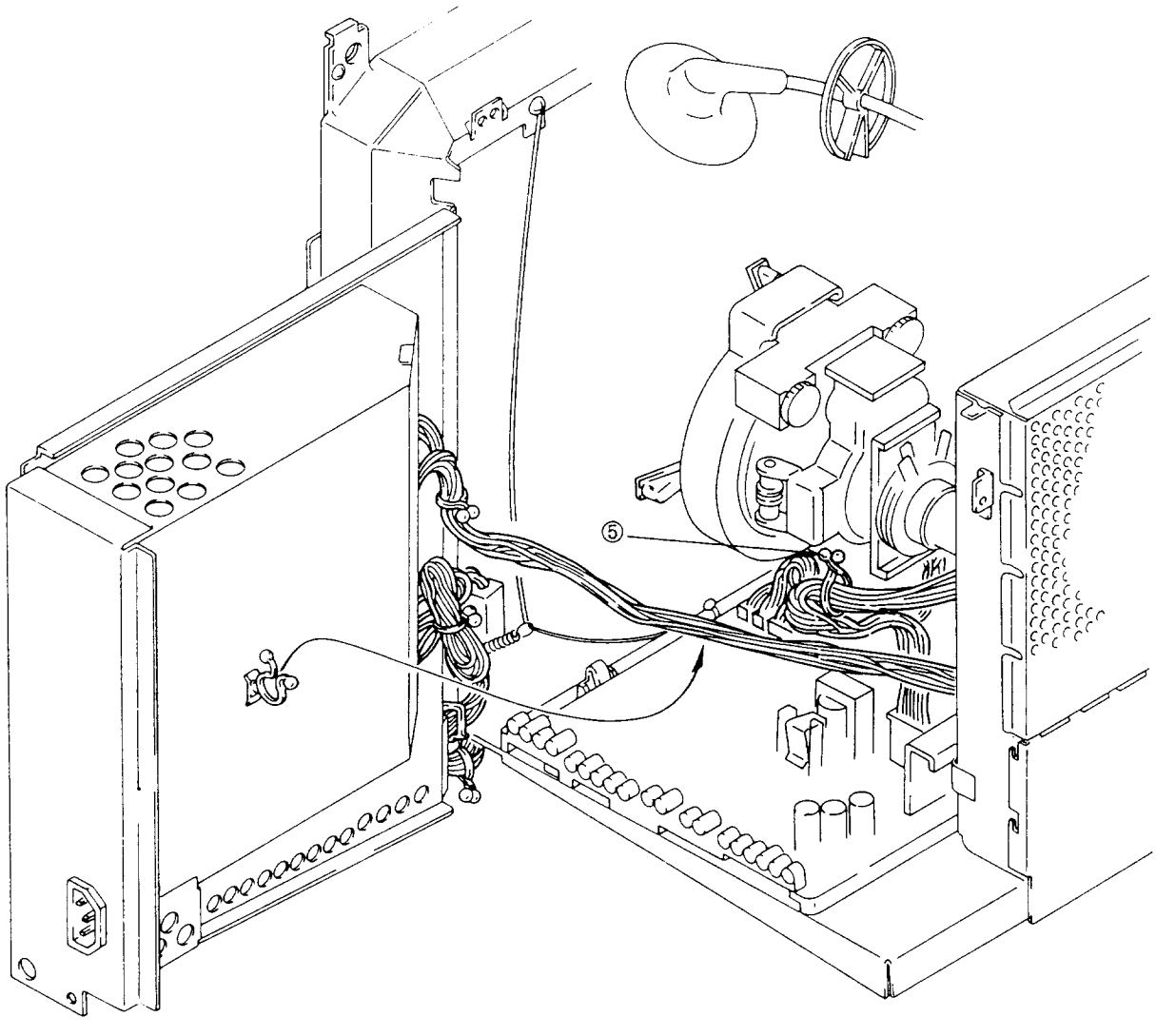
2-11-2. D3 BOARD, N BOARD, FOCUS PACK AND H.STAT VR



2-11-3. D3 BOARD LOCATION



2-11-4. D3 BOARD LOCATION



3-1. A BOARD

3-1-1. Composition

The A board consists of three channels of video signal amplifiers that include a contrast control circuit, pedestal clamp circuit, output amplifier (main), and blanking circuit. Each of the three AA1 boards, mounted on the A board, consists of a contrast amplifier and clamp circuit.

3-1-2. Contrast Amplifier (AA1 Board)

The contrast control amplifier utilizes a differential amplifier for current balance control and a feedback circuit to obtain wide frequency response and good tracking between channels. In this circuit, the amplifier gain can be continuously changed by DC adjustment for contrast control. This is achieved with the following signal process. A reference pulse is inserted on the back porch of the input signal (output of buffer Q1).

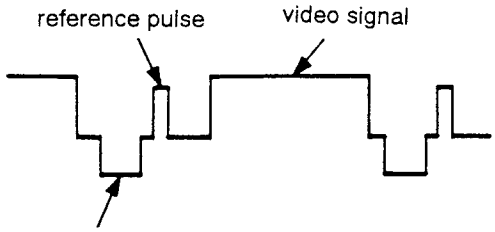


Fig. 3-1 Inserting the reference pulse

The signal is then input to the contrast amplifier consisting of Q2 thru Q7. The gain is determined in the differential amplifier, Q3 and Q4, by altering the balance of the collector currents. Q9 thru Q13 are preamplifiers. The amplified signal is then buffered by Q14 and input to a sampling circuit for feedback. Q15 samples the magnitude of the reference pulses and charges C10. Meanwhile, a DC voltage, determined by the contrast control (N board) via RV101 (R-DRV), is input at pin ⑤ of IC1 (2/2). IC1 (2/2) outputs a DC voltage to the base of Q6 so that the sampled voltage at pin ⑥ is compared with that at pin ⑤. By feeding back the output of IC1 (2/2) to the contrast amplifier, the reference pulse level becomes equal to the potential difference between the two inputs of IC1 (2/2). Contrast can be changed by S4 and S5 on the H4 board, as explained.

3-1-3. Pedestal Clamp (AA1 Board)

This circuit performs pedestal clamping for DC restoration of the input signal since the input stage of the video amplifier is AC coupled. Altering the DC bias at the collector of Q4 restores the DC component of the input signal and stabilizes the pedestal level (black) of the signal at the CRT cathode. Q5 acts as a DC power source to regulate a bias voltage to Q4. The emitter voltage of Q5 is controlled by the output from IC1 (1/2), which is a high gain DC amplifier. A reference voltage (DC) is provided at
pin ③ of IC1, and a feedback voltage subtracted by Q17 from the final video stage is at pin ②. Q17 samples and holds the detected voltage at R111 activating the gate by a background pulse. IC1 (1/2) compares the two input voltages and the output, thru Q5, controls the DC level of the collector of Q4 so as to equalize the input voltages.

3-1-4. Inserting the Blank Tip Pulse (AA1 Board)

Video signals amplified by the video output circuit are combined by the capacitor on the C board and then clamped again to perform background adjustment. In this instance, a blank tip pulse is inserted to the HD area of the video signals via D5 to clamp the video signals.

3-1-5. Video Output Amplifier

The video signals from the AA1 board preamplifier are input to the base of Q101. The video output stage is composed of a cascade amplifier consisting of Q101 and Q102 and has a gain of 20 dB. The frequency response of ± 3 dB from 60 Hz to 100 MHz is optimized with parallel peaking (L101), series peaking (L1 on C board), and emitter peaking (Q101), which compensates for the high frequency response.

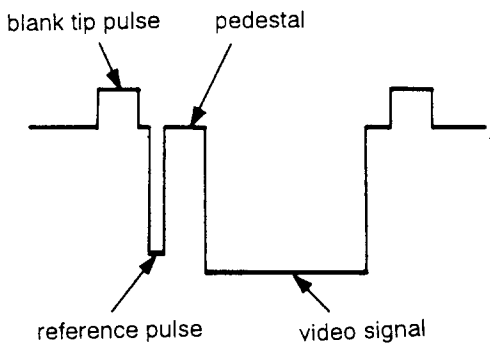


Fig. 3-2 Video output waveforms

3-1-6. Blanking Circuit and Bias Circuit G1

A blanking signal sent from the D3 board via the B1 board to the base of Q409 is converted into a pulse of approx. 60 Vp-p at Q409 and Q410, then the pulse is mixed with G1 bias voltage and supplied to G1 for the CRT.
Then the G1 bias voltage is the sum acquired by adding the voltage created by rectifying the blanking waveforms at D416 and the brightness control voltage.
When the brightness control is turned, G1 bias voltage varies and subsequently the background brightness can be changed.
The voltage which is rectified at D416 can be varied by SW401, (this enables highlighting the background).

3-2. B1 BOARD

The B1 Board operation consists of the following four functions and circuits:
1. Sync separation circuit
2. Blank tip pulse wave shaping circuit
3. Blank mix circuit
4. Interface

Following is an explanation of each function:

3-2-1. Sync separation circuit

The center of sync separation, IC501 (CXA1365S), enables the separation of the sync H and V at the time of inputting the composite video and separate sync.
As for the input of the composite video, it is input to pin ⑨ of IC501; while the separate sync is input to pin ⑦. In either case, the output of HD is acquired from pin ㉓ and that of VD from pin ㉖. The switchover between the composite video and the separate sync should be done within IC501 giving priority to the separate sync function.
Also, the polarity of the input sync are output to Q1 up to Q4 (pins ⑲ to ㉒) as shown in Table 3-1.
The indicated output signals are used to determine the input signals when they are sent to the N Board.

Decoder logic					
PV	PH	Q1 pin ㉒	Q2 pin ㉑	Q3 pin ⑳	Q4 pin ⑲
L	L	H	L	L	L
L	H	L	H	L	L
H	L	L	L	H	L
H	H	L	L	L	H

L: 0V
H: 5V (4.5V)

Table 3-1.

3-2-2. Blank tip pulse generation circuit

The HD OUT signal output from pin ㉓ of IC501 is output directly when dealing with the input of the composite video, whereas it is output from pin ⑧ of IC504 after passing through the duty constant circuit (composed by IC505 (1/2) and IC508) in case of the input of the separate sync.
The decision of separate sync is made at IC505 (2/2) and the switchover function is done at IC504.
Next, the pin ⑧ output of IC504 is input to the monostable multivibrator: IC502 (1/2). Based upon this pulse, the reference pulse for video level detection is made.
Also, with the output of IC502 (1/2) as a trigger, the background pulse is made by IC502 (2/2). The reference pulse goes through Q504 and Q505 buffers and the background pulse goes through Q506 and Q507 buffers: both of these are sent to the A board.
The generating relation between the reference pulse and the background pulse is described in Fig. 3-3.

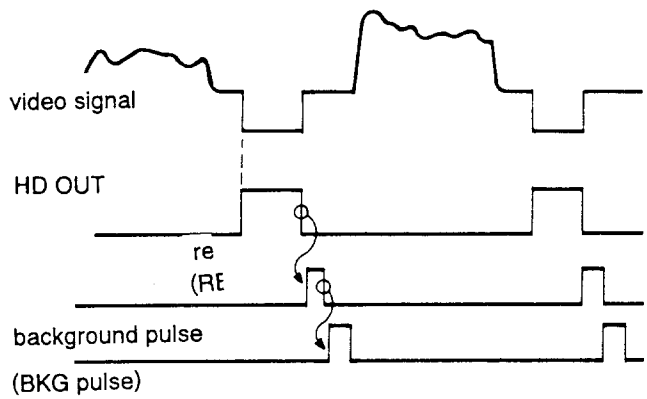


Fig. 3-3.

On the other hand, the signal of pin ⑧ of IC504 is also sent to Q508. The signal reversed at Q508 is sent to the A board as the blank tip pulse and then used in the AA1 board.
Also, the 2 μsec. HD pulse is made by IC506 (2/2) from the output signal of pin ㉓ of IC501, is passed through Q511 and Q512 buffers, and finally sent to the N board.

3-2-3. Blank mix circuit

With the output from pin ⑧ of IC504 as a trigger, the beginning pulse of the BKG pulse is made at IC506 (1/2). After mixing this pulse with the blanking waveform sent from the deflection system board (N Board) at Q513, it is output to the A board. This relation is as shown in Fig. 3-4.

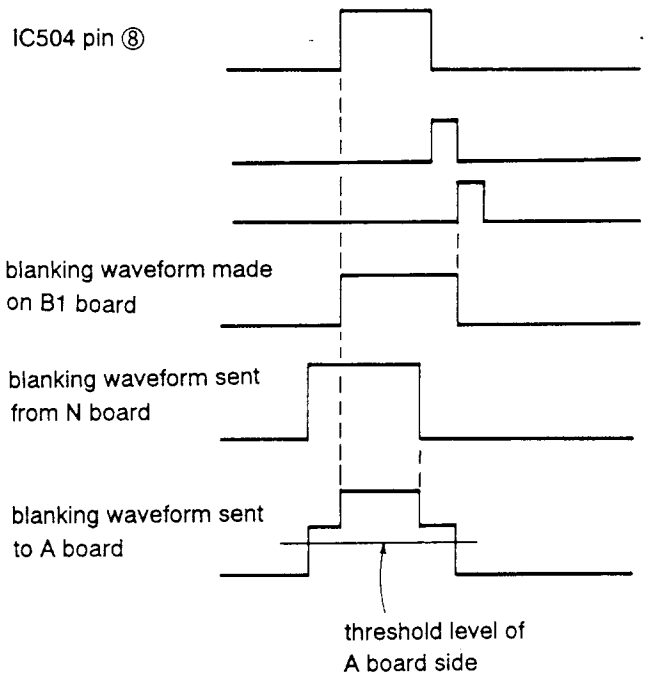


Fig. 3-4.

Also, for the testing, if TP1 and TP2 are short-circuited, Q509 works, and the whole raster can be seen by being stopped the blanking.

3-2-4. Interface

The B1 Board is equipped with A, M1, N and the interface function with the power board other than sync separation circuit, blank tip pulse wave shaping circuit and blank mix circuit. Also, for the use of EMI, the delivery of signals and power source is performed through the EMI filter.

3-3. C BOARD

Video signals input to the C board are subject to series peaking and combined by the capacitor. Then, the top end of the blank tip pulse is clamped again by BKG voltage determined by RV404 and Q413 of A board.
The blanking pulse and G1 bias voltage are mixed at D7 and supplied to G1 grid of the CRT. A spark gap and surge protectors are mounted on the board to return the CRT discharge (flash-over) current to chassis ground.

3-4. D3 BOARD

3-4-1. PWM reference, H SAW generating circuit

This circuit generates H. SAW signal which is the base for the pulse width modulation to control high voltage and H. SIZE. IC101 (1/2) generates the SAW wave, and it feeds back to keep the waveform level constant by IC101 (2/2). Q103 to Q105 are the pulse phase circuit.
First of all, the HD pulse is phased by Q103, Q104 and Q105 and becomes a very slender pulse, and then it is added to the base of Q101. Q101 is built for resetting purposes for the integrated circuit by IC101 (1/2).

As long as Q101 is on, the output from pin ① of IC101 is clamped to the GND level. Therefore, at every 1H, it generates the SAW wave terminated to GND. IC101 (2/2) detects the peak of SAW wave, and it feeds back to IC101 (1/2) so that the peak becomes equal to the voltage of R133.

The output from pin ① of IC101 is sent to 2 separate routes: one is sent through IC104 (1/2) and to H. SIZE, the other through IC104 (2/2) and to the high-voltage control circuit respectively. IC103 (1/2) and (2/2) are the buffers to detect the peak of H. SAW. It is limited by D108 and D519 so that the controls of horizontality (H) and high voltage are not separated beyond H. SAW.

3-4-2. Horizontal deflection circuit

The HD pulse generated on the N board goes through Q201 and Q202 buffers and drives T201 (HDT) by Q203. The current amplified by HDT operates on/off functions of Q204 (H. OUT) and high voltage pulse is generated at Q204 collector by the deflection yoke, damper diode D202 and the resonance capacitor C205, which causes SAW wave current running through the deflection yoke. Also, Q204 collector pulse is voltage divided by C206 and C207 and then sent to the N board where AFC loop is formed.
H. SIZE and pin signal from the N board are amplified after input into IC301 (1/2). These amplified signals are compared with H. SAW at IC201 (1/2), go through Q218 and Q219 as PWM wave, and are finally provided into FET Q217 gate. Q217 makes a switching of +B, controls the power source of horizontal deflection circuit and provides a desired H. SIZE and pin cushion correction.

T202 is the +B choke for horizontal deflection and also forms the boost circuit of +B voltage by D222 and C210 and the power source for H. center circuit by D209 and D210. Q213 to Q216 are the transistors for H. center voltage control; and they change the electric potential of bases depending on the H. center signal going through IC301 and Q102 and provide the voltage to the S-shaped capacitor through HCC.

C221, C222, C223, C224 and C225 are capacitors to make the S-shaped correction. Furthermore, as the value must be changed in accordance with the horizontal frequency, it chooses the appropriate combinations by Q205, Q207, Q209 and Q211.
The on/off relations between the frequency and the transistors are as shown in Table 3-2.

RANGE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
fH [kHz]	30 ~30.7	30.8 ~31.7	31.8 ~32.5	32.6 ~33.3	33.4 ~34.3	34.4 ~35.5	35.6 ~36.9	37.0 ~38.7	38.8 ~40.9	41.0 ~43.3	43.4 ~45.9	46.0 ~49.1	49.2 ~53.3	53.4 ~58.5	58.6 ~65.7	65.8 ~71.0
Q205	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Q207	ON		OFF		ON		OFF		ON		OFF		ON		OFF	
Q209	ONO				OFF				ON				OFF			
Q211	ON								OFF							
Q405	ON										OFF					
Q407	ON														OFF	

Table 3-2.

3-4-3. High-voltage CIRCUIT

Horizontal drive transistors Q203 and T201 (HDT) drive high voltage output transistor Q401 along with the H-OUT at Q204. Accelerated diodes D401 and D402 are connected in series to the base of Q401. After Q204 turns off, the diodes continue to operate, causing Q401 to turn off. This protects the horizontal deflection system from being affected by the deflection of the high-voltage load.
The series capacitors C401, C402, and C422 are connected to the collector at Q401 and function as the resonate components of the flyback pulse.
The total value is selected by shorting the two capacitors with Q405 and Q407 in order to get a enough peak voltage for the variable frequency.
The status of the two transistors are shown in Table 3-2.
The +B voltage is supplied via L401. Six rectifier diodes are built into the secondary side of the FBT and the voltage at the secondary level is supplied to the focus pack to remove focus voltage and the G2 voltage.
A high voltage output is built into the FBT and a high voltage capacitor and high-voltage resistor are installed between each ground where they perform high voltage rectification and high voltage detection.
The high voltage output in the FBT is scaled down to 1/3000 by the high voltage resistor and then supplied to pin ③ of IC302 (1/2) where it is compared with reference voltage (9.00 V). Next, the differential voltage is amplified and input to pin ③ of IC202 (1/2). The H. SAW wave input to pin ② of IC202 and subjected to PWM by the comparater. The pulse generated at pin ① of IC202 (1/2) switches Q402 (a damper diode with built-in FET) via Q403 and Q404.

3-4-4. Vertical deflection circuit

The V. SIZE signal sent from the N board is input by the vertical deflection circuit structured of Q301, Q307 and IC304, while the vertical deflection yoke is driven by the SEPP circuit structured at Q303 to Q306. Q302 which functions as the power source switch to the vertical output circuit from the B+ source, is turned on during vertical flyback by the pulse output from pin ⑯ of IC101 on the N board.

3-4-5. Dynamic Focus Circuit

H. parabola and H. SAW are mixed and amplified by IC102 (1/2), and the bottom of the waveform is rounded by D602.
It is amplified to approx. 700V H. parabola by the cascade amp. at Q602 and Q605. Q603 and Q607 consist push pull amp. and the output signal is fed back to Q605 and Q607 from the detector R623.
The V. parabola output from the N board is amplified to 300V by Q604 and this clamps the H. parabola with D601. As a result, dynamic focus waveforms which are composed where the V. parabola overlaps with the H. parabola are formed.

3-4-6. High Voltage Hold-Down Circuit

A feedback voltage which is normally 9V is initially sent from the focus pack and it is supplied to the (+) INPUT of IC203 (2/2) where it is compared with (-) input voltage. This voltage is selected so that 9.9 ± 0.2V is obtained at R508, R509 and R510. Thus, pin ⑦ for IC203 (2/2) on the D3 board is set at "Low".

If the high voltage abnormally increases and the (+) input voltage for IC203 (2/2) exceeds the (-) input voltage, pin ⑦ changes to "HIGH" and "HIGH" level voltage is output from pin ⑤ of the connector D-1 causing Zener diode D207 on the N board to continue to operate and input the voltage to pin ⑬ of IC101. At this point, the X-ray protector circuit in IC101 on the N board operates and stops the drive pulse for the output at pin ⑫ of the IC so that the high voltage circuit is suspended.

When the X-ray protector circuit is activated the IC302 (2/2) latches "HIGH" level and causes Q501 to turn on and hold down the high voltage.

The high voltage point at which voltage hold down starts is calculated by the following formula.

$HV(PRT)=9.9(\pm 0.2)\times 3000^{+3}_{-5}(\%)=29.7^{+1.5}_{-21}kV.$

3-4-7. Beam protector circuit

The beam protector circuit is a kind of ABL circuit which stops high voltage supply in instances when anode current for the CRT increases beyond the necessary level. This circuit features two beam protectors.

Anode current is detected by removing the secondary current (CRT current + high voltage resistor current + focus current + G2 resistor current) as voltage by detection resistors R511 to R514.

ABL current flows through these resistors, the voltage at TP403 drops. At this time, bleeder current flowing to the high voltage resistors is constant and if CRT current increases, the (-) input voltage at IC203 (1/2) drops below the (+) input voltage and changes output pin ① of IC203 to "HIGH" (beam protector (1)).

If the beam protector circuit (1) fails to operate for some reason, IC202 (beam protector (2)) operates in the same manner as beam protector (1). These outputs are connected to pin ⑤ (HV STOP) of the connector D-1 and hold down the high voltage. Beam protector (2) is designed to operate at a higher current than beam protector (1).

3-4-8. CRT protector

The CRT protector detects the H. ACT signal by rectifying the secondary output at T202 in order to protect the fluorescent surface of the CRT from burning when the horizontal deflection circuit malfunction and stops operating. Also, for the vertical deflection circuit, the CRT protector rectifies the V middle point voltage of pin ② of D-13 connector and detects the V. ACT signal.

If H. or V. deflection circuit stops, Q502 or Q503 turn off to stop the high voltage circuit in the same manner as the hold down circuit.

3-4-9. H, V-Static Convergence

H. STAT and V. STAT signal (DC) is controlled and output from the N board.

H. STAT is amplified approx. 300 times by IC303 (1/2) and Q703.

The collector of Q703 is connected to the CRT and controls the H. STAT convergence plate voltage.

V. STAT is amplified by IC303 (2/2), Q701 and Q702, and drives NTC.

3-5. H4 BOARD

From D1 to D7 are the select switches. They are LEDs to indicate the selected items. From D8 to D12 are the matrix circuit to read the states of push switches S1 to S5 on the front panel.

3-6. M1 BOARD

In this section, RGB signals input to J611 to J613 and HD and VD signals input to J604 to J605 are output to J606 to 610; at the same time, HV and VD are sent to the B1 board.

At J606 to J610, the terminal resistor becomes open when BNC connector is inserted. As for HD and VD, terminal resistor values can be selected at S-1.

3-7. G BOARD

3-7-1. AC Input-Degauss circuit-Rect & smoothing section

① After passing through the AC inlet and the filter section, AC is supplied to the rectifier diode. For 5 to 6 seconds after power on, the rush current is restrained by thermistor TH1. (Once RY1 turns on, TH1 is short-circuited.)
VDR1 (varistor) is equipped to protect against AC noise.

② Degauss circuit
As RY1 is open when the power on, the degauss current flows through posistor THP1. The varistor VDR2 clamps in the AC 200V system of excessive voltage. After 5 to 6 seconds from power on, RY1 is short-circuited and the degauss loop is cut off.

③ Rect switching circuit

When the voltage is below approx. AC 150V, the triac in IC1 (STR80145A) is turned on and the AC rectification becomes the double-voltage rectifier circuit. In the AC 200V system, the triac is turned off and the AC rectification becomes the bridge rectifier circuit. Hereafter Rect. Out voltage is referred to as Ei.

3-7-2. Start-up and oscillation circuit

When the Ei starts up, the power is supplied to IC102 (Low B system OSC) on the GA board through R5, THP2 and the series regulator Q5 on the G board, which it starts to oscillate. Due to this oscillation, the voltage caused at T3 (SRT-2) is rectified and smoothed by D17 and C19, reaching to 15V Vcc. When the Vcc is completely started up Q5 gets cut off. Also, Vcc is supplied to IC101 of the +B system OSC.

IC101 and IC102 (IR3M02) are the PWM controller, equivalent to TL494, which are used as the frequency controller by varying the time constant.

01 peripheral circuit

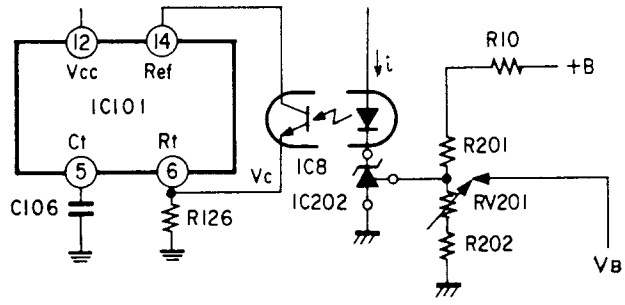


Fig. 3-5.

IC202 is the variable shunt regulator (TL431). It controls VC to regulate VB to 2.5V. In this case, by the increasing of +B, the current i is absorbed and the frequency is lowered with pin ⑥ electric potential of IC101 being increased via IC8.

3-7-3. Converter section

Principle of operation

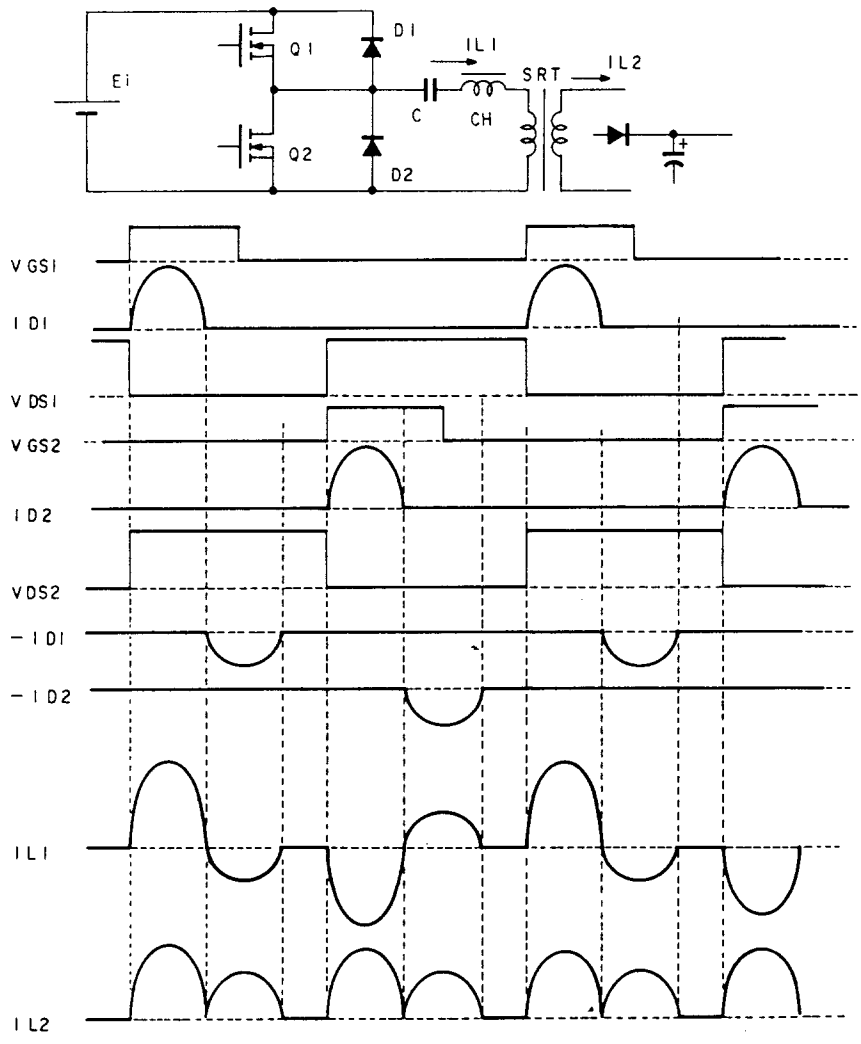


Fig. 3-6.

The SRT excitation current is a synthesizing of sine wave, determined by C and L (L CH) of CH. It is obtained by the formula of the resonance frequency $f=1/2\ \pi\ \sqrt{L\,CH \cdot C}$, being constant. Also, it can be controlled the power flowed to SRT by varying the frequency as shown in Fig. 3-7.
Ⓐ has twice as higher input power as Ⓑ.

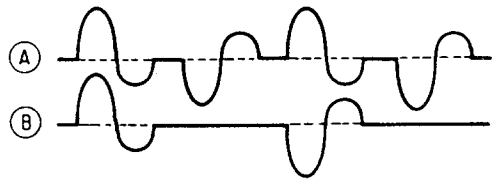


Fig. 3-7.

3-7-4. OCP circuit (Over current protector circuit)

After detecting the source currents of Q2 and Q4, it is integrated and applied to the comparaters of IC101 and IC102 respectively, and their oscillations are stopped.
As the primary 15V of low +B system is used for the Vcc of IC101, when the oscillation of IC102 stops (Low +B OCP, OVP...etc.), that of IC101 also stops. Therefore, the +B is shut off.
In case the OCP and the OVP of +B system, the Low B is output though the +B is shut off.

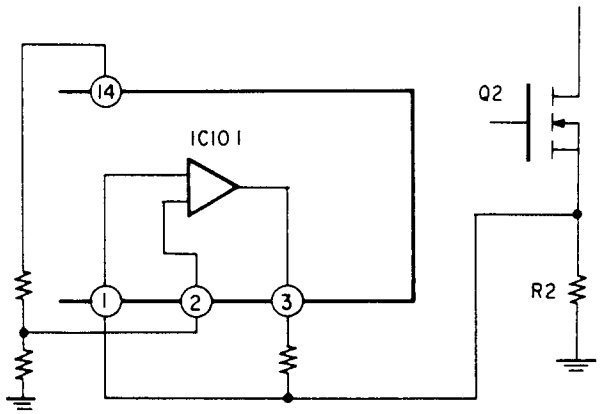


Fig. 3-8.

3-7-5. OVP circuit(Over voltage protector circuit)

The +B OVP circuit (important for DHHS) detects the +B by the absolute value, and returns to the primary side by the photo-coupler IC10 to stop IC101.

3-7-6. Fail mode

It goes down the +B only when short-circuiting +B, the others are continued to output. When short-circuiting ± 12V, IC2, IC3 and IC4 of 3-terminal regulator's internal protection circuit works. Therefore, only these lines are gone down.
For one of 65V, ± 20V and 6.3V, as IC102 stops when line short-circuiting, all the outputs go down.
Also, turn off the power after clearing the obstruction when +B goes down. And after a few seconds, turn on the power again. Thus, it can be restored. However, it can not be started again till the discharging of Rect. Out Ei as it is latched when low +B goes down. It can be started again by discharging a few times the both ends of D15 (RD10) on the G board. But as it is the primary side, be careful with an electric shock.

3-8. N BOARD

3-8-1. Composition

The N board is composed of the sync circuit, the basic waveform generation circuit and the picture distortion adjustment circuit by CPU.

3-8-2. Horizontal and Vertical Oscillations Sync Circuit

This circuit is composed around IC101 to make the horizontal and vertical oscillations, AFC and AFC phase control, and vertical oscillation sync. The flyback pulse (FBT) from the D3 board is determined as a trigger, and it generates the SAW wave compared with AFC. The capacity in pin ⑤ of IC101 is switched the value according to the frequency by the CPU (IC3) control to obtain the suitable SAW wave.
The trigger pulse of H is input to pin ① of IC101. Also, IC4 (D/A converter: hereinafter referred to as D/A) is controlled by the CPU (IC3), and the charged current of pin ② of IC101 is changed by Q204 to Q206 to adjust the phase of the trigger pulse. This pulse is compared with the SAW wave mentioned above to make a horizontal sync. Also, the capacity in pin ② of IC101 is switched the value according to the frequency by the CPU (IC3) control.
The horizontal oscillation frequency is determined by controlling the charged current to pin ⑧ of IC101 with the adjustment of RV1 and the signal from CPU (IC3). And the horizontal sync signal adjusted the phase and the frequency is output from pin ⑫ of IC101.
The vertical trigger pulse is input to pin ⑲ of IC101. The voltage according to the frequency from the vertical trigger pulse is made in IC27, and its pulse is input to pin ⑱ of IC101 to oscillate at the lower frequency than the trigger pulse. And then it is forcibly locked by the trigger pulse, outputting as the vertical sync signal from pin ⑯ of IC101.

3-8-3. Picture Distortion Correction Waveform Generation Circuit

This circuit is mainly composed of IC201 which makes the waveform generation and IC202 which makes the waveform correction.
The vertical sync pulse made in IC101 is input to pin ⑤ of IC201. And the FBT from the D3 board is input to pin ㉔ of IC201. The SAW wave of H cycle is output from pin ⑲ of IC201, and the parabola wave from pin ⑱, they are sent out to the D3 board. Also, the SAW wave of V cycle is output from pins ⑨ and ⑩, and the parabola wave from pin ⑪, they are input to IC202.
The waveform is shaped by IC202, and the parabola wave of V cycle (pins ㉖ and ㉗) and that of 1/2 V cycle (pins ⑰, ⑱, ⑲ and ⑳) are output by IC202. The 1/2 V cycle parabola wave is passed through RV6 and RV7, using for the adjustment of the upper and lower sections of the V. STAT convergence. Also, the sine wave according to the phase is output from pin ㉕ of IC202 by adjusting RV8. These waveforms are used as the basic waves of picture distortion adjustment.

3-8-4. CPU Periphery Circuit

The operation of each pin of CPU (IC3) is explained here.
The horizontal sync signal and the vertical sync signal are respectively input to pins ㉒ and ㉓. Also, the sync polarity discrimination signal from the B1 board is input to pins ㉟ and ㊳. Its timing is discriminated from these input signals, the picture distortion correction data of the timing is sent out from the memory, outputting to each D/A. The CPU discriminates the timing, and after it is determined, the mute signal ("H" level) is output from pin ⑫ for approx. 0.7 sec. By this signal, Q6 and Q8 turn on, the H. SIZE becomes low, and the horizontal sync becomes free-running. In the same way, after the timing is determined, the mute signal is also output from pin ㊾ for approx. 2 sec. By this signal, Q2 turns on, the contrast becomes minimum, and the picture becomes dark. The timings of mute are as shown in Fig. 3-9. The 4-bit S-shaped capacitor switching signal is output to pins ㊶ to ㊹ according to the frequency. The LEDs of the front panel are lighted up after the outputs of pins ② to ⑥, ㊸ to ㊹ have been passed through the LED driver of IC1.
The states of the front panel switches are input to pins ⑦ to ⑪. Also, the outputs from pins ⑭ to ⑰ are the control signals of IC7 and IC8 (E^2PROM). IC7 and IC8 are the data memories, and the picture distortion correction waveform data is stored there. The contents of memory are as shown in Table 3-3.

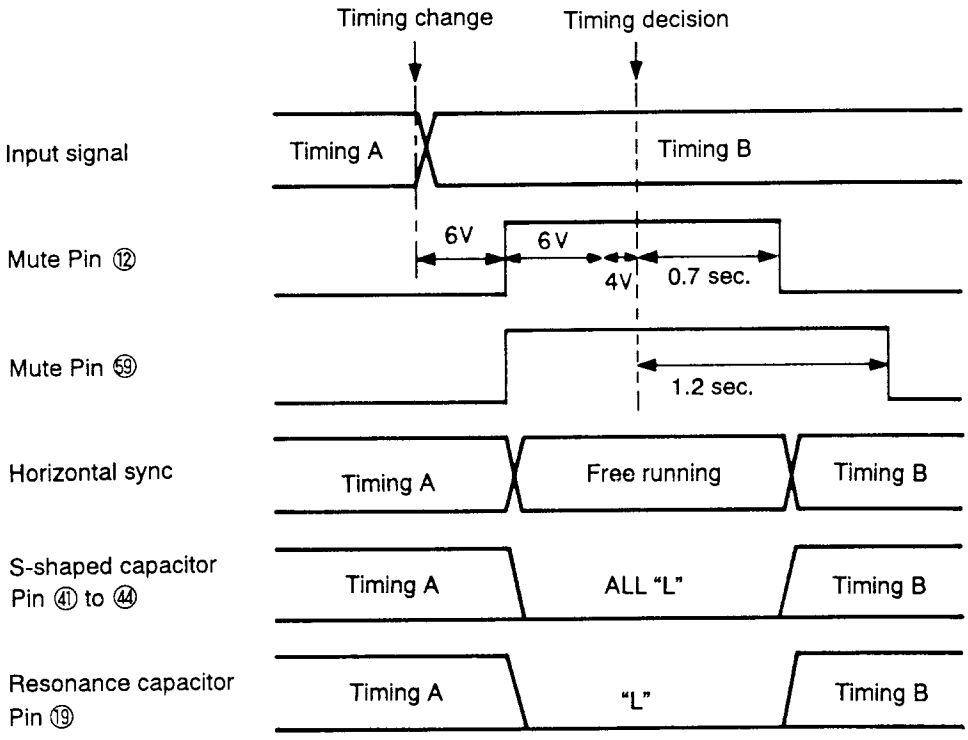


Fig. 3-9 Timing chart

00H~2FH	Preset system data
30H~6BH	User's system data
6CH~6FH	Jigs ID data
70H	Memory check ID
71H~7CH	Adjustment jig area
7DH~7FH	Other data
80H~DFH	Range data
EFH	Memory check ID
F0H~FFH	Coefficient data

Table 3-3. Memory map (IC7, IC8)

Note1: 00H to 7FH are assigned to IC7, and 80H to FFH to IC8.
Note2: Each address is WORD unit (16-bit).

Pins ⑳ to ㉑ are the communication terminals with external.
Pin ⑲ outputs the switching signal of the resonance capacitor by the frequency.
The clock signal is input to pins ㉙ and ㉚. Its clock frequency is 4 MHz, it is made from the crystal oscillator (X1).
The V cycle pulse is output from pin ⑱ while the CPU operates. This pulse is observed by IC28, if the pulse is exhausted, it judges that the CPU has hanged up. Therefore, it outputs the reset signal.
Pin ㉘ is the reset terminal, receiving the reset signal from IC28 and the that from Q1 by the falling of power source voltage to reset CPU.

Pins ㉝ and ㉞ are the mode discrimination terminals. R199 is connected to pin ㉝. In case R199 mounted 5 mm jumper wire, it becomes the OEM mode. The OEM mode is the mode which does not entrust H. SIZE and V. SIZE adjustments to user. (not opened) However, their modes are not required for the above two adjustments as used only for the determined timings in advance.
Pin ㉞ connects to SW1. It can be switched to the TEST mode by SW1. It is normally NORMAL mode. In the TEST mode, the adjustment value can be set to a maximum value or a minimum value with the user control on the front panel. (Press the ADJUST KEY while pressing the SELECT button to adjust it.) Also, The NORMAL/TEST mode are discriminated when power on.

3-8-5. Picture Distortion Correction Adjustment Circuit (D/A Converter and Its Periphery Circuits)

The basic waveform from the waveform generation circuit (IC201, IC202) is referred to the reference input, the picture distortion correction signal is obtained by changing the input level with the signal from CPU (IC3). There are 6 types of the picture distortion correction waveforms. They are 4 types of V. SIZE, H. SIZE, PIN and H. CENT sent to the D3 board, and 2 types of PIN BAL and KEY BAL input to the horizontal and vertical oscillation sync circuit on the N board.

3-8-5-1. V. SIZE correction waveform

The SAW wave of V. SIZE correction is output to pin ⑭ of N-1 connector. This wave includes the correction waveforms of V. SIZE, V. CENT, V. LIN and V. LIN bal.
The block diagram of V. SIZE correction waveform circuit is as shown in Fig. 3-10.

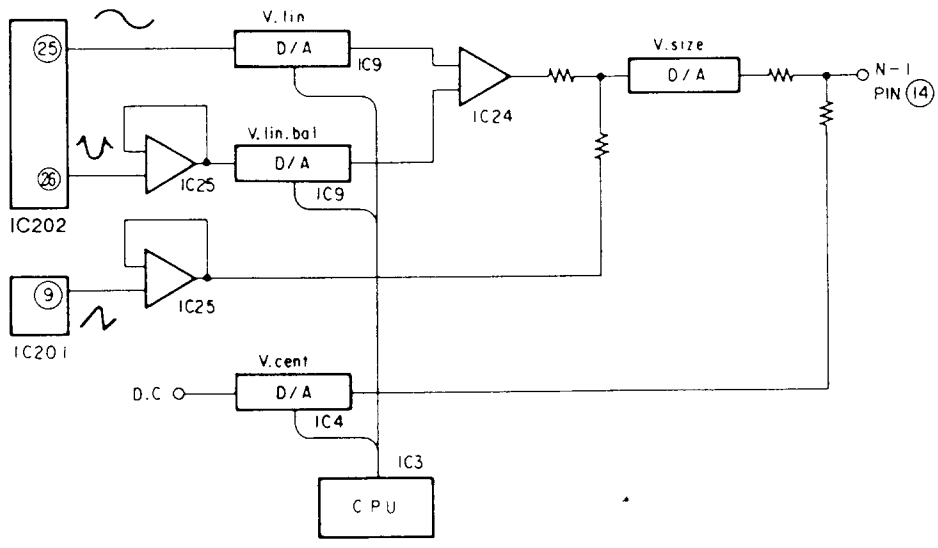


Fig. 3-10 V.SIZE correction block

(a). V. LIN correction waveform

The sine wave output from pin ㉕ of IC202 is input to IC9 (D/A) as the reference signal. It is adjusted the level by the signal from CPU (IC3) to obtain the V. LIN correction waveform to pin ① of IC19.

(b). V. LIN BAL correction waveform

The parabola wave output from pin ㉖ of IC202 is level shifted by IC25. The signal is input to IC9 (D/A) as the reference signal. It is adjusted the level by the signal from CPU (IC3) to obtain the V. LIN BAL correction waveform to pin ⑦ of IC20.

(d). V. SIZE correction waveform

The signal which is added the V. LIN, V. LIN BAL correction waveforms mentioned above to the SAW wave amplified pin ⑨ output of IC201 by IC25 is referred to the reference signal. Its signal is input to pin ⑧ of IC10. And it is adjusted the level by the signal of CPU (IC3) to obtain the V. SIZE correction waveform to pin ① of IC22. And after being added the V. CENT correction voltage mentioned above to this signal, it is sent to the D3 board as the V. SIZE correction waveform from pin ⑭ of connector N-1.

3-8-5-2. H. SIZE correction waveform

The signal according to the horizontal oscillation frequency is output by the CPU (IC3) control from pin ⑤ of IC4 (D/A). The maximum value of this voltage is limited by RV3 and RV4. This signal is the reference signal, it is input to IC10 (D/A), adjusting the voltage with the CPU (IC3) signal. After being added this voltage to the above voltage, the voltage adjusted with RV10 is sent out to the D3 board as the H. SIZE correction voltage from pin ⑮ of connector N-1.
The block diagram of H. SIZE correction waveform circuit is as shown in Fig. 3-11.

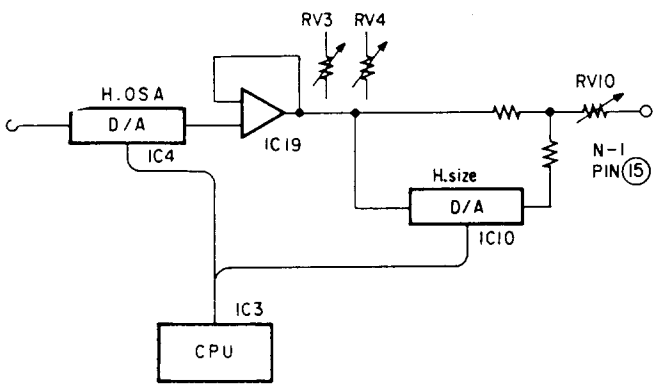


Fig. 3-11 H. SIZE correction block

3-8-5-3. H. CENT correction waveform

The signal of CPU (IC3) is input to IC4 (D/A) to adjust the voltage. And it is sent out to the D3 board as the H. CENT correction voltage from pin ⑳ of connector N-1. The block diagram of H. CENT correction waveform circuit is as shown in Fig. 3-12.

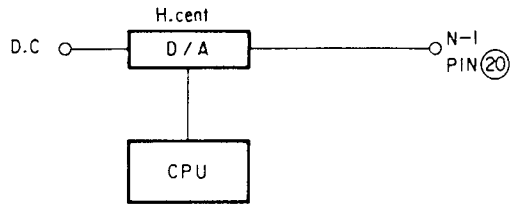


Fig. 3-12 H. CENT correction block

3-8-5-4. PIN correction waveform

The parabola wave of pin correction is output to pin ⑯ of connector N-1. This waveform includes the key correction waveform. And the V. lin and V. lin bal correction waveforms are added to compensate the pin distortion by the V. lin adjustment. The block diagram of pin correction waveform circuit is as shown in Fig. 3-13.

(a). KEY correction waveform

The SAW wave amplified the output of pin ⑨ of IC201 by IC25 is referred to the reference signal. It is input to IC9 (D/A). This signal is adjusted the level by the signal of CPU (IC3) to obtain the key correction waveform to pin ⑦ of IC17.

(b). PIN correction waveform

First, The V. lin correction waveform at 3-8-5-1(b) is delayed by IC29, and the signal is added the V. IIN BAL correction waveform at 3-8-5-1(b) by IC26. And the signal is added the parabola wave of pin ㉗ of IC202 and the key correction waveform at 3-8-5-4(a). The resulting signal is referred to the reference signal, inputting to IC10 (D/A). This signal is adjusted the level by the signal of CPU (IC3), sent out to the D3 board as the PIN correction waveform from pin ⑯ of connector N-1.

3-8-5-5. KEY BAL, PIN BAL correction waveforms

The SAW wave amplified the output of pin ⑨ of IC201 by IC25 is referred to the reference signal. The signal is input to IC9 (D/A). This signal is adjusted the level by the signal of CPU (IC3) to obtain the KEY BAL correction waveform to pin ⑦ of IC18.

Also, the parabola wave of pin ㉗ of IC202 which is referred to the reference signal is input to IC10 (D/A). This signal is adjusted the level by the signal of CPU (IC3) to obtain the PIN BAL correction waveform to pin ⑦ of IC23. The KEY BAL correction waveform mentioned above is added to this waveform, and the signal is input to pin ⑦ of IC101 to modulate the phase of the horizontal oscillation. The block diagram of the key bal, pin bal correction waveform circuits are as shown in Fig. 3-14.

3-8-5-6. Blanking pulse generation circuit

The vertical sync signal of pin ⑮ of IC101 is wave-shaped and amplified by Q301 to Q304, and sent out to the B board.

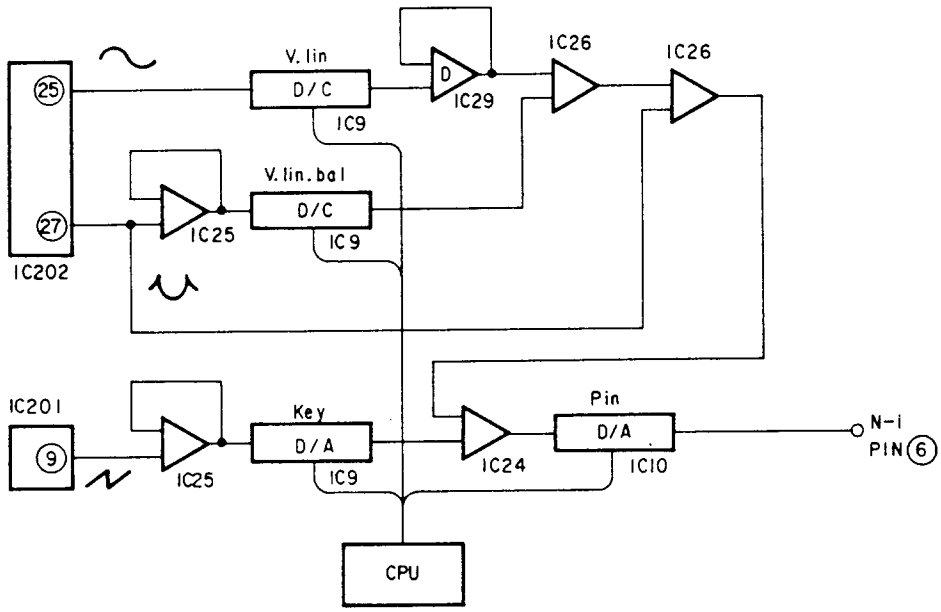


Fig. 3-13 PIN correction block

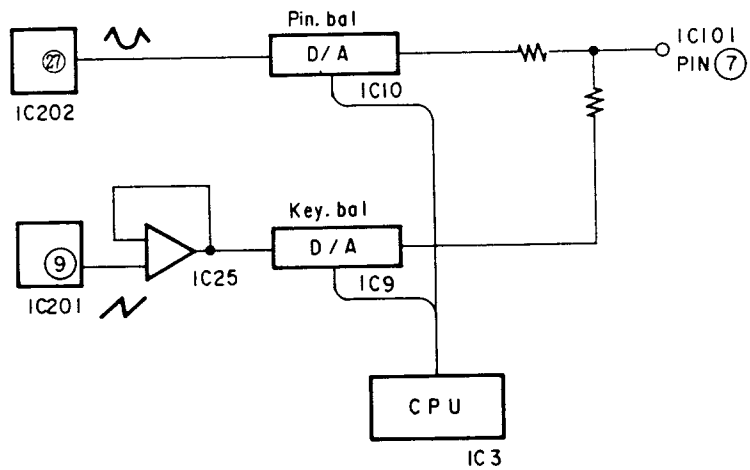
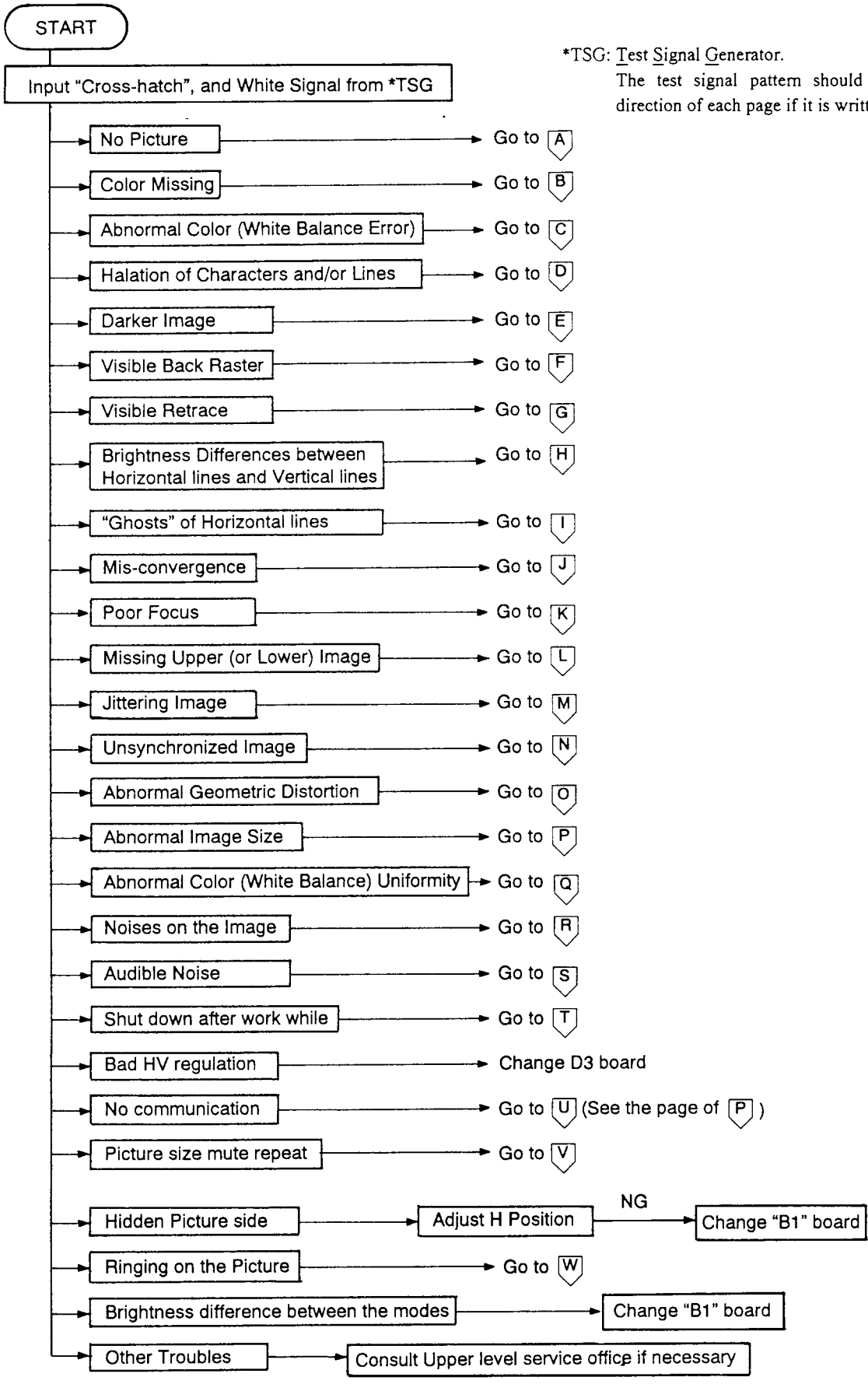


Fig. 3-14 KEY BAL, PIN BAL correction block

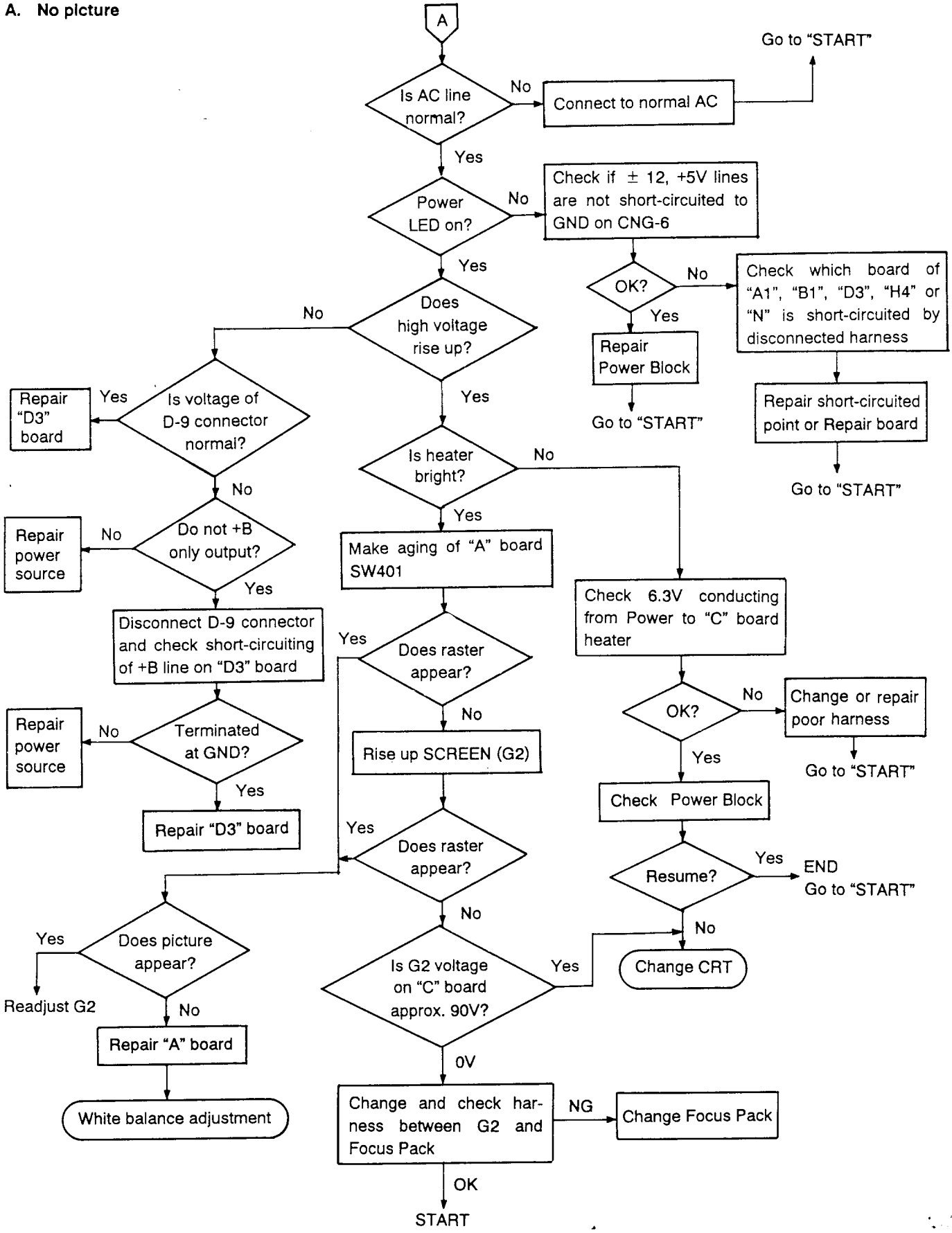
SECTION 4
TROUBLE SHOOTING

4-1. TROUBLE SHOOTING

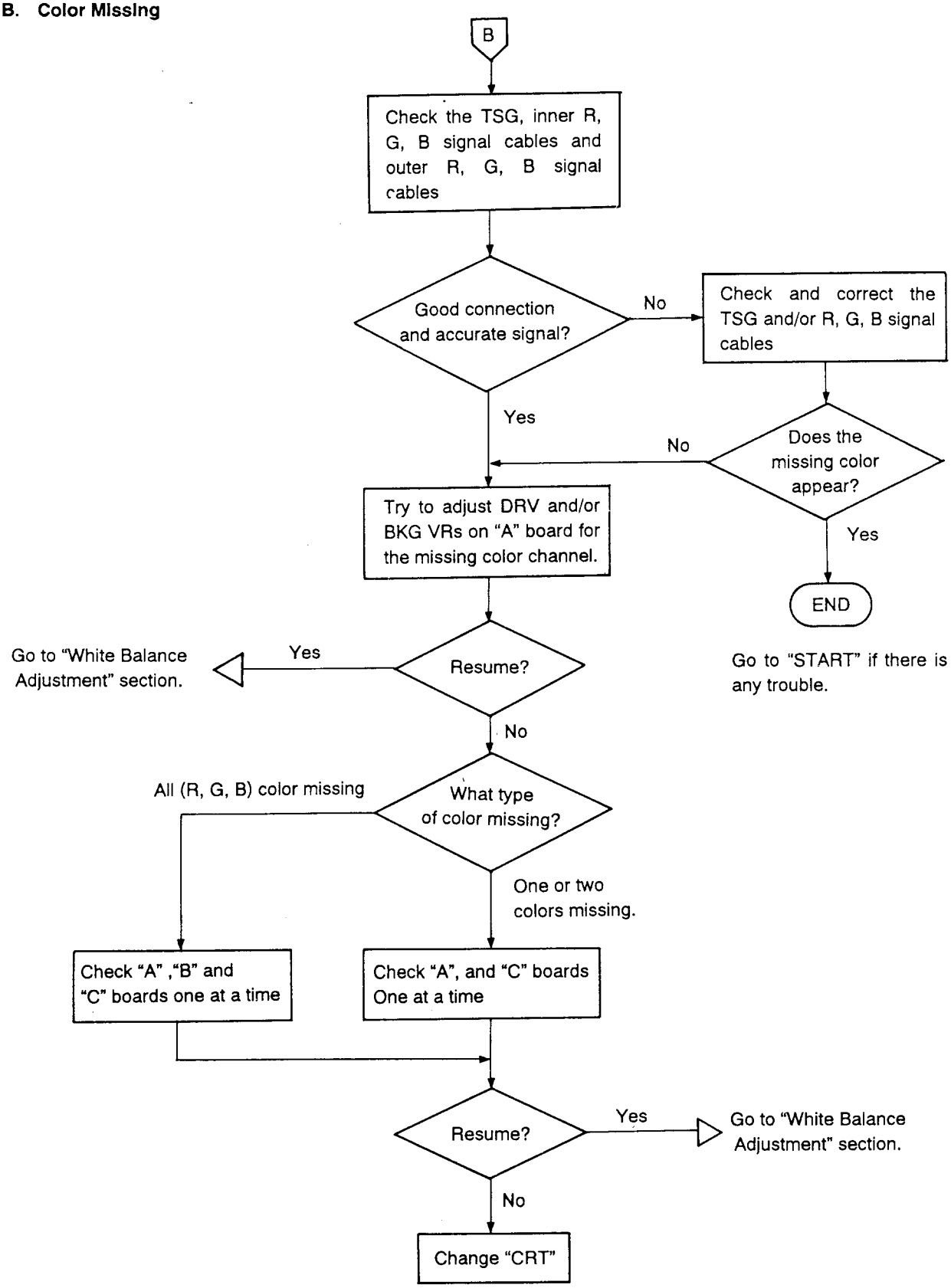


*TSG: Test Signal Generator.
The test signal pattern should be changed by the direction of each page if it is written.

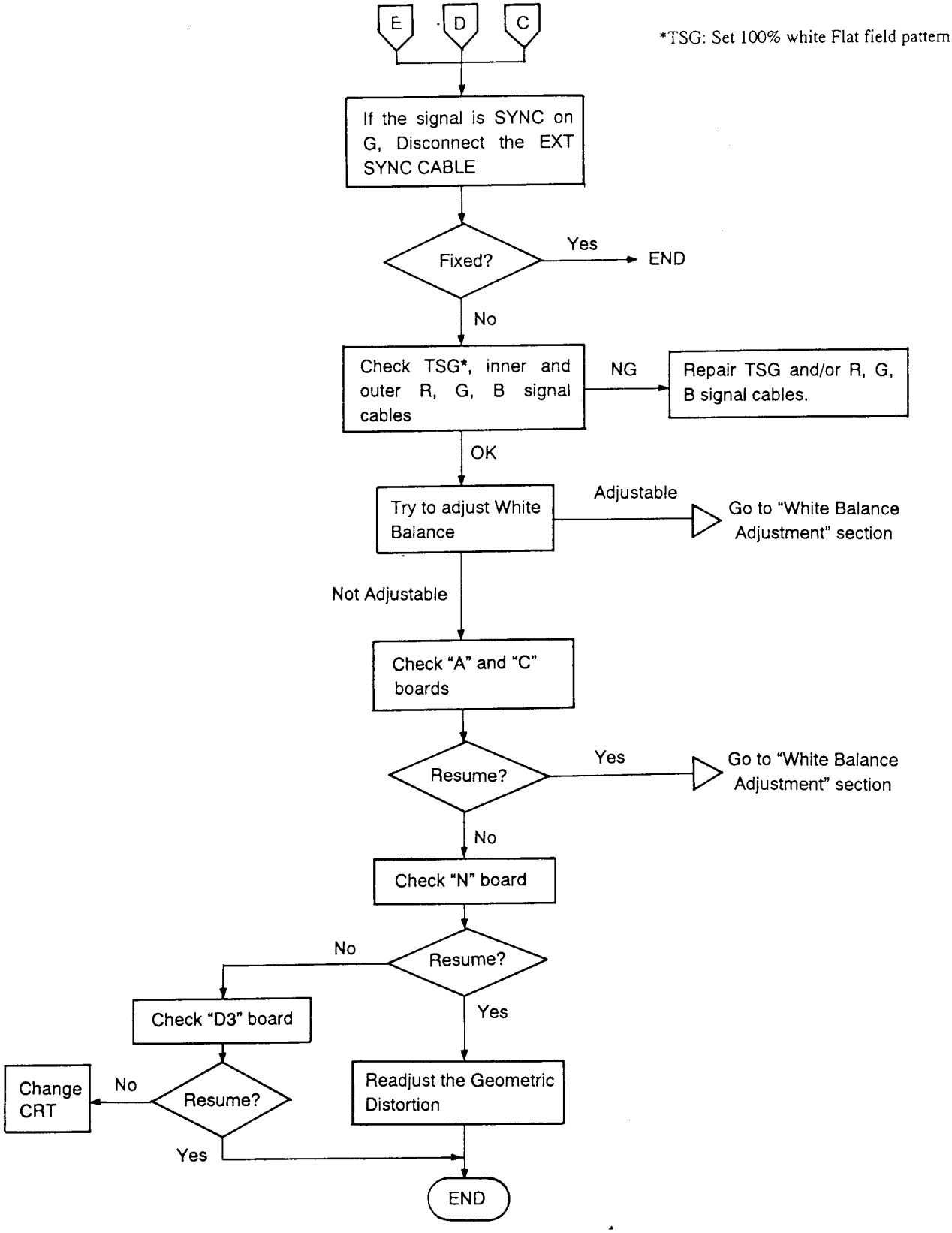
A. No picture


A
Is AC line normal?
No
Connect to normal AC
Go to "START"
Yes
Power LED on?
No
Check if ± 12, +5V lines are not short-circuited to GND on CNG-6
Yes
Does high voltage rise up?
No
OK?
No
Check which board of "A1", "B1", "D3", "H4" or "N" is short-circuited by disconnected harness
Yes
Repair Power Block
Go to "START"
Repair short-circuited point or Repair board
Go to "START"
Yes
Is voltage of D-9 connector normal?
Repair "D3" board
Yes
No
Do not +B only output?
Repair power source
No
Yes
Disconnect D-9 connector and check short-circuiting of +B line on "D3" board
Terminated at GND?
Repair power source
No
Yes
Repair "D3" board
Is heater bright?
No
Yes
Make aging of "A" board SW401
Does raster appear?
Yes
No
Rise up SCREEN (G2)
Does raster appear?
Yes
No
Check 6.3V conducting from Power to "C" board heater
OK?
No
Change or repair poor harness
Go to "START"
Yes
Check Power Block
Resume?
Yes
END
Go to "START"
No
Change CRT
Is G2 voltage on "C" board approx. 90V?
Yes
0V
Does picture appear?
Yes
Readjust G2
No
Repair "A" board
White balance adjustment
Change and check harness between G2 and Focus Pack
NG
Change Focus Pack
OK
START

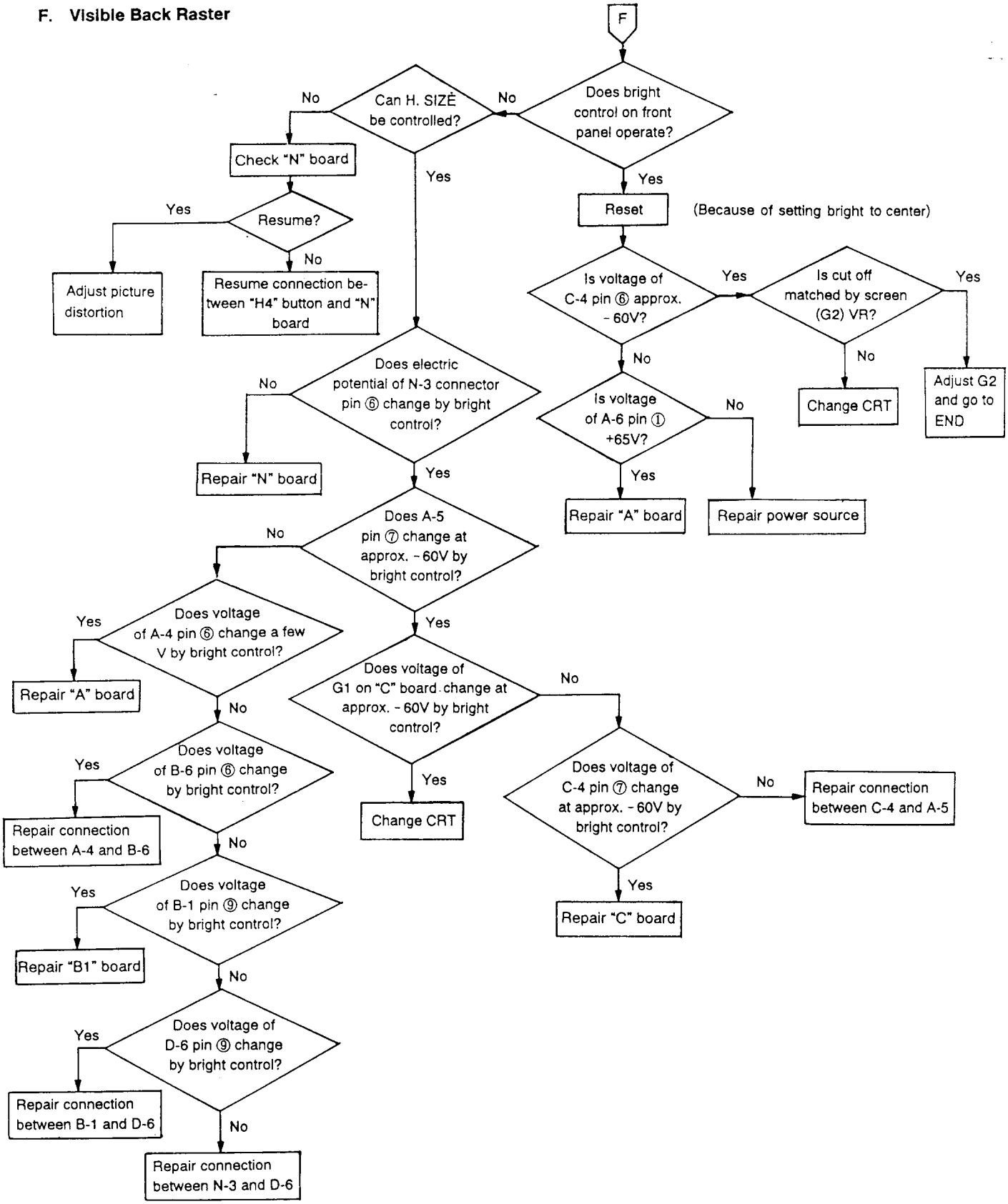
B. Color Missing



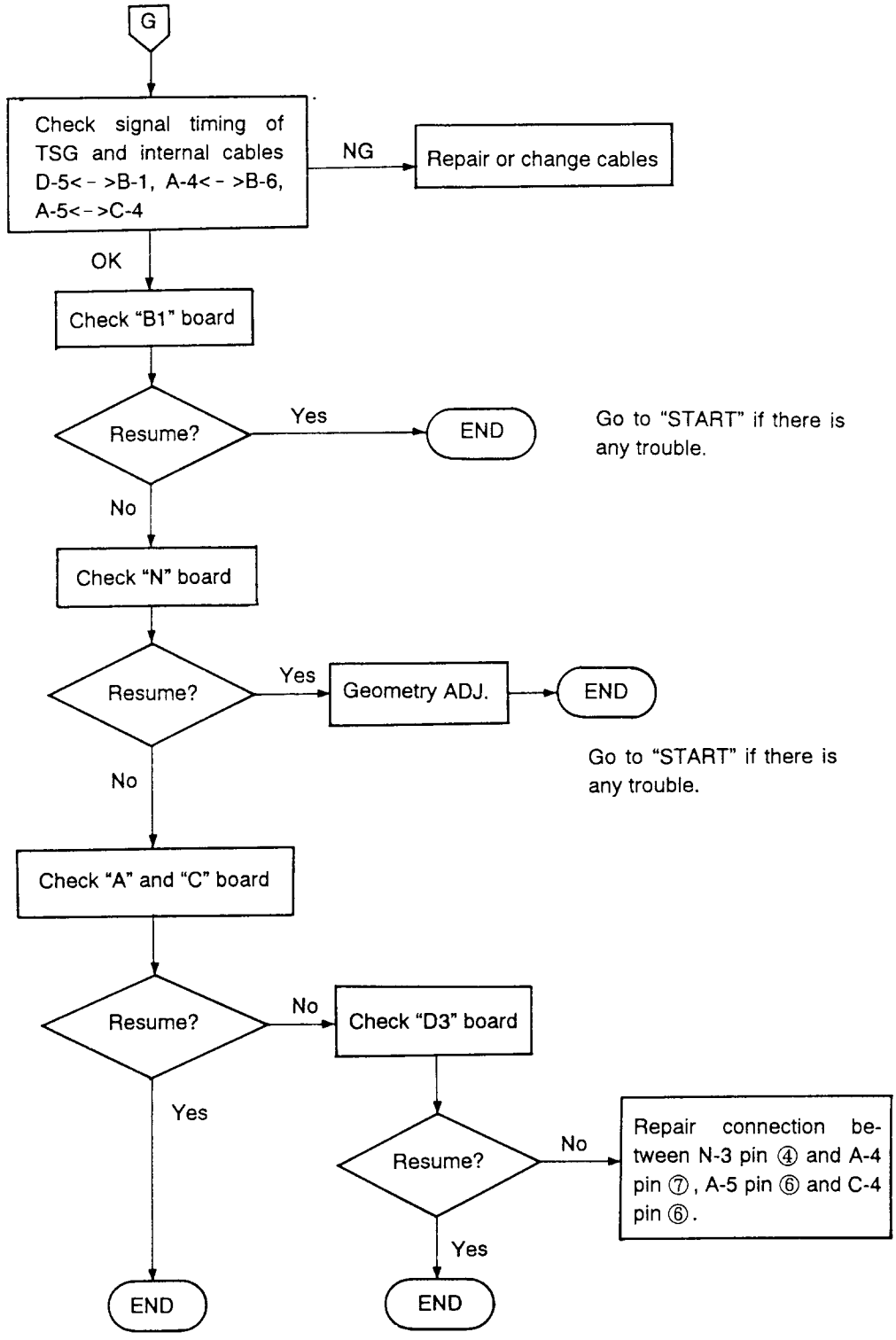
C. Abnormal Color (White Balance Error)
D. Halation of Characters and/or Lines
E. Darker Image



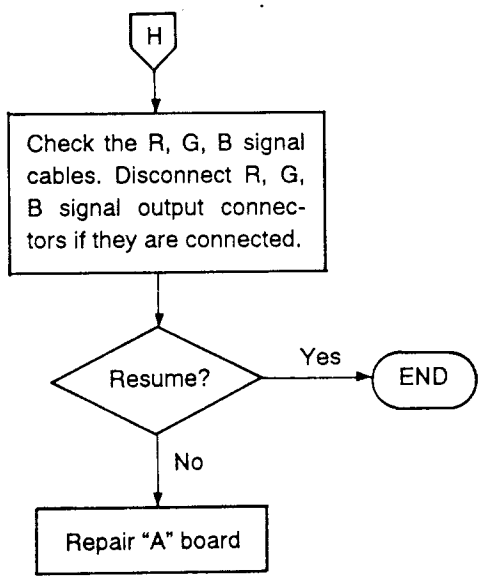
F. Visible Back Raster



G. Visible Retrace

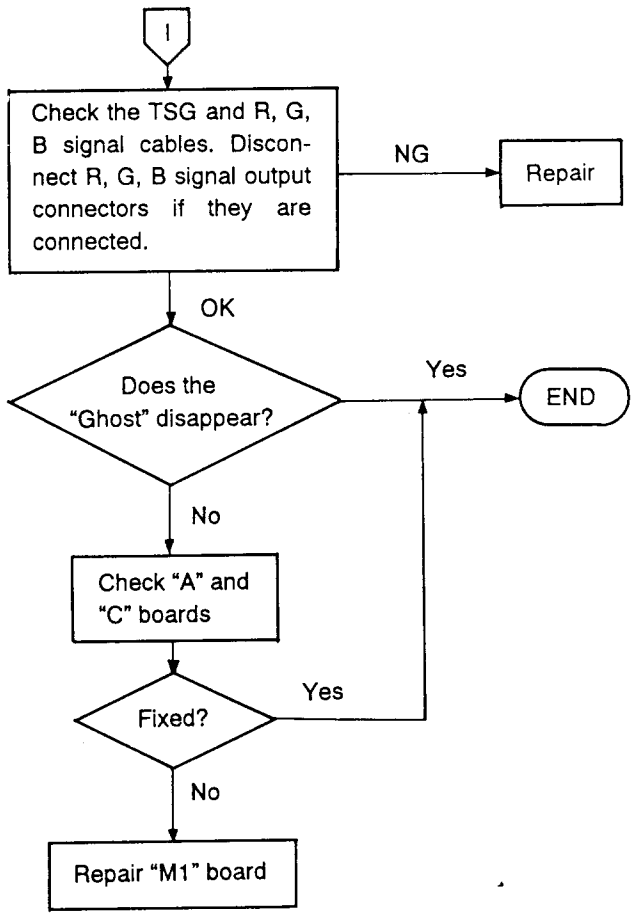


H. Brightness Differences between Horizontal lines and Vertical lines



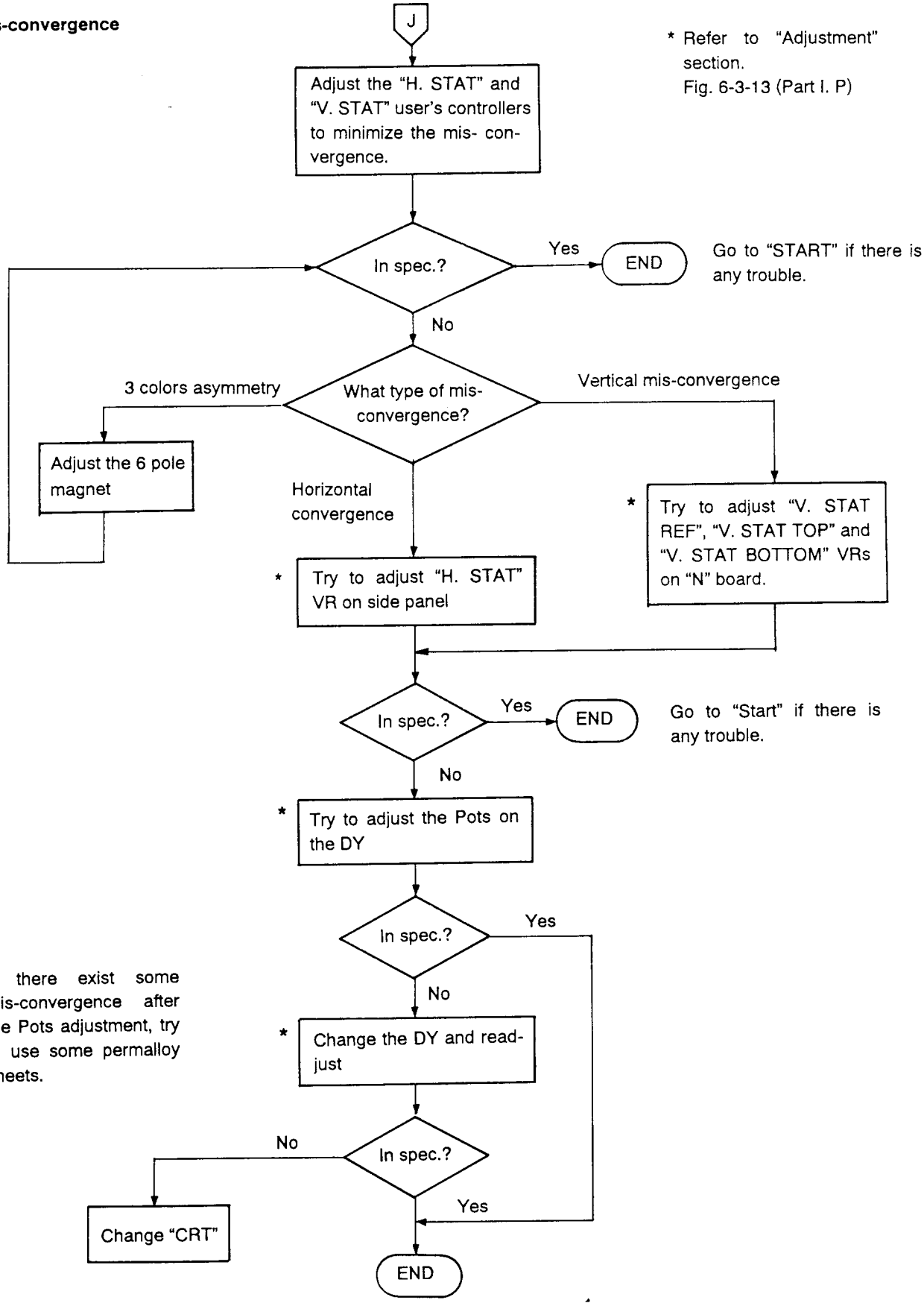
Go to "START" if there is any trouble.

I. "Ghosts" of Horizontal lines



GO to "START" if there is any trouble.

J. Mis-convergence



* Refer to "Adjustment" section.
Fig. 6-3-13 (Part I. P)

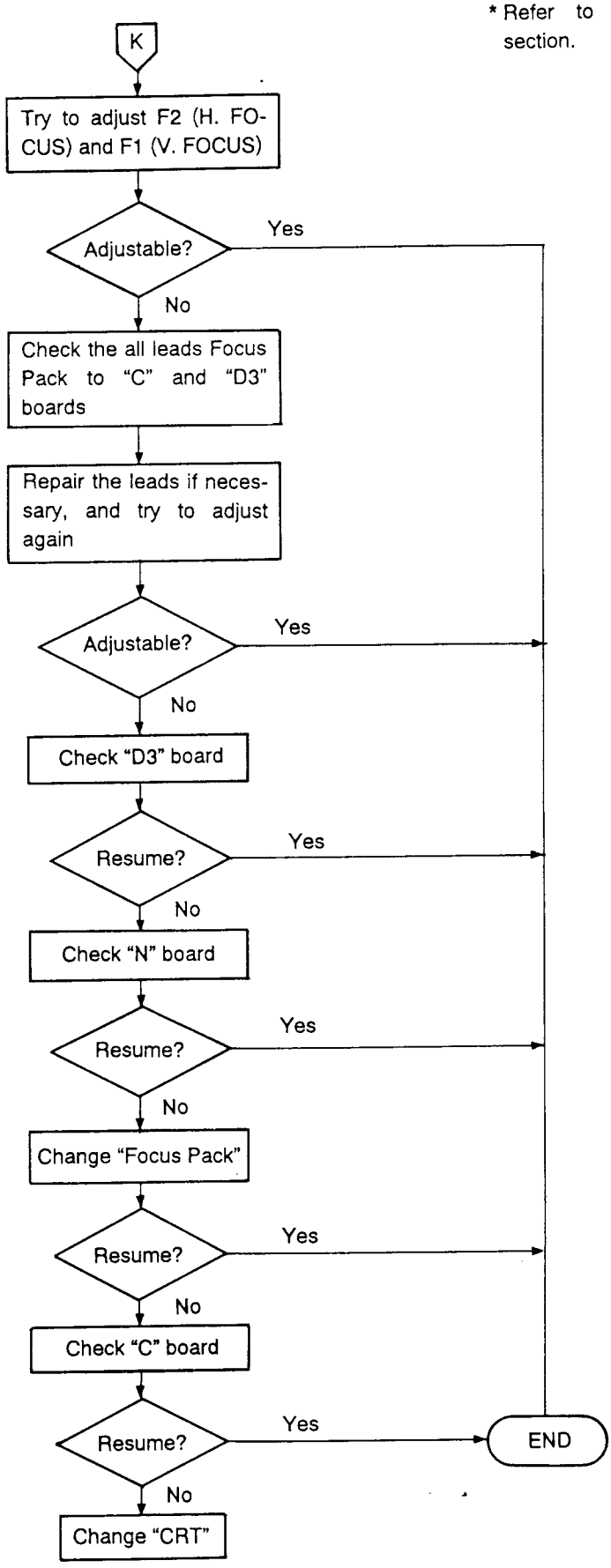
Go to "START" if there is any trouble.

Go to "Start" if there is any trouble.

* If there exist some mis-convergence after the Pots adjustment, try to use some permalloy sheets.

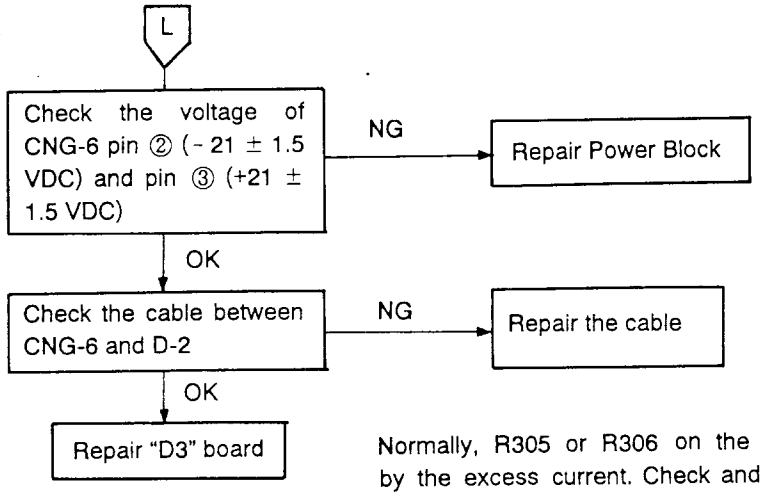
K. Poor Focus

* Refer to "Adjustment" section.



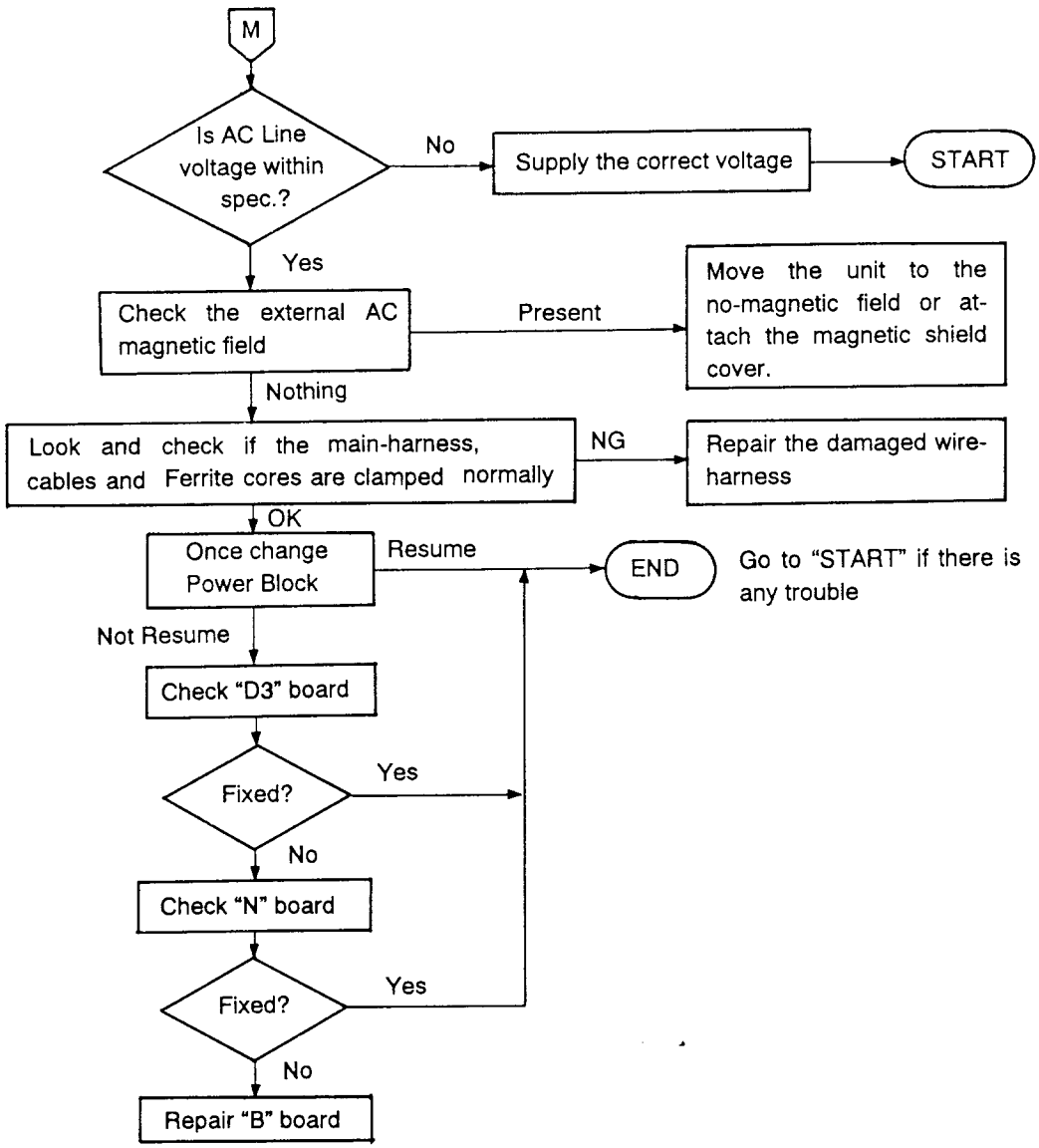
Go to "START" if there is any trouble.

L. Missing Upper (or Lower) Image



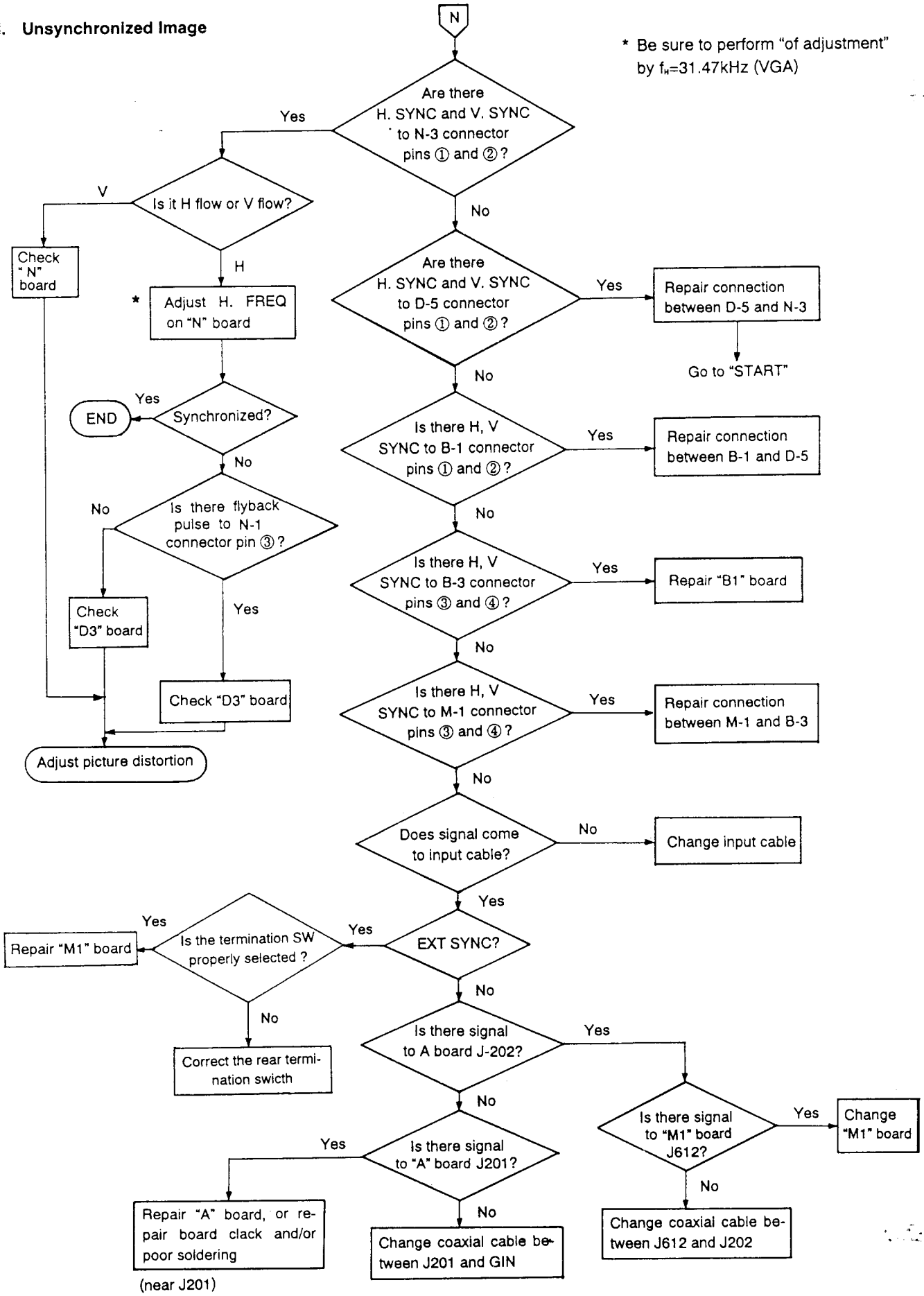
Normally, R305 or R306 on the D3 board is opened by the excess current. Check and repair it first.

M. Jittering Image

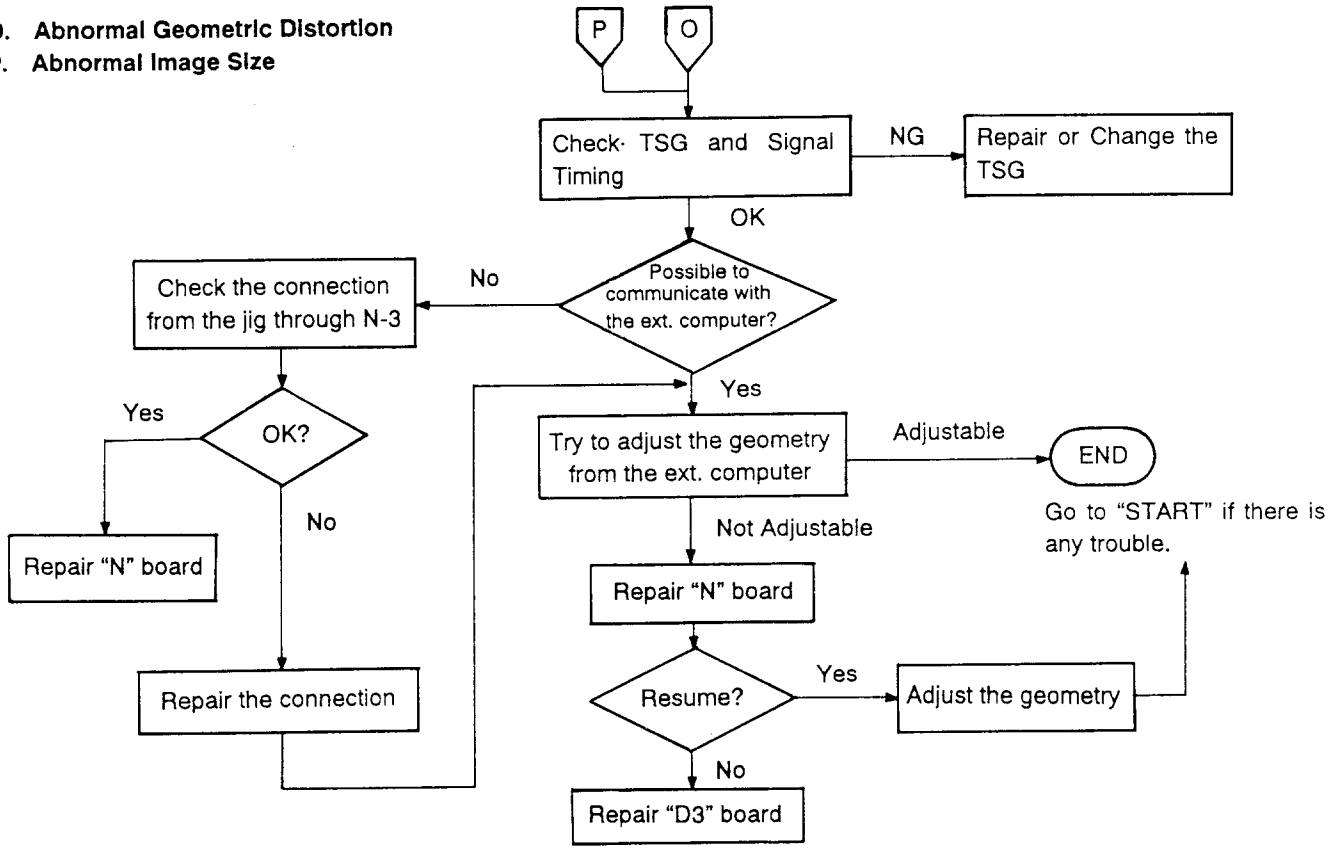


Go to "START" if there is any trouble

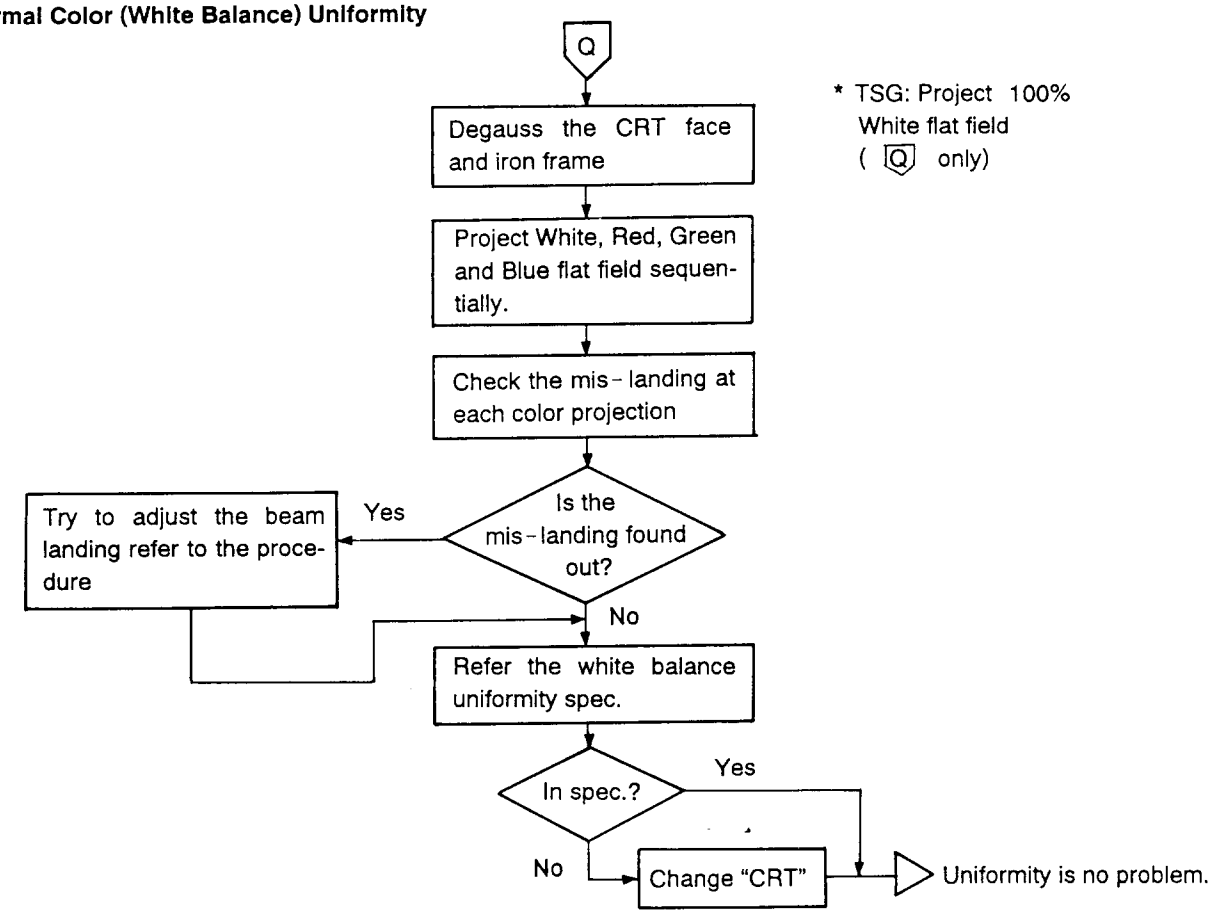
N. Unsynchronized Image



O. Abnormal Geometric Distortion
P. Abnormal Image Size



Q. Abnormal Color (White Balance) Uniformity

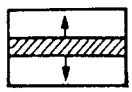
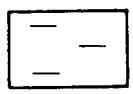
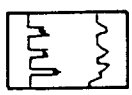
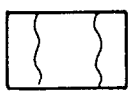
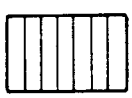


* TSG: Project 100% White flat field (Q only)

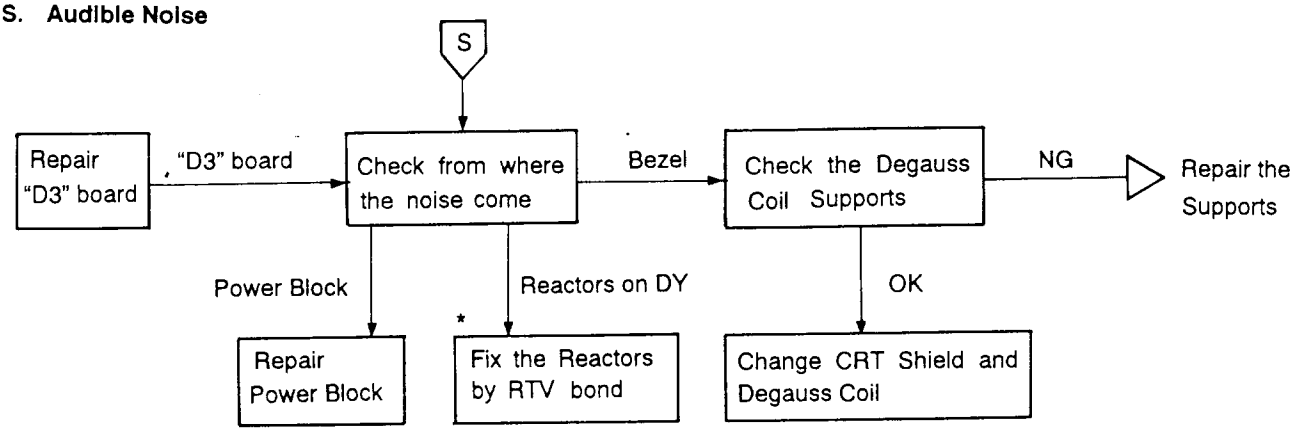
R. Noise on the Image

R

Noise could be generated from any place.
Distinguish the type of the noise, and find the cause from the referred points.

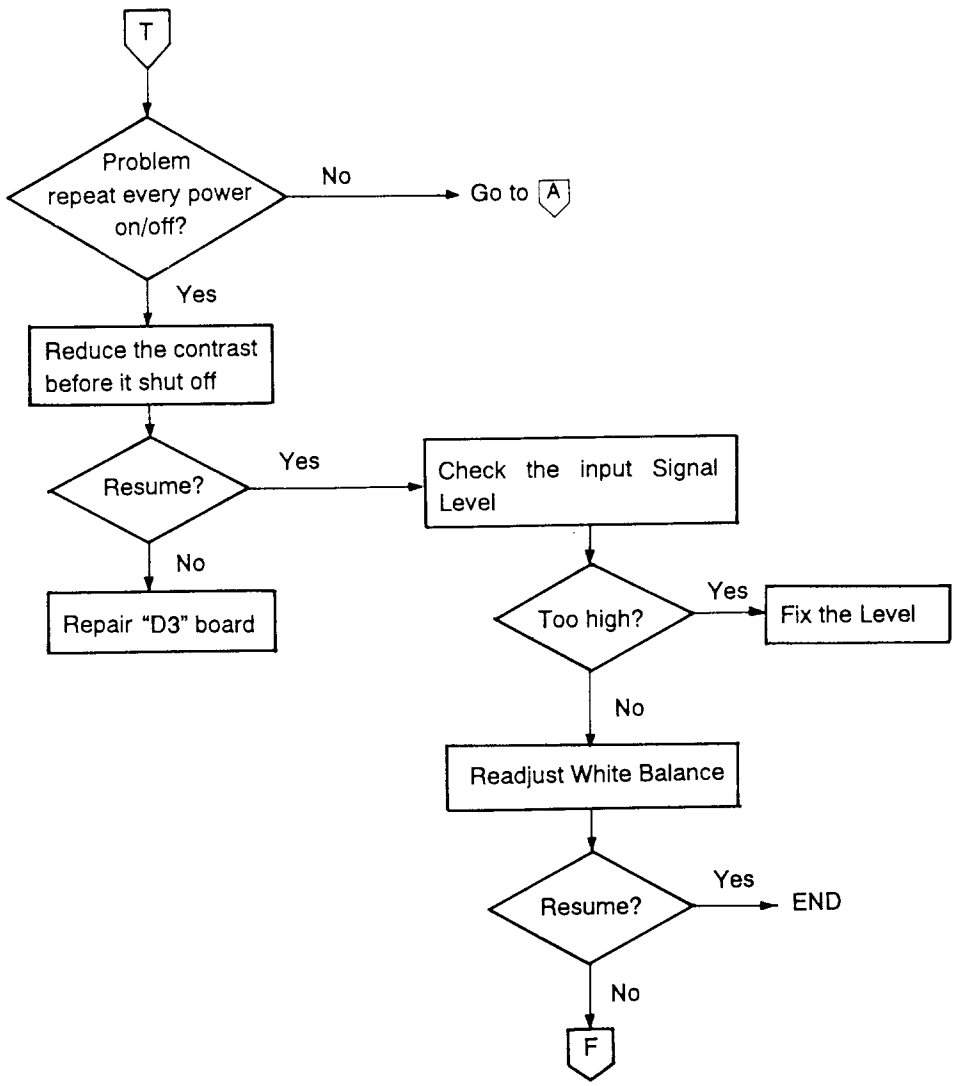
Phenomenon	Cause	Treatment
Moving Horizontal Bar 	External magnetic field, Poor regulation of Power Supply.	Move the other equipments away. Repair "G" board.
Pop noise appears random 	Arcing, Bad connection, Component dying, AC line Spike.	Repair "D3" board, Fix the connection, change CRT, eliminate the cause of the spike.
Seam 	Non linear Vertical Amp Non linear V-conv. Amp HV regulator noise	Repair "D3" board Repair "N" board
Scratch noise 	Video clamp miss Focus Oscillation Focus Arcing Lose anode-cap	Repair "A" or "B1" board Repair "D3" board Repair "C" board Attach the anode-cap correctly
Torn Picture 	HV arc, AFC circuit problem. Sync Sep. miss	Repair "D3", or "N," or "B1" board. Fix the anode Cap. Change Focus Pack.
Moire moving	EXT Magnetic Field. Sync jitter, AFC jitter, Power Supply noise.	Go to M
Picture Swim 	AFC problem Input Signal Ground Problem	Repair "D3" or "N" board Fix the ground between SG and Monitor.
Shade 	Video Amp Sag Poor HV Regulation	Repair "A "board Repair "D3" board
Vertical Streaking 	Video Oscillation TSG malfunction	Repair "A" board Repair the TSG

S. Audible Noise

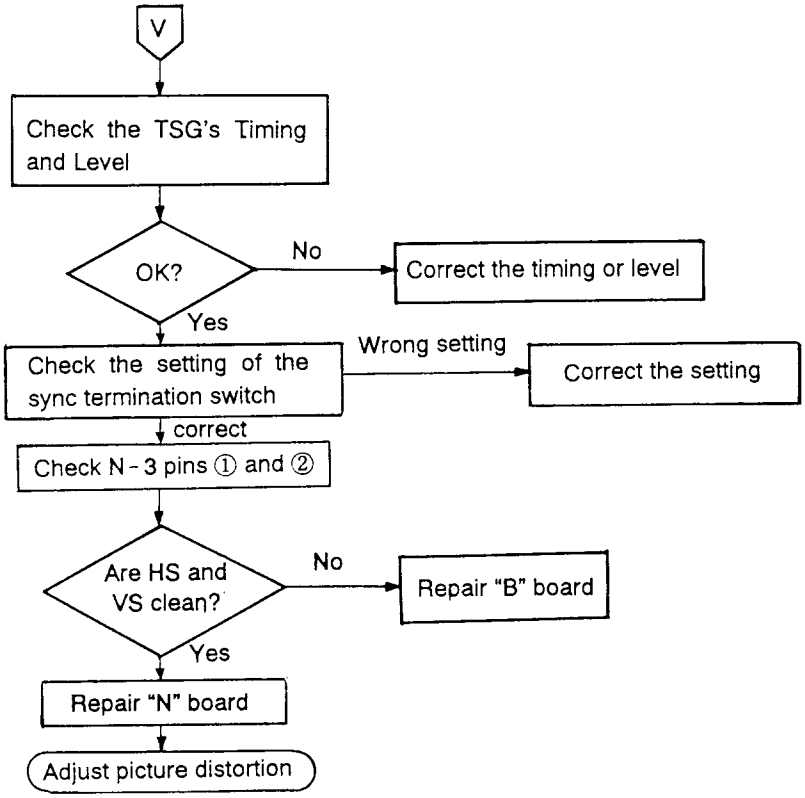


* See "Adjustment" section.

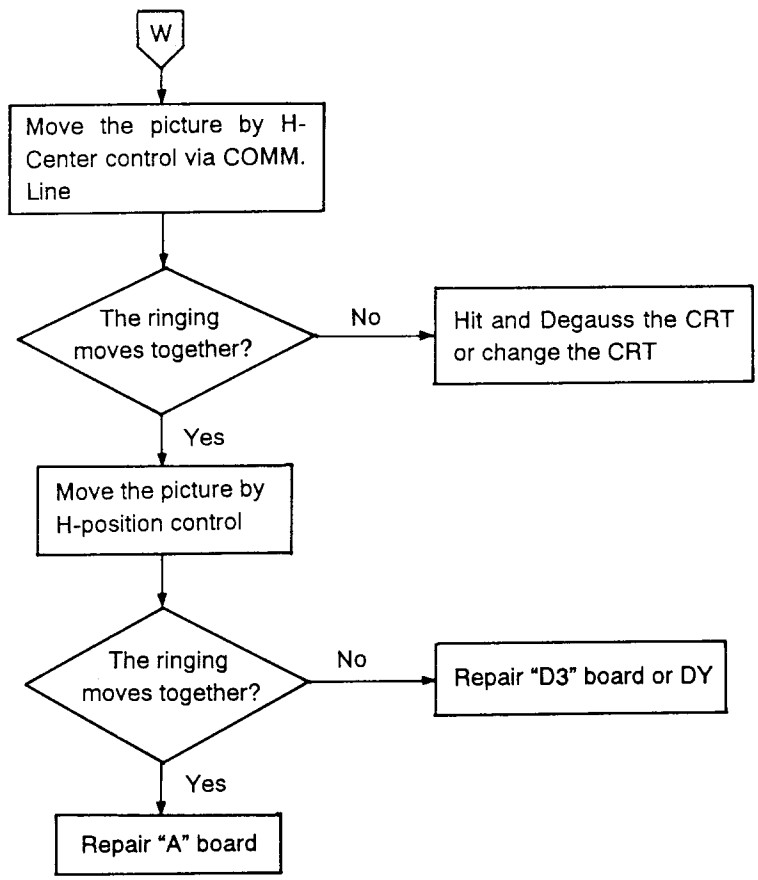
T. Shut down after get the picture



V. Picture size mute repeat



W. Ringing on the picture



4-2. PARTS LEVEL BOARD REPAIR

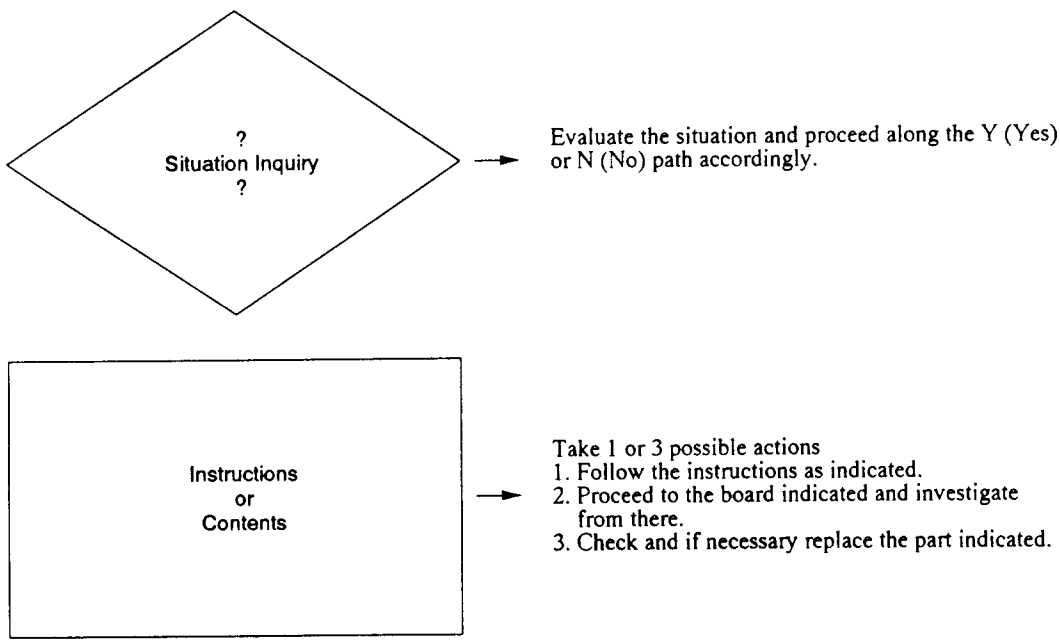
Flow charts are provided for doing parts level repair to Boards:

D3 Board
A Board
G Board
B1 Board
N Board

The circuit drawing in the Service Manual should be used to make repairs to the remaining boards:

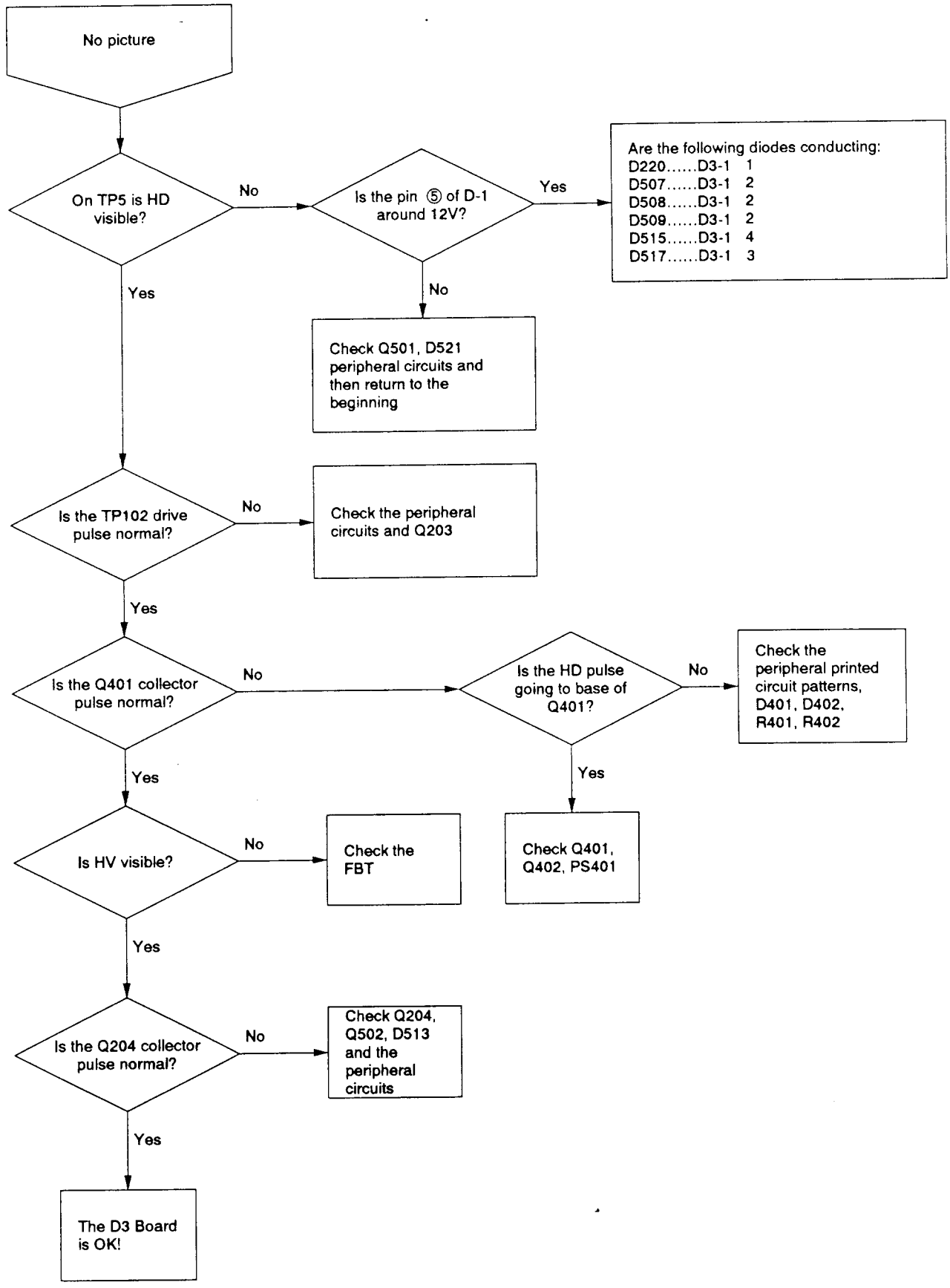
M Board
H Board
C Board

Please note that these flow charts use the following format:

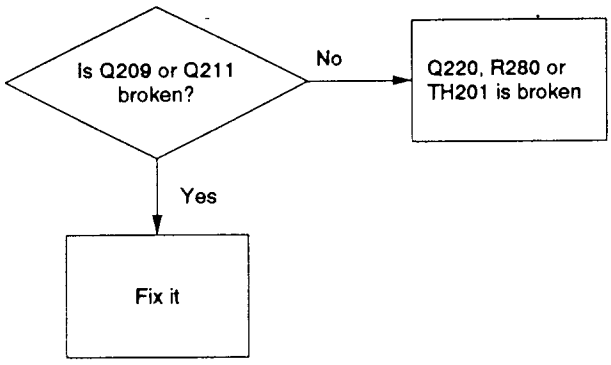


4-2-1. D3 Board

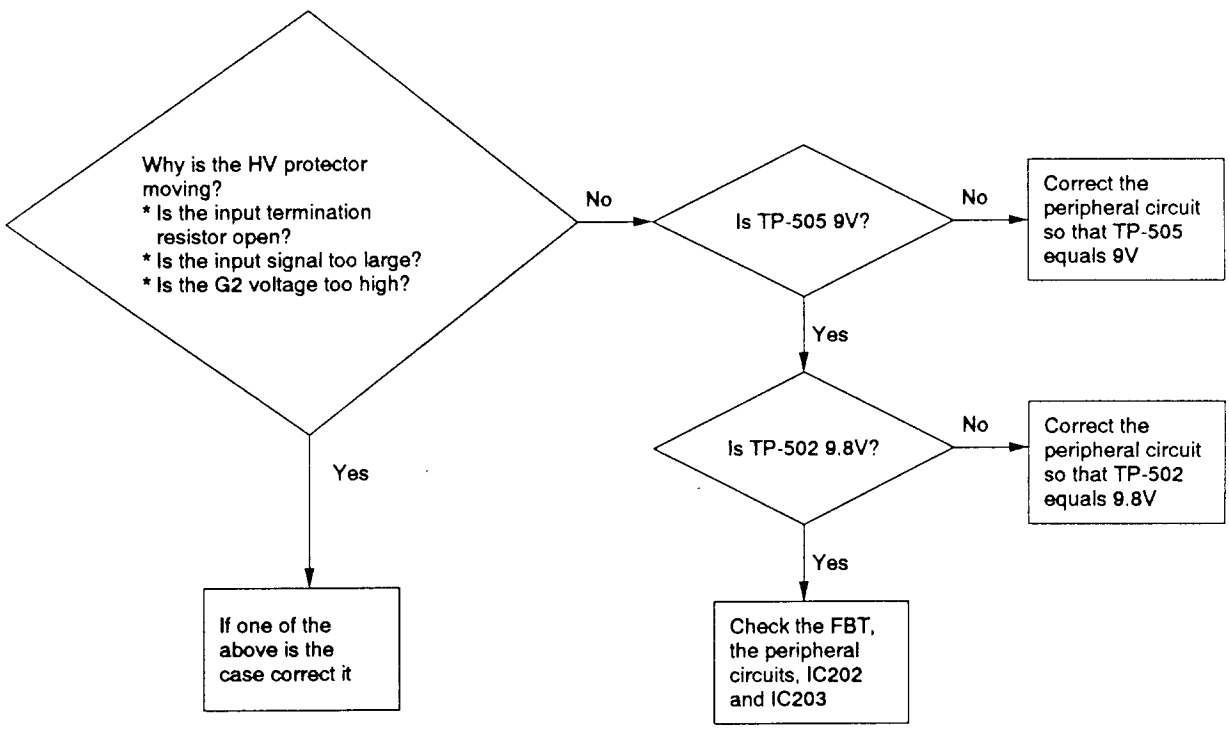
D3-1 (A)



D3-1 1 In the case of D220 Trouble

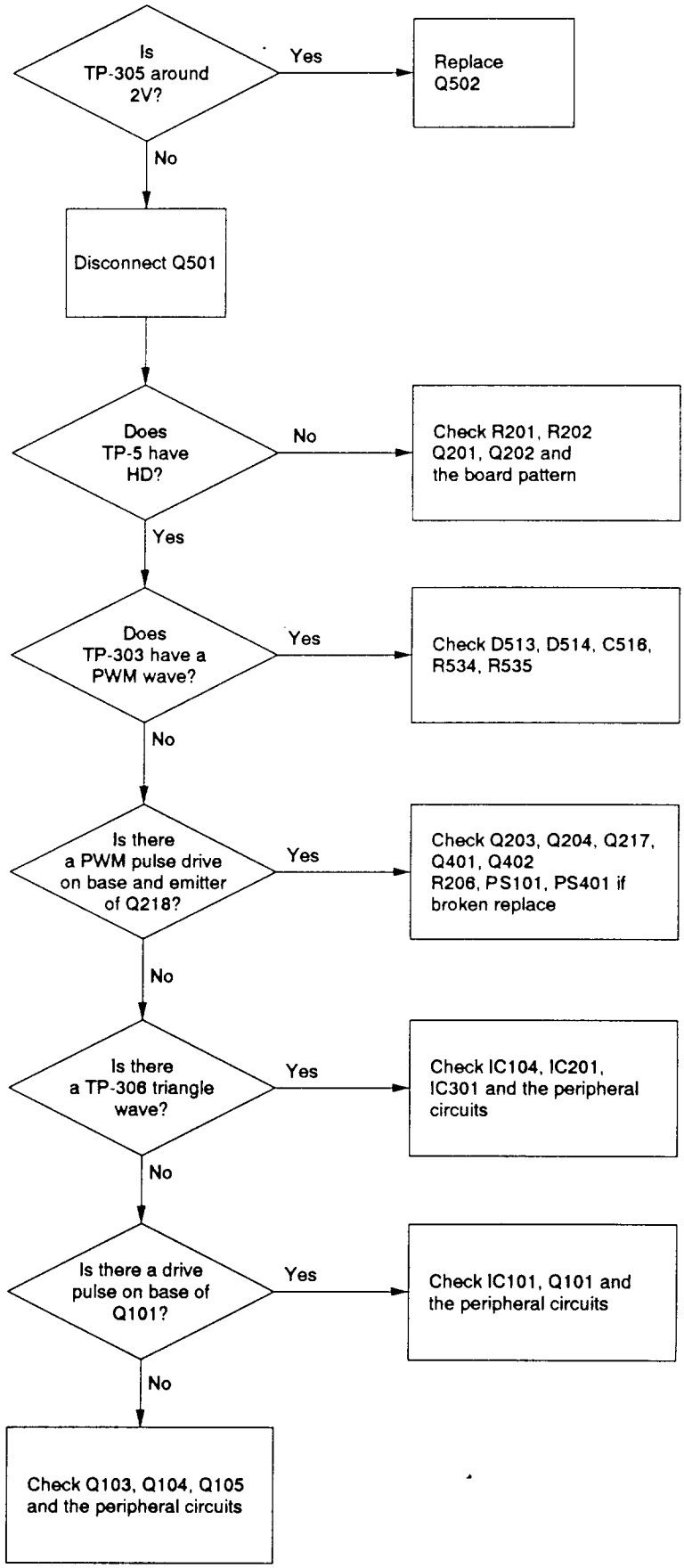


D3-1 2 In the case of D507, D508, D509 Trouble

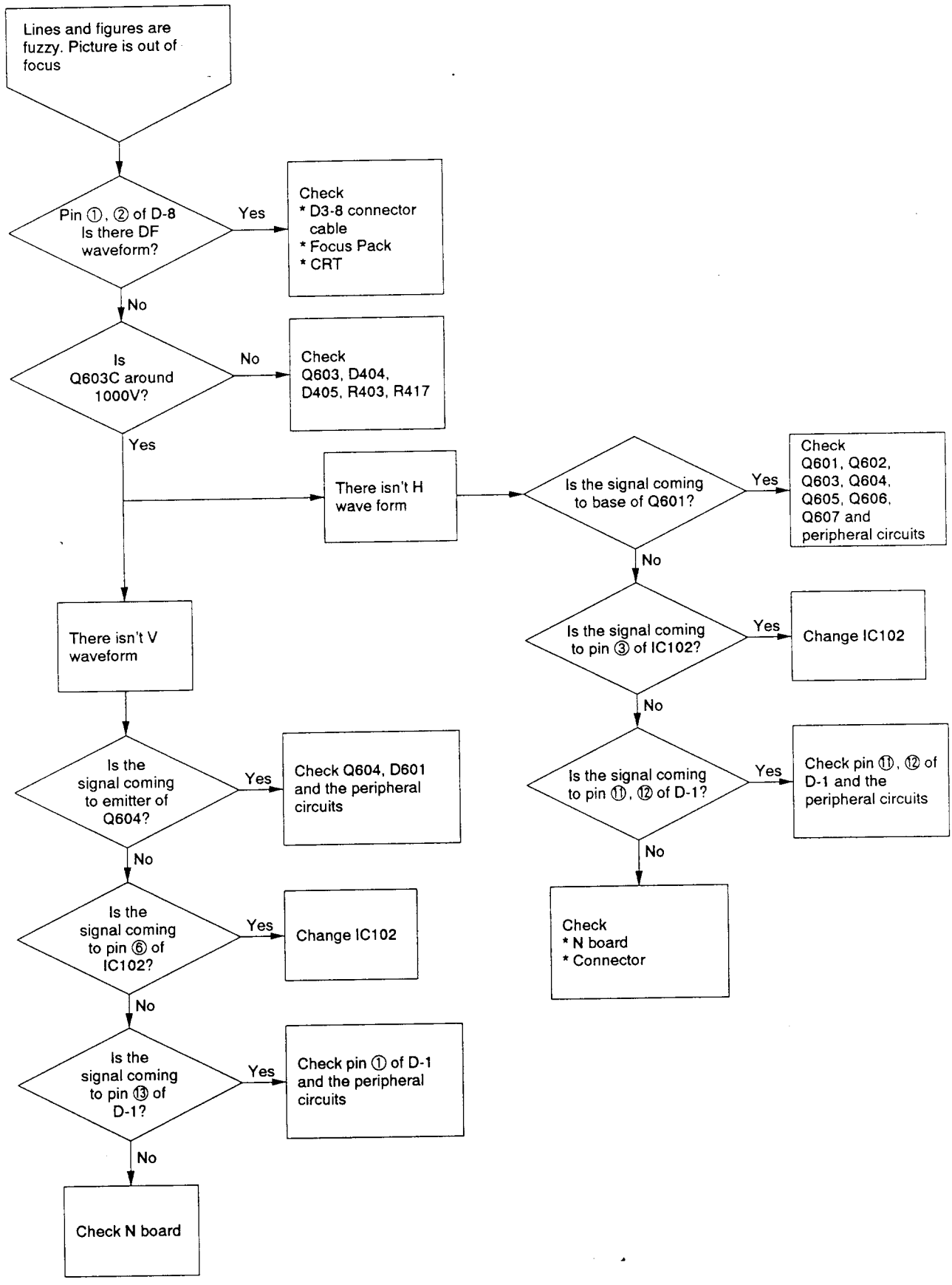


D3-1 3 In the case of D517 Trouble Go to D3-4

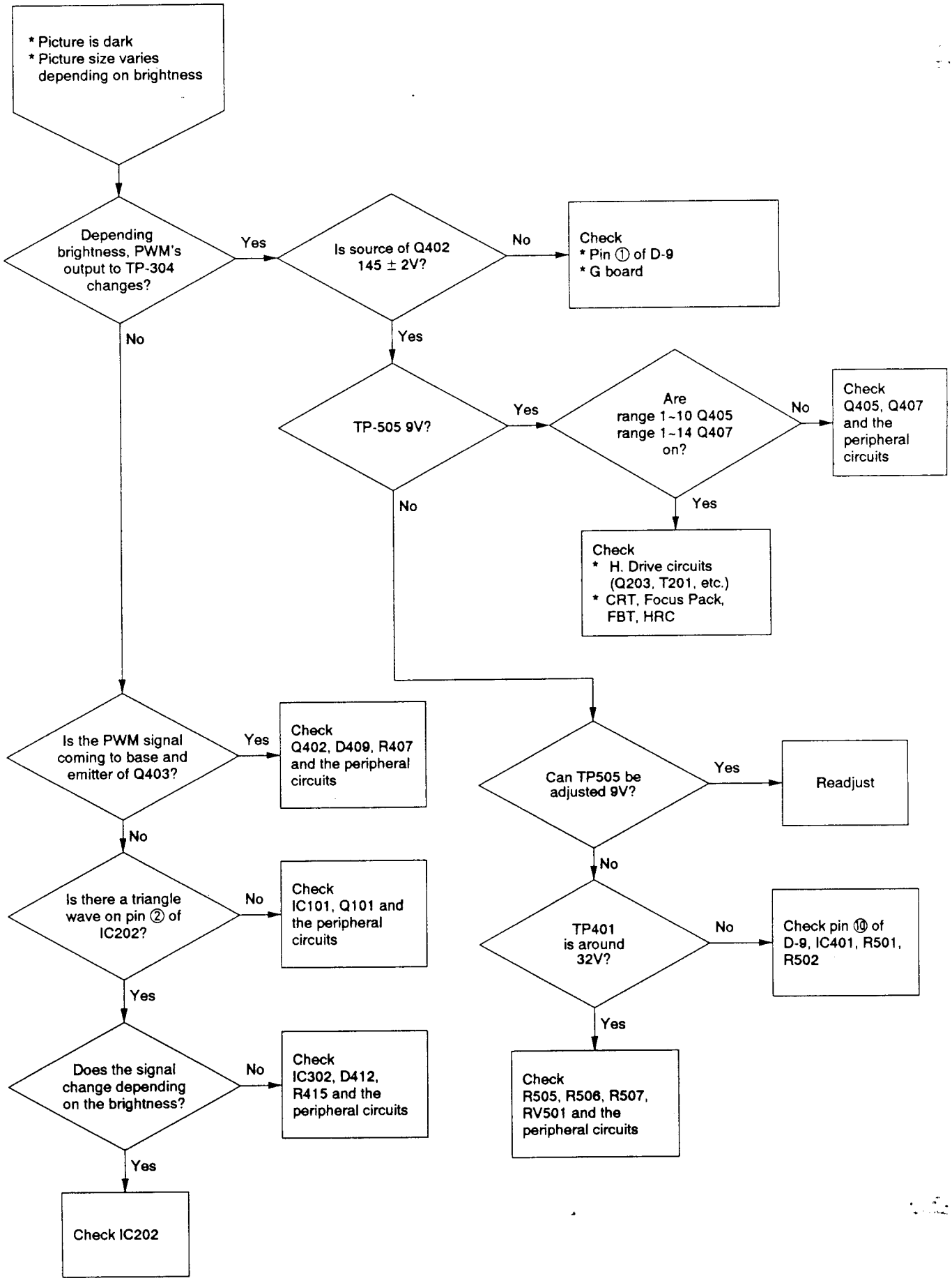
D3-1 4 In the case of D515 Trouble



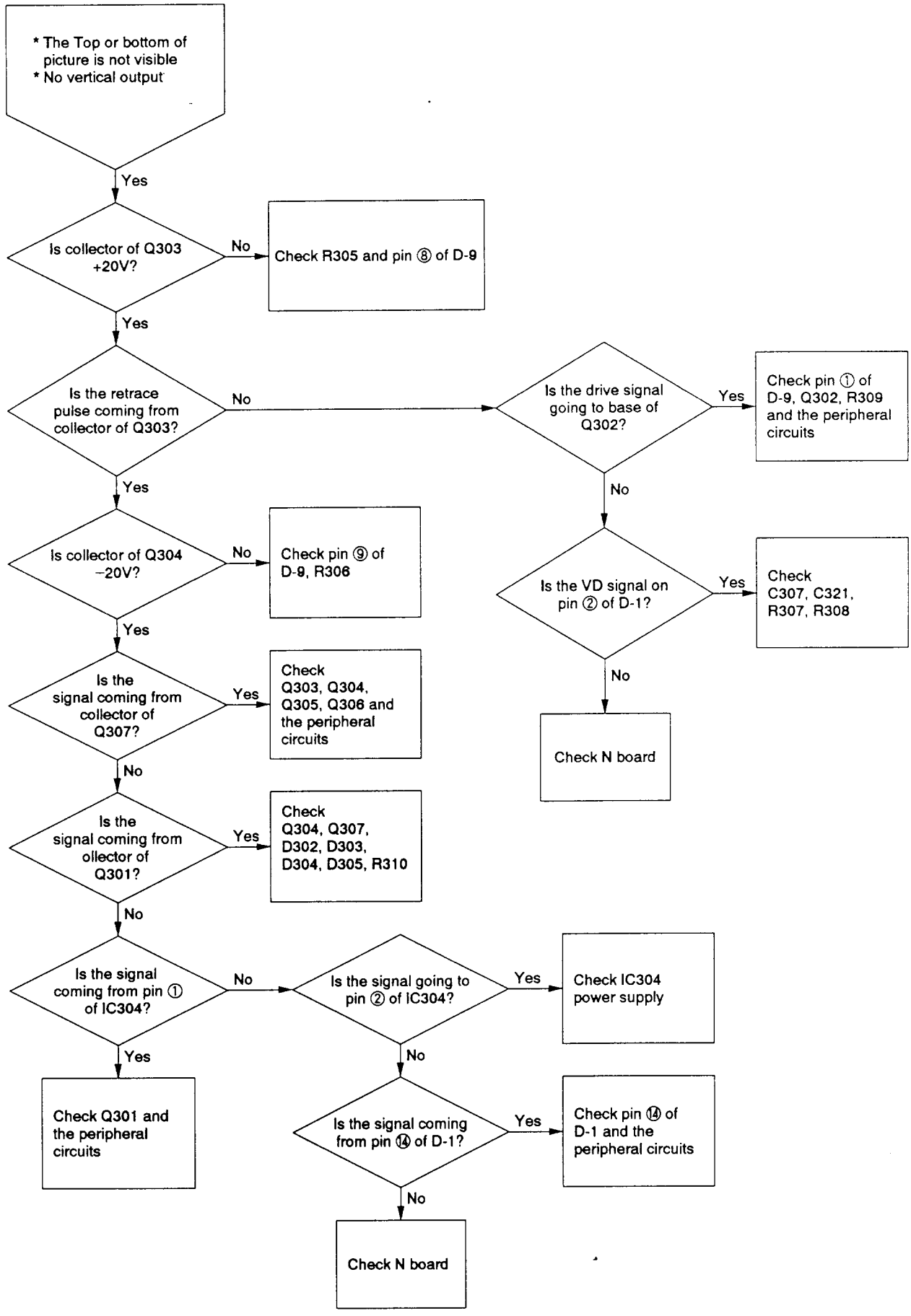
D3-2 (D) (K)


Lines and figures are fuzzy. Picture is out of focus
Pin ①, ② of D-8 Is there DF waveform?
Yes
Check
* D3-8 connector cable
* Focus Pack
* CRT
No
Is Q603C around 1000V?
No
Check Q603, D404, D405, R403, R417
Yes
There isn't H wave form
Is the signal coming to base of Q601?
Yes
Check Q601, Q602, Q603, Q604, Q605, Q606, Q607 and peripheral circuits
No
Is the signal coming to pin ③ of IC102?
Yes
Change IC102
No
Is the signal coming to pin ⑪, ⑫ of D-1?
Yes
Check pin ⑪, ⑫ of D-1 and the peripheral circuits
No
Check
* N board
* Connector
There isn't V waveform
Is the signal coming to emitter of Q604?
Yes
Check Q604, D601 and the peripheral circuits
No
Is the signal coming to pin ⑥ of IC102?
Yes
Change IC102
No
Is the signal coming to pin ⑬ of D-1?
Yes
Check pin ① of D-1 and the peripheral circuits
No
Check N board

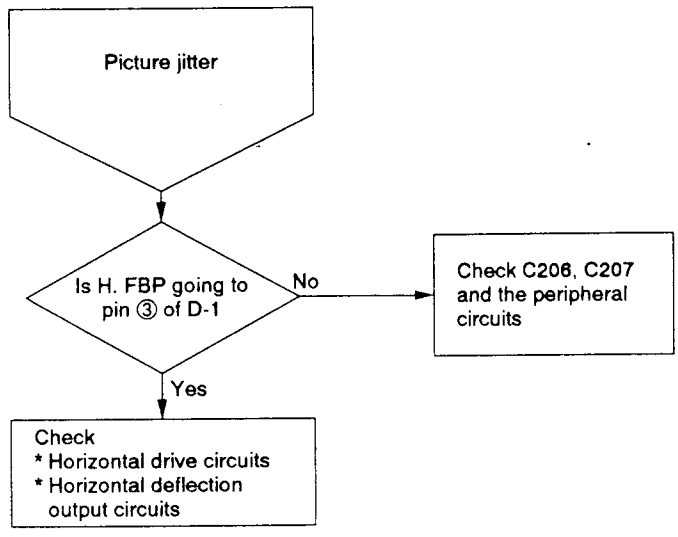
D3-3 (E)


* Picture is dark
* Picture size varies depending on brightness
Depending brightness, PWM's output to TP-304 changes?
Yes
Is source of Q402 145 ± 2V?
No
Check
* Pin ① of D-9
* G board
Yes
No
TP-505 9V?
Yes
Are range 1~10 Q405 range 1~14 Q407 on?
No
Check Q405, Q407 and the peripheral circuits
Yes
Check
* H. Drive circuits (Q203, T201, etc.)
* CRT, Focus Pack, FBT, HRC
No
Is the PWM signal coming to base and emitter of Q403?
Yes
Check Q402, D409, R407 and the peripheral circuits
No
Is there a triangle wave on pin ② of IC202?
No
Check IC101, Q101 and the peripheral circuits
Yes
Does the signal change depending on the brightness?
No
Check IC302, D412, R415 and the peripheral circuits
Yes
Check IC202
Can TP505 be adjusted 9V?
Yes
Readjust
No
TP401 is around 32V?
No
Check pin ⑩ of D-9, IC401, R501, R502
Yes
Check R505, R506, R507, RV501 and the peripheral circuits

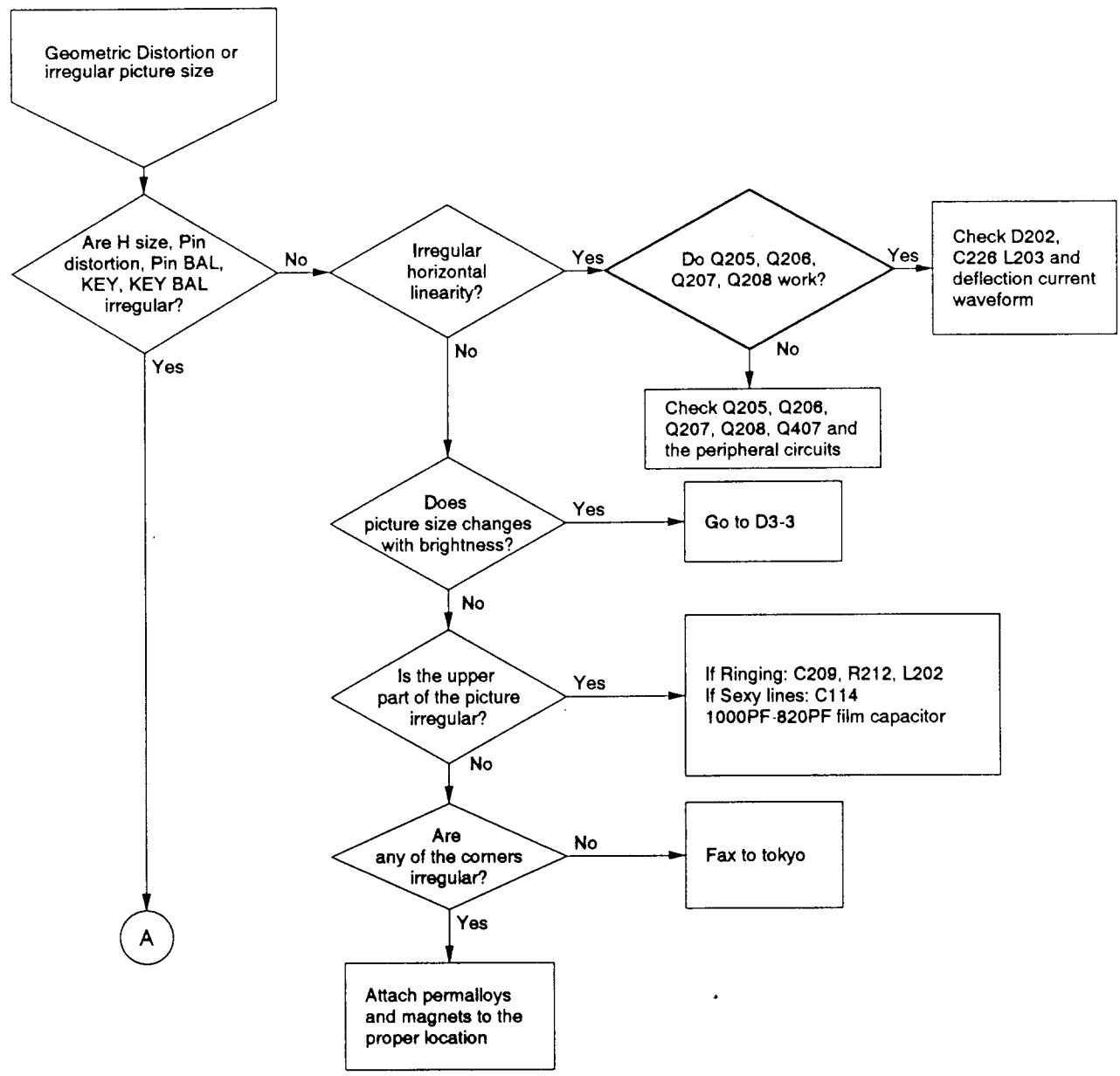
D3-4 (L)

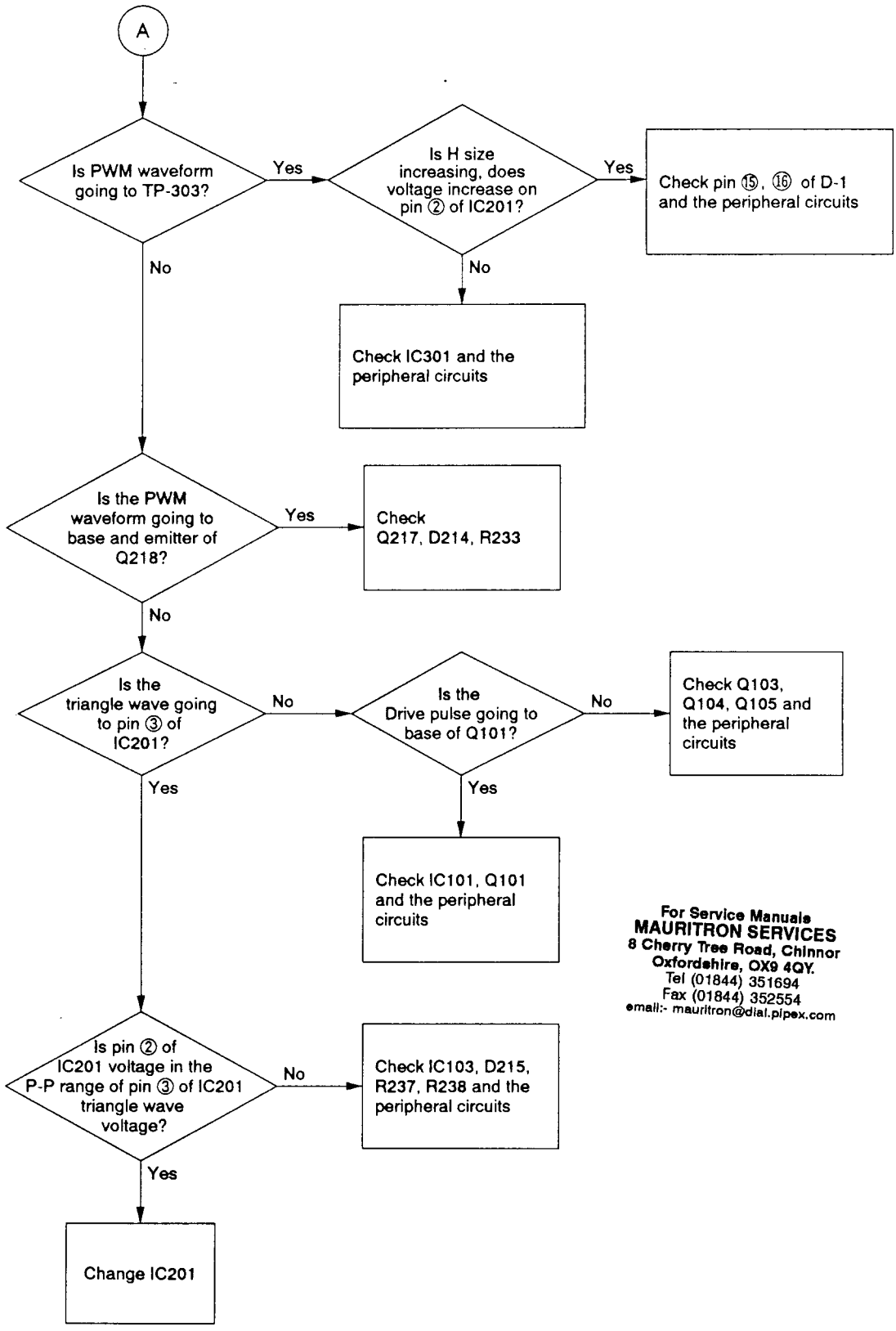

* The Top or bottom of picture is not visible
* No vertical output
Yes
Is collector of Q303 +20V?
No
Check R305 and pin ⑧ of D-9
Yes
Is the retrace pulse coming from collector of Q303?
No
Is the drive signal going to base of Q302?
Yes
Check pin ① of D-9, Q302, R309 and the peripheral circuits
No
Yes
Is collector of Q304 −20V?
No
Check pin ⑨ of D-9, R306
Yes
Is the VD signal on pin ② of D-1?
Yes
Check C307, C321, R307, R308
No
Yes
Is the signal coming from collector of Q307?
Yes
Check Q303, Q304, Q305, Q306 and the peripheral circuits
No
Check N board
No
Is the signal coming from ollector of Q301?
Yes
Check Q304, Q307, D302, D303, D304, D305, R310
No
Is the signal coming from pin ① of IC304?
No
Is the signal going to pin ② of IC304?
Yes
Check IC304 power supply
Yes
No
Check Q301 and the peripheral circuits
Is the signal coming from pin ⑭ of D-1?
Yes
Check pin ⑭ of D-1 and the peripheral circuits
No
Check N board

D3-5 (M)

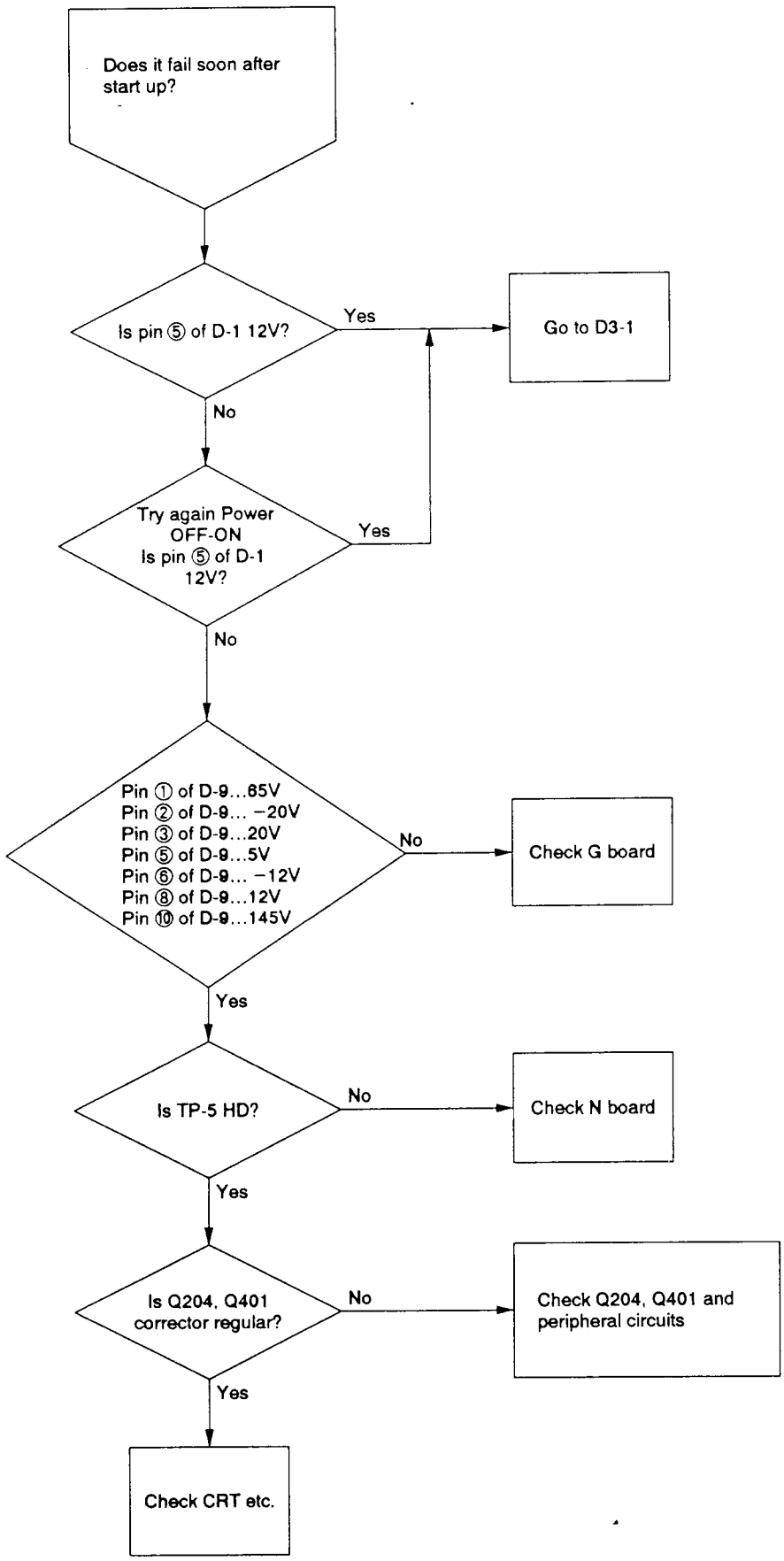

Picture jitter
Is H. FBP going to pin ③ of D-1
No
Check C206, C207 and the peripheral circuits
Yes
Check
* Horizontal drive circuits
* Horizontal deflection output circuits

D3-6 (O)

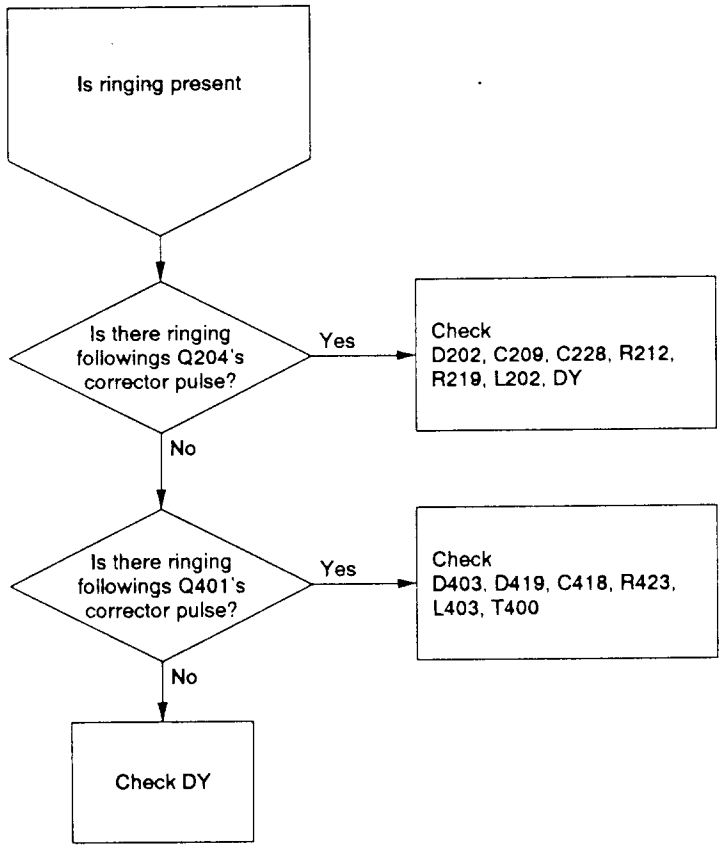

Geometric Distortion or irregular picture size
Are H size, Pin distortion, Pin BAL, KEY, KEY BAL irregular?
No
Irregular horizontal linearity?
Yes
Do Q205, Q206, Q207, Q208 work?
Yes
Check D202, C226 L203 and deflection current waveform
No
Check Q205, Q206, Q207, Q208, Q407 and the peripheral circuits
Yes
No
Does picture size changes with brightness?
Yes
Go to D3-3
No
Is the upper part of the picture irregular?
Yes
If Ringing: C209, R212, L202
If Sexy lines: C114
1000PF-820PF film capacitor
No
Are any of the corners irregular?
No
Fax to tokyo
Yes
Attach permalloys and magnets to the proper location
A



D3-7 (T)


Does it fail soon after start up?
Is pin ⑤ of D-1 12V?
Yes
Go to D3-1
No
Try again Power OFF-ON Is pin ⑤ of D-1 12V?
Yes
No
Pin ① of D-9...65V
Pin ② of D-9... −20V
Pin ③ of D-9...20V
Pin ⑤ of D-9...5V
Pin ⑥ of D-9... −12V
Pin ⑧ of D-9...12V
Pin ⑩ of D-9...145V
No
Check G board
Yes
Is TP-5 HD?
No
Check N board
Yes
Is Q204, Q401 corrector regular?
No
Check Q204, Q401 and peripheral circuits
Yes
Check CRT etc.

D3-8 (W)



Note: In mode 9 ringing can sometimes be observed. This is ok as long as ringing is not present in other modes.

D3-9 Other Issues regarding the D3 Board

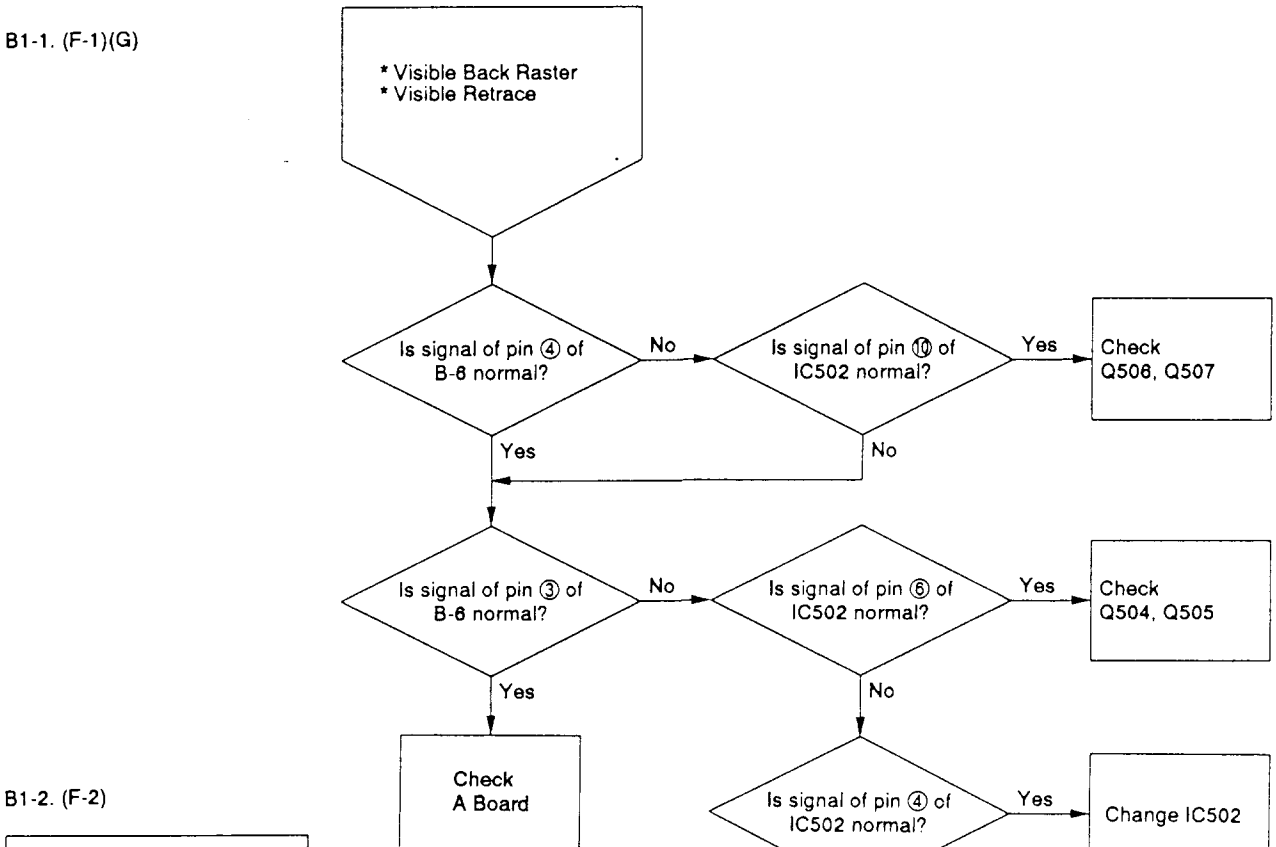
* If the picture fails several minutes after turning on the power, check the following: Q203, Q204, Q217, Q401, Q402, R206, PS101, PS401. Pay special attention to the condition of Q302, R206.

* If you keep the power on after PS401 burns out, you will burn out Q203, Q209, Q217, R206, PS101. So if you are trying to troubles shoot you should use capacitors.

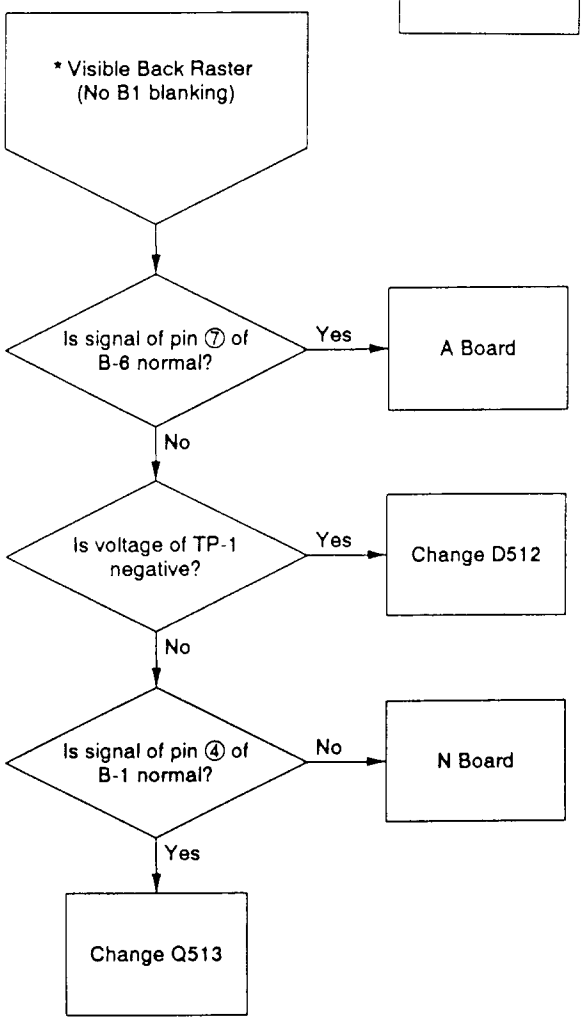
* When the monitor is turned on and when signals are switched a strange noise can be heard around the power supply, this is normal. If a strange noise can be detected at other times, repairs should be made.

4-2-2. B1 Board

B1-1. (F-1)(G)



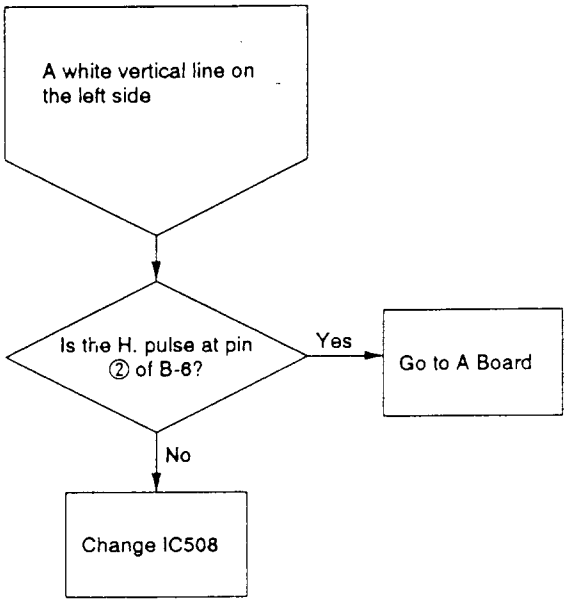
B1-2. (F-2)



B1-3. (M)(N)(V)

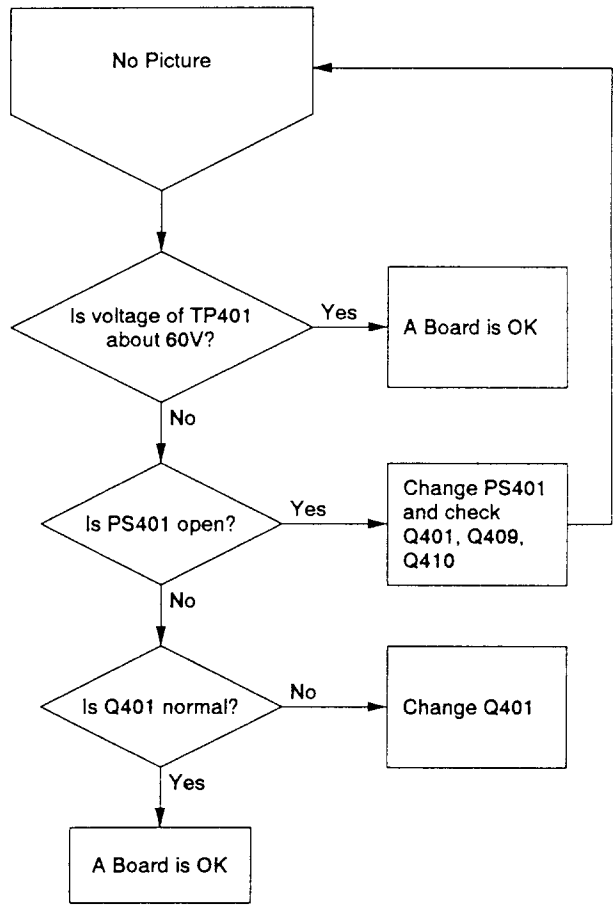

* Picture size mute repeat
* Jittering Image
* Unsynchronized Image
Is signal of pin ㉓ of IC501 normal?
No
Is it external sync?
No
Is signal of pin ⑨ of B-6 normal?
No
Check A Board
Yes
Yes
Yes
Change IC501
Is signal of pin ⑦ of IC504 normal?
No
Change IC504
Yes
Change IC501
Is signal of pin ⑤ of IC506 normal?
No
Change IC506
Yes
Is signal of pin ① of B-1 normal?
No
Change Q511, Q512
Yes
Is it external sync?
No
The circuit is located on another board connected to pin ① of B-1
Yes
Is signal of pin ㉖ of IC501 normal?
No
Change IC501
Yes
The circuit is located on another board connected to pin ② of B-1

B1-4.

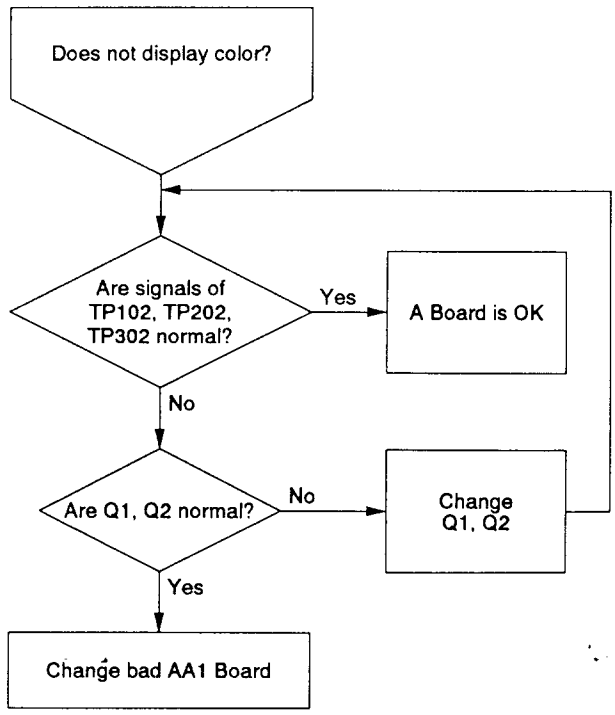


4-2-3. A Board

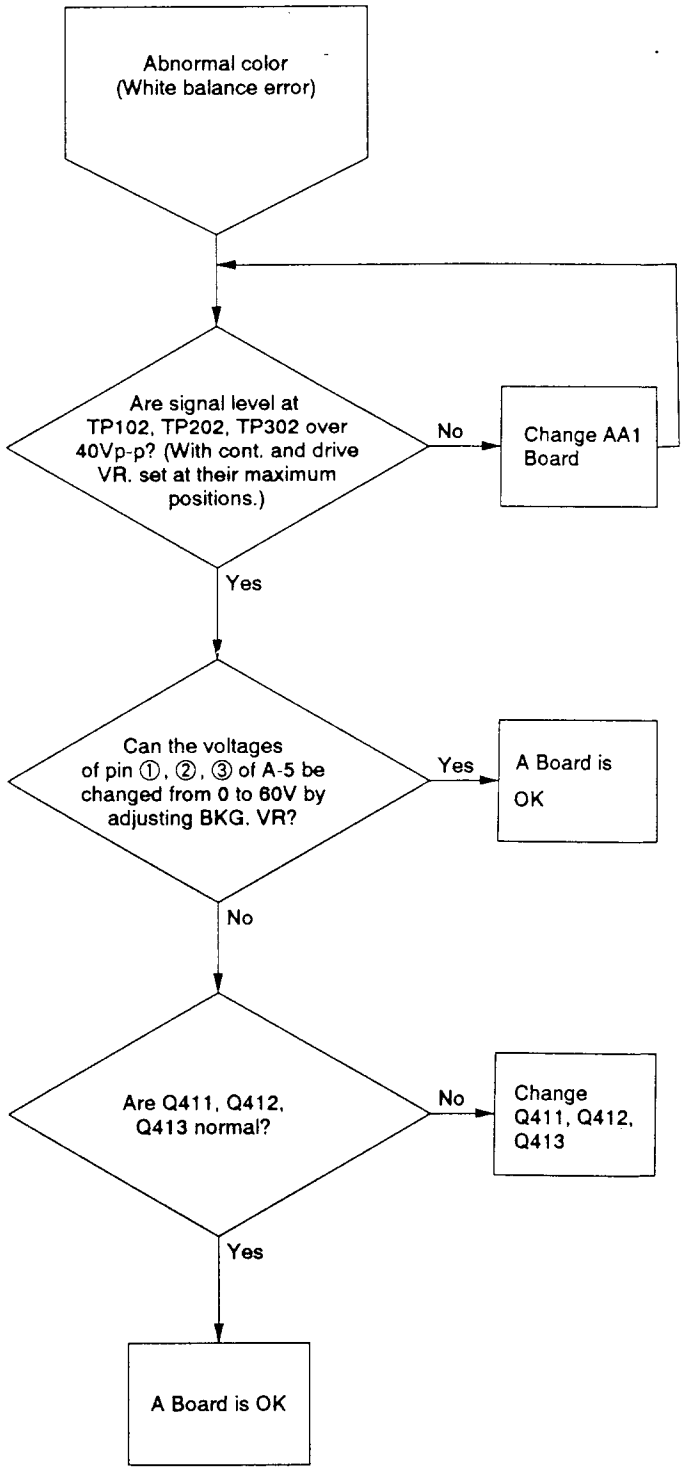
A-1. (A)



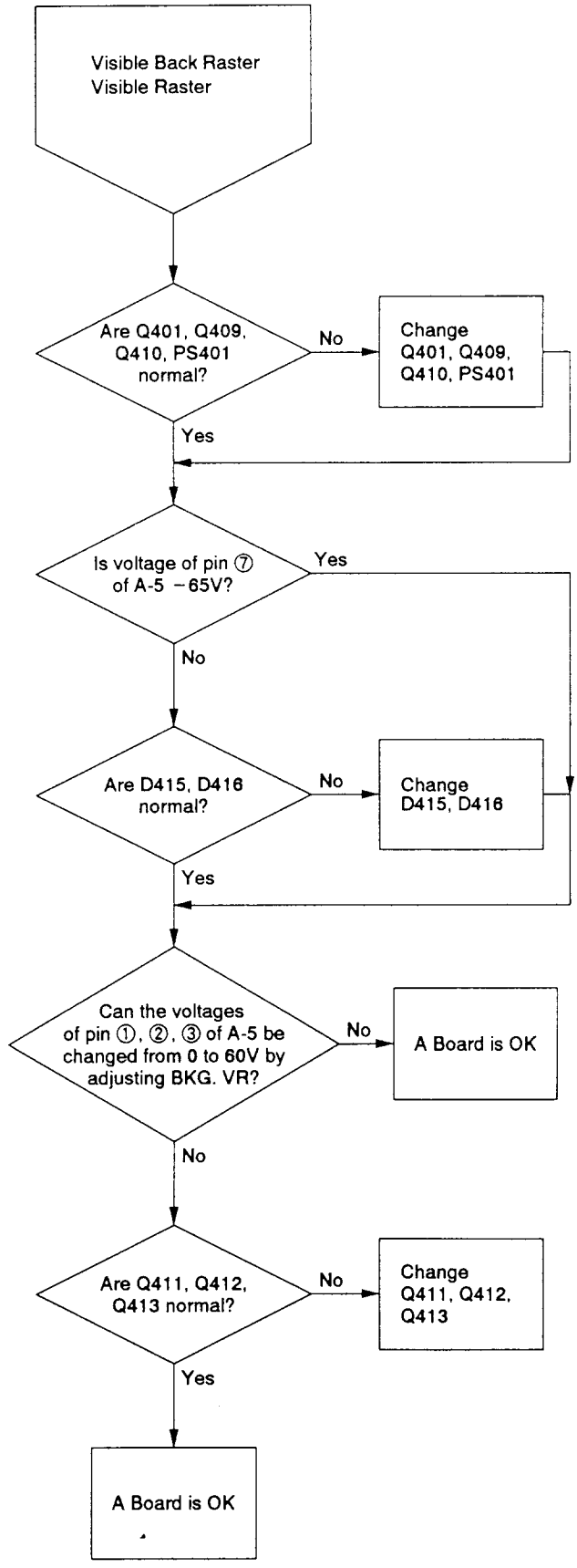
A-2. (B)



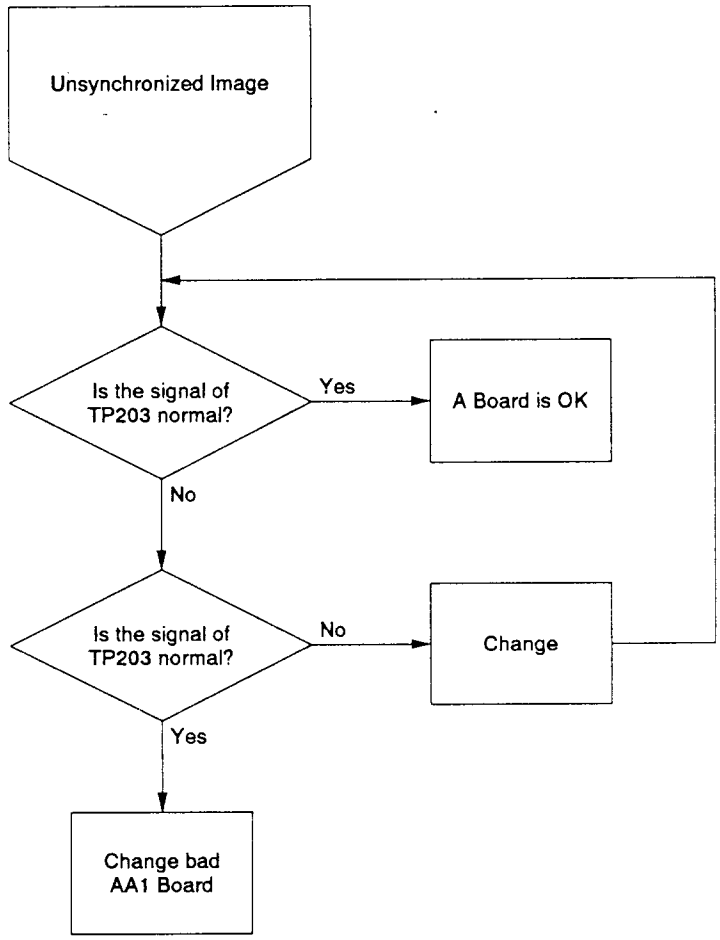
A-3. (C)


Abnormal color
(White balance error)
Are signal level at TP102, TP202, TP302 over 40Vp-p? (With cont. and drive VR. set at their maximum positions.)
No
Change AA1 Board
Yes
Can the voltages of pin ①, ②, ③ of A-5 be changed from 0 to 60V by adjusting BKG. VR?
Yes
A Board is OK
No
Are Q411, Q412, Q413 normal?
No
Change Q411, Q412, Q413
Yes
A Board is OK

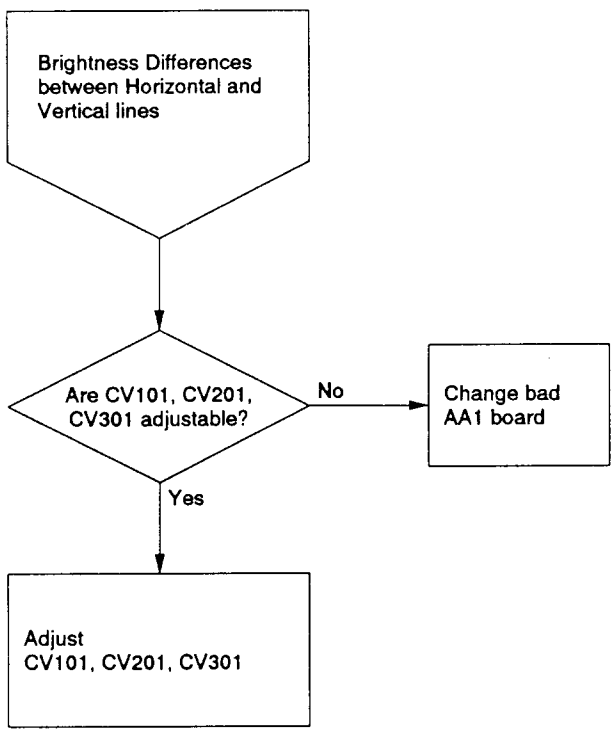
A-4. (F)(G)


Visible Back Raster
Visible Raster
Are Q401, Q409, Q410, PS401 normal?
No
Change Q401, Q409, Q410, PS401
Yes
Is voltage of pin ⑦ of A-5 −65V?
Yes
No
Are D415, D416 normal?
No
Change D415, D416
Yes
Can the voltages of pin ①, ②, ③ of A-5 be changed from 0 to 60V by adjusting BKG. VR?
No
A Board is OK
No
Are Q411, Q412, Q413 normal?
No
Change Q411, Q412, Q413
Yes
A Board is OK

A-5. (N)

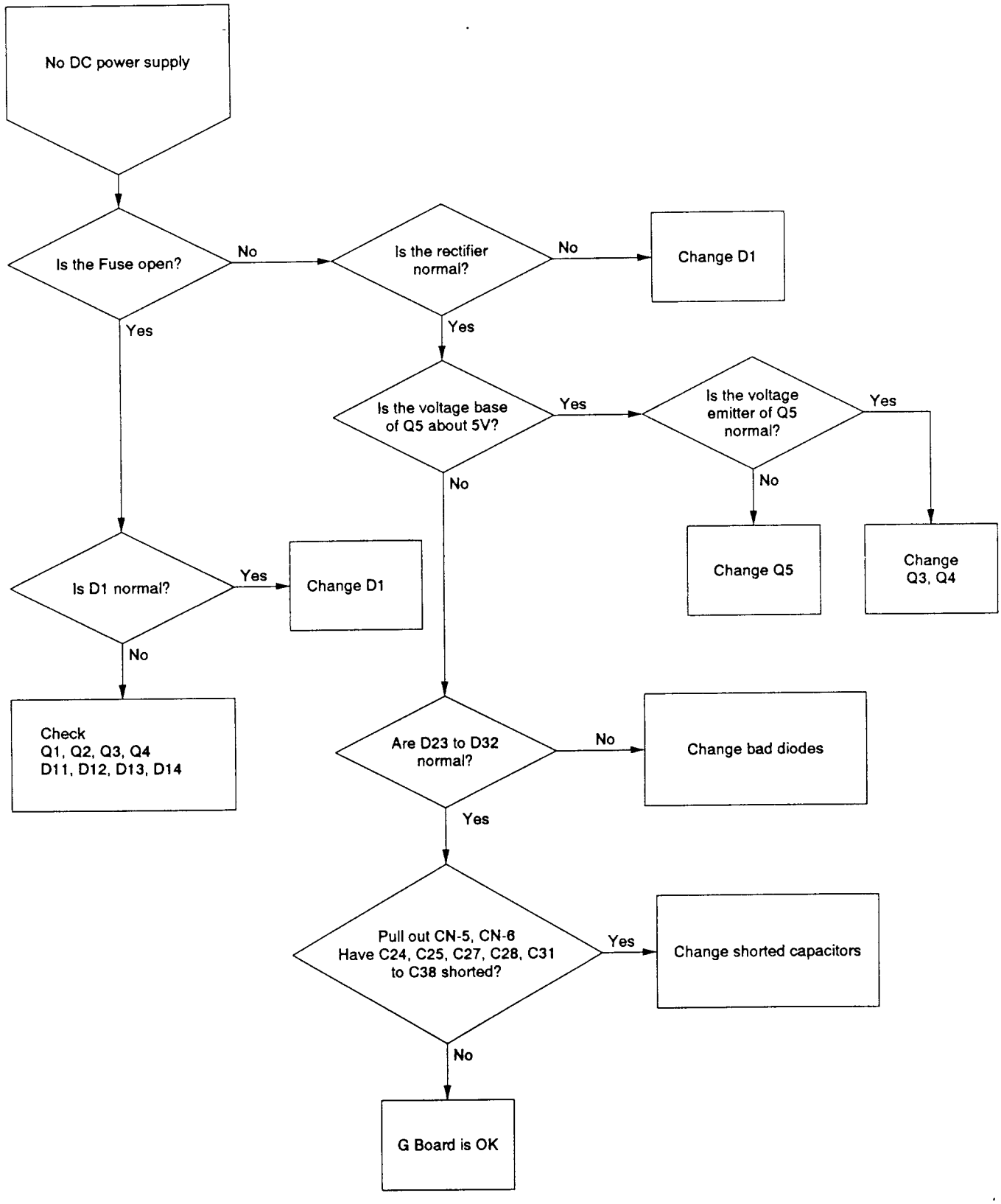

Unsynchronized Image
Is the signal of TP203 normal?
Yes
A Board is OK
No
Is the signal of TP203 normal?
No
Change
Yes
Change bad AA1 Board

A-6. (H)

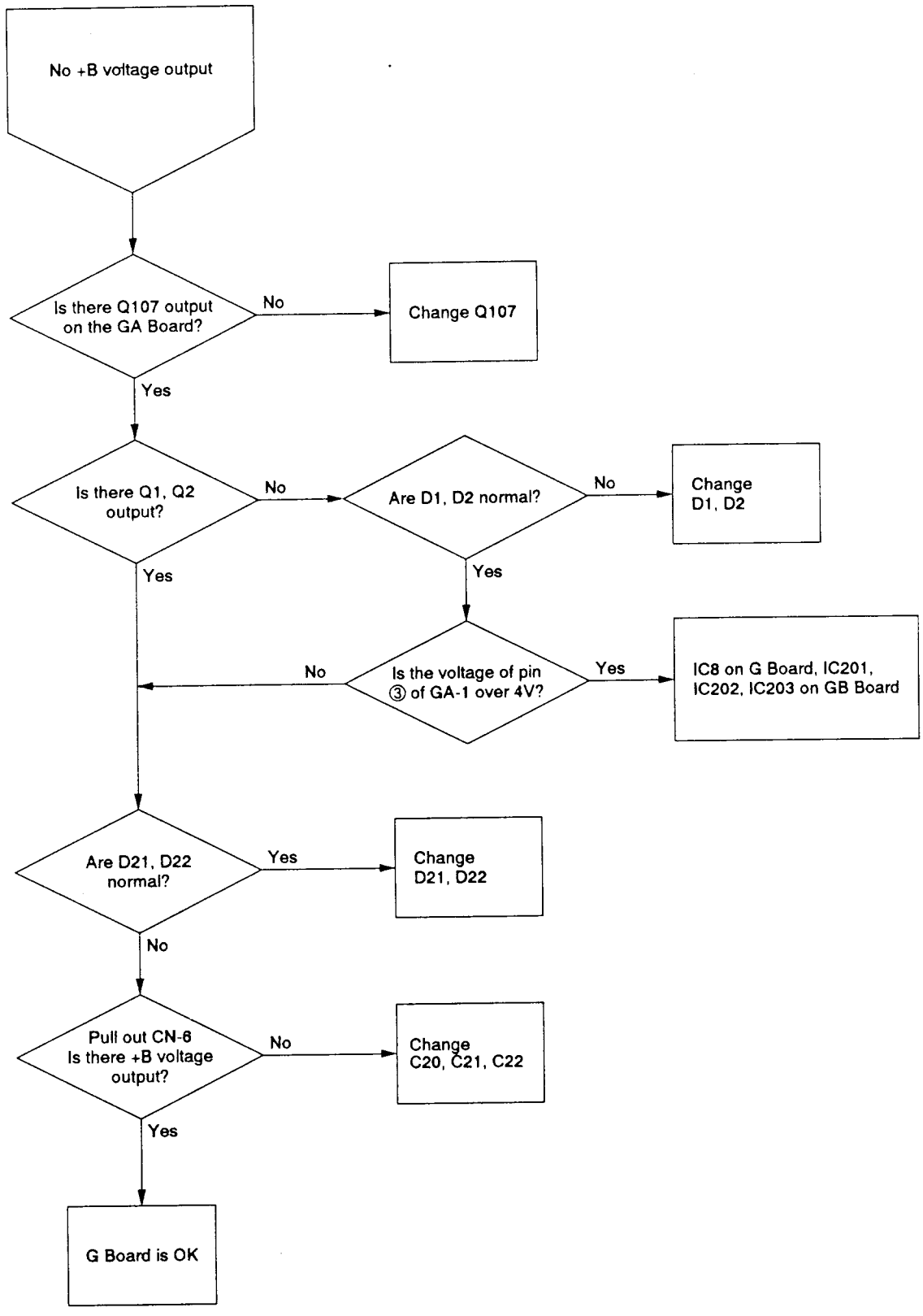

Brightness Differences between Horizontal and Vertical lines
Are CV101, CV201, CV301 adjustable?
No
Change bad AA1 board
Yes
Adjust CV101, CV201, CV301

4-2-4. G Board

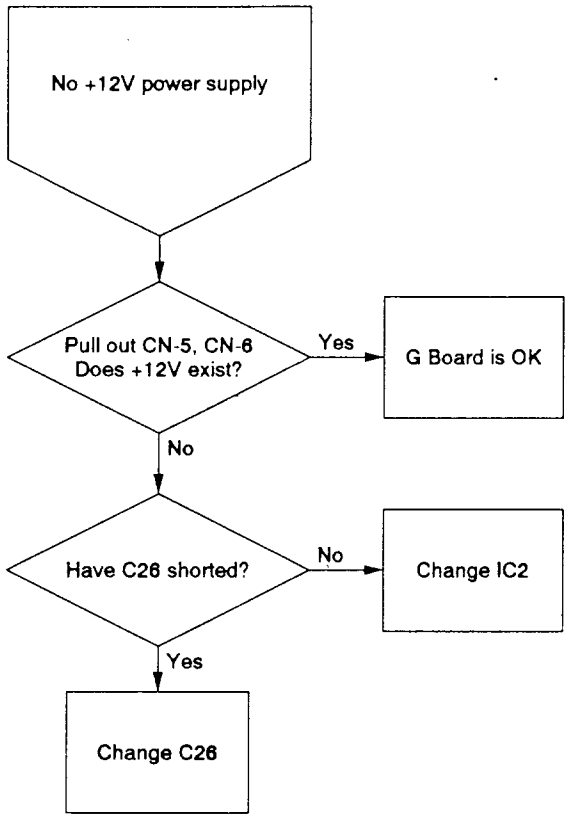
G-1.



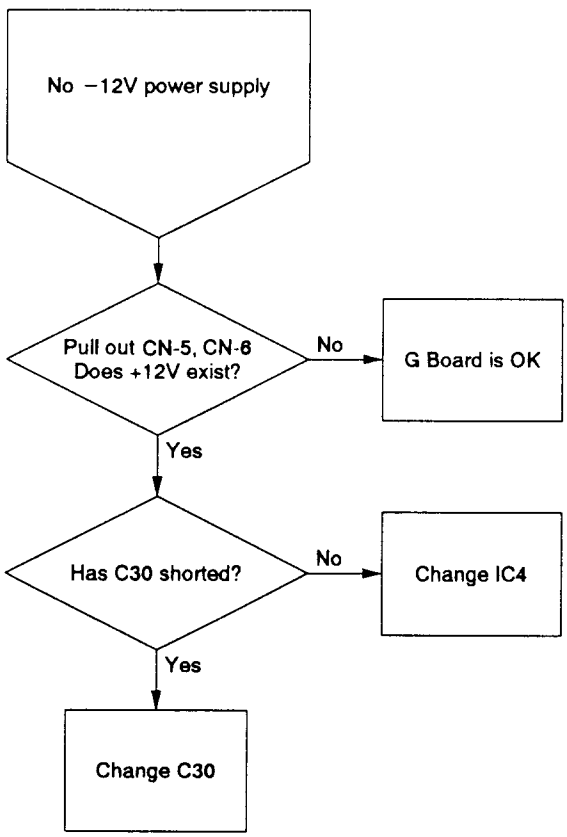
G-2.


No +B voltage output
Is there Q107 output on the GA Board?
No
Change Q107
Yes
Is there Q1, Q2 output?
No
Are D1, D2 normal?
No
Change D1, D2
Yes
Yes
No
Is the voltage of pin ③ of GA-1 over 4V?
Yes
IC8 on G Board, IC201, IC202, IC203 on GB Board
Are D21, D22 normal?
Yes
Change D21, D22
No
Pull out CN-6 Is there +B voltage output?
No
Change C20, C21, C22
Yes
G Board is OK

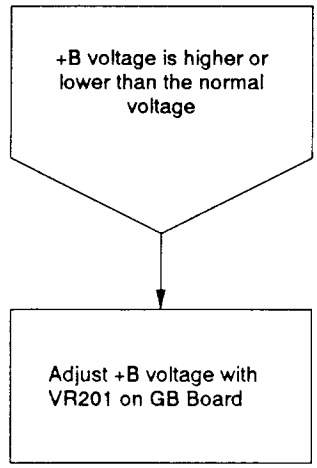
G-3.


No +12V power supply
Pull out CN-5, CN-6
Does +12V exist?
Yes
G Board is OK
No
Have C26 shorted?
No
Change IC2
Yes
Change C26

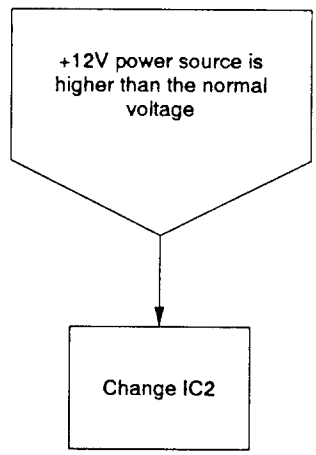
G-4.


No −12V power supply
Pull out CN-5, CN-6
Does +12V exist?
No
G Board is OK
Yes
Has C30 shorted?
No
Change IC4
Yes
Change C30

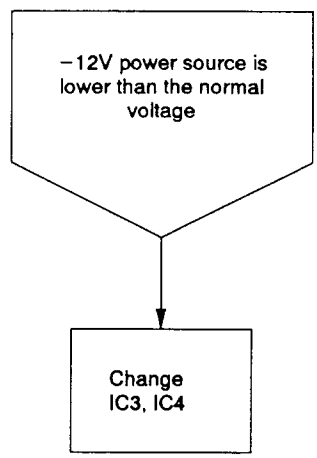
G-5.


+B voltage is higher or lower than the normal voltage
Adjust +B voltage with VR201 on GB Board

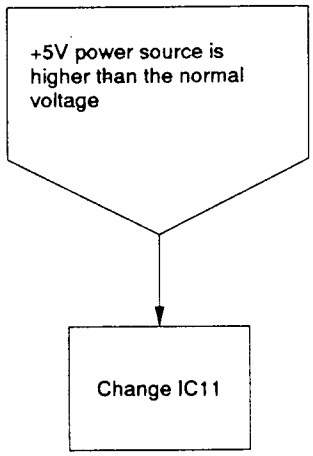
G-6.


+12V power source is higher than the normal voltage
Change IC2

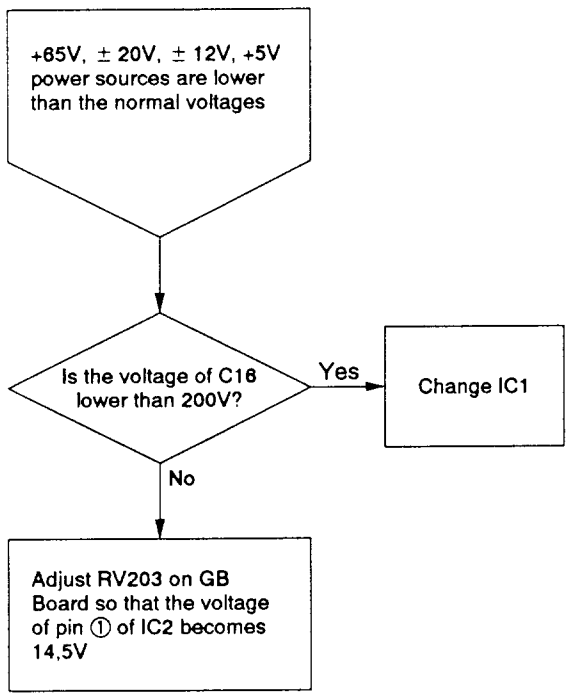
G-7.


−12V power source is lower than the normal voltage
Change IC3, IC4

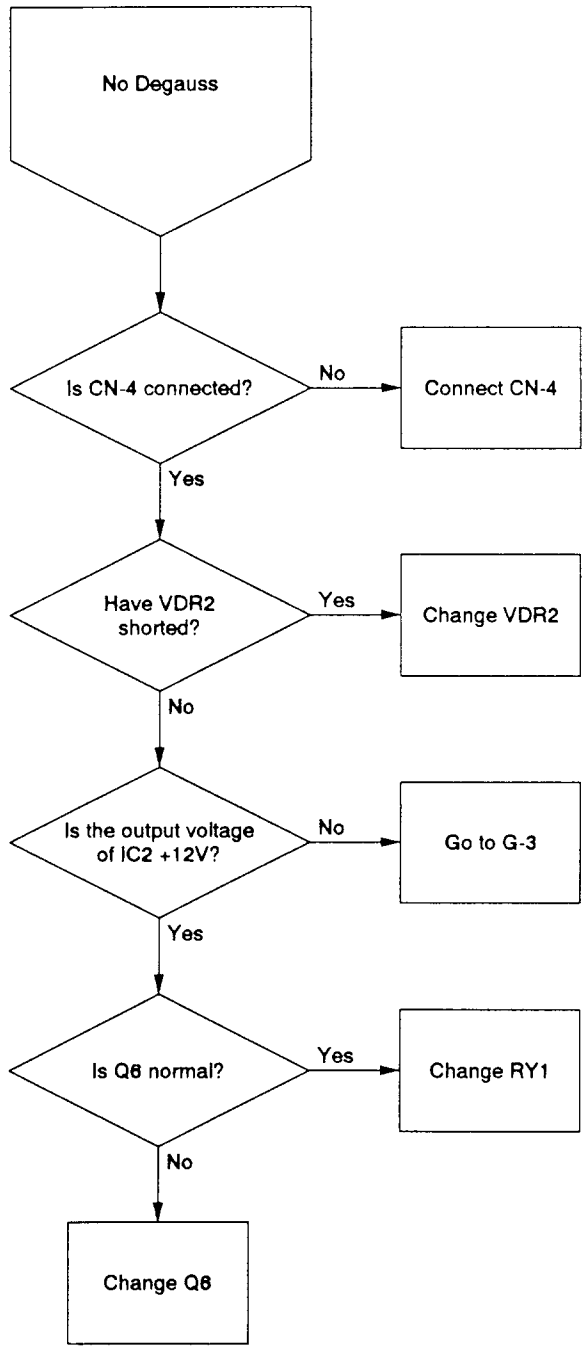
G-8.



G-9.



G-10.



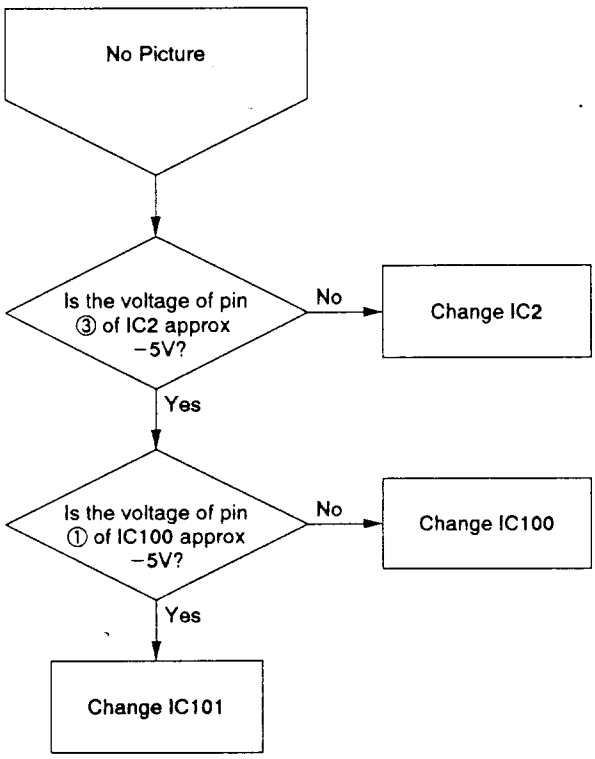
G-11.

When using in the AC220V area.

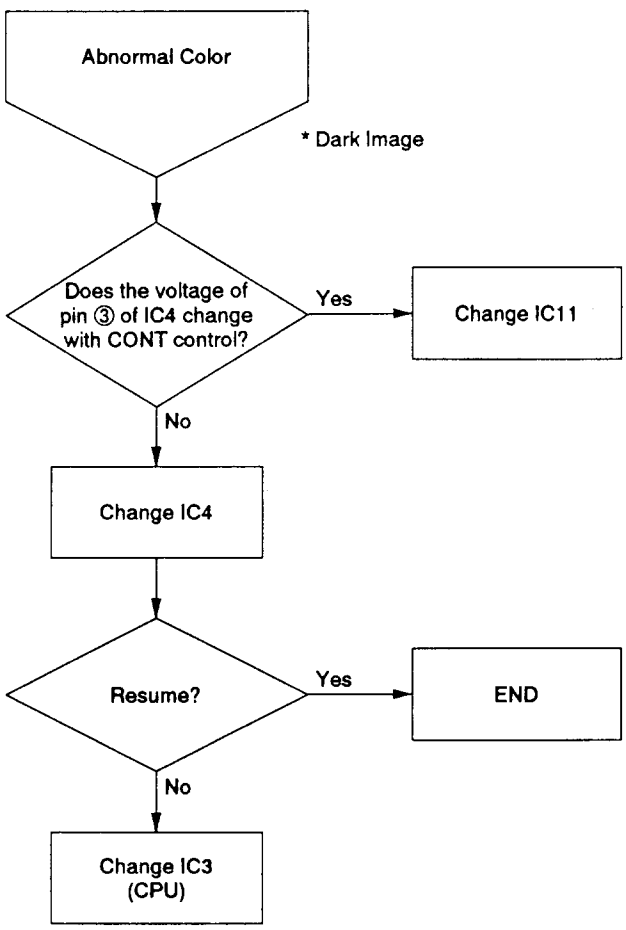
If the Fuse is shorted and Q1 to Q4, D1, D11 to D14 are normal, then you should change IC1.

4-2-5. N Board

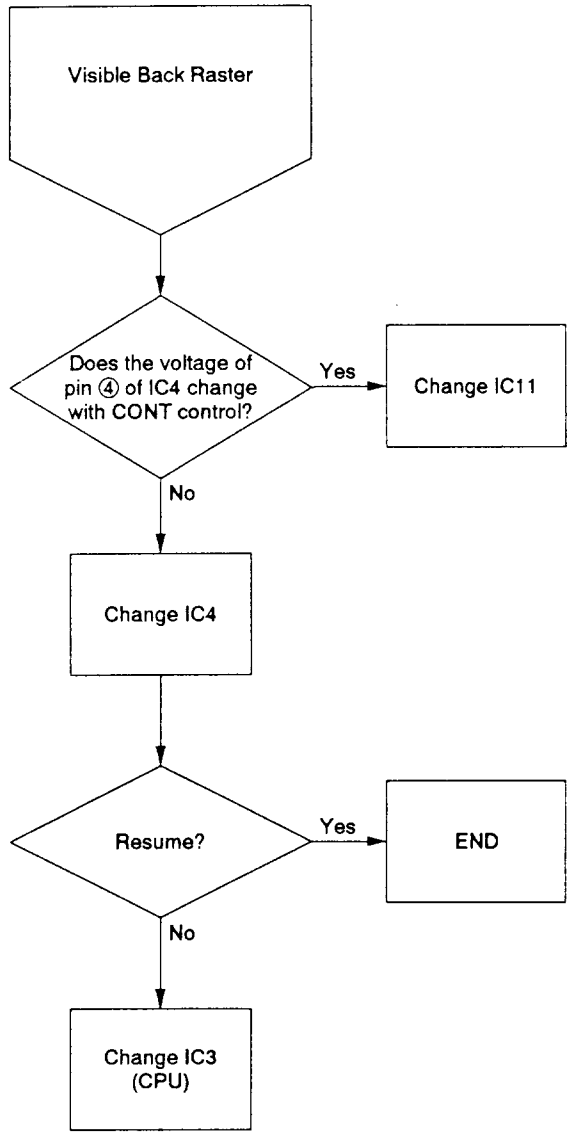
N-1 (A)



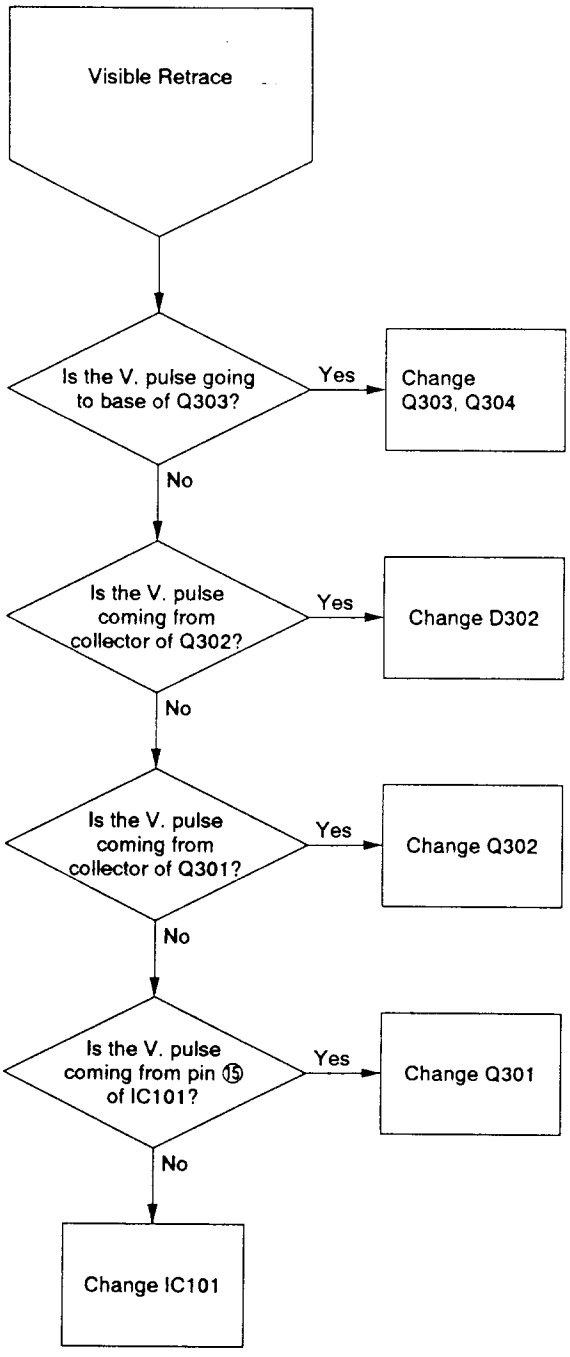
N-2 (C)



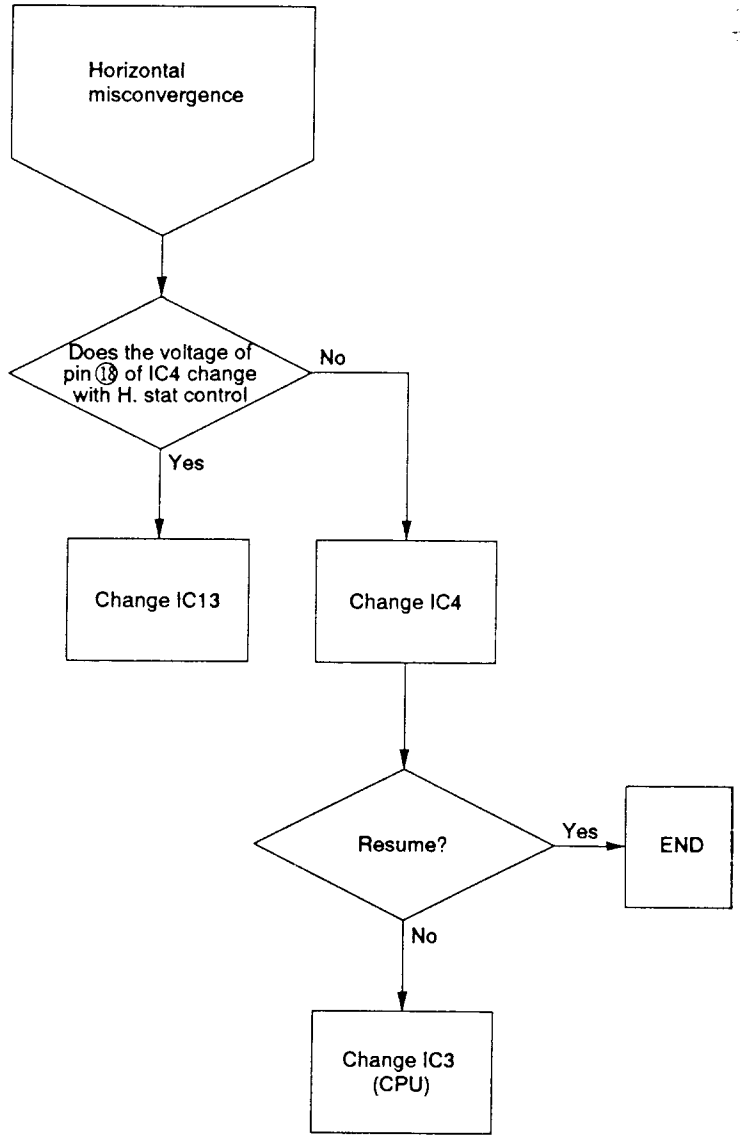
N-3 (F)



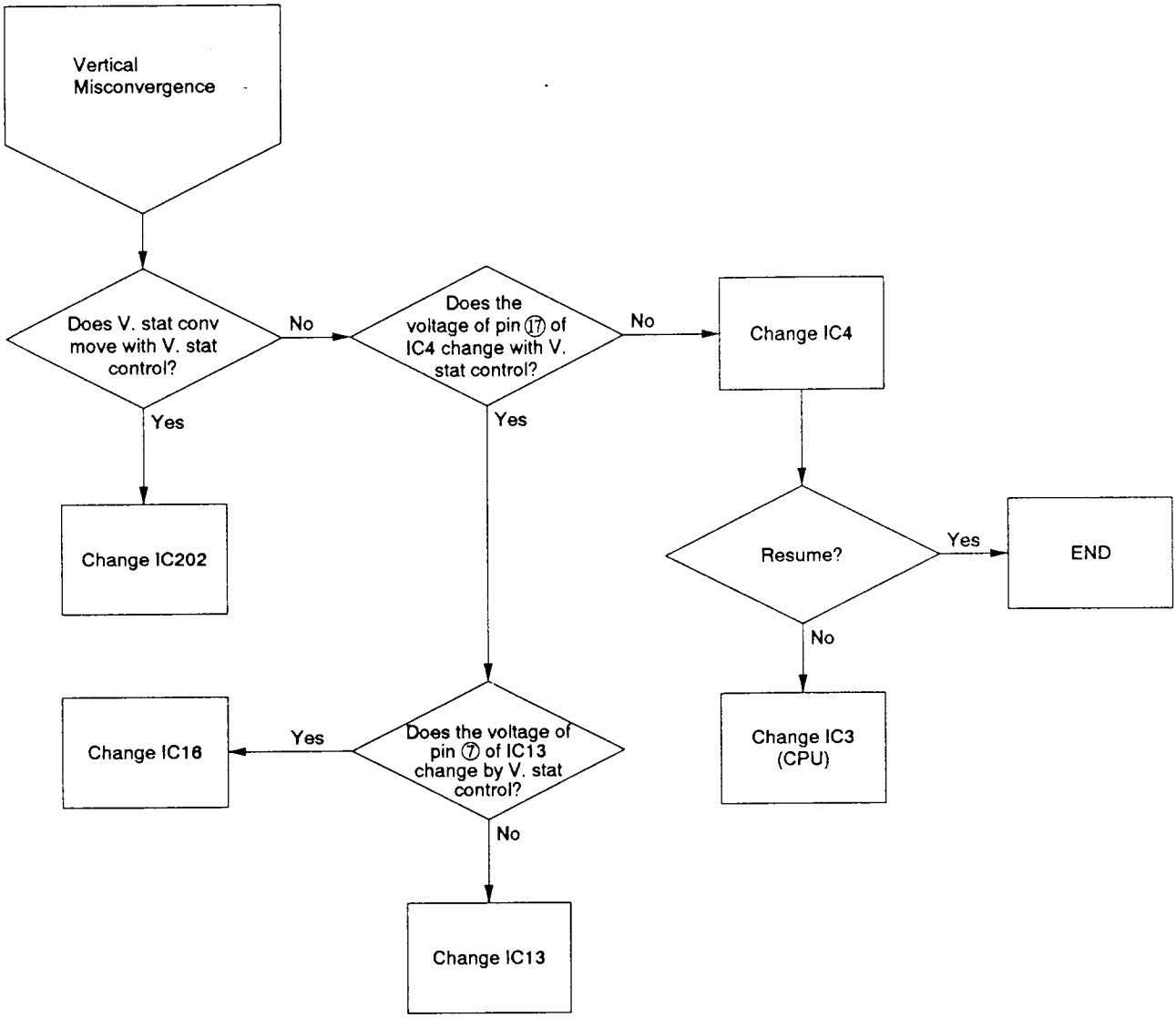
N-4 (G)


Visible Retrace
Is the V. pulse going to base of Q303?
Yes
Change Q303, Q304
No
Is the V. pulse coming from collector of Q302?
Yes
Change D302
No
Is the V. pulse coming from collector of Q301?
Yes
Change Q302
No
Is the V. pulse coming from pin ⑮ of IC101?
Yes
Change Q301
No
Change IC101

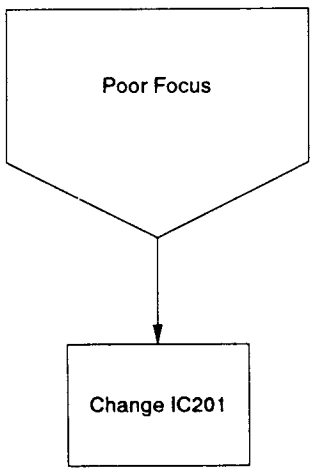
N-5 (J)


Horizontal misconvergence
Does the voltage of pin ⑱ of IC4 change with H. stat control
No
Yes
Change IC13
Change IC4
Resume?
Yes
END
No
Change IC3 (CPU)

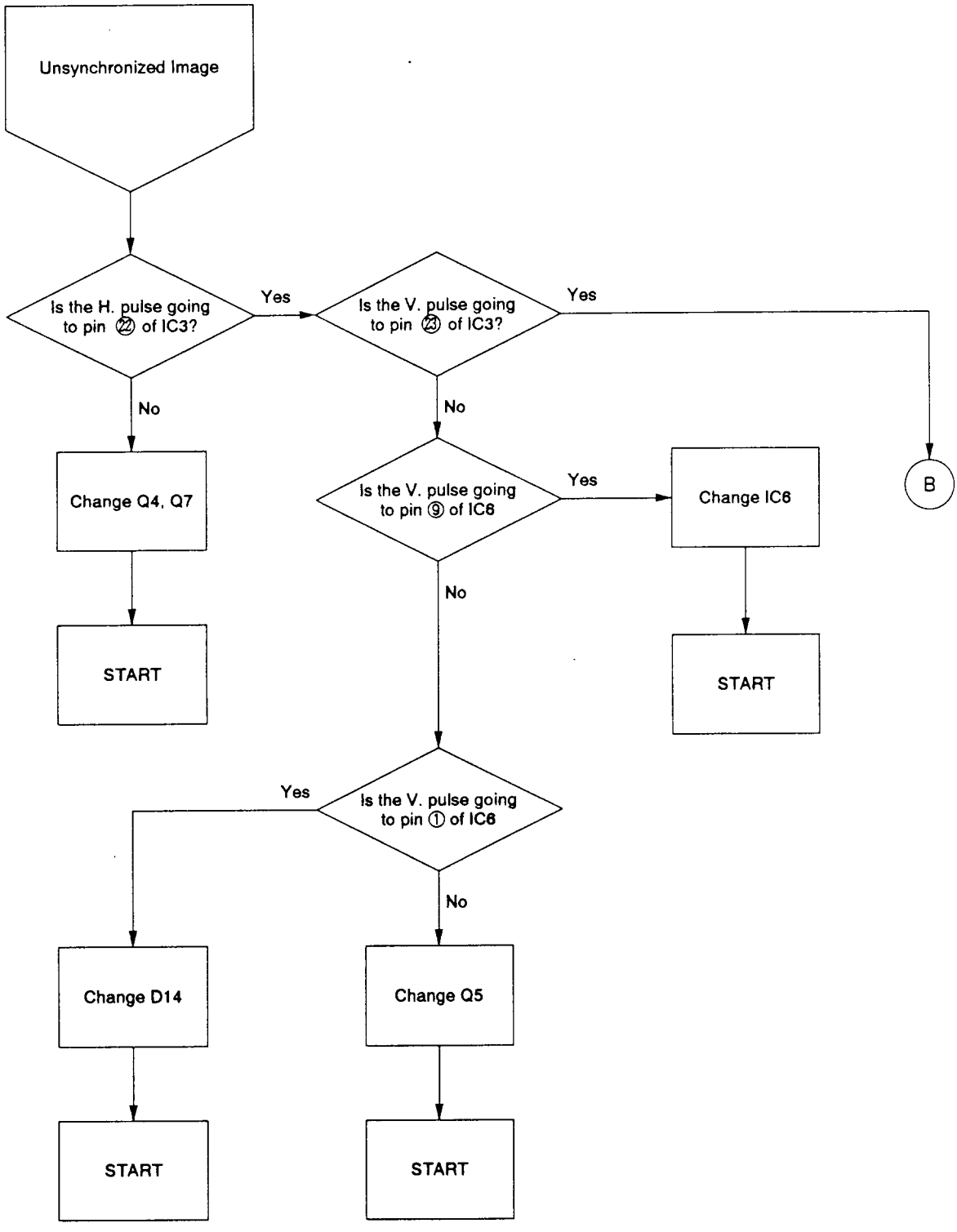
N-5 2 (J)


Vertical Misconvergence
Does V. stat conv move with V. stat control?
No
Does the voltage of pin ⑰ of IC4 change with V. stat control?
No
Change IC4
Yes
Yes
Change IC202
Resume?
Yes
END
No
Change IC3 (CPU)
Change IC16
Yes
Does the voltage of pin ⑦ of IC13 change by V. stat control?
No
Change IC13

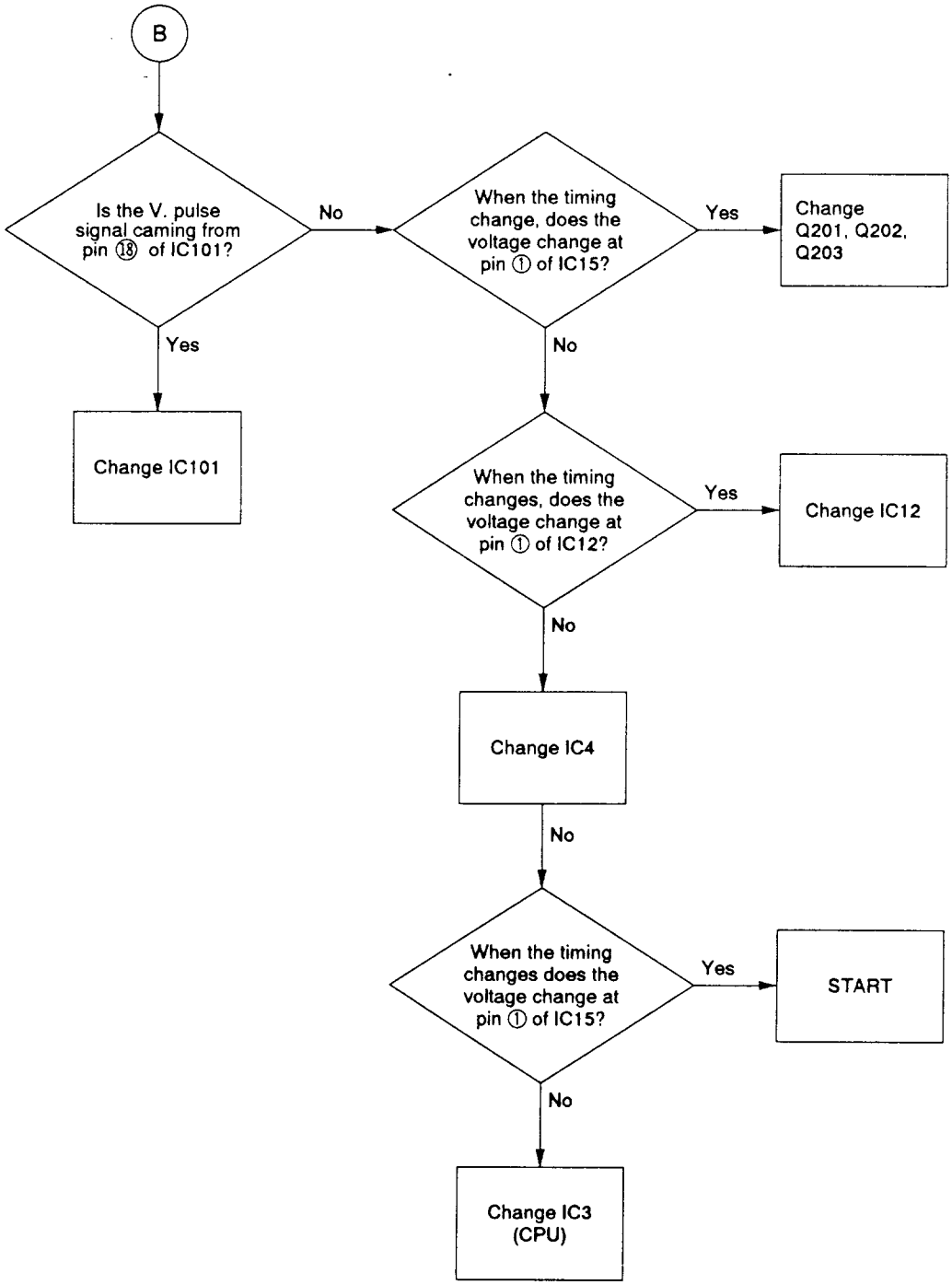
N-6 (K)


Poor Focus
Change IC201

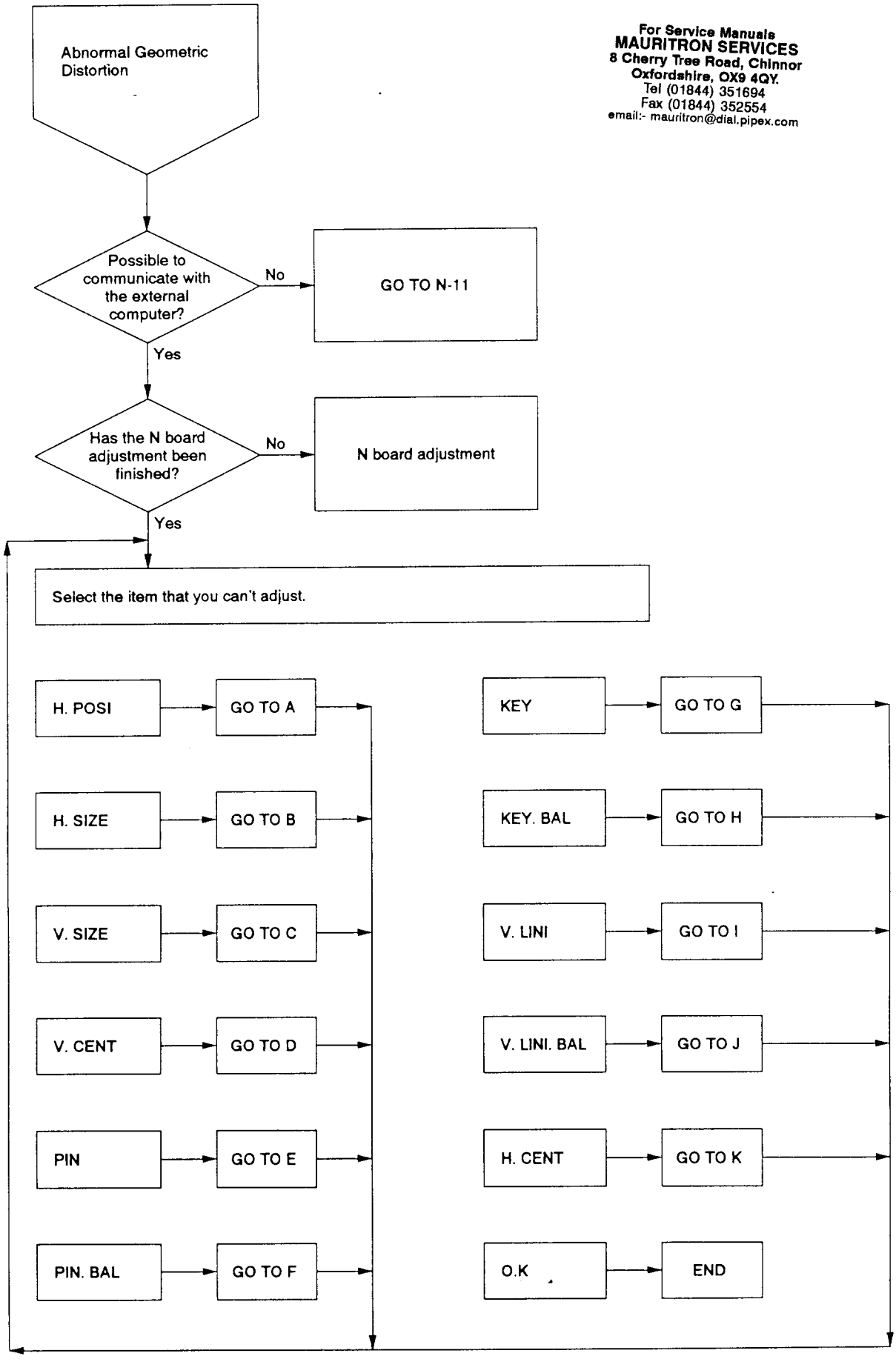
N-7 1 (N)


Unsynchronized Image
Is the H. pulse going to pin ㉒ of IC3?
Yes
Is the V. pulse going to pin ㉓ of IC3?
Yes
No
No
B
Change Q4, Q7
Is the V. pulse going to pin ⑨ of IC6
Yes
Change IC6
START
No
START
Yes
Is the V. pulse going to pin ① of IC6
No
Change D14
Change Q5
START
START

N-7 2 (N)

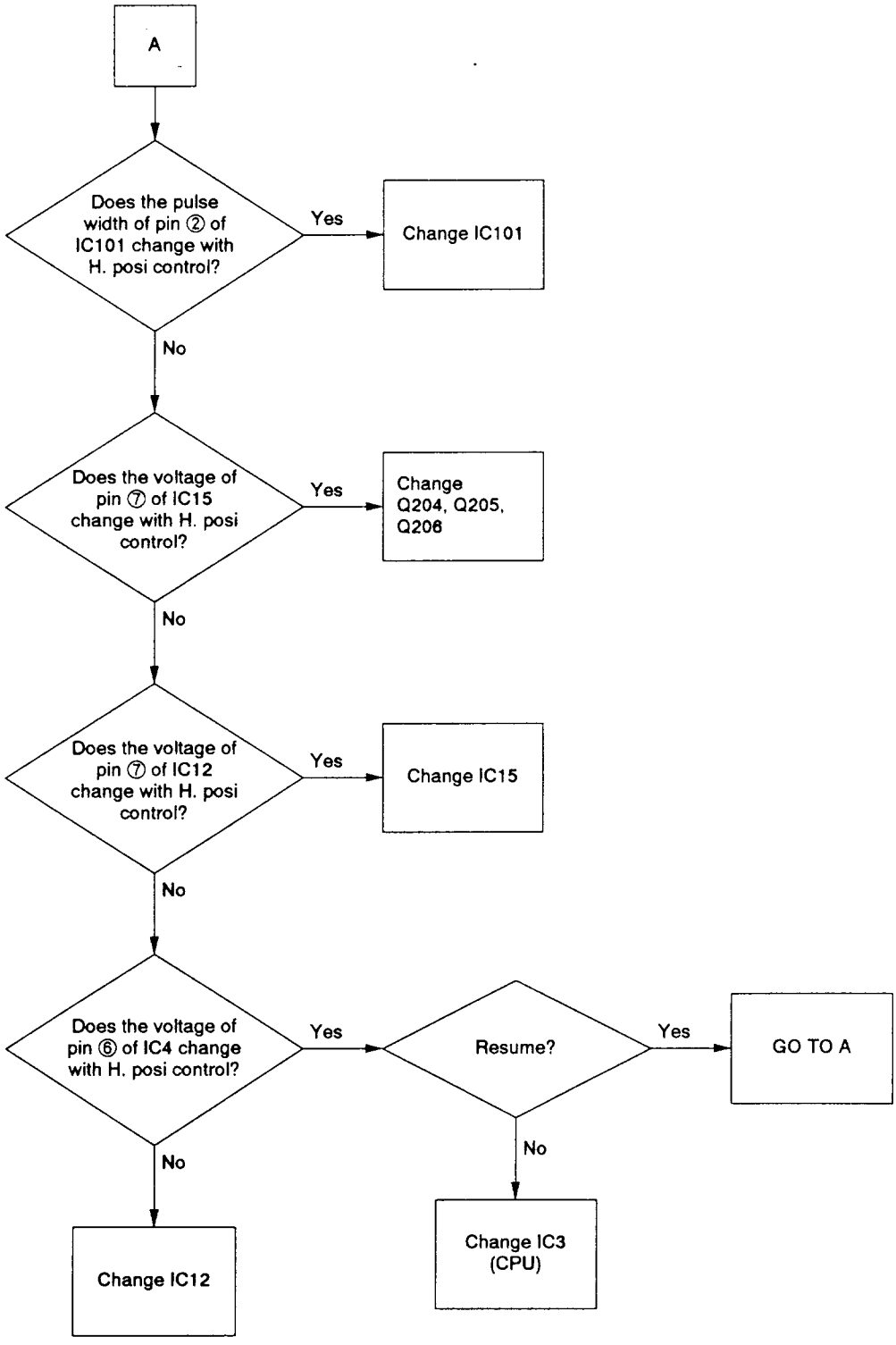

B
Is the V. pulse signal caming from pin ⑱ of IC101?
No
When the timing change, does the voltage change at pin ① of IC15?
Yes
Change Q201, Q202, Q203
Yes
Change IC101
No
When the timing changes, does the voltage change at pin ① of IC12?
Yes
Change IC12
No
Change IC4
No
When the timing changes does the voltage change at pin ① of IC15?
Yes
START
No
Change IC3 (CPU)

N-8 1 (O)



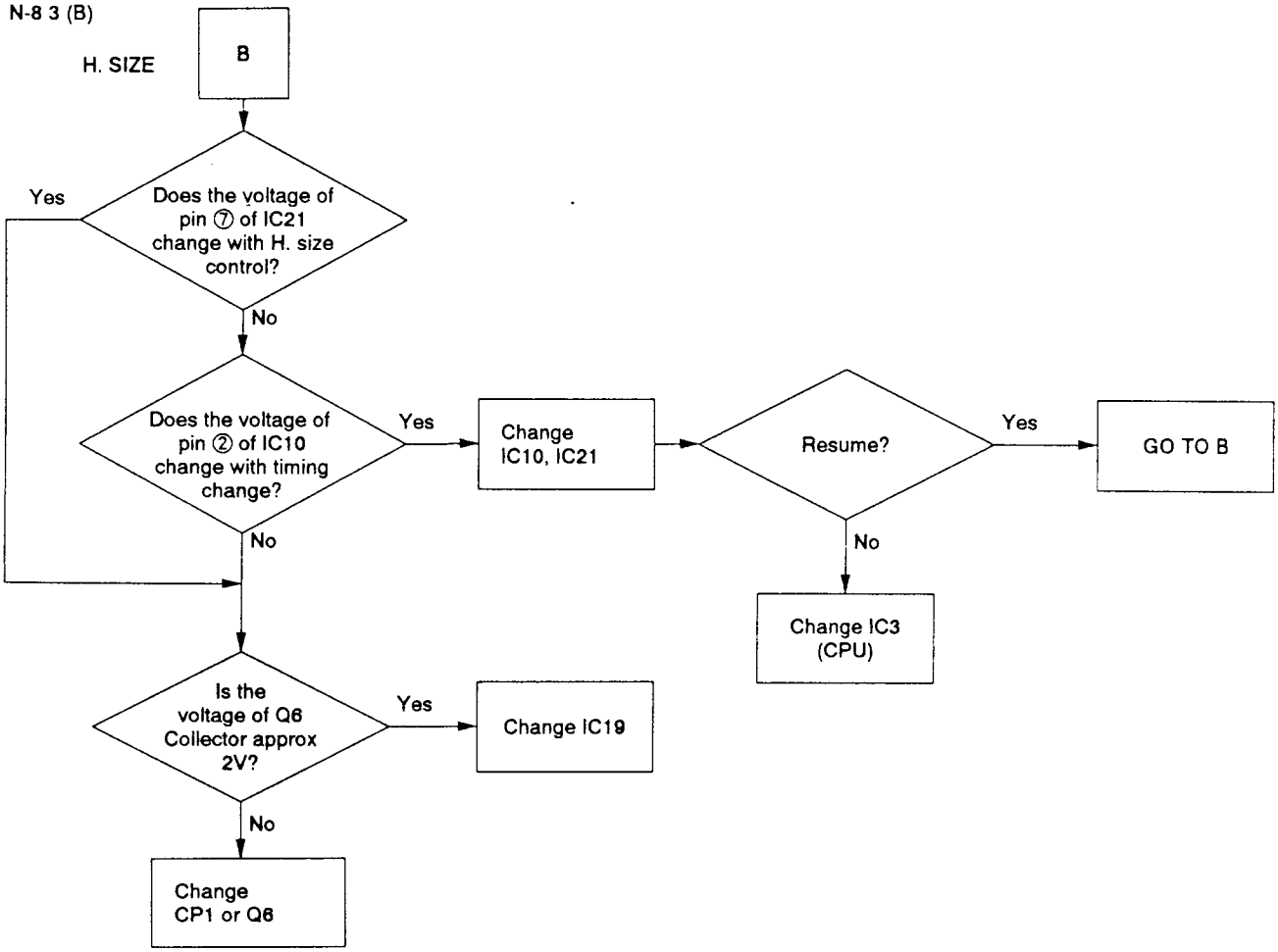
N-8 2 (A)

H POSI


A
Does the pulse width of pin ② of IC101 change with H. posi control?
Yes
Change IC101
No
Does the voltage of pin ⑦ of IC15 change with H. posi control?
Yes
Change Q204, Q205, Q206
No
Does the voltage of pin ⑦ of IC12 change with H. posi control?
Yes
Change IC15
No
Does the voltage of pin ⑥ of IC4 change with H. posi control?
Yes
Resume?
Yes
GO TO A
No
Change IC3 (CPU)
No
Change IC12

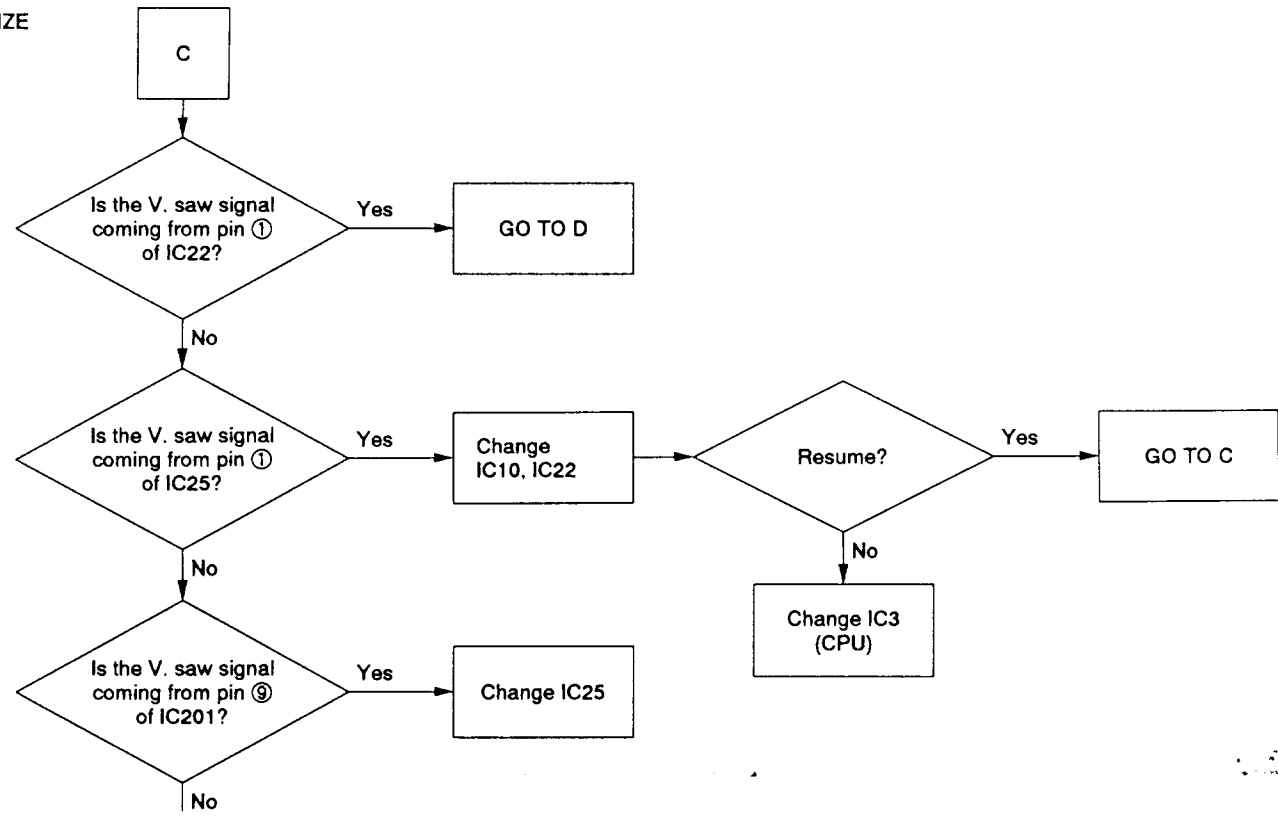
N-8 3 (B)

H. SIZE



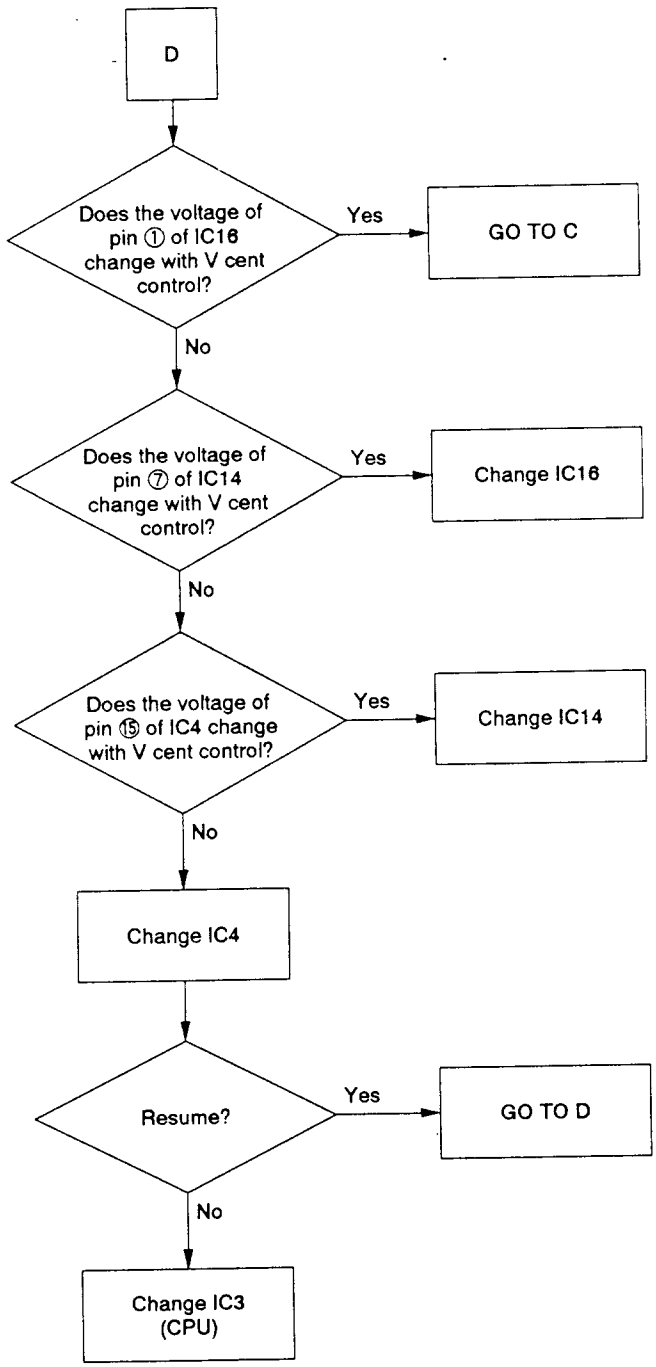
N-8 4 (C)

V. SIZE



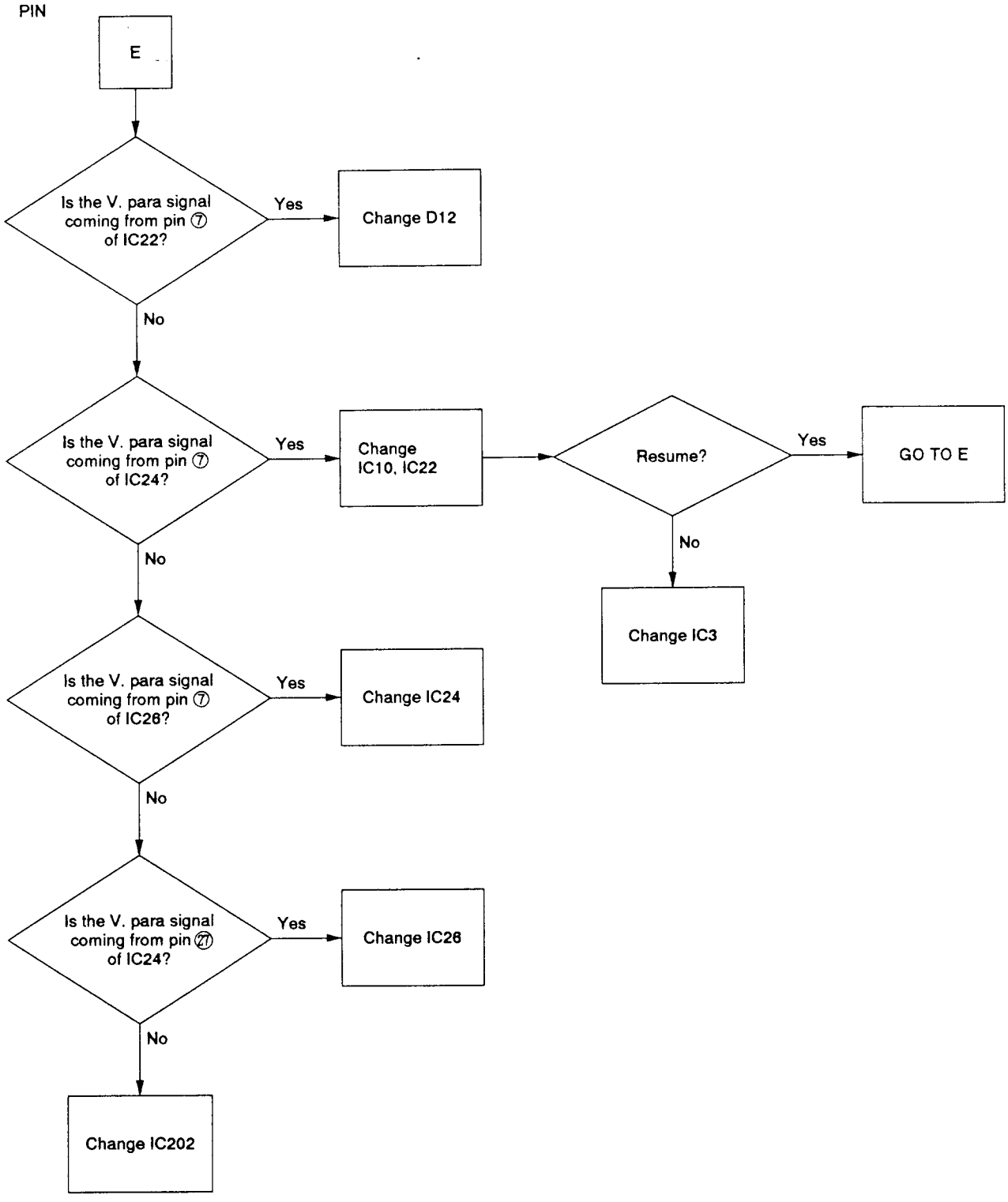
N-8 5 (D)

V CENT


D
Does the voltage of pin ① of IC16 change with V cent control?
Yes
GO TO C
No
Does the voltage of pin ⑦ of IC14 change with V cent control?
Yes
Change IC16
No
Does the voltage of pin ⑮ of IC4 change with V cent control?
Yes
Change IC14
No
Change IC4
Resume?
Yes
GO TO D
No
Change IC3 (CPU)

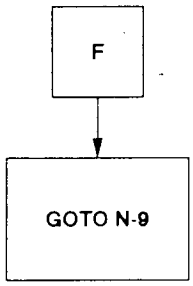
N-8 6 (E)

PIN


E
Is the V. para signal coming from pin ⑦ of IC22?
Yes
Change D12
No
Is the V. para signal coming from pin ⑦ of IC24?
Yes
Change IC10, IC22
Resume?
Yes
GO TO E
No
Change IC3
No
Is the V. para signal coming from pin ⑦ of IC26?
Yes
Change IC24
No
Is the V. para signal coming from pin ㉗ of IC24?
Yes
Change IC26
No
Change IC202

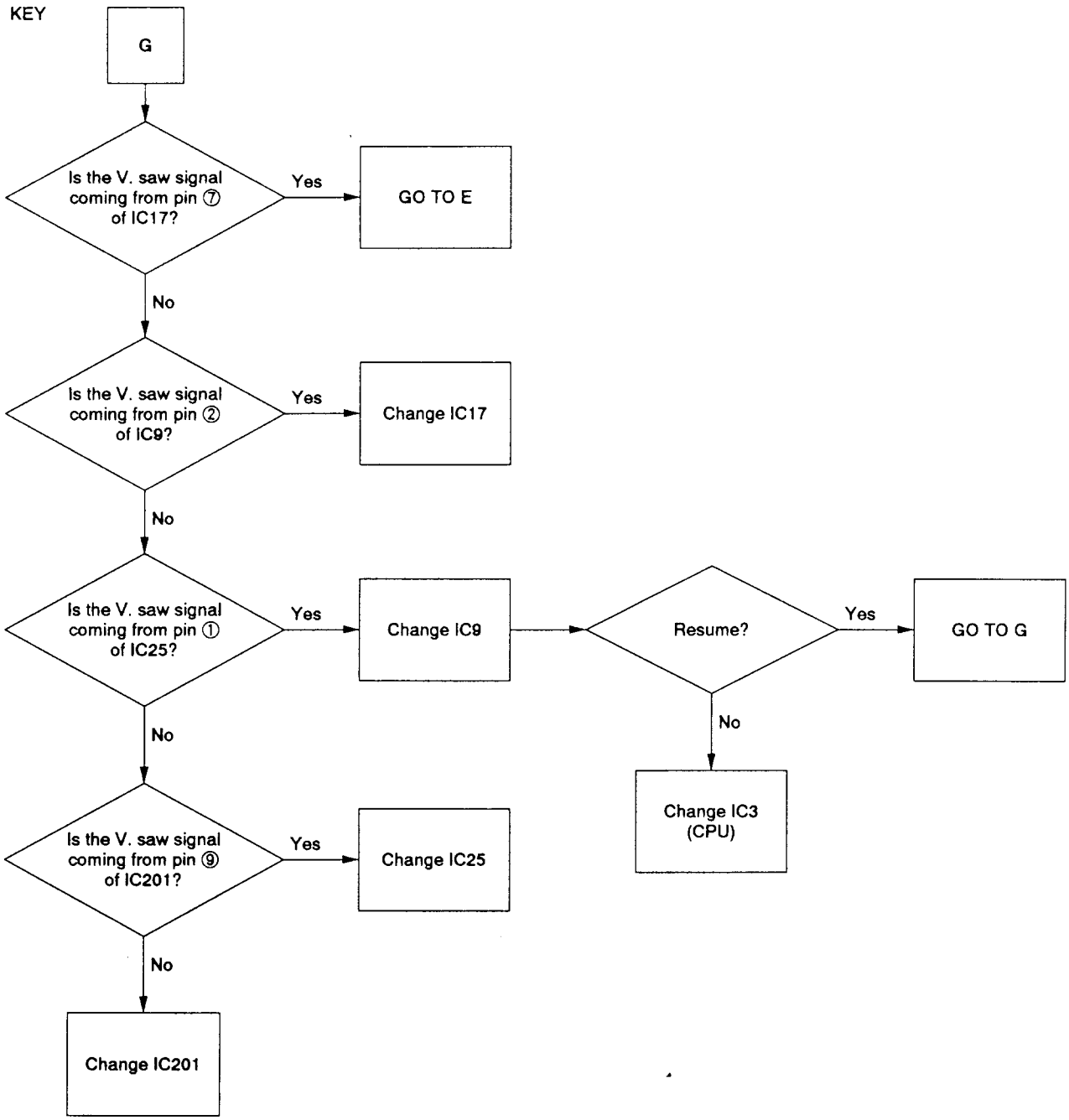
N-8 7 (F)

PIN BAL



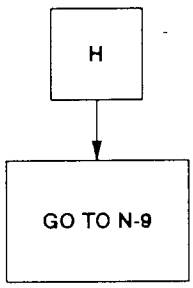
N-8 8

KEY



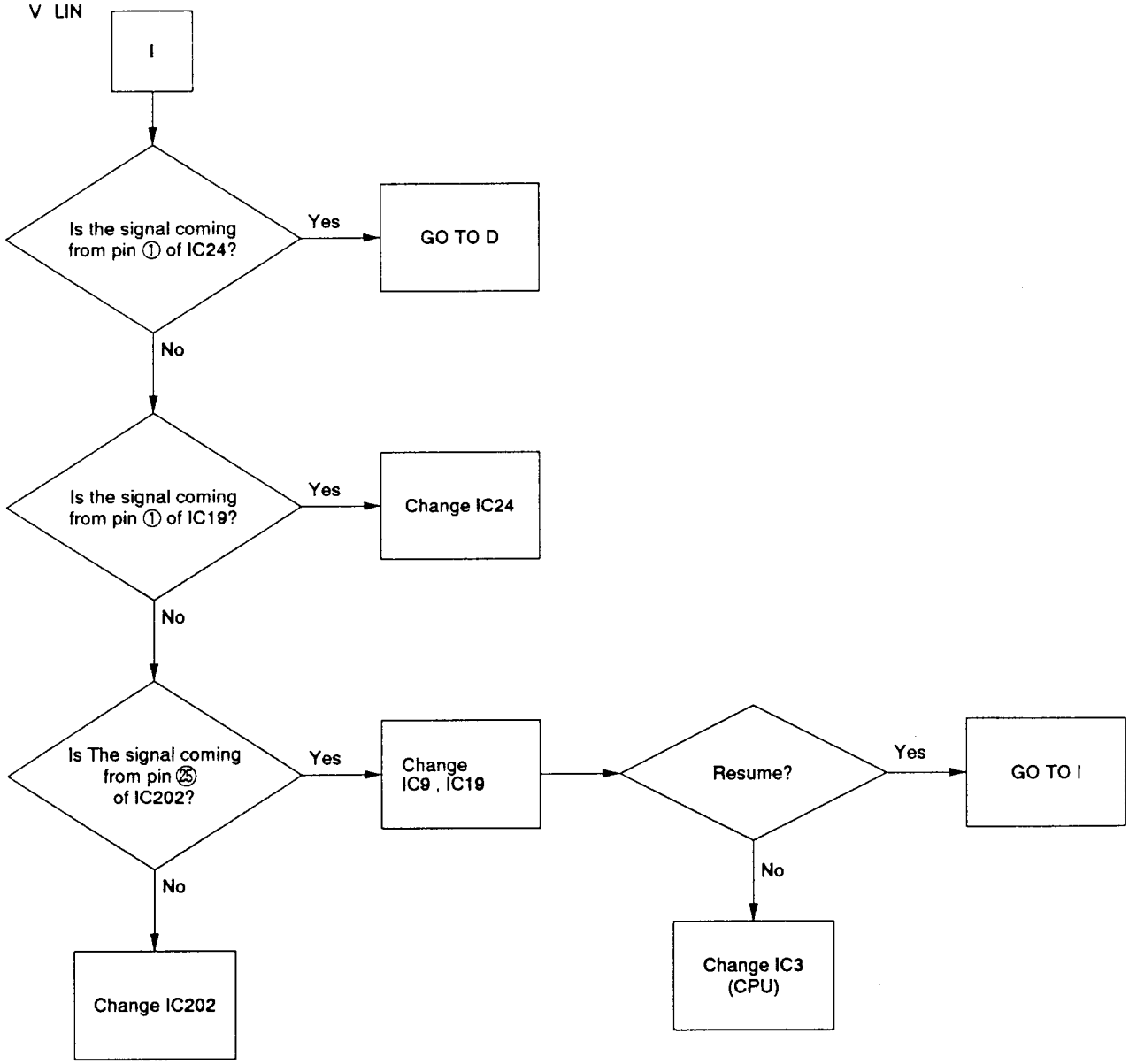
N-8 8 (H)

KEY BAL



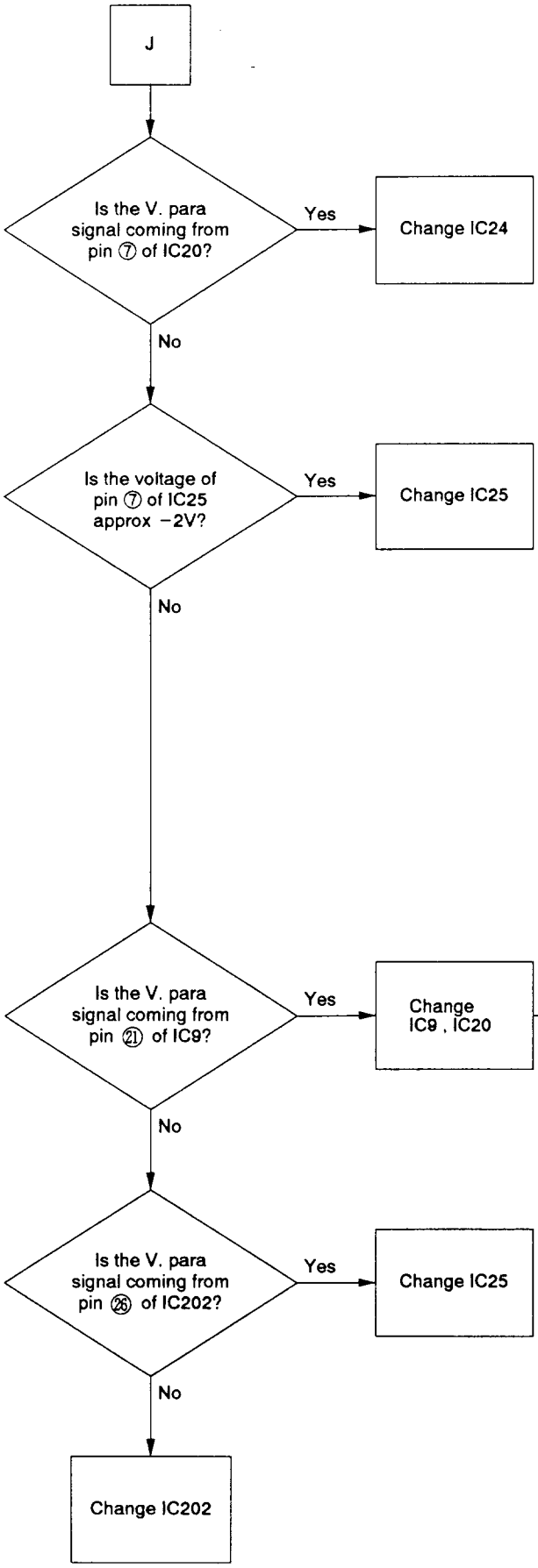
N-8 9 (I)

V LIN



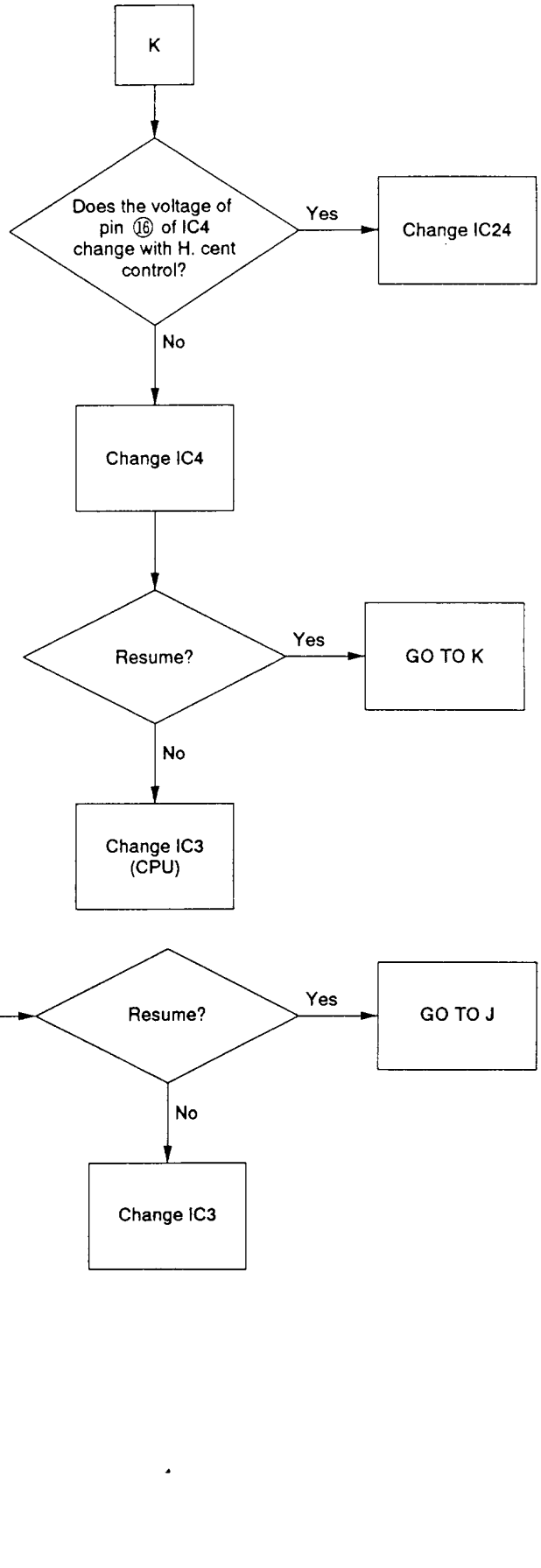
N-8 10 (J)

V. LIN. BAL

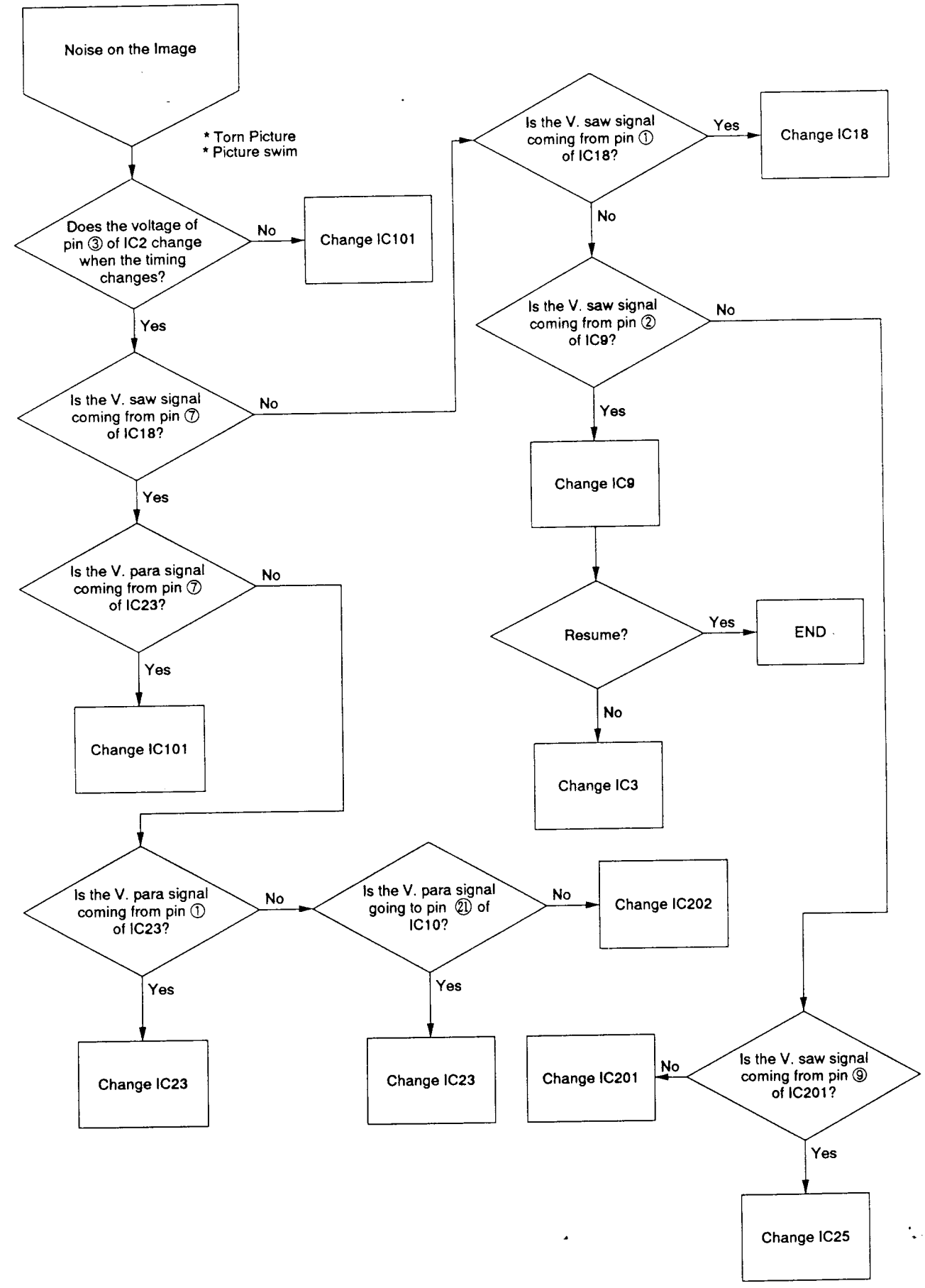


N-8 11

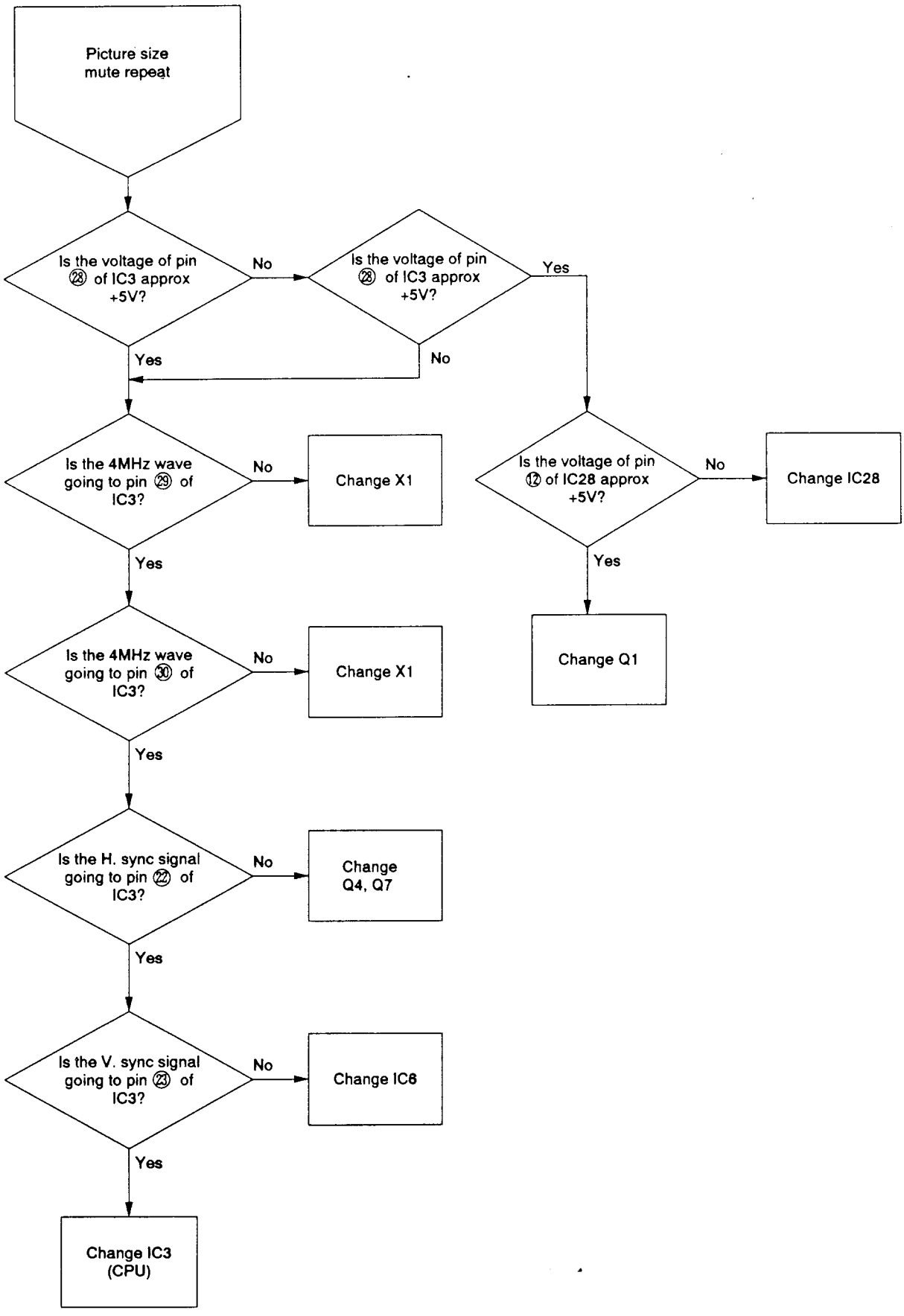
H. CENT



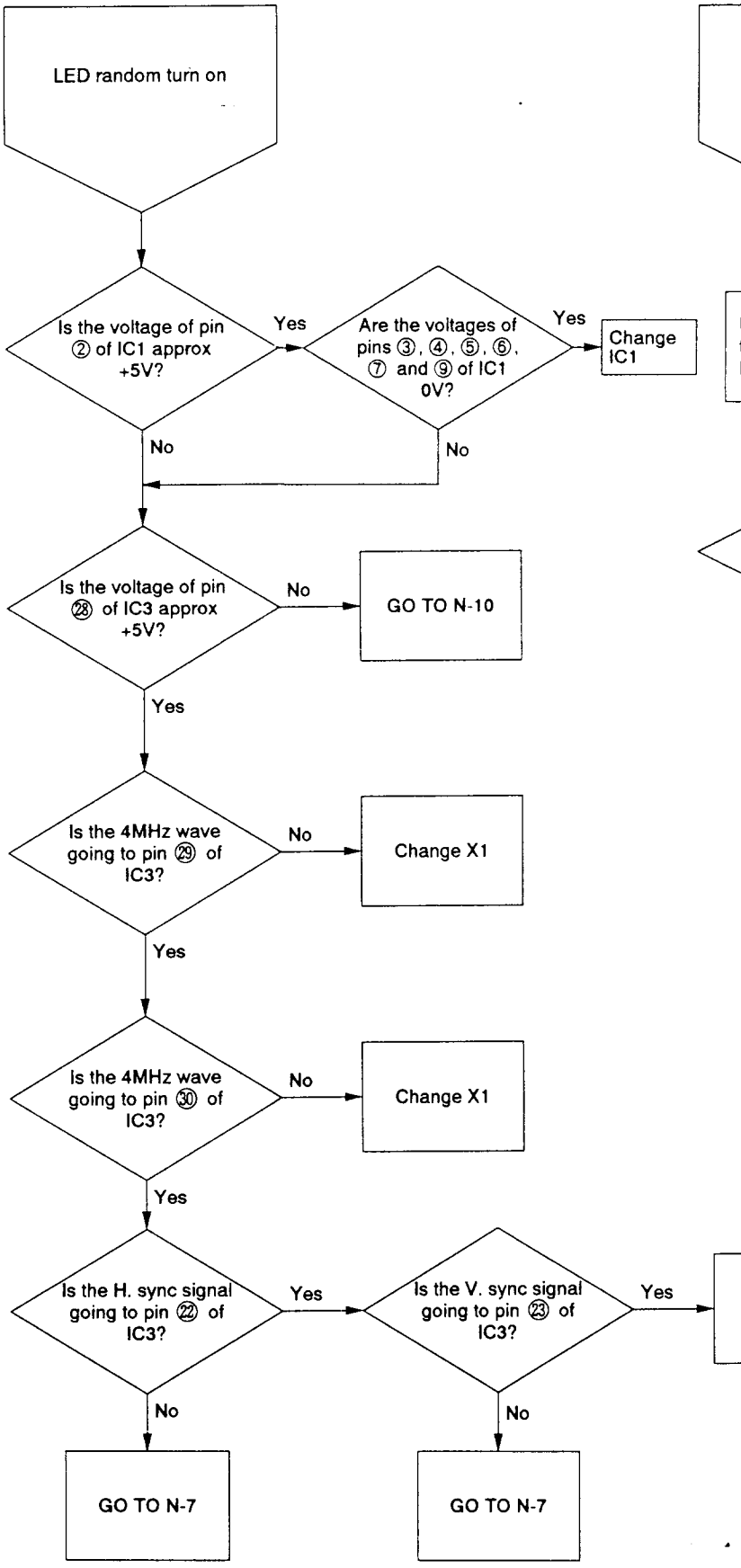
N-9 (R)


Noise on the Image
* Torn Picture
* Picture swim
Does the voltage of pin ③ of IC2 change when the timing changes?
No
Change IC101
Yes
Is the V. saw signal coming from pin ⑦ of IC18?
No
Yes
Is the V. para signal coming from pin ⑦ of IC23?
No
Yes
Change IC101
Is the V. para signal coming from pin ① of IC23?
No
Yes
Change IC23
Is the V. para signal going to pin ㉑ of IC10?
No
Change IC202
Yes
Change IC23
Is the V. saw signal coming from pin ① of IC18?
Yes
Change IC18
No
Is the V. saw signal coming from pin ② of IC9?
No
Yes
Change IC9
Resume?
Yes
END
No
Change IC3
Is the V. saw signal coming from pin ⑨ of IC201?
No
Change IC201
Yes
Change IC25

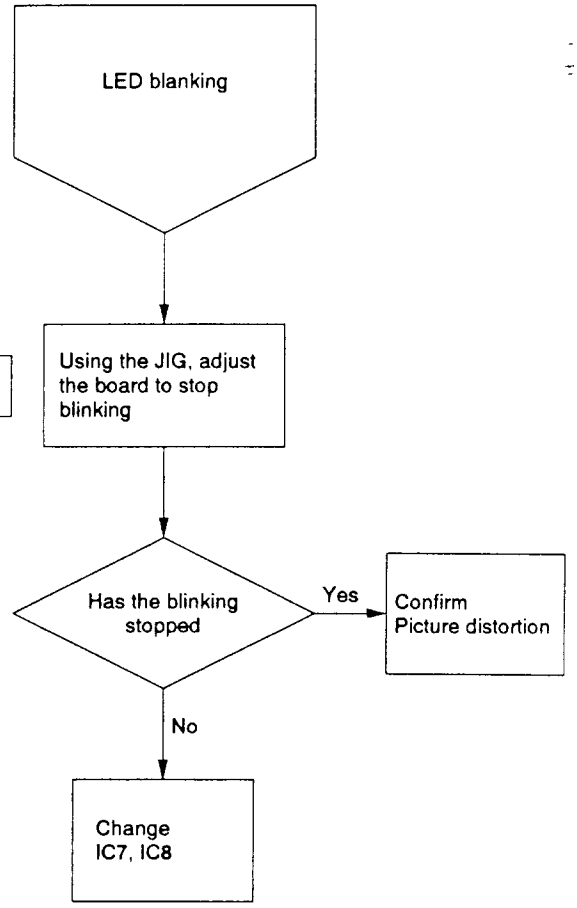
N-10 (V)


Picture size mute repeat
Is the voltage of pin ㉘ of IC3 approx +5V?
No
Is the voltage of pin ㉘ of IC3 approx +5V?
Yes
Yes
No
Is the 4MHz wave going to pin ㉙ of IC3?
No
Change X1
Yes
Is the 4MHz wave going to pin ㉚ of IC3?
No
Change X1
Yes
Is the H. sync signal going to pin ㉒ of IC3?
No
Change Q4, Q7
Yes
Is the V. sync signal going to pin ㉓ of IC3?
No
Change IC6
Yes
Change IC3 (CPU)
Is the voltage of pin ⑫ of IC28 approx +5V?
No
Change IC28
Yes
Change Q1

N-11 (other)



N-12 (other)



SECTION 5
SAFETY RELATED ADJUSTMENT

When replacing or repairing the D3 board, the power block or focus pack, the following adjustments and operational checks must be performed as a safety precaution against X-rays emissions from the unit.

– Component side –

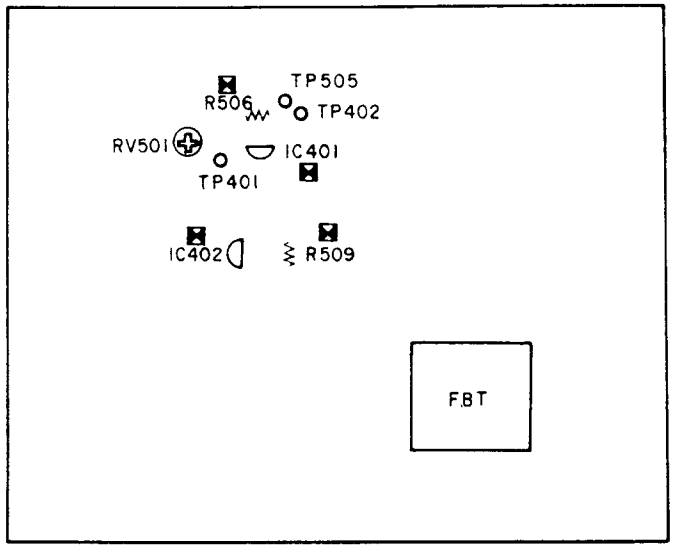


Fig. 4-4-1. D3 board

a) Replacing D3 board parts

1) Check parts which require voltage checks at TP401, TP402 and TP505 and make adjustments if necessary.

Replaceable parts (◪)	Check point		Parts to be adjusted (◙)
(1) IC401	TP401	31.00–32.50V ·····	◙IC401
R502, R504	TP505	9.00 ± 0.05V ·····	RV501
(2) RV501, R505	TP505	MAX of	
R507, R506	RV501	<9.45V ·····	◙R506
	TP505	9.00 ± 0.05V ·····	RV501
(3) IC401,IC402	TP402	9.70–10.10V ·····	◙R509
R503,R508,TP502			◙IC402
R510,R509			

Notes:

1. When the voltage at TP401 is out of the specified voltage range, replace IC401.
2. When the maximum voltage at TP505 is out of the specified range, adjust R506.
3. When the voltage at TP402 is out of the specified range, adjust R509.

2) When the following parts are replaced, check that the HV Hold Down circuit operates normally.
IC203, D505, D506, D509, C510, C511, C521, R521, R522, R523

<Checking method>
Check if the raster appears when the voltage between 9.60 to 9.70 VDC is applied between TP405 and GND from the external power source. Also check if the raster disappears when voltage between 10.00 to 10.10 VDC is applied.

3) When the following parts is replaced, check that the beam protector circuit operates normally.
IC202, IC203, D501, D502, D503, D504, D507, D508, C504, C505, C506, C507, C508, R511, R512, R513, R514, R515, R516, R517, R518, R519, R520

<Checking method>
(1) Input a white dot signal and adjust the contrast to the minimum level where dots can be seen.
(2) Short circuit pins ④ and ⑦ of IC202 with the power turned off, then turn the power back on. (At this time check that raster appears.)
(3) Reduce the resistance gradually from the maximum level using a variable resistor of more than 12 [k-ohm] and an ammeter connected in series between TP403 and GND.
Check that the protector circuit operates to disappear the raster when the current level drops below 1.23 [mA].
(4) Move short clip (2) to between pins ④ and ① of IC203.
(5) Check that the protector circuit operates to disappear the raster when the current level drops below 1.23[mA], same the way (3).
(6) Remove the short clip.
(7) Check that there are no problems with the unit.

b) D3 board and D3 complement replacement

Check all the items indicated in section a) above.

c) Replacing the power block

Check that the +B voltage (between TP406 and GND on the D3 board) is 145V ± 3V.

SECTION 6
ADJUSTMENTS

Unless otherwise it is specified, the input signal during the adjustment is Mode 10.

6-1. ADJUSTMENTS PROCEDURE

1. Carry out the adjustments according to the following procedure. For reference, the adjustment procedures are shown in units of the main blocks (FRU units).

① When replacing the video amp board (A board)
6-2-1. Picture projection Items 1) – 3)
↓
6-3-1. White balance rough adjustment
↓
6-3-12. White balance fine adjustment

② When replacing the EMI filter board (B board)
6-2-1. Picture projection Items 1) – 3), Item 6), and Item 8).
↓
6-2-2. Checking the operation of each section Item ① and ② of Item 2)

③ When replacing the CRT socket board (C board)
6-2-1. Picture projection Items 1) – 3)
↓
Input a white flat signal and gray scale signal and verify that there is no problem with the white balance.
(See 6-3-12 White balance fine adjustment.)

④ When replacing the deflection board (D3 board)
6-2-1. Picture projection except Item 4)
↓
6-2-2. Checking the operation of each section Items 1) – 3), but Items ⑨ – ⑬ of Item 2) are unnecessary
↓
6-3-6. Vertical and horizontal position and size adjustment
↓
6-3-7. Left and right pin cushion distortion adjustment
↓
6-3-8. Vertical linearity adjustment
↓
6-3-9. Overall image distortion check
↓
5. Safety-related adjustments

⑤ When replacing the power supply block (G board)
6-2-1. Picture projection Items 1) – 3)
↓
6-2-3. Checking the voltage

⑥ When replacing the control block assembly (H4 board)
6-2-1. Picture projection Items 1) – 3)
↓
6-2-2. Checking the operation of each section Item 1), and Items ① – ⑧ of Item 2)

⑦ When replacing the CRT assembly (CRT, deflection yoke, Neck twist coil ITC block)
6-2-1. Picture projection Items 1) – 5)
↓
6-2-2. Checking the operation of each section
↓
6-3-1. White balance rough adjustment
↓
6-3-3. Convergence rough adjustment Items 3) – 5)
↓
6-3-4. Beam landing fine adjustment Item 8) Final check
↓
6-3-6. Vertical and horizontal position and size adjustment
↓
6-3-7. Left and right pin cushion distortion adjustment
↓
6-3-8. Vertical linearity adjustment
↓
6-3-9. Overall image distortion check
↓
6-3-10. Focus adjustment
↓
6-3-11. Static convergence adjustment
↓
6-3-12. White balance fine adjustment

⑧ When replacing the focus pack (high-voltage resistor assembly)
6-2-1. Picture projection Items 1) – 5)
↓
6-3-10. Focus adjustment
↓
6-3-12. White balance fine adjustment Items 1) – 4) and Item 11)

⑨ When replacing the H. STAT variable resistor (high-voltage resistor)
6-2-1. Picture projection Items 1) – 5)
↓
6-3-3. Convergence rough adjustment Items 3) and 4)

⑩ When replacing the connector panel assembl (M1 board)
6-2-1. Picture projection Items 1) – 3) and Items 5) and 7).
↓
6-2-2. Checking the operation of each section Item 3)

⑪ When replacing the main harness
6-2-1. Picture projection Items 1) – 3) and Items 5) and 7).
↓
6-2-2. Checking the operation of each section Item 1) and Items ① and ② of Item 2)

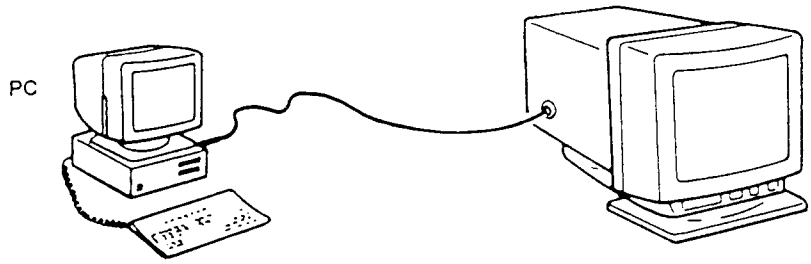
⑫ When replacing other FRUs
After replacing any parts, make sure there are no scratches, loosen parts, or any other differences in appearance from the normal state. As necessary, carry out the inspections in 6-2-1. Picture projection Items 1) – 3) and Items 5) and 7).

2. Caution items

The geometric adjustment (from 6-3-6. to 6-3-7.) can be performed with two methods. One is from the external personal computer and the other is by the front panel button the Monitor.

1) Using personal computer

Connect the communication cable of the PC to the connecter located on the left side of the monitor. Run the service software and then follow the instruction.



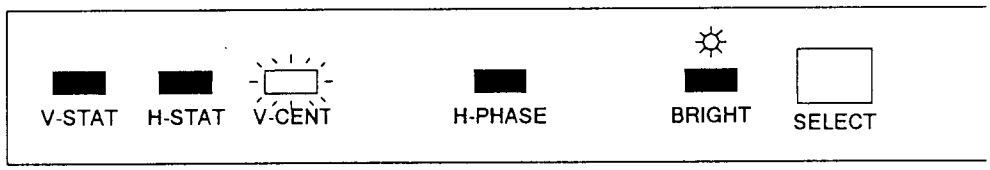
2) Using the front panel button (For the model which equips the service switch SW2 on the N board.)

Set the SW2 on the N board to the "SERVICE" side and turn on the monitor. The left five LEDs of the three series LEDs turn on.

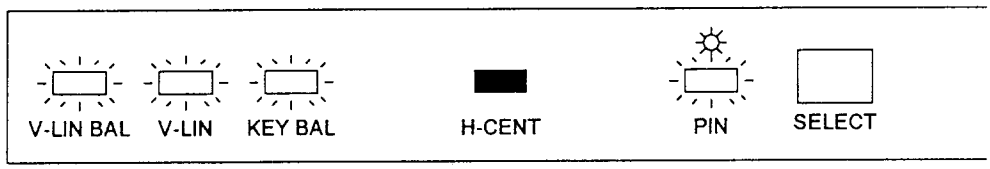
It means now you entered the service mode and you are in the reverse side of the adjustment.

In order to control 11 different geometric adjustment, the 7 LEDs are double tasked distinguished by turning on the only one LED or turning off the only one LED. Let's call the latter "Reverse mode".

The each adjustment are positioned as the picture below.



NORMAL MODE
now, V. CENT is selected



REVERSE MODE
now, H. CENT is selected

The selected LED moves one left every time you push the SELECT button, and continues form Normal mode to Reverse mode and vice versa. The selected LED stays on the same position until you push the SELECT button again.

This adjustment directly changes the preset data of the mode which is displayed at the moment. You can change the input signal without exit from the service mode.

Do not forget to set the SW2 to the "USER" side when you finish the adjustment.

6-2. PICTURE PROJECTION TEST

6-2-1. Picture projection

1) Make sure that the power switch for the unit is set to OFF and supply power from an isolated-type variac.
2) Adjust the AC input voltage to the rated value and turn the power on.
3) Supply MODE 10 signal to the set. (Recommended signal is the black cross-hatch on the white flat field pattern).
4) Adjust the SCREEN (G2) VR so that the raster become starting to be visible.
5) Adjust the H. FOCUS (G2) and V. FOCUS (F1) variable resistors in the focus pack and optimize the overall screen focus. If the center vertical static misconvergence is too large (± 0.1mm or greater), adjust the six-pole magnet. (See 6-3-6.)
6) Verify that the image is not moving.
7) If the image is moving left to right or right to left, input Mode 1 signal first and then switch off the SG sync signal or for internal synchronization remove the G input, then turn the H. FREQ control on the N board to stop the image.
8) Reconnect the sync signal and supply some other scan mode signal and double check 6).

6-2-2. Checking the operation of each section

1) Check that the green Power On indicator lamp lights up, when the power for the set is switched on.
2) Operate the following controls and check that their circuits are functioning.
‹User's Controls› ····· see P. 10 to know how it works.
① CONTRAST
② BRIGHTNESS
③ H. SIZE
④ H. CENT
⑤ V. SIZE
⑥ V. CENT
⑦ V. STAT
⑧ H. STAT

<Internal Controls>
⑨ SCREEN(G2) ····· changes the overall brightness for the screen.
⑩ V. FOCUS(F1) ····· changes the focus in the vertical direction.
⑪ H. FOCUS(F2) ····· changes the focus in the horizontal direction.
⑫ R. DRV, G. DRV, and B. DRV VRs
(A board) · change the peak brightness for their respective colors.
⑬ R BKG, G. BKG, and B. BKG VRs
(A board) · change the dark level brightness for their respective colors.

3) Checking the connection for R. G. B
Turn the R, G and B switches for the signal generator ON and OFF to check if each switch renders correct R, g and B color reproduction.

6-2-3. Checking the voltage

Check that the following voltage are present on each board.
1) +B : +145 ± 3V (G board CNG6 ① pin)
2) +20V:+21 ± 2V (G board CNG6 ⑧ pin)
3) -20V:-21 ± 2V (G board CNG6 ⑨ pin)
4) +12 :+12 ± 0.6V (G board CNG6 ③ pin)
5) -12 :-12 ± 0.6V (G board CNG6 ⑤ pin)
6) +65 :+66 ± 3V (G board CNG5 ⑦ pin)
7) The voltage between TP505 and GND of D3 board is within the 9.00 ± 0.05 V range. When the voltage is out of the specified range, turn RV501 to adjust it to within the required range.

6-3. ADJUSTMENT

6-3-1. White balance rough adjustment

– Component side –

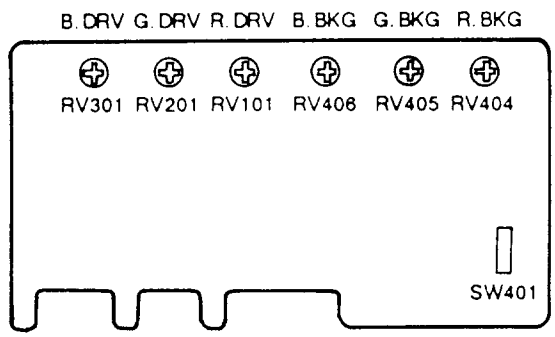


Fig. 6-3-1 A board

1) Setting the video signal level
① Input a full-white signal (a flat field signal in which the video level is 0.714Vp-p for R, G and B).
② Set to the following points.
<A board>
RV404(R. BKG) ····· Minimum
RV405(G. BKG) ····· Minimum
RV406(B. BKG) ····· Minimum
RV101(R. DRV) ····· Minimum
RV201(G. DRV) ····· Minimum
RV301(B. DRV) ····· Minimum
Front panel
CONTRAST control ····· Maximum

BRIGHTNESS control ····· Center

③ Connect the osciloscope probe and observer the waveform at TP2 (KG) on the C board.

④ Turn RV201 on the A board to adjust the video level to 40 Vp-p.

⑤ Adjust the pedestal level to 20 ± 1 V by RV405 on the A board.

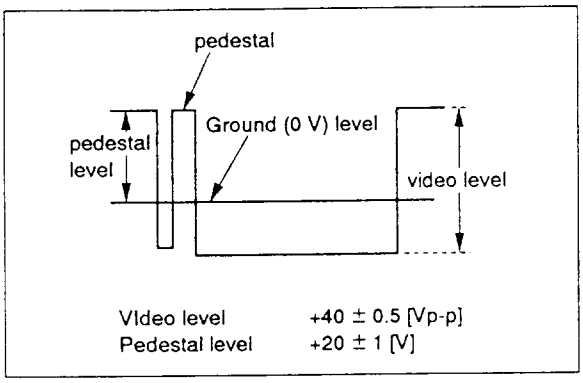


Fig. 6-3-2

⑥ Connect the oscilloscope probe and observe the waveform at TP (G1) on the C board.

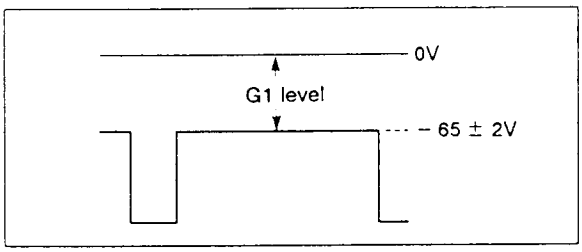


Fig. 6-3-3

2) Rough adjustment

① Set the CONTRAST control to minimum.

② Adjust the SCREEN VR so that the back raster disappears

③ Turn R.BKG (RV404) and B. BKG (RV406) to adjust the white balance for the dark level.

④ Set the CONTRAST control to maximum.

⑤ Turn R.DRV (RV101) and B. DRV (RV301) to adjust the white balance for the dark level.

⑥ Repeat steps ① through ⑤ to adjust the white balance. (This adjustment need not to be precise.)

6-3-2. Beam landing rough adjustment

Note: The following beam landing adjustments are not required for servicing CRTs (ITC) supplied by SONY.

1) Input a full–green signal. (100 IRE green flat field signal pattern.)
2) Set the CONTRAST control to minimum.
3) Face the monitor to the east or west.
4) Adjustment the SCREEN (G2) VR to obtain the optimum brightness.
5) Move the deflection yoke backward.
6) Adjust the purity magnets so that the green is positioned at the center of the screen. (See Fig. 6-3-4 and 6-3-6.)
7) Move the deflection yoke forward and adjust it so that the entire screen becomes green.
8) adjust the tilt for the deflection yoke.
9) Fix the deflection yoke lightly.
10) fix the neck twist coil as shown in Fig. 6-3-5.

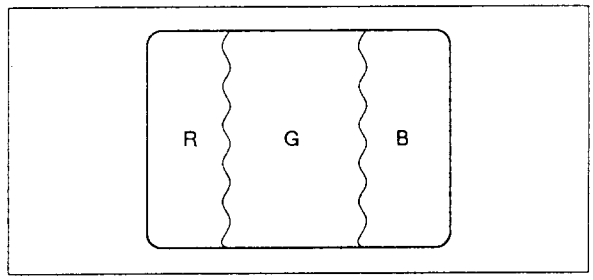


Fig. 6-3-4

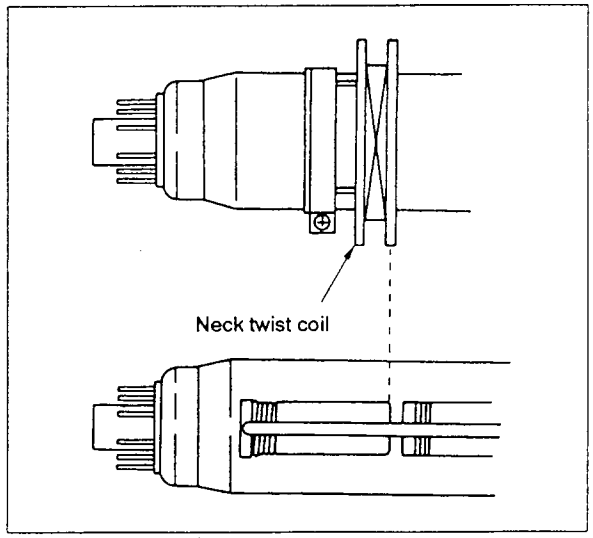


Fig. 6-3-5

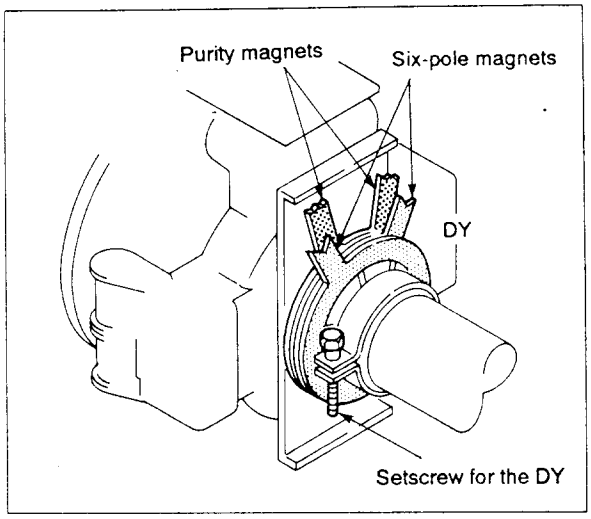


Fig. 6-3-6

6-3-3. Convergence rough adjustment

Note: The adjustment in step 2) is not necessary for servicing CRTs (ITC) supplied SONY. (The six-pole magnet is fixed by paint.)

1) Input the MODE 10 white cross-hatch signal to the set.
2) Align the tabs for the six- pole magnet.(See Fig 6-3-6 and 6-3-7.)
3) Fix the [H. STAT] and [V. STAT] controls on the front control panel at the center position.(Reset status)
4) Turn the H. STAT on the video shield case to a point where color separation of the vertical line at the center of the screen disappears.
5) Turn RV5, RV6 and RV7 on the N board to adjust the V. STAT.

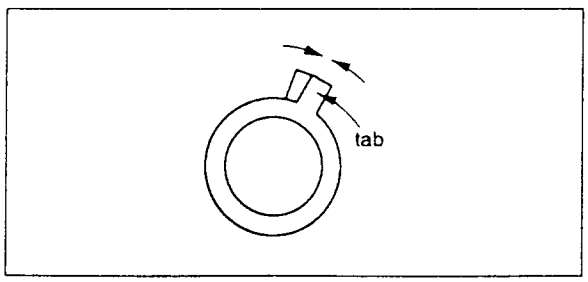


Fig. 6-3-7 Six-pole magnet

6-3-4. Beam landing fine adjustment

Note: Since the CRTs SONY supplies for service have already completed the beam landing adjustment, the following adjustment is not necessary. Carry out Item 9) only.

1) Place the set in the no magnetic field (a Helmholz coil). $IB_H=0$; $IB_V=0.45$
2) Input a 100 IRE green flat field signal (in Mode 10).
3) Set the [CONTRAST] control to maximum.
4) Degauss the steel parts of chassis and with a handheld degausser.
5) Input 230 VAC, switch on the power, and apply auto-degaussing. Then, degauss the CRT screen again.
6) After again the CRT for at least 30 minutes, install a wobbling coil on the neck of the CRT , then adjust the deflection yoke position with the landing checker and adjust the purity, the four corner landing, and the deflection yoke tilt. The four corner landing error must be no greater than 5 μm for green and no greater than 14 μm for blue and red. As necessary, attach CRT magnets as shown in Fig. 6-3-8 (no more than one magnet at each corner).
   After installing magnets, degauss the CRT screen with a handled degauss.

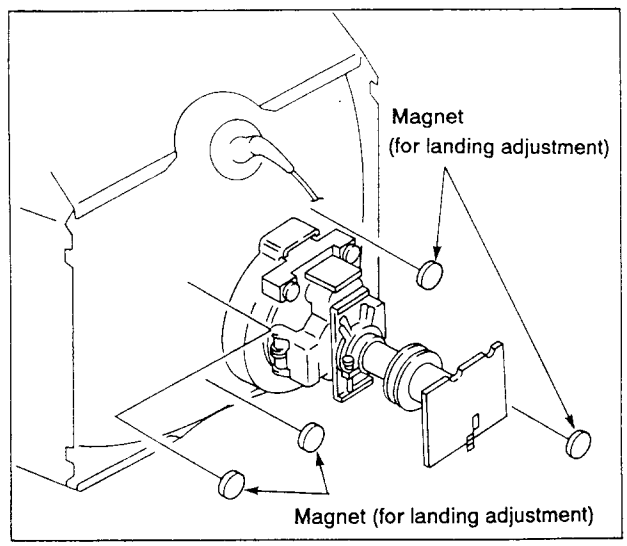


Fig. 6-3-8

7) Tighten the setscrew of deflection yoke, input a white cross - hatch signal, swing the deflection yoke up and down, then fasten the deflection yoke with the deflection yoke spacers at a position where the top and bottom pin cushion distortions are about the same (as shown in Fig. 6-3-9).

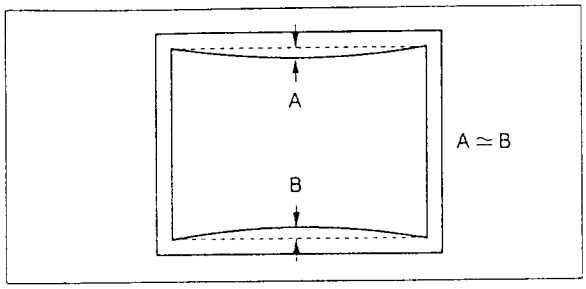


Fig. 6-3-9

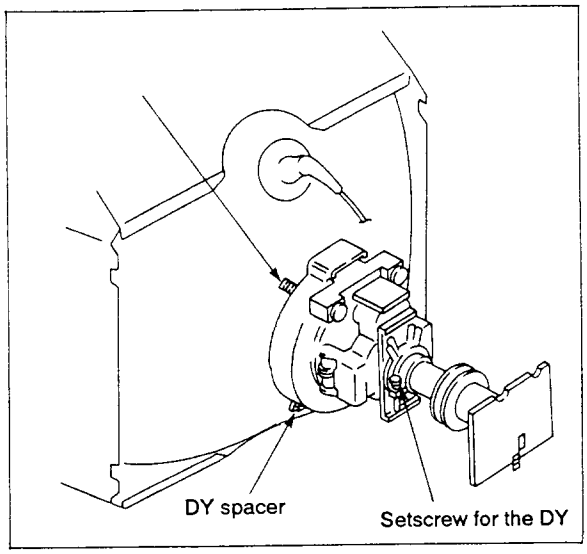


Fig. 6-3-10

8) Final check
When the landing adjustment is complete, face the set in each direction, north, east, south and west, and check for uniformity and mislanding. (Check red, green, blue and white flat field.) Check that the image is not tilted.

9) When the check is complete, fasten the purity magnet with white paint. Continue the adjustment with the set facing east or west.

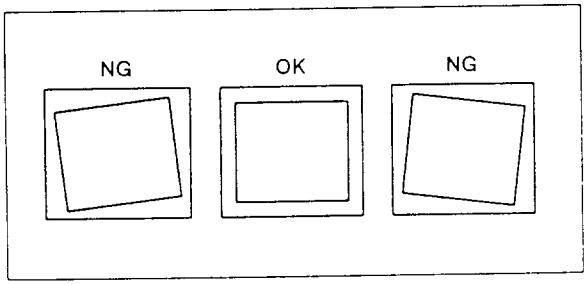


Fig. 6-3-11

6-3-5. Synchronization check

A black hatch signal is desirable for the following adjustments.
Check that normal synchronization is obtained (Check if the set is synchronized at the moment when the switch us turned ON) under the following conditions.

1) Turning the power switch for the monitor ON and OFF.
2) Switching the SYNC switch of SG ON and OFF.
3) Switch the signal mode and check 1) and 2) again.

Item 6-3-6. to 6-3-8. are the general description of each adjustment. Follow the SERVICE SOFTWARE MANUAL when you proceed the adjustment.

6-3-6. Vertical and horizontal position and size adjustment

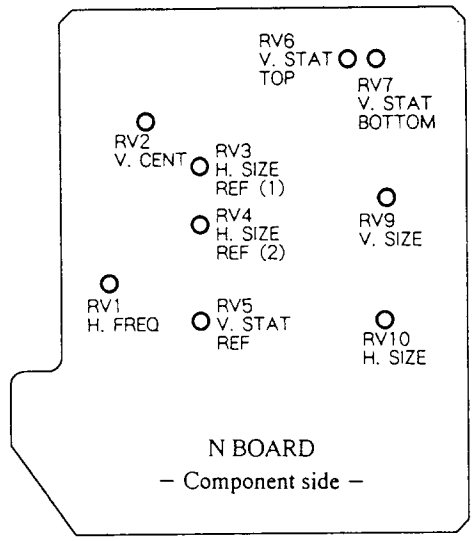


Fig. 6-3-12 Left Side Panel Adjustment Positions

Recommended magnetic field condition of this section (6-3-6.) is IB_H= 0;IB_V=0.45 in the Helmholtz coil, but if it is hard to get this condition, adjust with the following face direction. For the vertical position adjustment in 1), face the CRT screen north or south and set the V. CENT control on the front panel to the center. For other adjustments, face the CRT screen east and west adjust V. CENT control to put the image at the center of the CRT screen. Be sure to degauss when the direction is changed.

1) Adjust V. CENT data so that the vertical position of the cross-hatch image is at the center of the CRT screen (at the bezel opening).
2) Adjust the vertical size to the prescribed size with V. SIZE data.
3) Set S401 on the A board to the TEST side to make the rasters appear, then adjust H. CENT data so that the rasters are at the center of the CRT.

4) Adjust the horizontal size to the prescribed size with H. SIZE data.
5) Adjust H. PHASE data so that the image is at the center of the rasters.

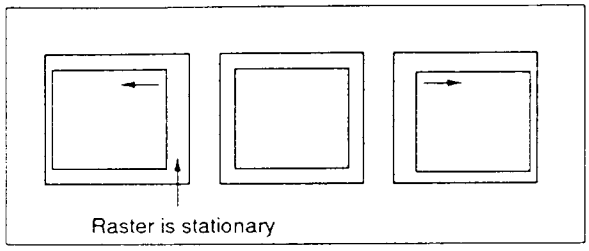


Fig. 6-3-13 H. PHASE movement

6) In case if the H linearity is asymmetrical, change the H. CENT and H. PHASE data together so as to retain the picture center position and choose the best point.

Note: The adjustments in the section 6-3-6 have to be performed again after the adjustments in the section 6-3-7 and 6-3-8 are completed. The raster is set as shown in the Fig. 6-3-14 and 6-3-15 after the horizontal and vertical position and size adjustments are completed.

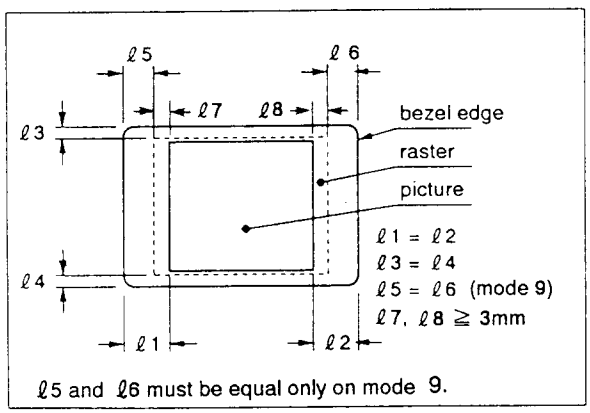
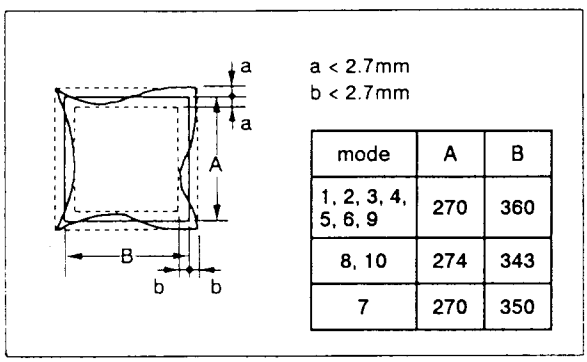


Fig. 6-3-14 Centering Standard



mode	A	B
1, 2, 3, 4, 5, 6, 9	270	360
8, 10	274	343
7	270	350

Fig. 6-3-15 Image Size and Distortion Standards

6-3-7. Left and right pin-cushion distortion adjustment

1) Change the PIN data to adjust the right and left sides lines of the image become linear.

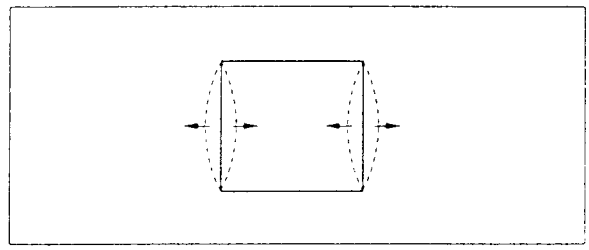


Fig. 6-3-16 PIN Movement

2) Adjust the KEY and KEY BAL data so that the width at the top and bottom sections of the image becomes equal.

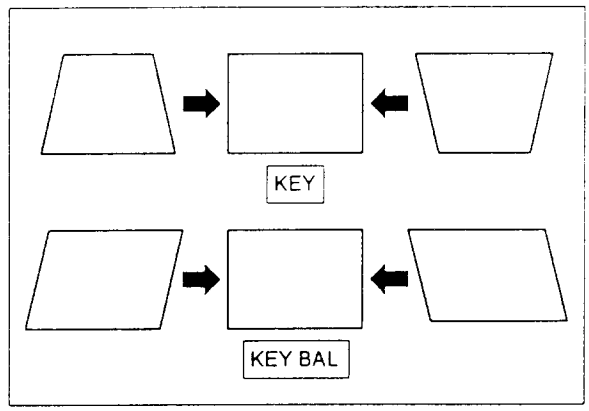


Fig. 6-3-17 Movement of KEY and KEY BAL

3) Check if the pin-cushion distortion balance is even on the right and left sides (i.e., when one side is adjusted to straight line, the correction for the other side is not over or under). If the balance differs, change the PIN BAL data to adjust pin-cushion distortion on both right and left sides equally. Then, adjust both sides to become straight lines using the PIN data again.

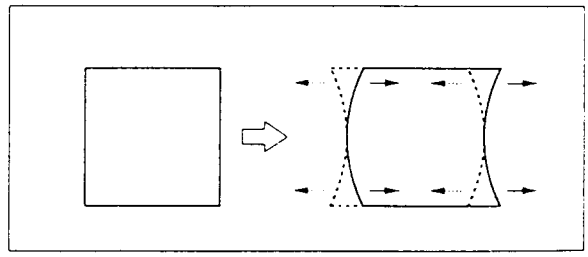
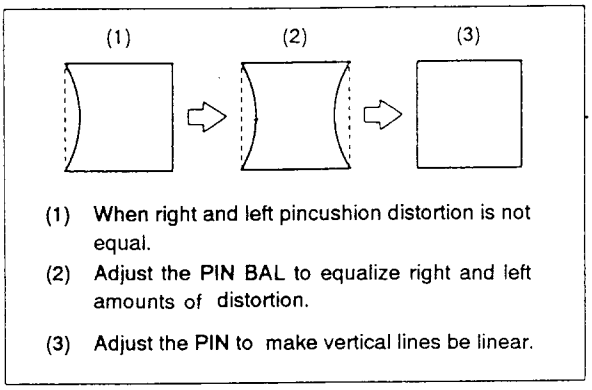


Fig. 6-3-18 Movement of SIDE PIN BAL



(1) When right and left pincushion distortion is not equal.
(2) Adjust the PIN BAL to equalize right and left amounts of distortion.
(3) Adjust the PIN to make vertical lines be linear.

Fig. 6-3-19 Left and Right PIN Cushion Distortion Adjustment Method

6-3-8. Vertical linearity adjustment

1) Adjust the V. LIN BAL data so that the vertical size of the grid is symmetric with center.
2) Adjust the V. LIN data so that the vertical size of the grid at the center is equal to the upper and lower portions of the grid.
3) If the size of the grid cannot be adjusted once, repeat step 1) and 2) above.

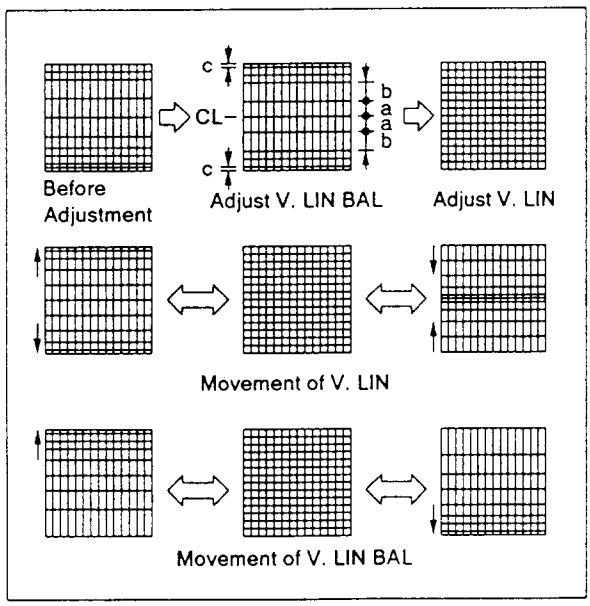


Fig. 6-3-20

6-3-9. Overall image distortion check

1) Image size and image distortion must meet with the conditions specified in Fig. 6-3-15.
2) Attach the linearity gauge (EIA ball-chart) to check that each intersections of cross hatch is positioned within the ± 1% deviation circles.
3) If there are any excess points out of circles, the monitor should be adjusted again.

6-3-10. Focus adjustment

Note: If the landing fine adjustment, picture size adjustment, convergence fine adjustment, and white balance fine adjustment are not complete, after those adjustments are complete, adjust the focus again

1) Input a character pattern (an E pattern is recommended) by Mode 8. If the character pattern is not available, use cross-hatch pattern.
2) Set the CONTRAST control to maximum.
3) Turn the V. FOCUS and H. FOCUS knobs to adjust the screen focus. (Balance the focus at the center and on the periphery.)
4) When the adjustment is complete, lock the knobs with white paint.

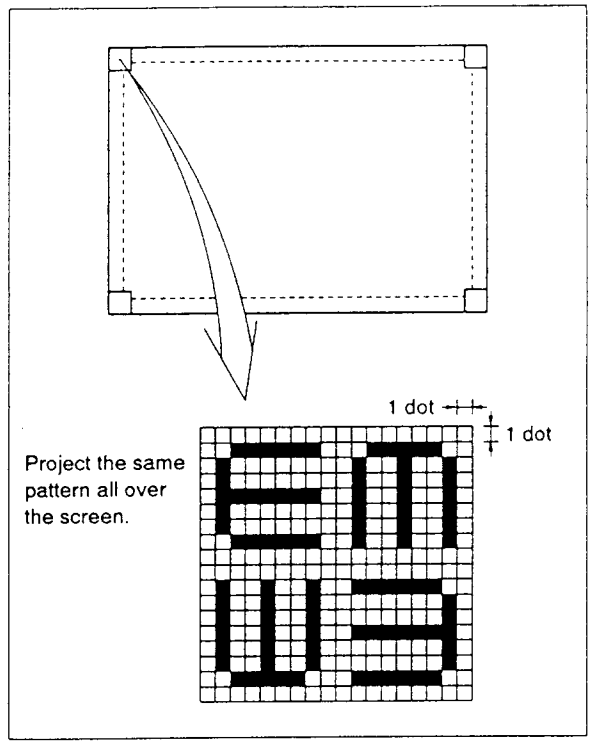


Fig. 6-3-21 E Pattern

6-3-11. Static convergence adjustment

Note: Since the CRTs SONY supplies for service have already been adjusted, 1) - 6), 7) ①-⑥, ⑫, ⑬ are not necessary.

1) Place the set in the Helmholtz coil. (IB_H=0; IB_V=0.45)
2) Input the white cross-hatch signal (mode 7).
3) Set the front control panel's H. STAT and V. STAT controls to the center point.
4) Turn the H. STAT VR inside the set to separate the red, green and blue lines individually. Turn V. STAT (RV5) on the N board to separate the red, green and blue lines individually.

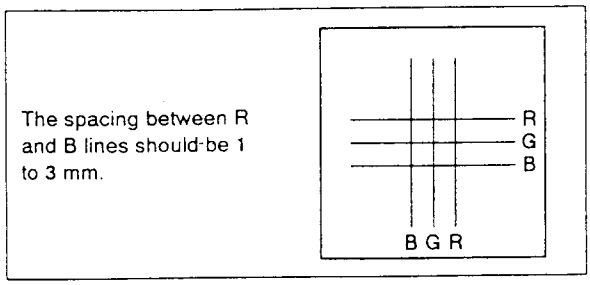


Fig. 6-3-22

5) Turn the six-pole magnet ring behind the DY to equalize the distance between the red and green parallel lines and the distance between the blue and green parallel lines.

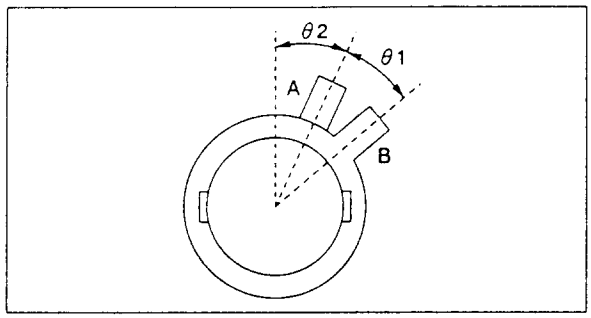


Fig. 6-3-23

* Correction with the six-pole magnet is carried out by adjusting the angle θ 1 between A and B the inclination angle θ 2.
(When θ 1=0, the correction is 0.)

6) Return the H. STAT and V. STAT(RV5)VRs turned in 4)to set misconvergence at center of the screen to 0.

7) Fine convergence adjustment.

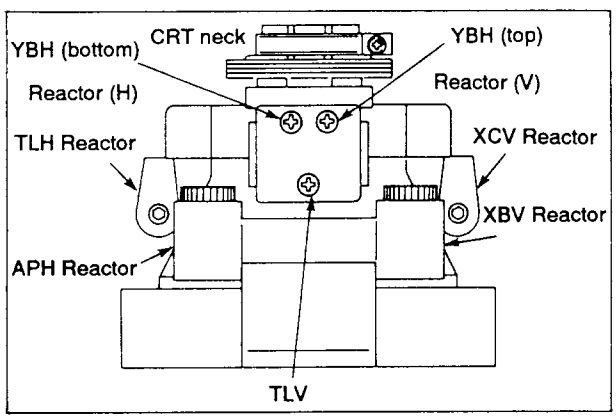
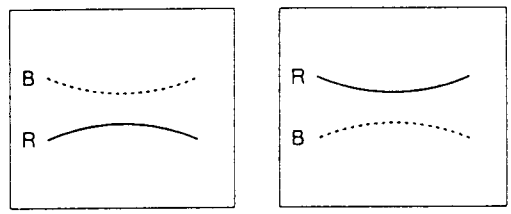


Fig. 6-3-24 Reactors and Adjustment

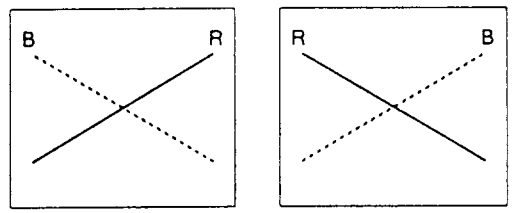
① Set the V. STAT TOP(RV6)and V. STAT BOTTOM(RV7)VRs on the N board to their mechanical centers.

② Adjust the vertical convergence on the X axis whit the vertical reactor(the one on the right as seen from the CRT funnel).

a)XBV
Adjust XBV convergence with XBV reactor



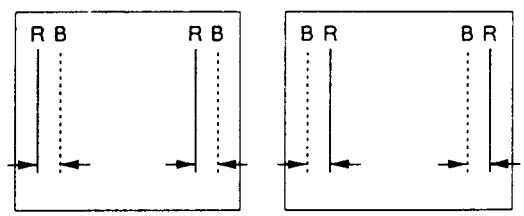
b)XCV
Adjust XCV convergence with XCV reactor



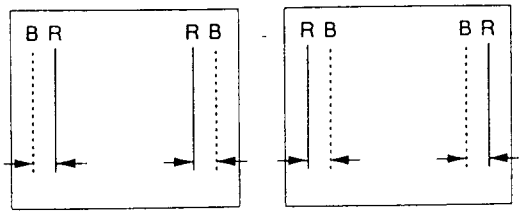
Note: For XBV correction, re-adjust RV5 (V.STAT), RV10 (H. SIZE). If XCV is too large to correct, adjust with the deflection yoke vertical neck swing.

③ Adjust the horizontal convergence on the Y axis with the horizontal rector(the one on the left as seen from the CRT funnel).

a) H. AMP
Adjust H. AMP convergence with APH reactor

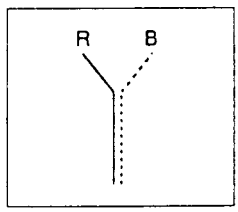


b) H. TILT
Adjust H. TILT convergence with TLH reactor

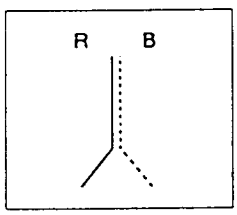


Note: Re-adjust H. STAT too. If there is still horizontal tilt, adjust it by swinging the DY neck right and left For H. AMP correction, re-adjust RV10 (H. SIZE) on the N board.

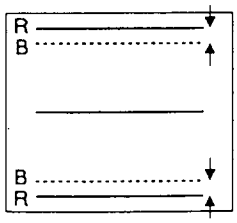
④ Adjust the upper YBH convergence with YBH (top)VR on the deflection yoke.



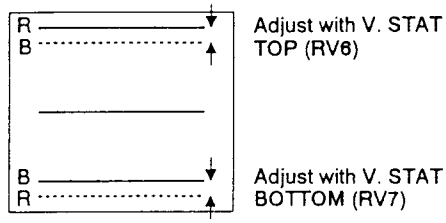
⑤ Adjust the lower YBH convergence with YBH (bottom)VR on the deflection yoke.



⑥ Adjust the upper and lower TLV(balance)with the TLV VR on the deflection yoke.



⑦ Adjust the APV by turning RV6 and RV7 on the N board.

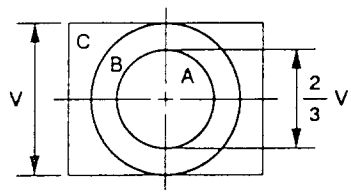


⑧ Switch the signal to mode 10, fine adjust with [H. STAT] and [V. STAT] controls on the front panel, then verify the convergence in this mode.

⑨ Return [H. STAT] and [V. STAT] controls on the front panel to the position where they click at the center.

⑩ Verify the overall screen convergence. If necessary adjust H. STAT(inside), carry out operations ③-⑩, and carry out the permalloy correction.

⑪ Switch the signal to hi-scan mode, verify the overall screen convergence. Verify that the amount of misconvergence is within the spec given below, in each direction of the CRT screen facing north, south, east or west.



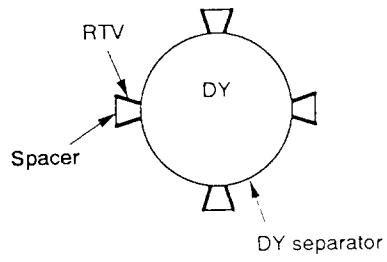
A zone: 0.3mm max.
B zone: 0.4mm max.
C zone: 0.5mm max.

⑫ Secure the reactors with RTV and secure the six-pole magnet with white paint.

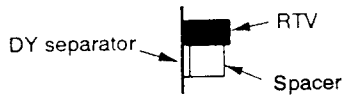
⑬ Fasten the deflection yoke spacers and permalloy with RTV.

Note:

•Spacer installation method(as seen from the rear)

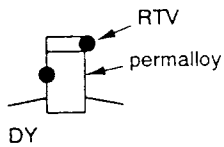


•How to apply RTV to DY and wedge



Apply RTV directry to CRT funnel, wedge the separator.

•How to apply RTV to the permally



6-3-12. White balance fine adjustment

– Component side –

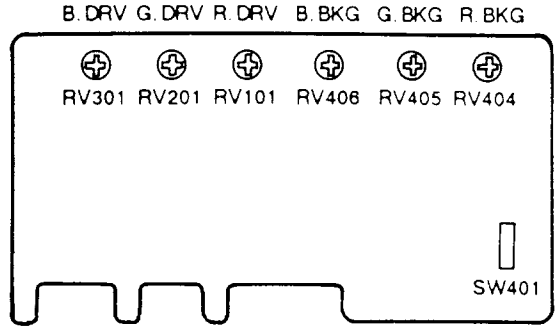


Fig. 6-3-25 A board

Conditions:

1. Input a 100 IRE white flat field signal and perform aging for more than 30 minutes.
2. Position the unit in the Helmholtz coil (IB_H=0, IB_V =0.45).
3. Make sure that landing fine adjustment, convergence fine adjustment, white balance rough adjustment have been performed beforehand.
4. Perform adjustments using a Minolta Color analyzer II , calibrated by SONY's spectrometer.
5. This adjustment must to be performed in a dark room or a drak curtain.

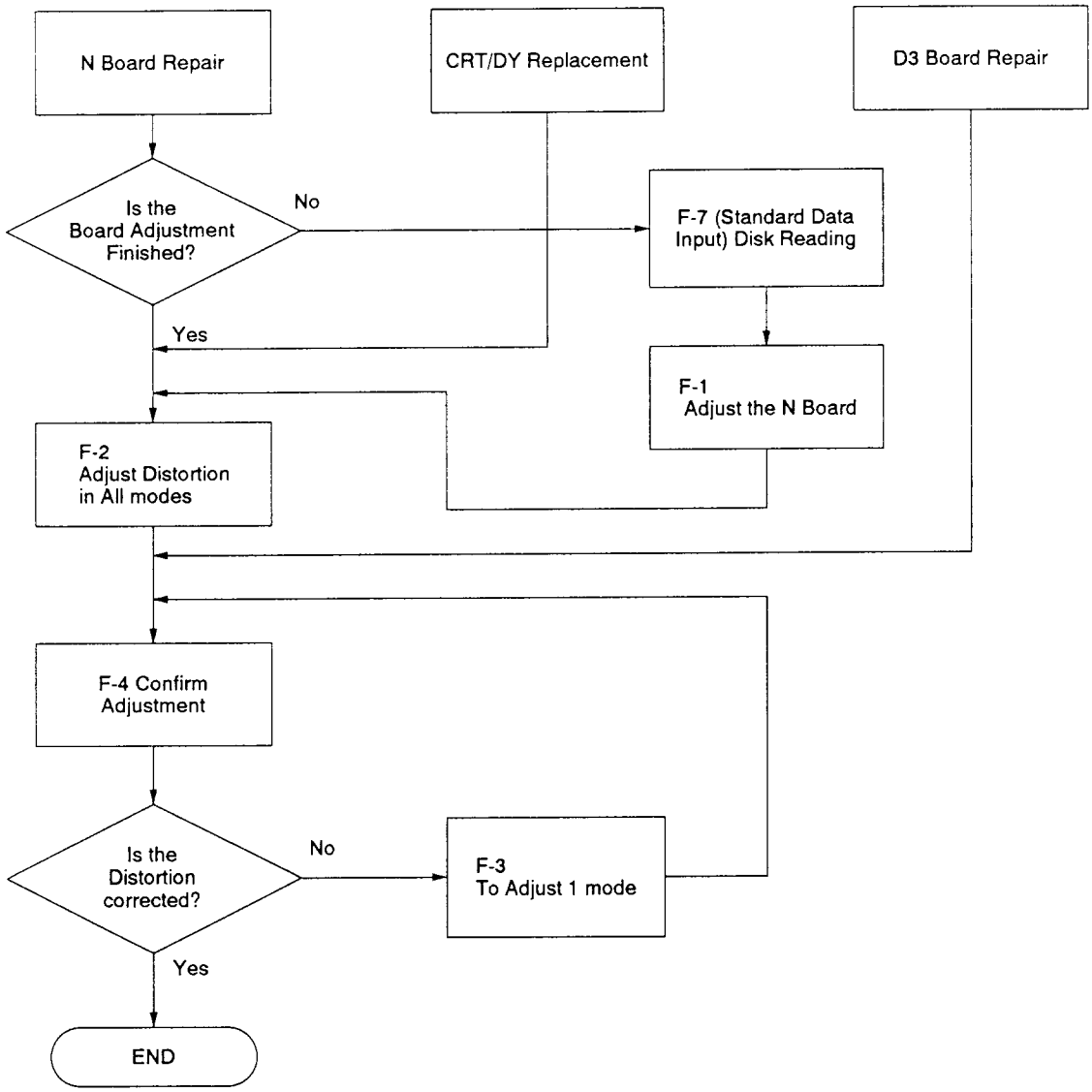
1) Align the sensor of the measuring instrument to the center of the screen.
2) Input a 16-gradation gray scale signal with the set up into the unit.
3) Set the CONTRAST control to maximum.
4) Vary the SCREEN(G2)VR gradually so that the background pedestal level is lit.
5) Set the CONTRAST control to minimum.
6) Input a entire white signal and adjust the white balance for dark level using the R. BKG and B. BKG VRs.
7) Set the CONTRAST control to maximum.
8) Adjust the white balance for highlight using the R. DRV and B. DRV VRs.
9) Return to the gray signal input and check that the background is cut off and the set up level it lit.
10) Repeat steps 4)to 9)to obtain optimum white balance for both the dark level and highlight.
11) When the adjustment is complete, secure the SCREEN (G2)knob with white paint.

Note: Color temperature is 9300 °K +8MPCD, the chromatic coordinates of CIE are X = 0.283 ± 0.03, Y = 0.298 ± 0.03.
After performing adjustment check that the unit meets with the product specifications.

6-4. USING THE GDM-1937 SERVICE JIG

- Is the cable connected securely?
- Is GDM-1937 power on?
- Start up the program MS_SER.
- Follow the instructions as indicated on the screen.

6-4-1. Adjustment Flow Chart



6-4-2. Key Points for Using the Service Jig

- If the monitor's power is switched of during use the computer can get hung up.

- Adjust distortion after entering the user reset mode.
  There are two ways to enter this mode:
  a. Turn the monitor off and on while pressing two adjustment buttons.
  b. Press the rear adjustment button.

- Following the instructions as indicated on the screen. Try not to press keys other than the function and cursor keys. Also please do not press the keys too hard or too fast. Both of these can cause the software to malfunction.

- Please do not press the keys until after the signal has been switched. Depending on the mode the signal generators speed may vary.

- Be sure to connect the Horizontal and Vertical Sync cables.

- Before shipping, the N board's switch #1 should be set to normal and switch #2 should be set to User. (Some models may not have a #2.)

6-4-3. Explanation of Each Adjustment Routine

1. N Board adjustment (F-1)

- This routine allows you to adjust the potential meters of the N board.

- FRU N-Boards have been preadjusted so further adjustment of FRU boards is not necessary. Should you accidentally adjust the volume, please follow this adjustment routine.

- In order to make adjustments, an oscilloscope, voltmeter, and adjustment driver will be necessary.

- Adjusting the N board renders stored data for all modes unusable, so you will have to readjust all modes as according to 「 2. Routine for all picture adjustment (F-2) 」.

- Please follow all instructions as indicated.

2. Routine for all picture adjustment (F-2).

- This is the program's main adjustment routine. You will make adjustments in order from mode 1 to 10. The switching of the signal generator will be made automatically by the computer.

- First we will adjust pincushion distortion. The compensation value is determined by adding the "pin slope" and "pin base" values. To decide the value of the pin slope roughly adjust modes 1 and 10.

- Next adjust all other modes. Mode are displayed in the upper right hand corner. The mode presently being adjusted is indicated in blue and the mode it has finished adjusting is shown in green. Select the next adjustment item and adjust it using the [←] [→] Keys. When you have finished press [RET] to save. Then go to the next mode.

- For modes 2 (EGA Em) and 3 (VGA Text) only size and positioning adjustment is necessary. It is not necessary to make the other adjustments because, the data is common with the other modes. Should for some reason other adjustments be necessary, they can be made within the other common modes. The common modes are as follows:

  2 (EGA Em), 3 (VGA text) ⟶ 1 (VGA Graphic)

- Turn the aging switch on the A board off and check the raster margin by increasing the back light.

- The jig sets the signal generator to the color green.

3. 1 Mode Picture Adjustment Routine (F-3)

- Select a timing and adjust that mode.

- Follow the adjustment method as explained in Section #2.

4. Picture Quality Check Routine (F-4)

- In this routine, check the picture adjustment from mode 1 to 10.

- Change the signal generator's output by pressing the [RET] key.

5. Coefficient Alteration Routine (F-6)

- Use this routine to modify the coefficients for changing the V center and V size.

- General adjustment is not necessary.

- Move to the desired coefficient using the [←] [→] keys. When changing coefficients please precede all numbers with a 0 (i.e. 10 → 010).

- Check your inputted data using the [ESC] key and save it using the [S] key.

- Changing of coefficients can effect all adjustment, thus necessity complete readjustment. Accordingly coefficients should not be modified unless absolutely necessary.

6. New Preset Timing Input Routine (F-7)

- Use this mode to display data on the timing presets, and to add or change presets.

- There are two methods to additions or changes:
  a. Using the keyboard (F-1).
     Use the method from 「5. Coefficient Alteration Routine」.
  b. Saving the signal generator's present timing (F-10).
     1. Set the signal generator to the timing you wish to preset.
     2. Input the number you wish to preset. Confirm the data by pressing the RET key. Save the setting by pressing the S key.

- You can preset 12 timing. 10 timings are set at the factory. The remaining 2 are open. When adding timings use slot #11 or #12.

- Explanation of the various modes:
  a. 1v line - the number of horizontal lines in one vertical scan.
  b. h freq. - Horizontal frequency. The displayed value is a calculated value. The actual horizontal frequency is determined according to the following formula.
     fh=30kHz + (h freq. × 200Hz) minimum convertible range 200Hz.
  c. ck - Check flags, when displayed as 0 that number's data is effective. When displayed as 1 this data is unoperational even if information on other adjustments is available. (When the user resets modes ck become 1s in the user system.
  d. sync - Following sync configurations are used:

SYNC	HD	VD
4	−	−
8	+	−
16	−	+
32	+	+
*16	SYNC on Green	

− : Negative ⊓⊔
+ : Positive ⊔⊓

* No distinction can be made between HD and VD.

SYNC

7. Disk read- write routine (F-7), (F-8)

- Use this routine to down load present data to disk for storage or to modify the standard data.

- The standard data is located in file #00. Be careful not write over it.

- When you want to write over the standard data go to the read mode and select file #00.

- Insert the disk is in Drive A. Use a 3.5 floppy formatted to write.

- One set of data uses approximately 700 bytes of memory.

- Files 1/999 can be to store data. #00 hold the standard

8. Signal Generator Control Routine (F-9)

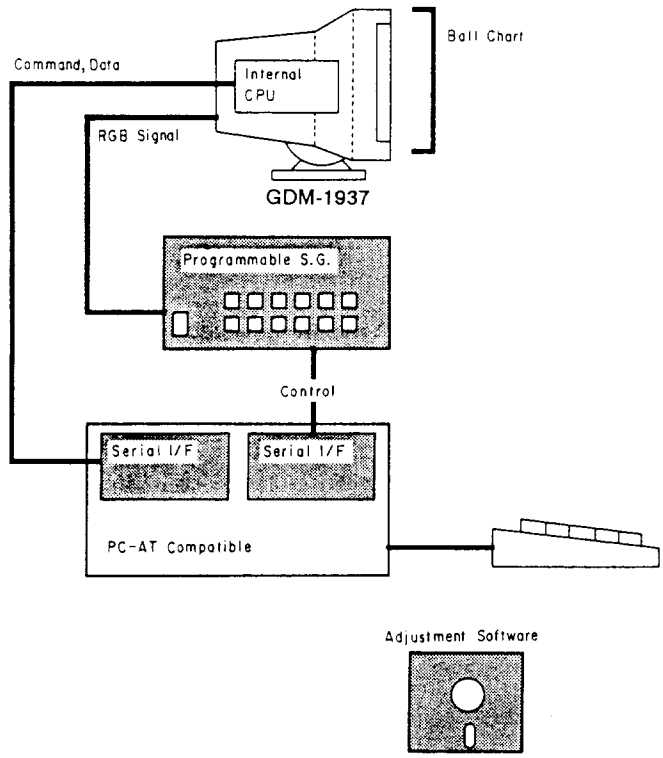
- Use this routine to control the signal generator's timing and patterns.

- The window pattern can not be controlled.

- Special ROM inside the signal generator determines its timings. Be sure to use the ROM labeled 19MS Ver 1.

- During this routine the signal generator does not communicate with the monitors microprocessor.

- If you press the TAB key you can select optional numbers beyond the prepared 1-10.



- Major part of the equipment consist of;
  1. PC-AT compatible ("Host")
  2. Programmable S. G.
  3. Serial I/F for the monitor and the Programmable S. G.
- Almost all of the adjustment will be done through the Host.
- The programmable S. G. also will be controlled by the Host to supply necessary signal to the monitor.
- Judgment should be done by service technician using the alignment gauge.

6-4-4. Summary

This is a program to adjust picture distortion on GDM-1937 using IBM AT.
This program have 8 routines.
1) N-board adjustment
2) Complete distortion adjustment
3) Part distortion adjustment
4) All confirmation
5) Coefficents change
6) New timing set
7) Disk read/wright
8) Signal Generator control

*NOTE 5) & 6) are only for expert.
Don't use for general adjustment.

6-4-5. Hardware & How to Connect

You need following hard wares to adjust picture distortion on GDM-1937.

- IBM AT (or compatible PC)
- Dual Port RS422 Interface Board
  (Model PCL-743, B & C Micro systems Inc)
  *Refer to APPENDIX 1 to set the DIP switches on the interface board
- Communication Cable
  9 pin D-sub → 25 pin D-sub
  9 pin D-sub → 6 pin D-sub
  *Refer to APPENDIX 2 about the pin assignment
- R, G, B, HD, VD Cable

6-5. APPENDIX

Appendix 1

Dual Part RS422 Interface Card (Model PCL-743)

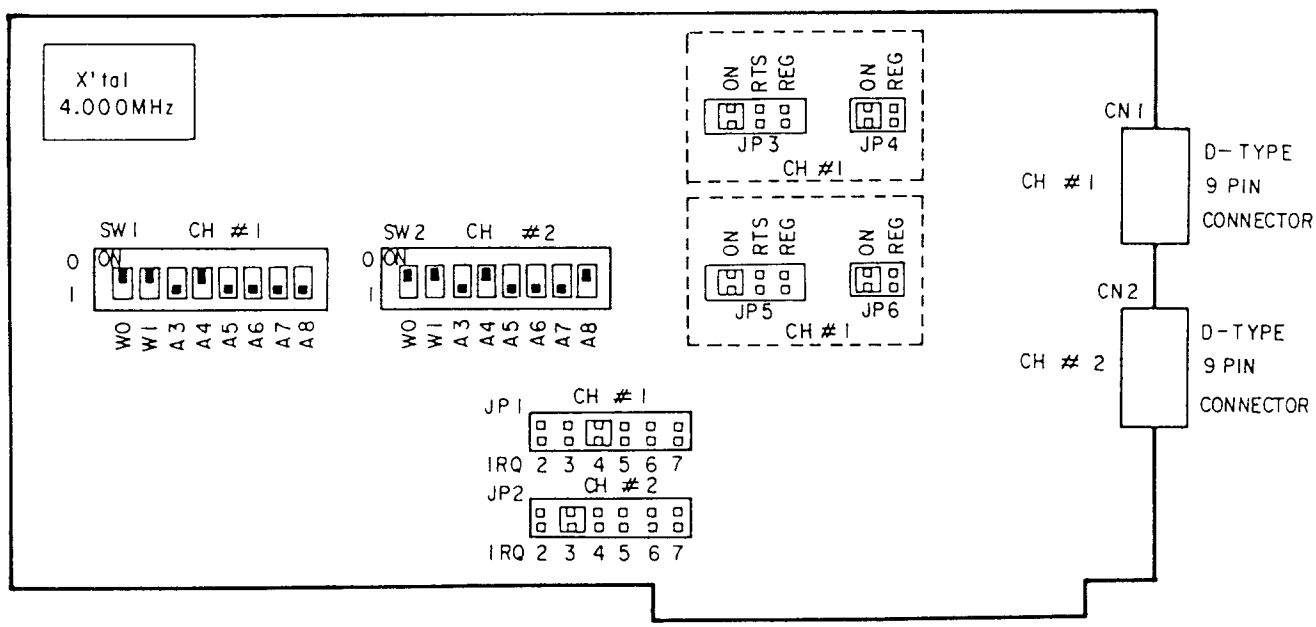


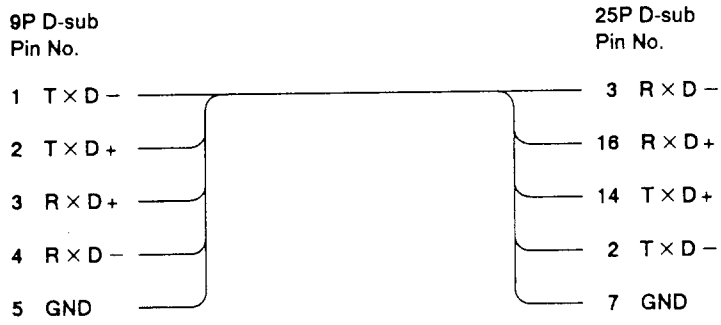
Fig. A1-1 The position of DIP switches and jumpers

- Set DIP switches an jumpers as Fig. A1-1.
- And change the X'tal 7.8432MHz to 4.000MHz
- And install the resistors on the PCL-743. Use the 100 Ω 1/2w resistor. Mount the resistors at RT.
- Then, it will work.

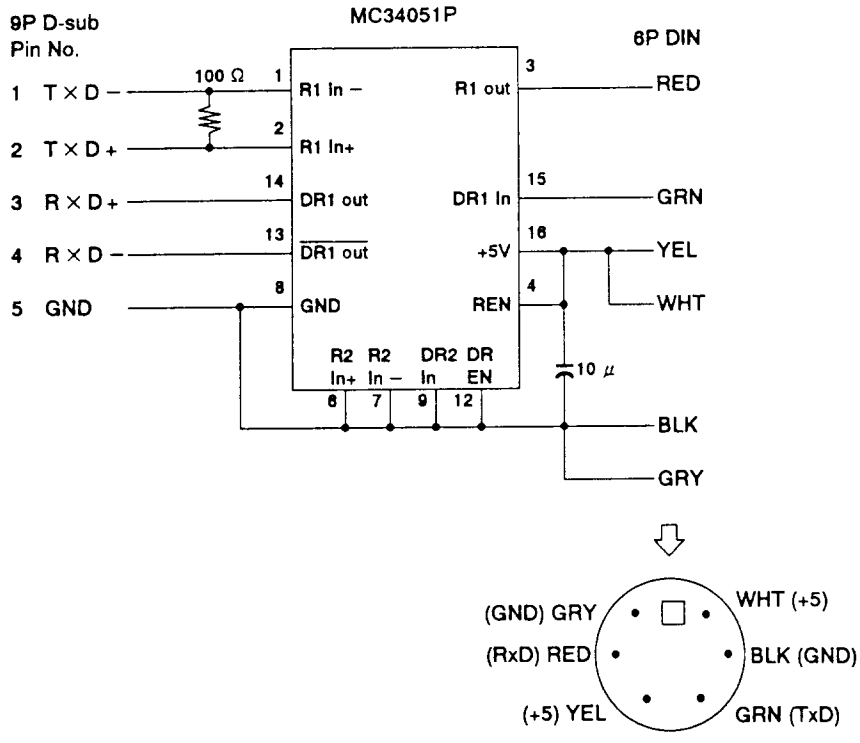
Appendix 2

Interface Cable Pin Assignment

1. 9P D-sub – 25P D-sub Cable



2. 9P D-sub - 6P DIN Cable (include MC34051P)
MC34051P is the dual transceiver.



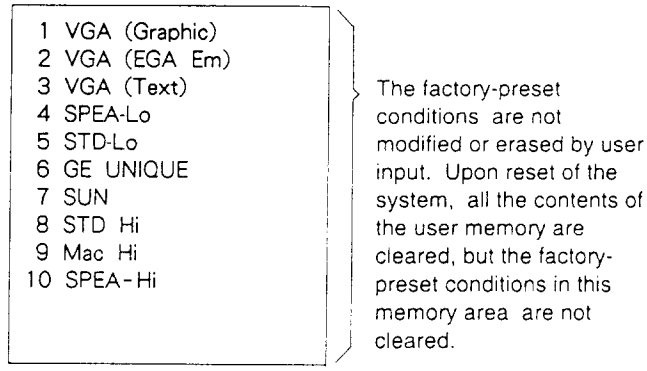
Appendix 3

Sony Display Memory System

The GDM-1937 incorporates the Sony Display Memory System (SDMS) that allows it to discriminate between the types of input signals and to automatically display the optimum picture.
The SDMS has a large-capacity non-volatile memory in which the display conditions for each input signal is stored. When the signal is input, the corresponding display conditions are called back from the memory and the unit is automatically adjusted for the signal.
It also has a video muting function. This function eliminates display distortions that may occur when the input video signal is changed.
Detailed explanation of the SDMS memory and the muting function are given below.

The SDMS memory

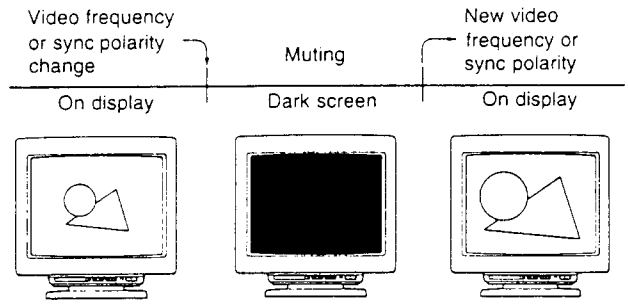
Factory-preset memory
As explained in "Preset Mode" on page 9, optimum display conditions for the 10 preset-type models (see the chart to the right) are stored in the memory area at the factory. No manual adjustment is necessary for these preset-type models.



Sony Display Memory System memory map

The video muting system

If the input video signal changes, the muting circuit senses the change and mutes the screen. This function eliminates scrambled images during the scanning transition.

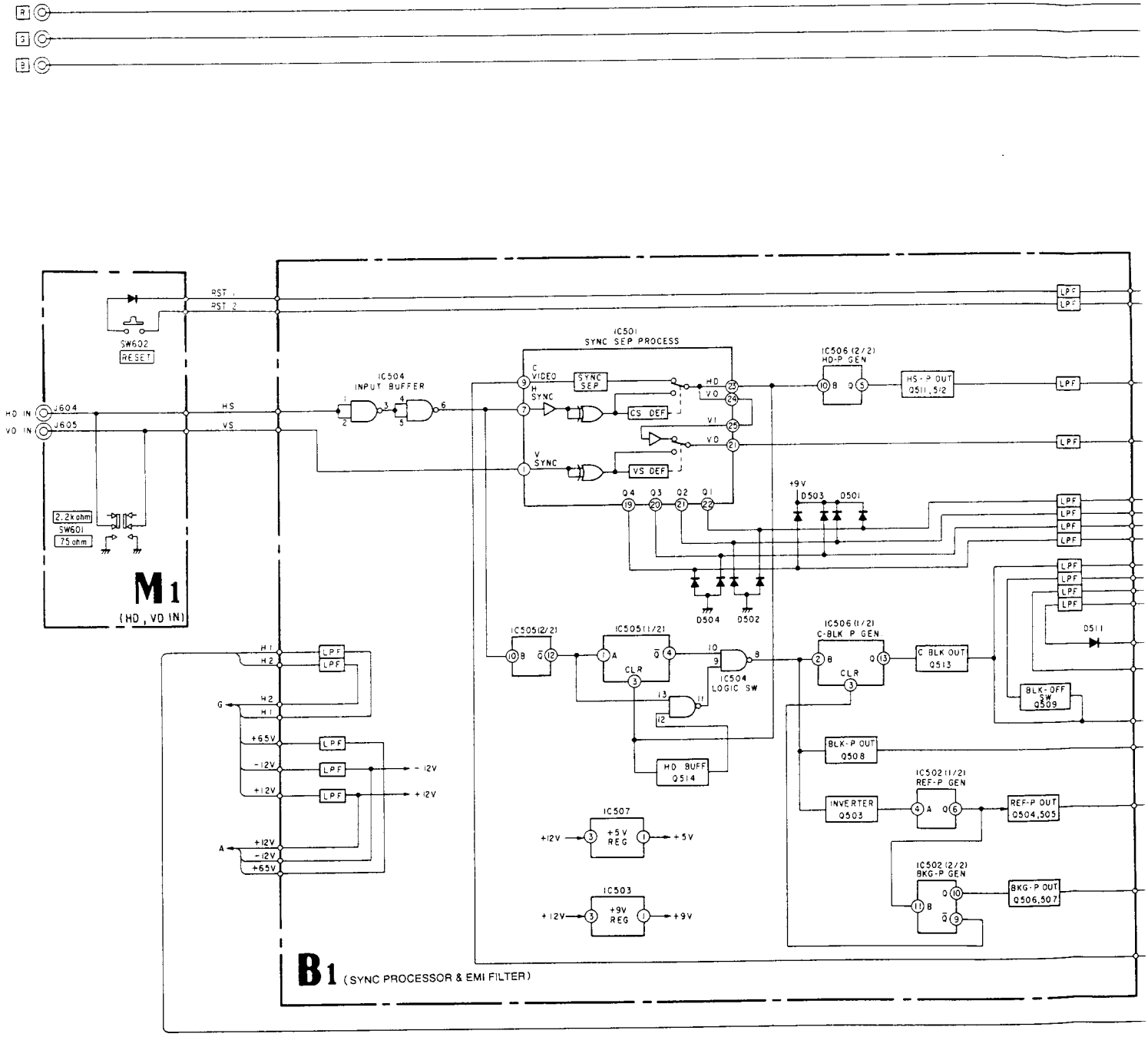


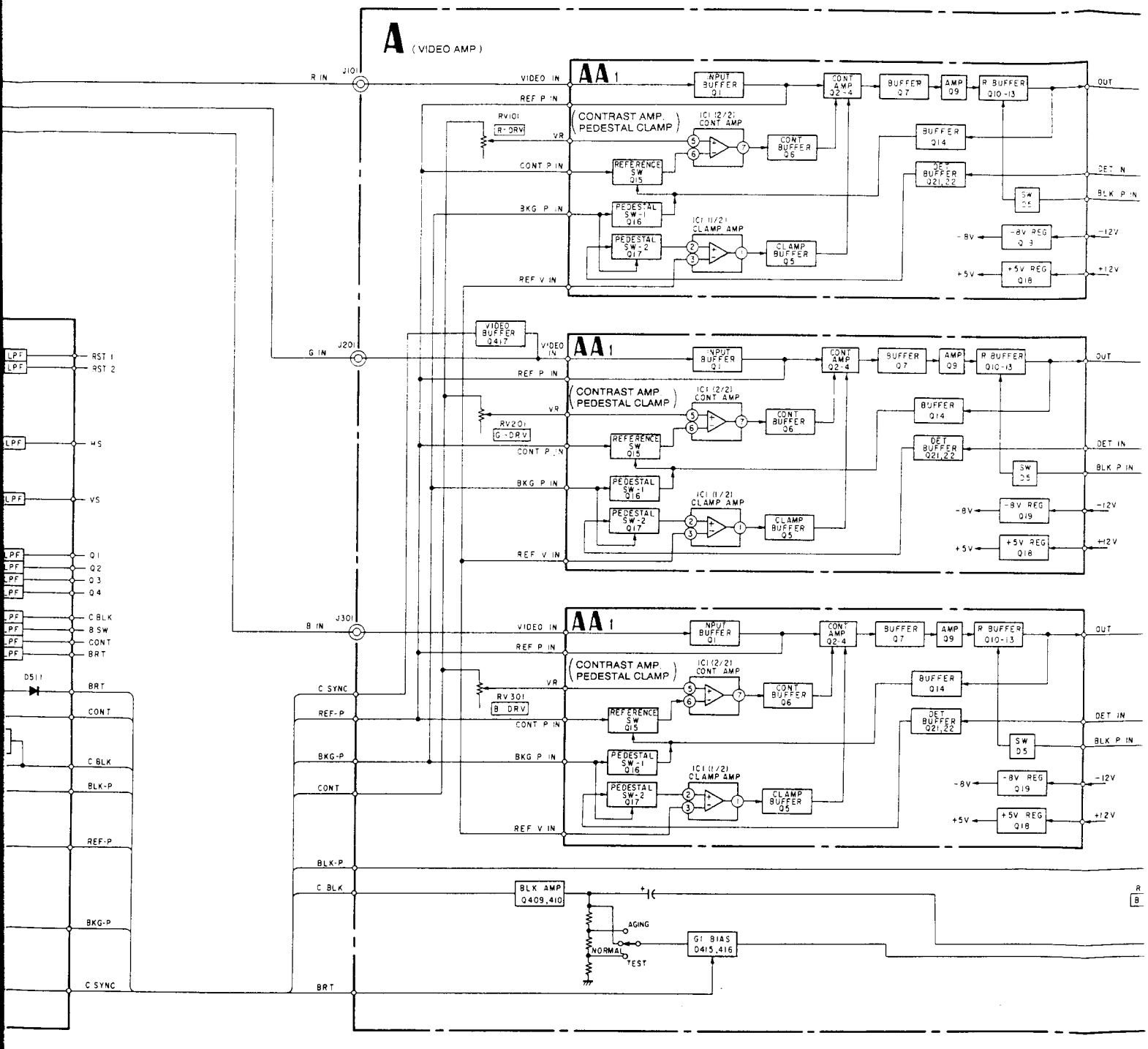
Note

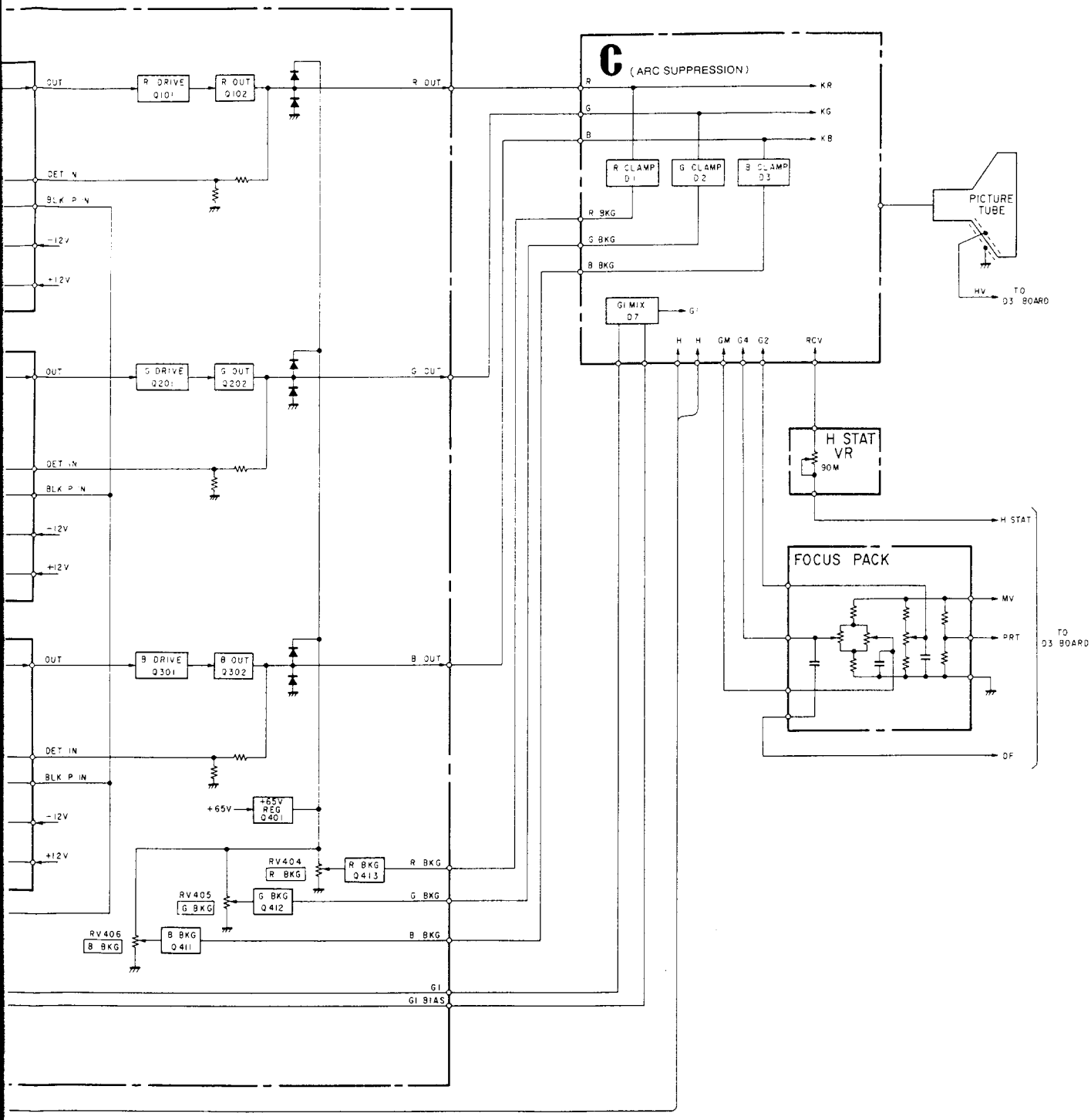
The muting duration differs depending on the time that takes until the newly input signal is stabilized.
It will last a minimum of 1.5 seconds approximately.

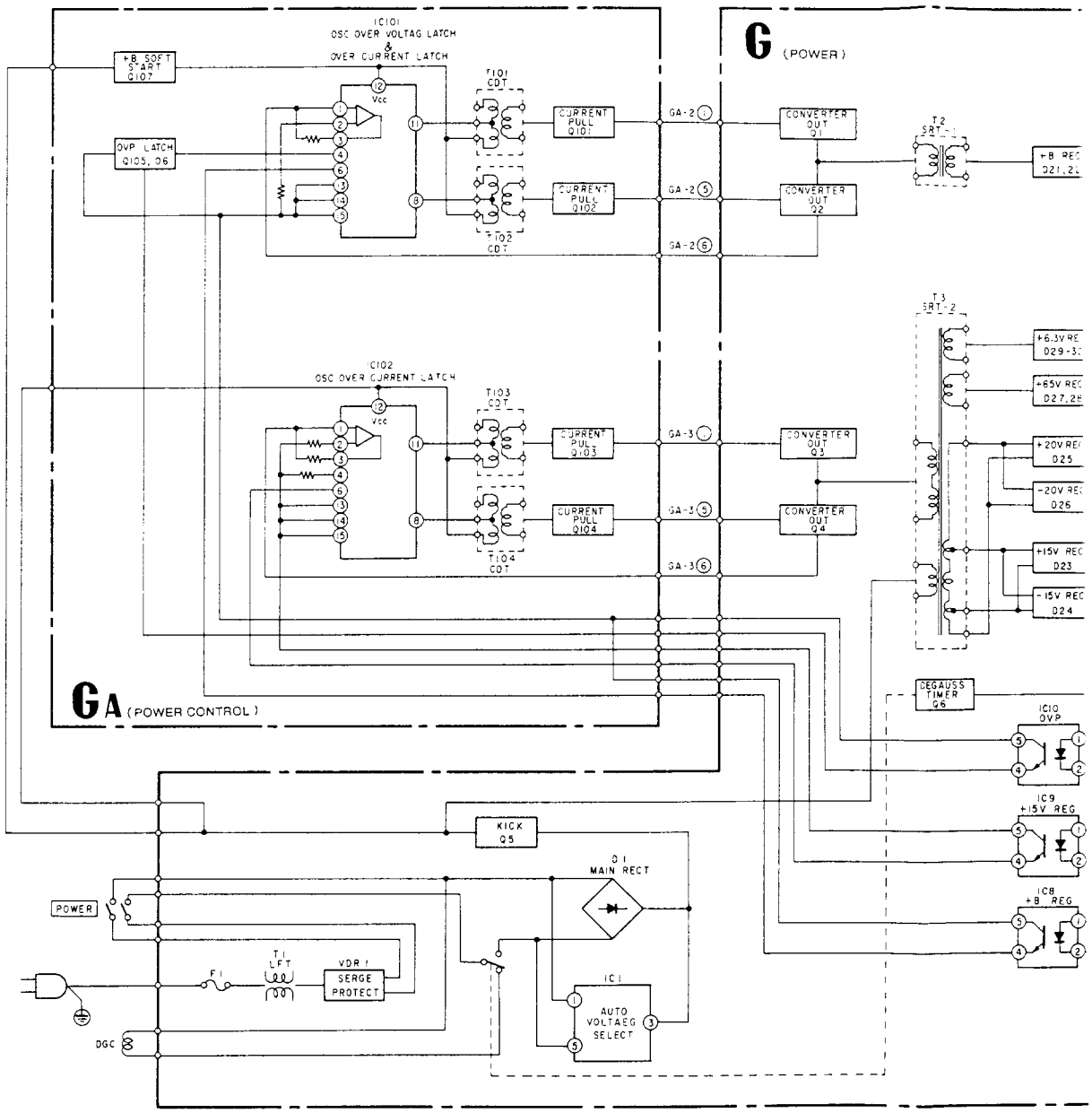
SECTION 7
DIAGRAMS

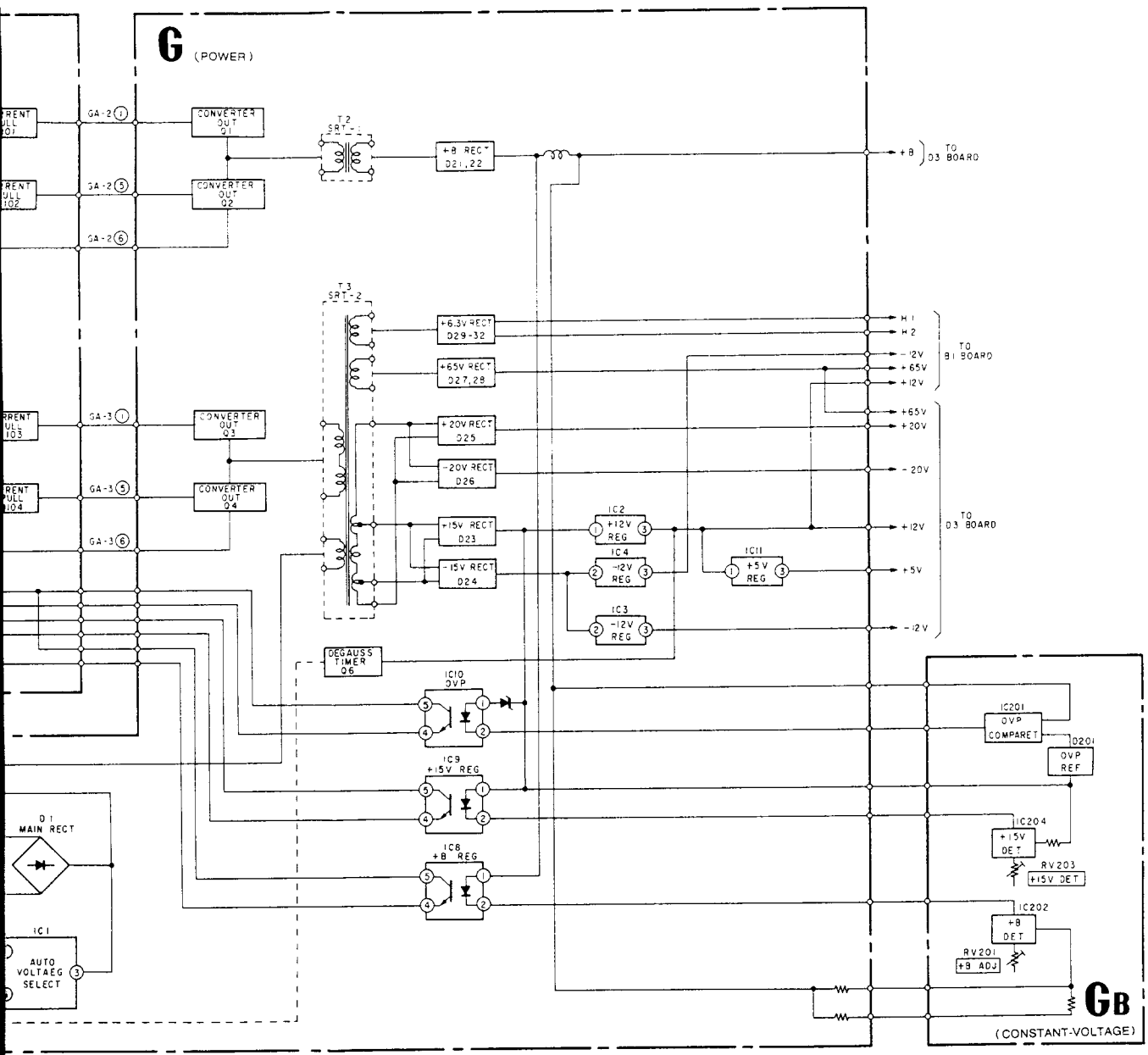
7-1. BLOCK DIAGRAMS

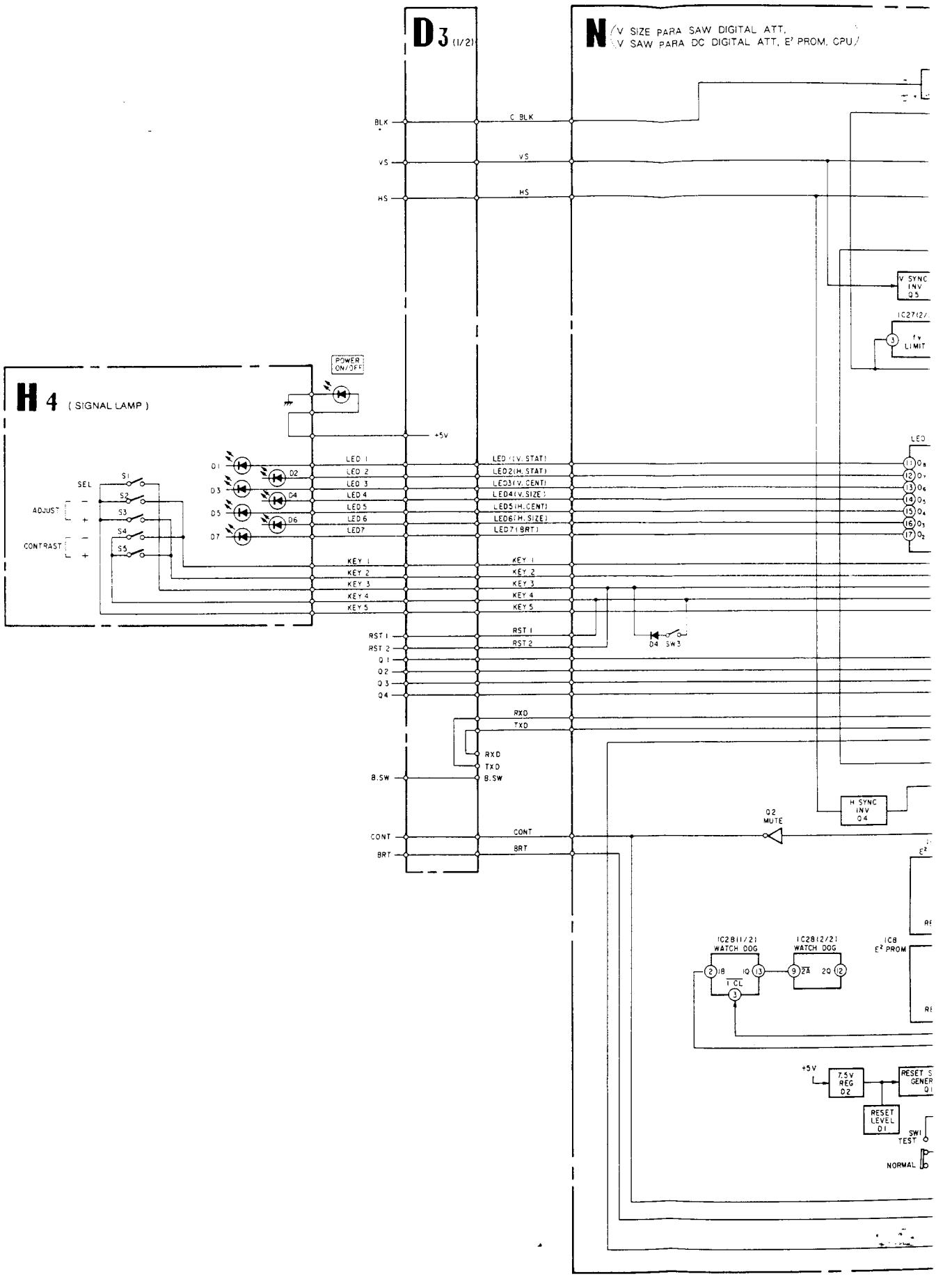


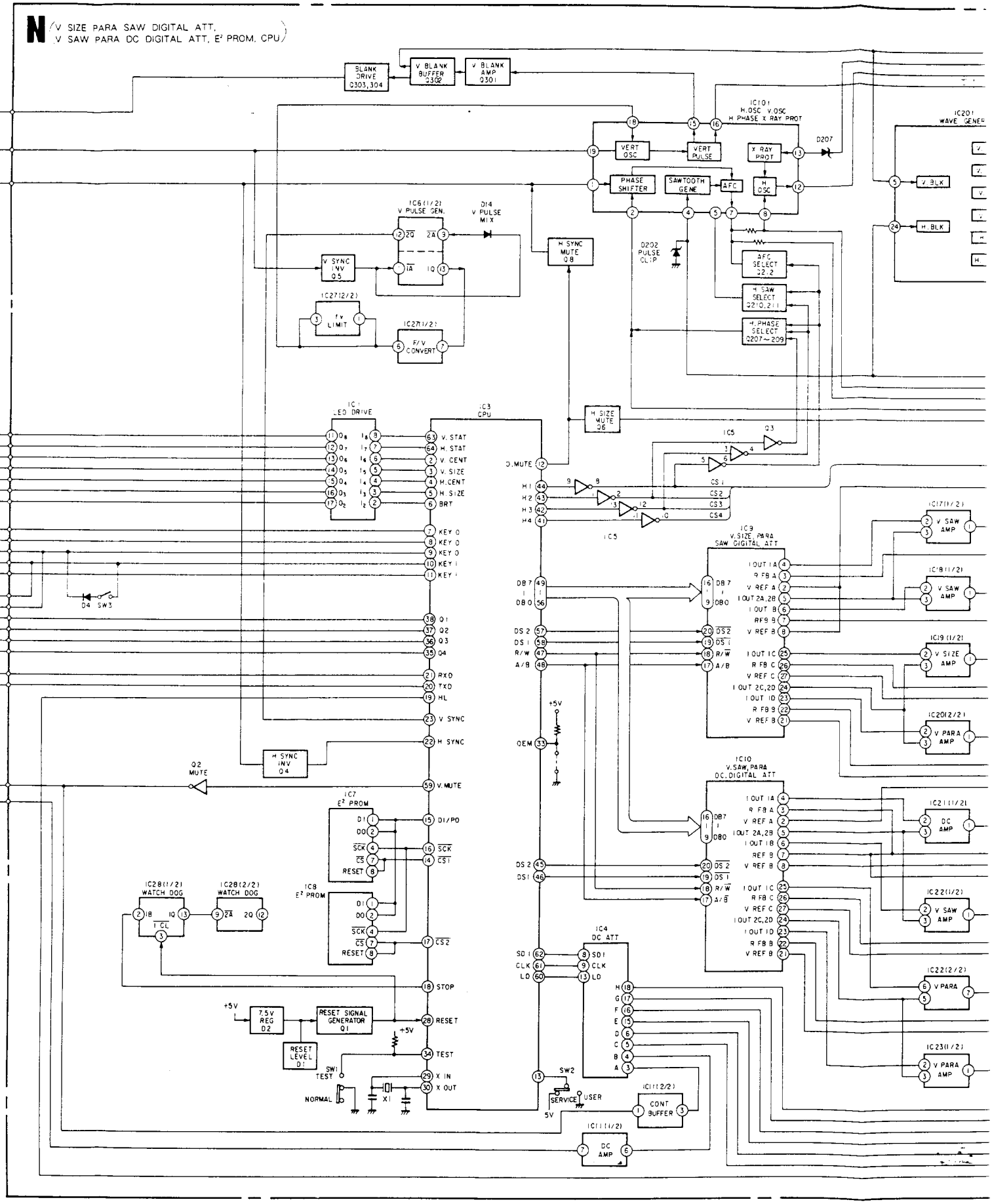

A (VIDEO AMP)
AA1
R IN
J101
G IN
J201
B IN
J301
VIDEO IN
REF P IN
CONTRAST AMP.
PEDESTAL CLAMP
RV101
R-DRV
RV201
G-DRV
RV301
B DRV
VR
CONT P IN
BKG P IN
REF V IN
INPUT BUFFER Q1
CONT AMP Q2-4
BUFFER Q7
AMP Q9
R BUFFER Q10-13
OUT
IC1 (2/2) CONT AMP
CONT BUFFER Q6
REFERENCE SW Q15
PEDESTAL SW-1 Q16
PEDESTAL SW-2 Q17
IC1 (1/2) CLAMP AMP
CLAMP BUFFER Q5
BUFFER Q14
DET BUFFER Q21,22
SW Q5
DET IN
BLK P IN
-8V
-8V REG Q19
+5V
+5V REG Q18
-12V
+12V
VIDEO BUFFER Q417
C SYNC
REF-P
BKG-P
CONT
BLK-P
C BLK
BRT
BLK AMP Q409,410
AGING
NORMAL
TEST
G1 BIAS Q415,416
LPF
RST 1
RST 2
HS
VS
Q1
Q2
Q3
Q4
C BLK
B SW
CONT
BRT
D511

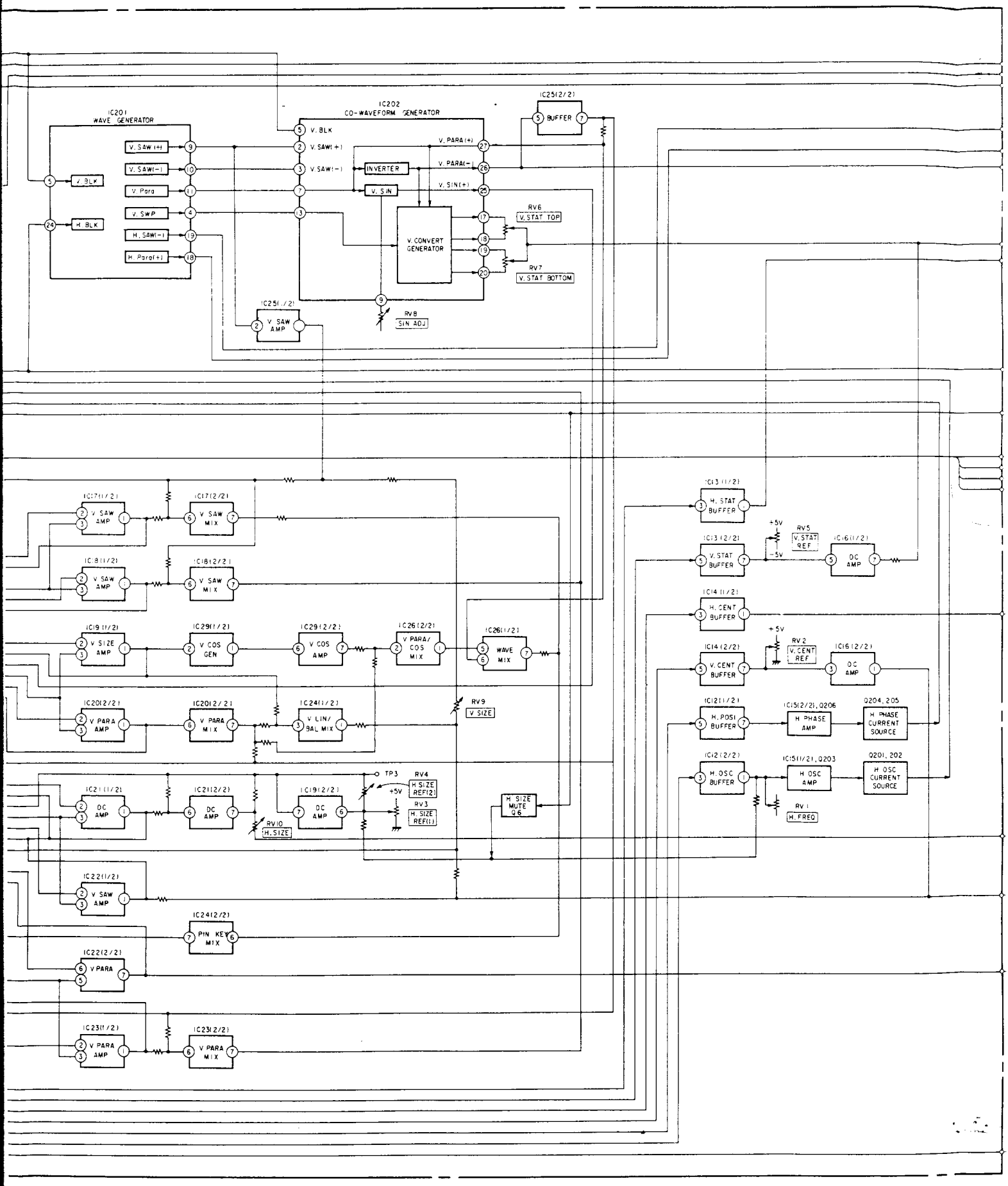

C
(ARC SUPPRESSION)
R
G
B
KR
KG
KB
R CLAMP D1
G CLAMP D2
B CLAMP D3
R BKG
G BKG
B BKG
G1 MIX D7
G1
H
H
GM
G4
G2
RCV
PICTURE TUBE
HV
TO D3 BOARD
H STAT VR 90M
H STAT
FOCUS PACK
MV
PRT
TO D3 BOARD
DF
OUT
R DRIVE Q101
R OUT Q102
R OUT
DET IN
BLK P IN
-12V
+12V
G DRIVE Q201
G OUT Q202
G OUT
B DRIVE Q301
B OUT Q302
B OUT
+65V
+65V REG Q401
RV404 R BKG
R BKG Q413
RV405 G BKG
G BKG Q412
RV406 B BKG
B BKG Q411
G1
G1 BIAS

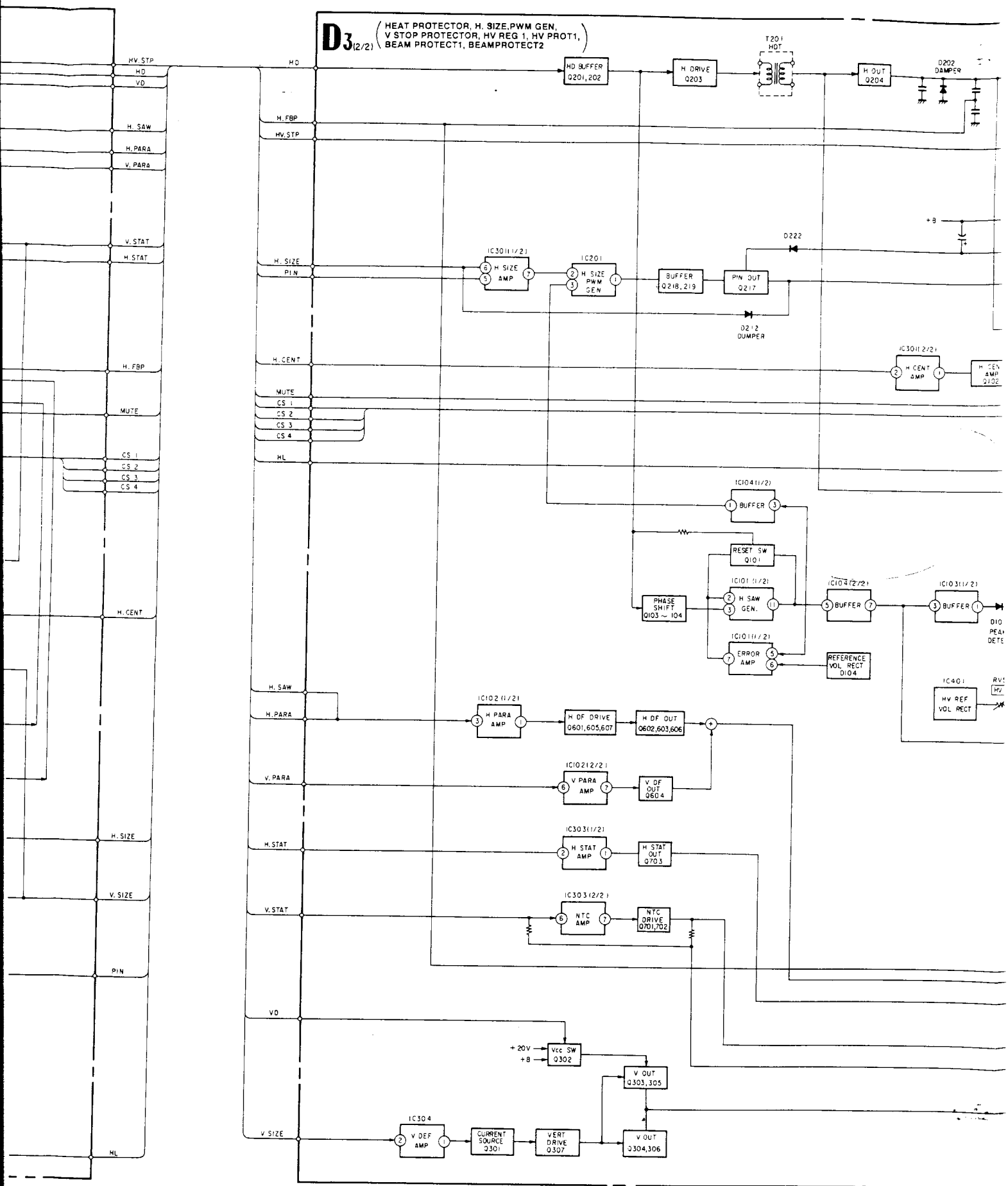

G (POWER)
GA (POWER CONTROL)
IC101
OSC OVER VOLTAG LATCH
&
OVER CURRENT LATCH
+B SOFT START Q107
OVP LATCH Q105, 06
T101 CDT
T102 CDT
CURRENT PULL Q101
CURRENT PULL Q102
GA-2
CONVERTER OUT Q1
CONVERTER OUT Q2
T2 SRT-1
IC102
OSC OVER CURRENT LATCH
T103 CDT
T104 CDT
CURRENT PULL Q103
CURRENT PULL Q104
GA-3
CONVERTER OUT Q3
CONVERTER OUT Q4
T3 SRT-2
+6.3V REC D29-33
+65V REC D27,28
+20V REC D25
-20V REC D26
+15V REC D23
-15V REC D24
DEGAUSS TIMER Q6
IC10 OVP
IC9 +15V REG
IC8 +B REG
KICK Q5
D1 MAIN RECT
POWER
F1
T1 LFT
VDR1 SERGE PROTECT
IC1 AUTO VOLTAEG SELECT
DGC
TO D3 BOARD
TO D3 BOARD

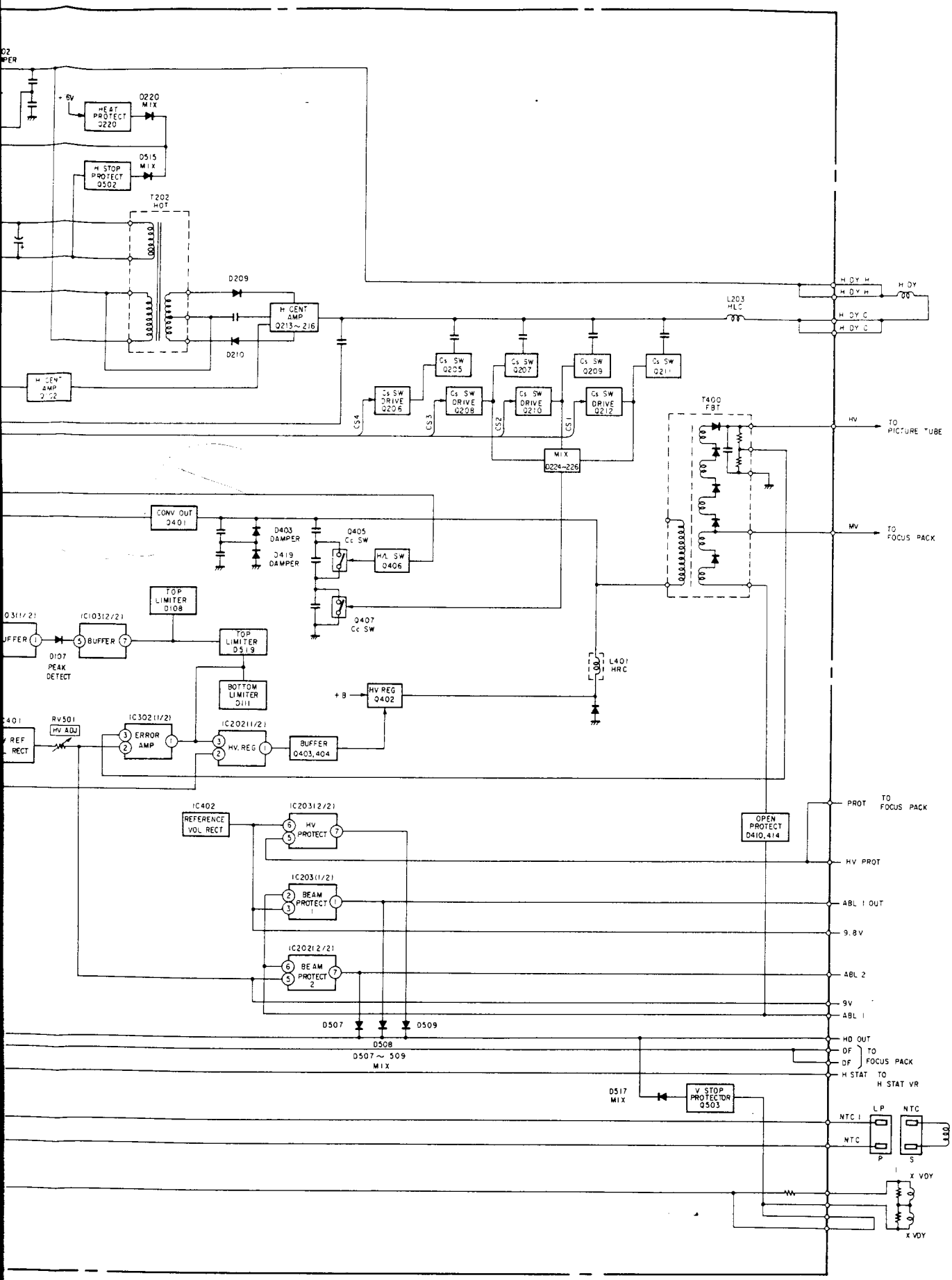

G (POWER)
CONVERTER OUT Q1
CONVERTER OUT Q2
CONVERTER OUT Q3
CONVERTER OUT Q4
T2 SRT-1
T3 SRT-2
+B RECT D21,22
+6.3V RECT D29-32
+65V RECT D27,28
+20V RECT D25
-20V RECT D26
+15V RECT D23
-15V RECT D24
IC2 +12V REG
IC4 -12V REG
IC3 -12V REG
IC11 +5V REG
DEGAUSS TIMER Q6
IC10 OVP
IC9 +15V REG
IC8 +B REG
D1 MAIN RECT
IC1 AUTO VOLTAEG SELECT
TO D3 BOARD
TO B1 BOARD
TO D3 BOARD
IC201 OVP COMPARET
D201 OVP REF
IC204 +15V DET
RV203 +15V DET
IC202 +B DET
RV201 +B ADJ
GB (CONSTANT-VOLTAGE)


D3 (1/2)
N (V SIZE PARA SAW DIGITAL ATT, V SAW PARA DC DIGITAL ATT, E² PROM, CPU)
H 4 (SIGNAL LAMP)
POWER ON/OFF
+5V
SEL
ADJUST
CONTRAST
S1
S2
S3
S4
S5
D1
D2
D3
D4
D5
D6
D7
LED 1
LED 2
LED 3
LED 4
LED 5
LED 6
LED7
LED1(V. STAT)
LED2(H. STAT)
LED3(V. CENT)
LED4(V. SIZE)
LED5(H. CENT)
LED6(H. SIZE)
LED7(BRT)
KEY 1
KEY 2
KEY 3
KEY 4
KEY 5
RST 1
RST 2
Q1
Q2
Q3
Q4
RXD
TXD
B.SW
CONT
BRT
C BLK
VS
HS
SW3
Q2 MUTE
V SYNC INV Q5
H SYNC INV Q4
IC2811/21 WATCH DOG
IC2812/21 WATCH DOG
IC8 E² PROM
7.5V REG D2
RESET LEVEL D1
SW1 TEST
NORMAL

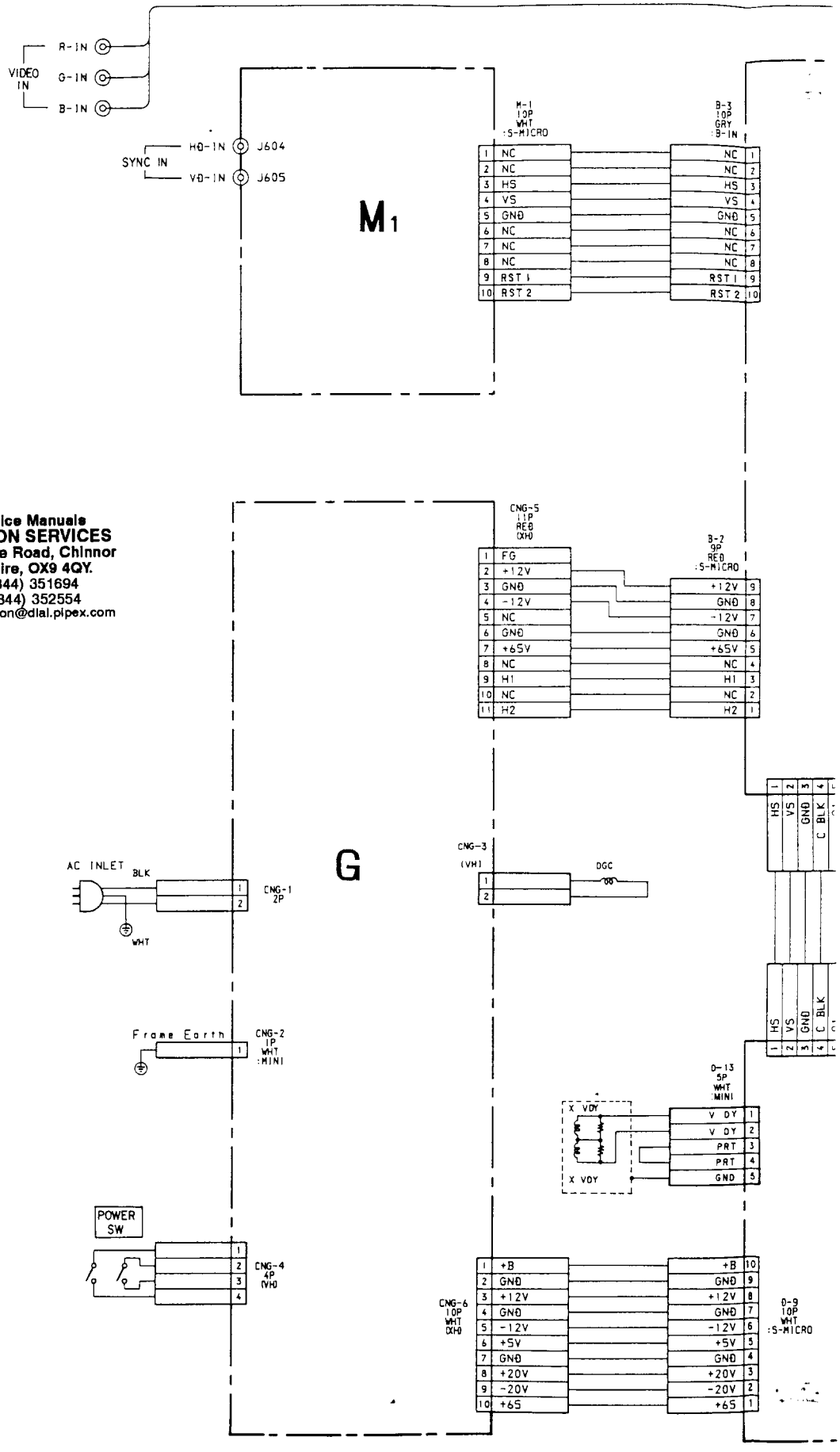

N (V SIZE PARA SAW DIGITAL ATT, V SAW PARA DC DIGITAL ATT, E² PROM, CPU)
BLANK DRIVE Q303, 304
V BLANK BUFFER Q302
V BLANK AMP Q301
IC101 H.OSC V.OSC H PHASE X RAY PROT
IC201 WAVE GENER
VERT OSC
VERT PULSE
X RAY PROT
D207
PHASE SHIFTER
SAWTOOTH GENE
AFC
H OSC
V.BLK
H.BLK
IC6(1/2) V PULSE GEN.
D14 V PULSE MIX
V SYNC INV Q5
H SYNC MUTE Q8
D202 PULSE CLIP
AFC SELECT Q2,2
H SAW SELECT Q210,211
H.PHASE SELECT Q207~209
IC27(2/2) f/v LIMIT
IC27(1/2) F/V CONVERT
IC1 LED DRIVE
IC3 CPU
H SIZE MUTE Q6
IC5
Q3
V.STAT
H.STAT
V.CENT
V.SIZE
H.CENT
H.SIZE
BRT
KEY 0
KEY 0
KEY 0
KEY 1
KEY 1
D4 SW3
Q1
Q2
Q3
Q4
RXD
TXD
HL
V SYNC
H SYNC
H SYNC INV Q4
Q2 MUTE
V.MUTE
IC9 V.SIZE PARA SAW DIGITAL ATT
IC17(1/2) V SAW AMP
IC18(1/2) V SAW AMP
IC19(1/2) V SIZE AMP
IC20(2/2) V PARA AMP
IC10 V.SAW PARA DC DIGITAL ATT
IC21(1/2) DC AMP
IC22(1/2) V SAW AMP
IC22(2/2) V PARA
IC23(1/2) V PARA AMP
IC7 E² PROM
IC8 E² PROM
IC28(1/2) WATCH DOG
IC28(2/2) WATCH DOG
IC4 DC ATT
IC11(2/2) CONT BUFFER
IC11(1/2) DC AMP
+5V
7.5V REG D2
RESET SIGNAL GENERATOR Q1
RESET LEVEL D1
SW1 TEST
SW2
SERVICE
USER
NORMAL
X1
STOP
RESET
TEST
X IN
X OUT

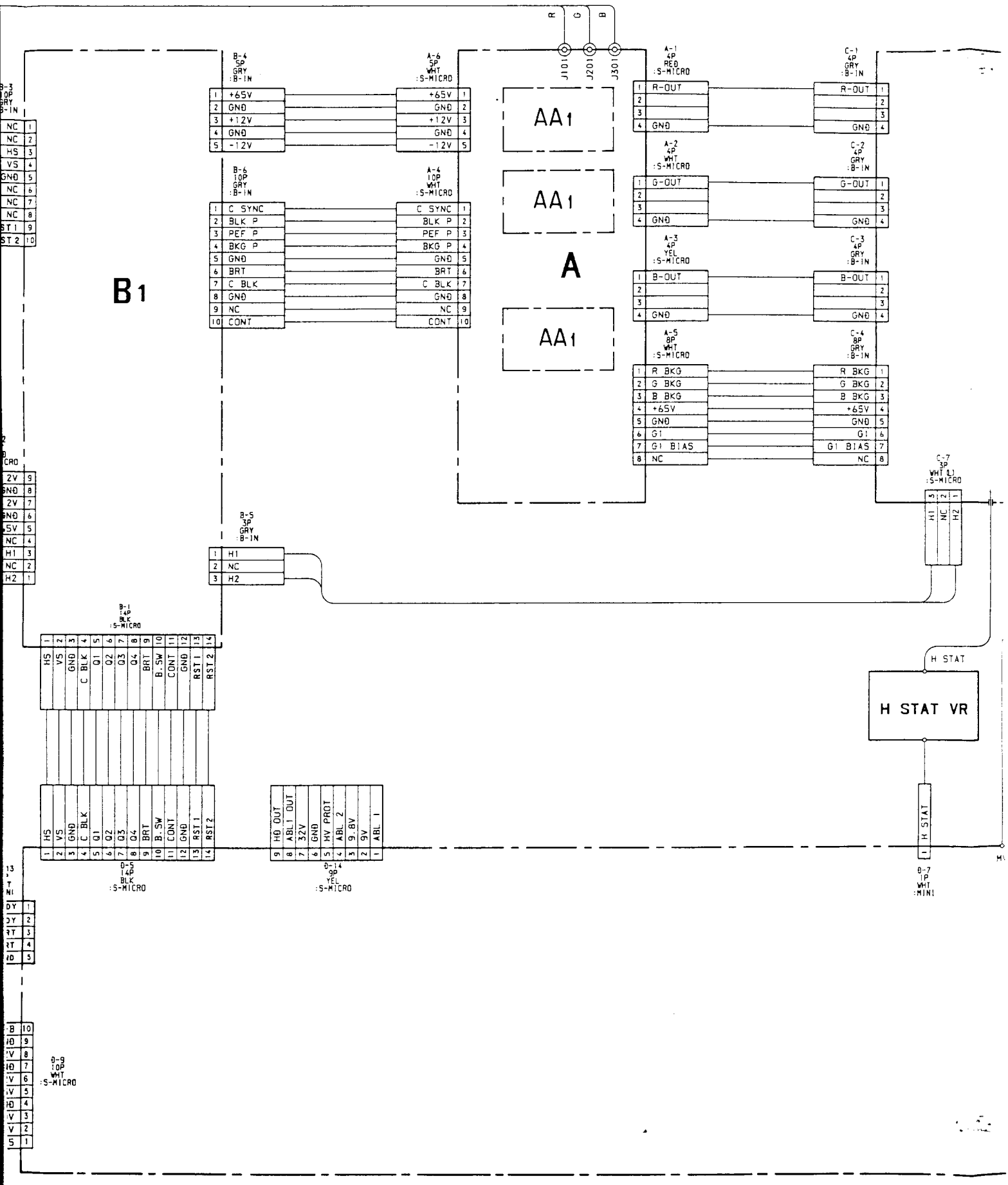

IC201
WAVE GENERATOR
V. BLK
H. BLK
V. SAW(+)
V. SAW(−)
V. Para
V. SWP
H. SAW(−)
H. Para(+)
IC202
CO-WAVEFORM GENERATOR
V. BLK
V. SAW(+)
V. SAW(−)
INVERTER
V. PARA(+)
V. PARA(−)
V. SIN(+)
V. SIN
V. CONVERT GENERATOR
IC25(2/2)
BUFFER
RV6
V. STAT TOP
RV7
V. STAT BOTTOM
IC25(1/2)
V. SAW AMP
RV8
SIN ADJ
IC17(1/2)
V. SAW AMP
IC17(2/2)
V. SAW MIX
IC18(1/2)
V. SAW AMP
IC18(2/2)
V. SAW MIX
IC19(1/2)
V. SIZE AMP
IC29(1/2)
V. COS GEN
IC29(2/2)
V. COS AMP
IC26(2/2)
V. PARA/ COS MIX
IC26(1/2)
WAVE MIX
IC20(2/2)
V. PARA AMP
IC20(2/2)
V. PARA MIX
IC24(1/2)
V. LIN/ BAL MIX
RV9
V. SIZE
IC21(1/2)
DC AMP
IC21(2/2)
DC AMP
IC19(2/2)
DC AMP
TP3
RV4
H. SIZE REF(2)
+5V
RV3
H. SIZE REF(1)
RV10
H. SIZE
H. SIZE MUTE Q6
IC22(1/2)
V. SAW AMP
IC24(2/2)
PIN KEY MIX
IC22(2/2)
V. PARA
IC23(1/2)
V. PARA AMP
IC23(2/2)
V. PARA MIX
IC13(1/2)
H. STAT BUFFER
IC13(2/2)
V. STAT BUFFER
+5V
RV5
V. STAT REF
−5V
IC16(1/2)
DC AMP
IC14(1/2)
H. CENT BUFFER
+5V
RV2
V. CENT REF
IC14(2/2)
V. CENT BUFFER
IC16(2/2)
DC AMP
IC12(1/2)
H. POSI BUFFER
IC15(2/2), Q206
H. PHASE AMP
Q204, 205
H. PHASE CURRENT SOURCE
IC12(2/2)
H. OSC BUFFER
IC15(1/2), Q203
H. OSC AMP
Q201, 202
H. OSC CURRENT SOURCE
RV1
H. FREQ

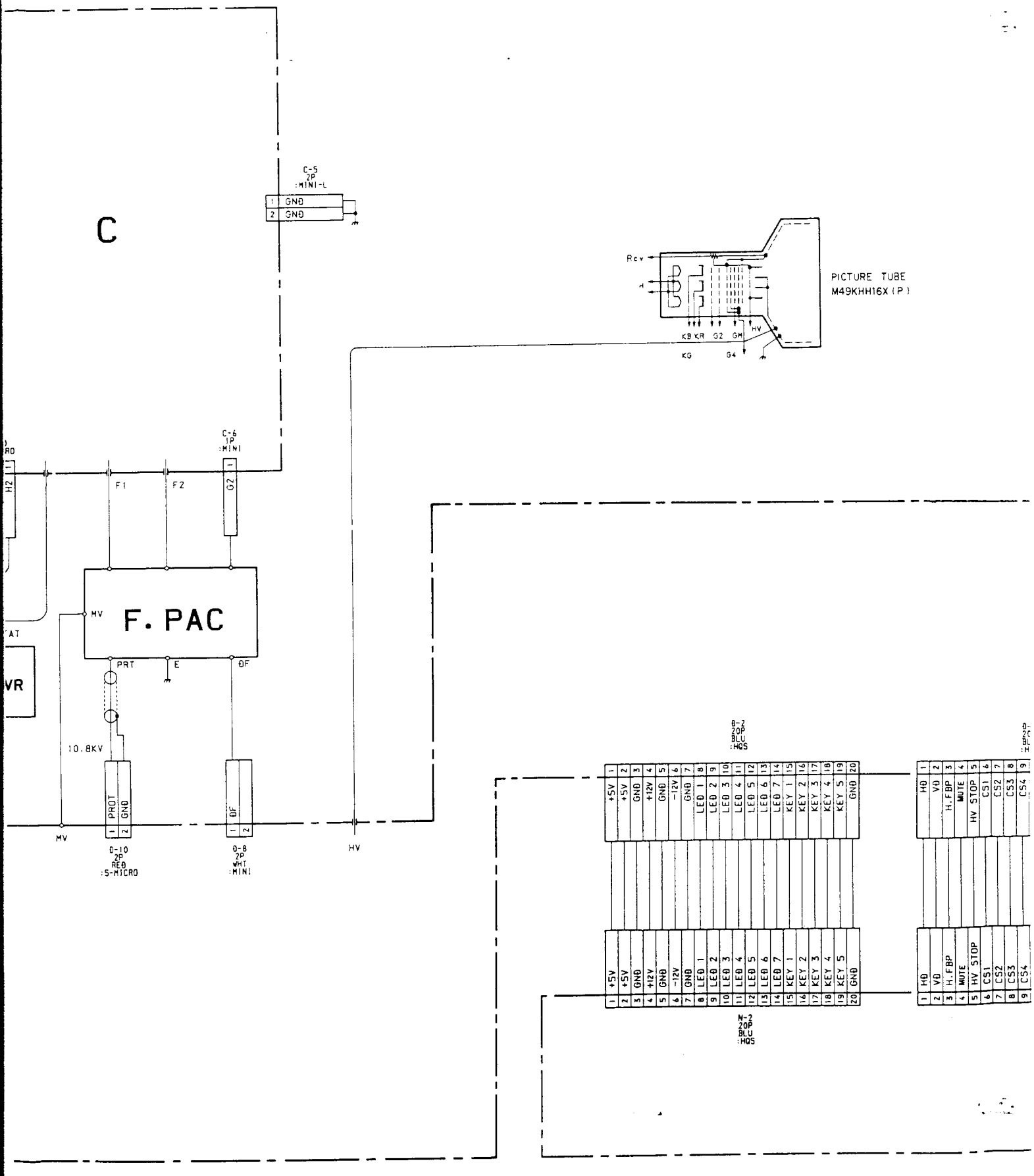

D3 (2/2) HEAT PROTECTOR, H. SIZE,PWM GEN, V STOP PROTECTOR, HV REG 1, HV PROT1, BEAM PROTECT1, BEAMPROTECT2
HV.STP
HD
VD
H. SAW
H.PARA
V. PARA
V.STAT
H.STAT
H. FBP
MUTE
CS 1
CS 2
CS 3
CS 4
H.CENT
H.SIZE
V.SIZE
PIN
HL
HD
H.FBP
HV.STP
H.SIZE
PIN
H.CENT
MUTE
CS 1
CS 2
CS 3
CS 4
HL
H. SAW
H.PARA
V. PARA
H.STAT
V.STAT
VD
V.SIZE
HD BUFFER Q201,202
H. DRIVE Q203
T201 HOT
H. OUT Q204
D202 DAMPER
+B
D222
IC301(1/2) H SIZE AMP
IC201 H. SIZE PWM GEN
BUFFER Q218,219
PIN OUT Q217
D212 DUMPER
IC301(2/2) H CENT AMP
IC104(1/2) BUFFER
RESET SW Q101
PHASE SHIFT Q103 ~ 104
IC101(1/2) H SAW GEN.
IC104(2/2) BUFFER
IC103(1/2) BUFFER
IC101(1/2) ERROR AMP
REFERENCE VOL. RECT D104
IC401 HV REF VOL RECT
IC102(1/2) H PARA AMP
H DF DRIVE Q601,605,607
H DF OUT Q602,603,606
IC102(2/2) V PARA AMP
V. DF OUT Q604
IC303(1/2) H STAT AMP
H. STAT OUT Q703
IC303(2/2) NTC AMP
NTC DRIVE Q701,702
+20V
+8
Vcc SW Q302
V. OUT Q303,305
IC304 V DEF AMP
CURRENT SOURCE Q301
V.DEF DRIVE Q307
V OUT Q304,306

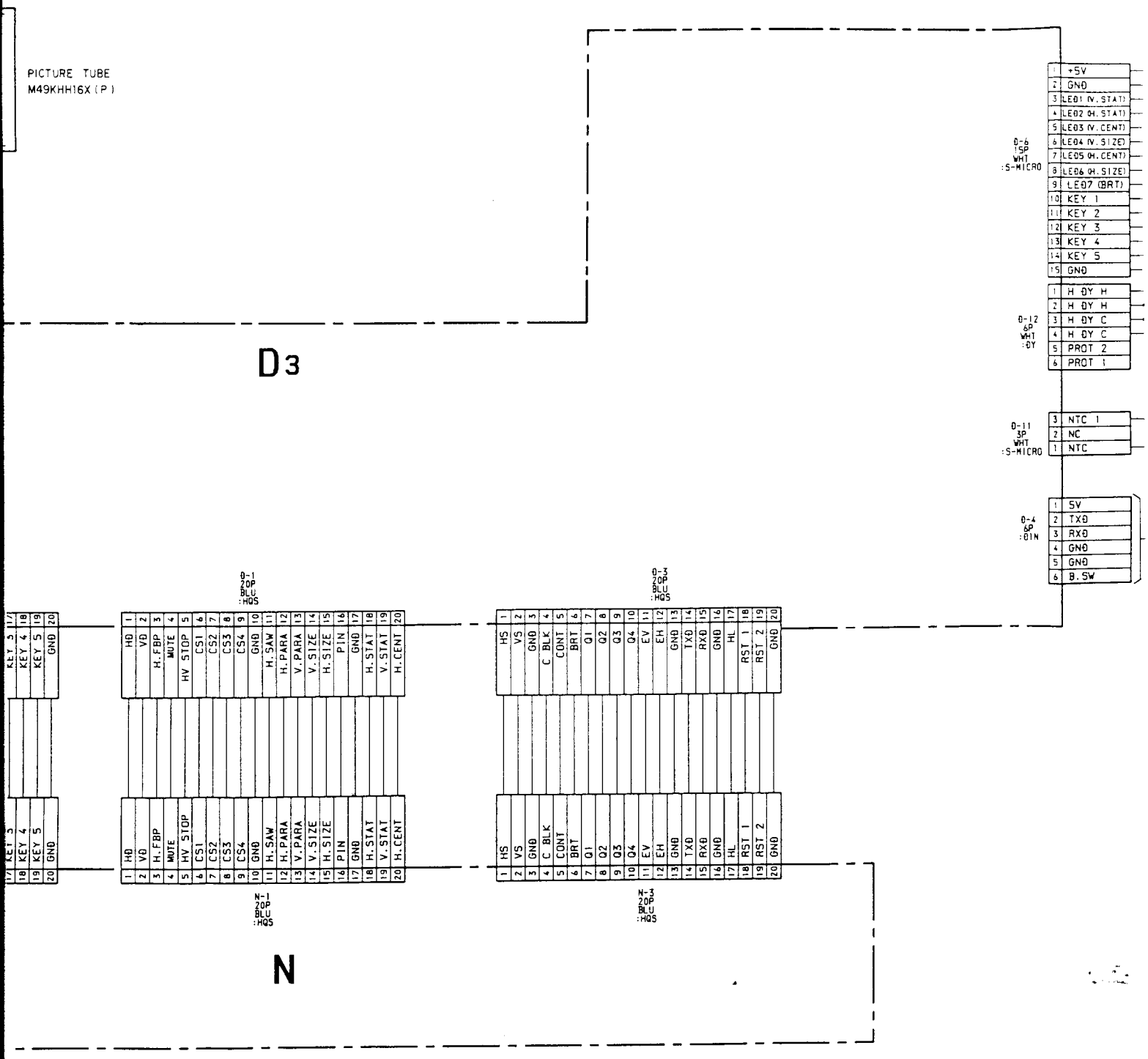

+ 6V
HEAT PROTECT Q220
Q220 MIX
H STOP PROTECT Q502
D515 MIX
T202 HOT
D209
D210
H CENT AMP Q213~216
H CENT AMP Q212
H.DY H
H.DY H
H.DY
H.DY C
H.DY C
L203 HLC
Cs SW Q205
Cs SW Q207
Cs SW Q209
Cs SW Q211
Cs SW DRIVE Q206
Cs SW DRIVE Q208
Cs SW DRIVE Q210
Cs SW DRIVE Q212
CS4
CS3
CS2
CS1
MIX Q224~226
T400 FBT
HV
TO PICTURE TUBE
MV
TO FOCUS PACK
CONV OUT Q401
D403 DAMPER
D419 DAMPER
Q405 Cc SW
HA. SW Q406
Q407 Cc SW
TOP LIMITER D108
IC1031(1/2)
IC10312(2/2)
BUFFER
D107 PEAK DETECT
TOP LIMITER D519
BOTTOM LIMITER D111
L401 HRC
+B
HV REG Q402
RV501 HV ADJ
IC3021(1/2)
ERROR AMP
IC20211(2/2)
HV. REG
BUFFER Q403,404
IC402
REFERENCE VOL RECT
IC20312(2/2)
HV PROTECT
OPEN PROTECT D410,414
PROT
TO FOCUS PACK
HV PROT
IC2031(1/2)
BEAM PROTECT 1
ABL 1 OUT
9.8V
IC20212(2/2)
BEAM PROTECT 2
ABL 2
9V
ABL 1
D507
D508
D509
D507~509 MIX
HD OUT
DF
DF
TO FOCUS PACK
H STAT
TO H STAT VR
D517 MIX
V STOP PROTECTOR Q503
NTC 1
NTC
LP
NTC
P
S
X VDY
X VDY

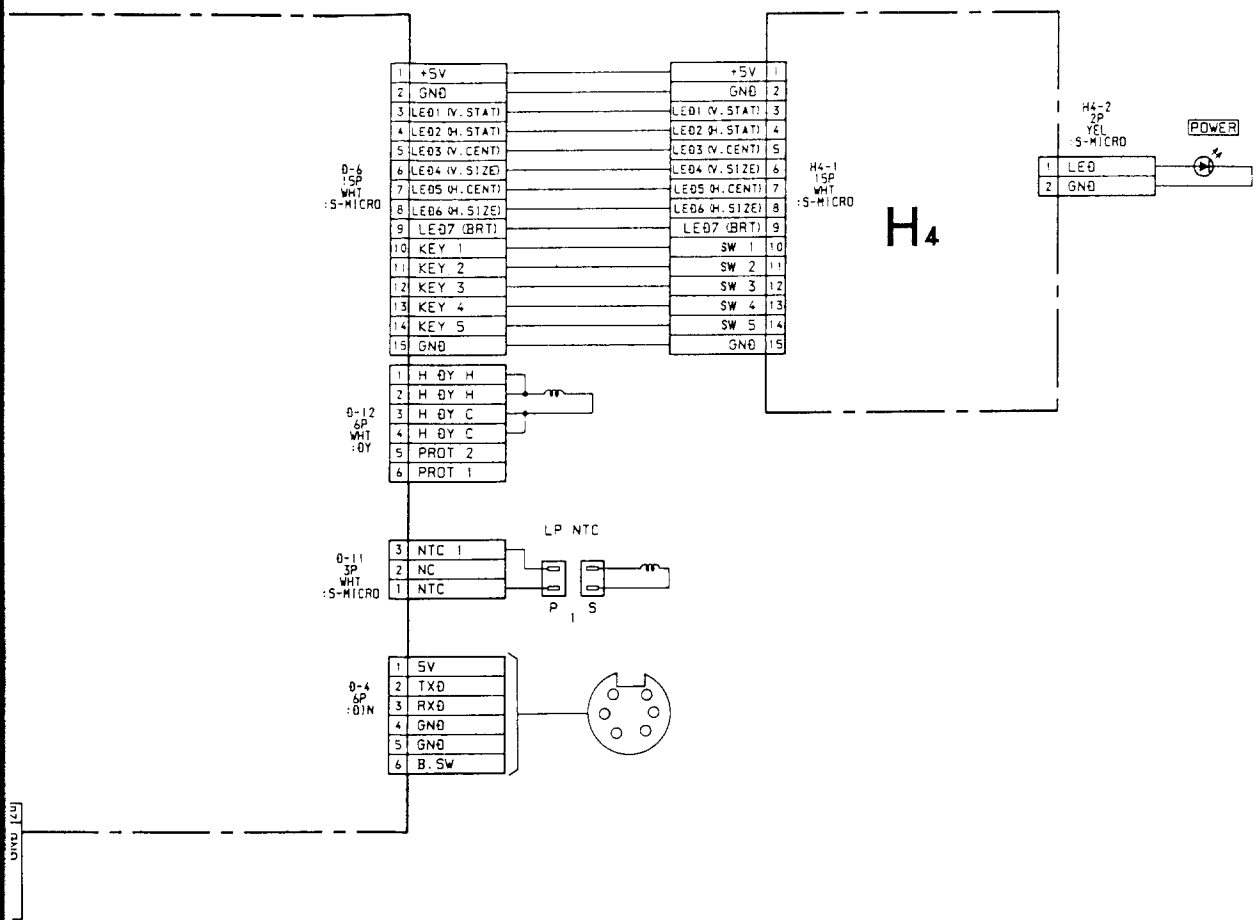
7-2. FRAME SCHEMATIC DIAGRAM



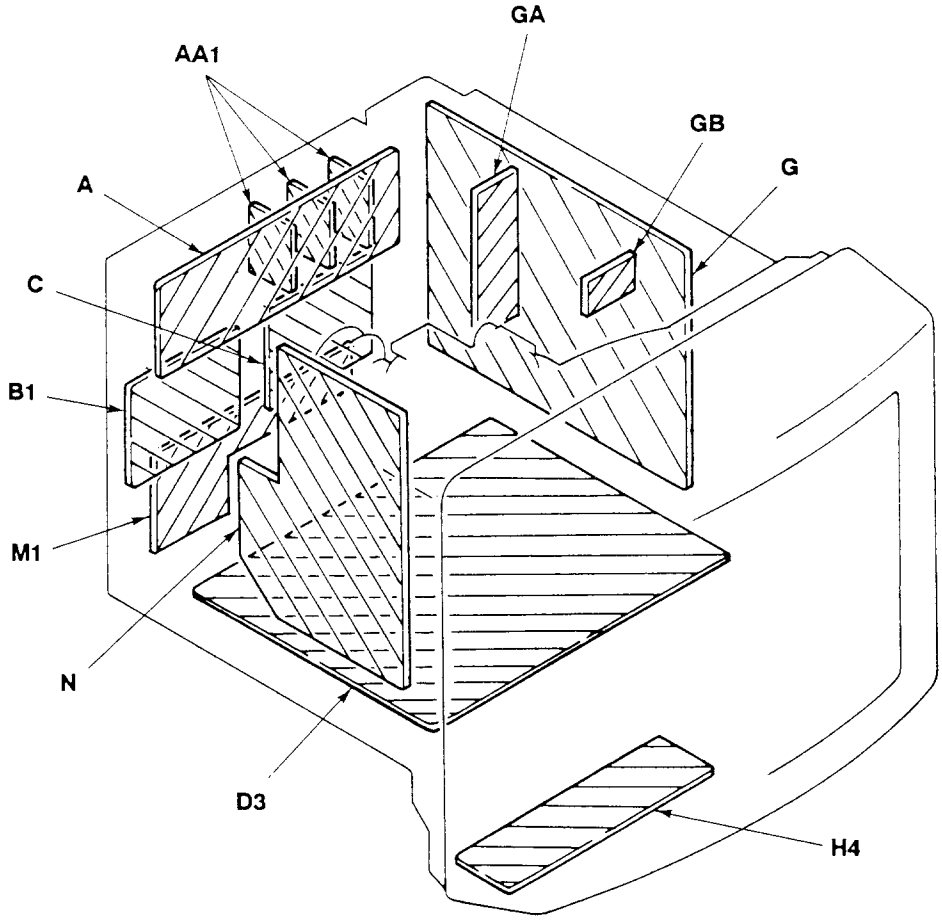

B1
A
AA1
AA1
AA1
R
G
B
J101
J201
J301
B-4 5P GRY :B-IN
A-6 5P WHT :S-MICRO
+65V
GND
+12V
GND
-12V
B-6 10P GRY :B-IN
A-4 10P WHT :S-MICRO
C SYNC
BLK P
PEF P
BKG P
GND
BRT
C BLK
GND
NC
CONT
A-1 4P RED :S-MICRO
A-2 4P WHT :S-MICRO
A-3 4P YEL :S-MICRO
A-5 8P WHT :S-MICRO
R-OUT
G-OUT
B-OUT
GND
R BKG
G BKG
B BKG
+65V
GND
G1
G1 BIAS
NC
C-1 4P GRY :B-IN
C-2 4P GRY :B-IN
C-3 4P GRY :B-IN
C-4 8P GRY :B-IN
C-7 3P WHT (L) :S-MICRO
H1
NC
H2
B-5 3P GRY :B-IN
B-1 14P BLK :S-MICRO
H STAT
H STAT VR
D-5 14P BLK :S-MICRO
D-14 9P YEL :S-MICRO
D-7 1P WHT :MINI
D-9 10P WHT :S-MICRO


C
C-5
2P
:MINI-L
1 GND
2 GND
Rcv
PICTURE TUBE
M49KHH16X (P)
KB KR G2 GM HV
KG G4
C-6
1P
:MINI
F1
F2
G2
F. PAC
HV
PRT
E
DF
10.8KV
PROT
GND
DF
MV
HV
0-10
2P
RED
:S-MICRO
0-8
2P
WHT
:MINI
0-2
20P
BLU
:HQS
+5V
+5V
GND
+12V
GND
-12V
GND
LED 1
LED 2
LED 3
LED 4
LED 5
LED 6
LED 7
KEY 1
KEY 2
KEY 3
KEY 4
KEY 5
GND
HD
VD
H.FBP
MUTE
HV STOP
CS1
CS2
CS3
CS4
N-2
20P
BLU
:HQS


PICTURE TUBE
M49KHH16X (P)
D3
+5V
GND
LED1 (V. STAT)
LED2 (H. STAT)
LED3 (V. CENT)
LED4 (V. SIZE)
LED5 (H. CENT)
LED6 (H. SIZE)
LED7 (BRT)
KEY 1
KEY 2
KEY 3
KEY 4
KEY 5
GND
H OY H
H OY H
H OY C
H OY C
PROT 2
PROT 1
NTC 1
NC
NTC
5V
TXD
RXD
GND
GND
B.SW
N
HD
VD
H.FBP
MUTE
HV STOP
CS1
CS2
CS3
CS4
GND
H.SAW
H.PARA
V.PARA
V.SIZE
H.SIZE
PIN
GND
H.STAT
V.STAT
H.CENT
HS
VS
GND
C BLK
CONT
BRT
Q1
Q2
Q3
Q4
EV
EH
GND
TXD
RXD
GND
HL
RST 1
RST 2
GND


D-6
15P
WHT
:S-MICRO
1 +5V
2 GND
3 LED1 (V.STAT)
4 LED2 (H.STAT)
5 LED3 (V.CENT)
6 LED4 (V.SIZE)
7 LED5 (H.CENT)
8 LED6 (H.SIZE)
9 LED7 (BRT)
10 KEY 1
11 KEY 2
12 KEY 3
13 KEY 4
14 KEY 5
15 GND
H4-1
15P
WHT
:S-MICRO
+5V 1
GND 2
LED1 (V.STAT) 3
LED2 (H.STAT) 4
LED3 (V.CENT) 5
LED4 (V.SIZE) 6
LED5 (H.CENT) 7
LED6 (H.SIZE) 8
LED7 (BRT) 9
SW 1 10
SW 2 11
SW 3 12
SW 4 13
SW 5 14
GND 15
H4
H4-2
2P
YEL
:S-MICRO
1 LED
2 GND
POWER
D-12
6P
WHT
:DY
1 H DY H
2 H DY H
3 H DY C
4 H DY C
5 PROT 2
6 PROT 1
D-11
3P
WHT
:S-MICRO
3 NTC 1
2 NC
1 NTC
LP NTC
P
S
D-4
6P
:DIN
1 5V
2 TXD
3 RXD
4 GND
5 GND
6 B.SW

7-3. CIRCUIT BOARDS LOCATION



7-4. SCEMATIC DIAGRAMS ANC

Note:

- All capacitors are in μF unless otherwise note
  50 WV or less are not indicated except for electro
- Indication of resistance, which does not have
  electrical power, is as follows.

  Pitch: 5 mm
  Rating electrical power ¼ W
- All resistors are in ohms.
- : nonflammable resistor.
- : fusible resistor.
- △ : internal component.
- : panel designation, and adjustment for
- All variable and adjustable resistors have chara
  B, unless otherwise noted.
- The components identified by ⊠ in this ba
  diagram have been carefully factory-selected fo
  order to satisfy regulations regarding X-ray radiat
  Should replacement be required, replace only
  originally used.
- When replacing components identified by ◪
  necessary adjustments indicated. If results do
  specified value, change the component identifi
  repeat the adjustment until the specified value
  (Refer to IC401, IC402, R508 and R509 on page
  5.)
  - When replacing the part in below table, be sure
    related adjustment.

Replaceble parts(◪)	Check point	Po ad
(1)IC401 R502,R504	TP401 3.100 – 32.50V TP505 adj 9.00 ± 0.05V	
(2)RV501,R505	TP505 MAX<9.45V TP505 MAX is adjusted t TP505 adj 9.00 ± 0.05V	
(3)IC402,R502, R503,R508 R509,R510	TP402 9.70 – 10.10V TP502	

  - All voltages are in V.
  - Readings are taken with a 10M Ω digital multim
  - Readings are taken with a color-bar signal inpu
  - Voltage variations may be noted due to no
    tolerance.
  - : B+bus.
  - : B+bus.

7-4. SCEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics.
- Indication of resistance, which does not have one for rating electrical power, is as follows.

Pitch: 5 mm Rating electrical power ¼ W

- All resistors are in ohms.
- : nonflammable resistor.
- : fusible resistor.
- △ : internal component.
- : panel designation, and adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- The components identified by ⊠ in this basic schematic diagram have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by ◪ , make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by ⊠ and repeat the adjustment until the specified value is achieved. (Refer to IC401, IC402, R506 and R509 on pages 87 of section 5.)
  - When replacing the part in below table, be sure to perform the related adjustment.

Replaceble parts(◪)	Check point	Point to be adjusted(⊠)
(1)IC401 R502,R504	TP401 3.100 ~ 32.50V	⊠ IC401
	TP505 adj 9.00 ± 0.05V	RV501
(2)RV501,R505	TP505 MAX<9.45V	⊠ R506
	TP505 MAX is adjusted by RV501	
	TP505 adj 9.00 ± 0.05V	RV501
(3)IC402,R502, R503,R508 R509,R510	TP402 9.70 ~ 10.10V TP502	⊠ R509 ⊠ IC402

  - All voltages are in V.
  - Readings are taken with a 10M Ω digital multimeter.
  - Readings are taken with a color-bar signal input.
  - Voltage variations may be noted due to normal production tolerance.
  - : B+bus.
  - : B+bus.

Reference information

RESISTOR	: RN	METAL FILM
	: RC	SOLID
	: FPRD	NONFLAMMABLE CARBON
	: FUSE	NONFLAMMABLE FUSIBLE
	: RW	NONFLAMMABLE WIREWOUND
	: RS	NONFLAMMABLE METAL OXIDE
	: RB	NONFLAMMABLE CEMENT
COIL	: LF-8L	MICRO INDUCTOR
CAPACITOR	: TA	TANTALUM
	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE
	: ALB	BIPOLAR
	: ALT	HIGH TEMPERATURE
	: ALR	HIGH RIPPLE

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une trame et par une marque ⚠ sont d'une importance critique pour la sécurité. Ne les remplacer que par des pièces de numéro spécifié.

A BOARD L

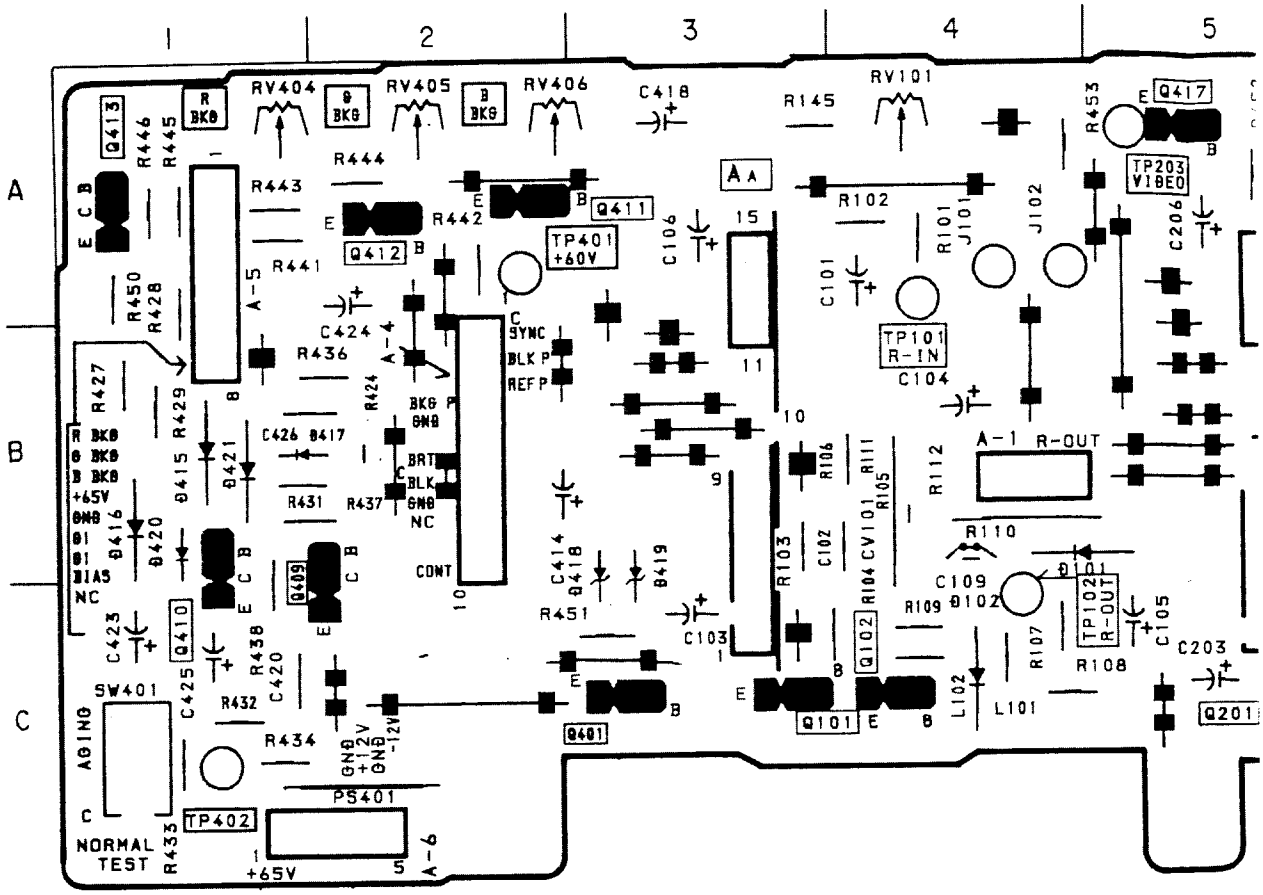
TRANS
Q101
Q102
C201
Q202
Q301
Q302
Q401
Q409
Q410
Q411
Q412
Q413
Q417

DIO
D101
D102
D201
D202
D301
D302
D415
D416
D417
D418
D419
D420
D421

VARIA RESIS
RV101
RV201
RV301
RV404
RV405
RV406

A [VIDEO AMP]

– A BOARD –



A BOARD LOCATION

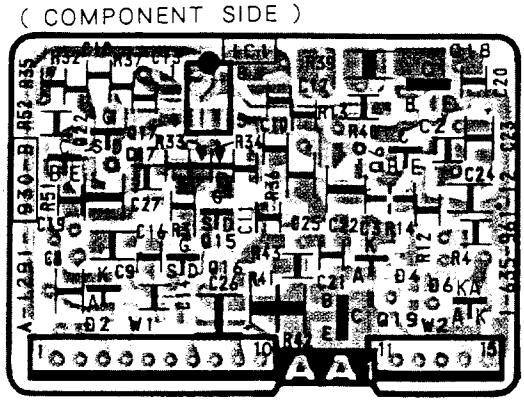
TRANSISTOR	
Q101	C-3
Q102	C-4
C201	C-5
Q202	C-6
Q301	C-7
Q302	C-8
Q401	C-3
Q409	C-2
Q410	B-1
Q411	A-2
Q412	A-2
Q413	A-1
Q417	A-5

DIODE	
D101	B-5
D102	C-4
D201	B-7
D202	C-6
D301	B-9
D302	C-8
D415	B-1
D416	B-1
D417	B-1
D418	B-3
D419	B-3
D420	B-1
D421	B-1

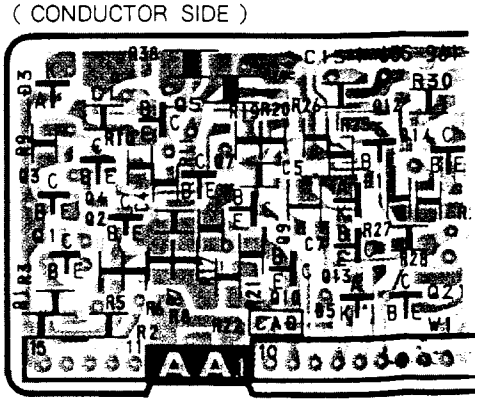
VARIABLE RESISTOR	
RV101	A-4
RV201	A-6
RV301	A-8
RV404	A-1
RV405	A-2
RV406	A-2

– AA1 BOARD –

(COMPONENT SIDE)

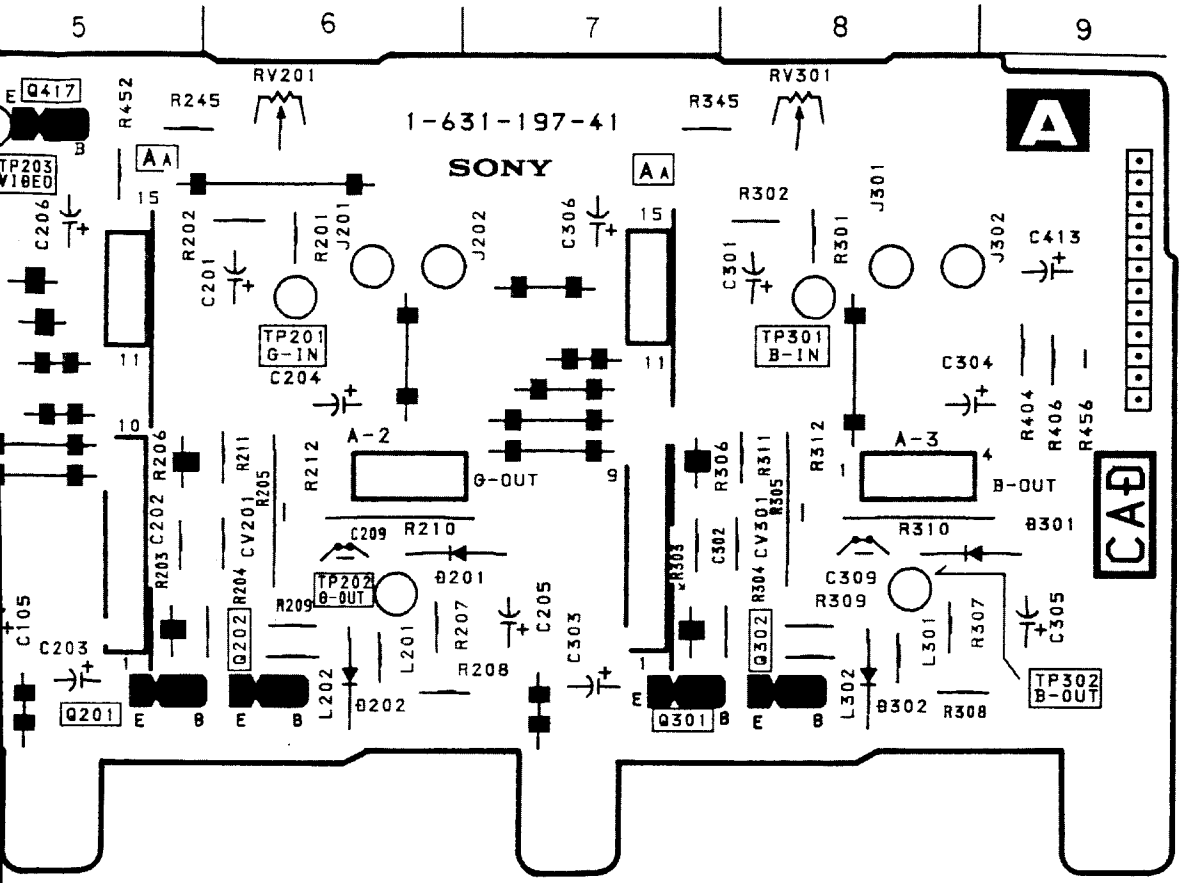


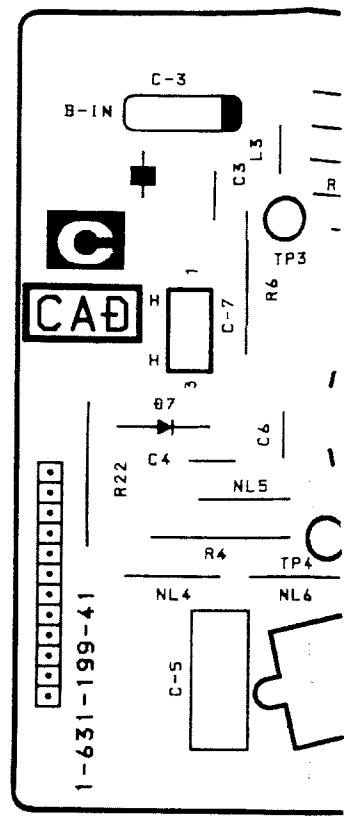
(CONDUCTOR SIDE)

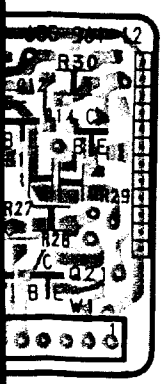


AA1

[CONTRAST AMP. PEDESTAL CLAMP]

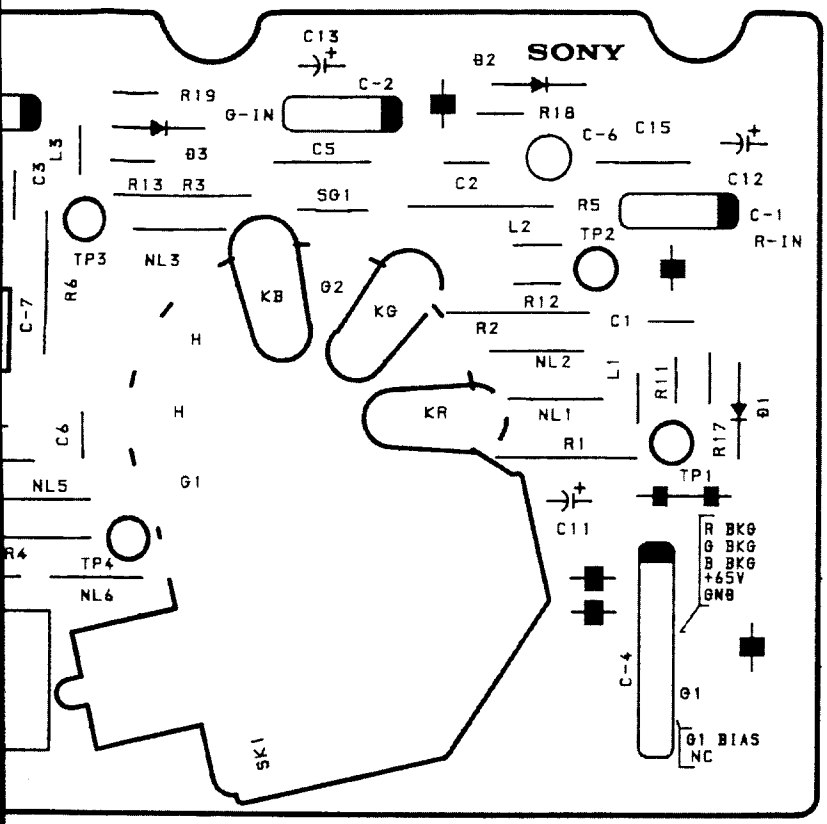






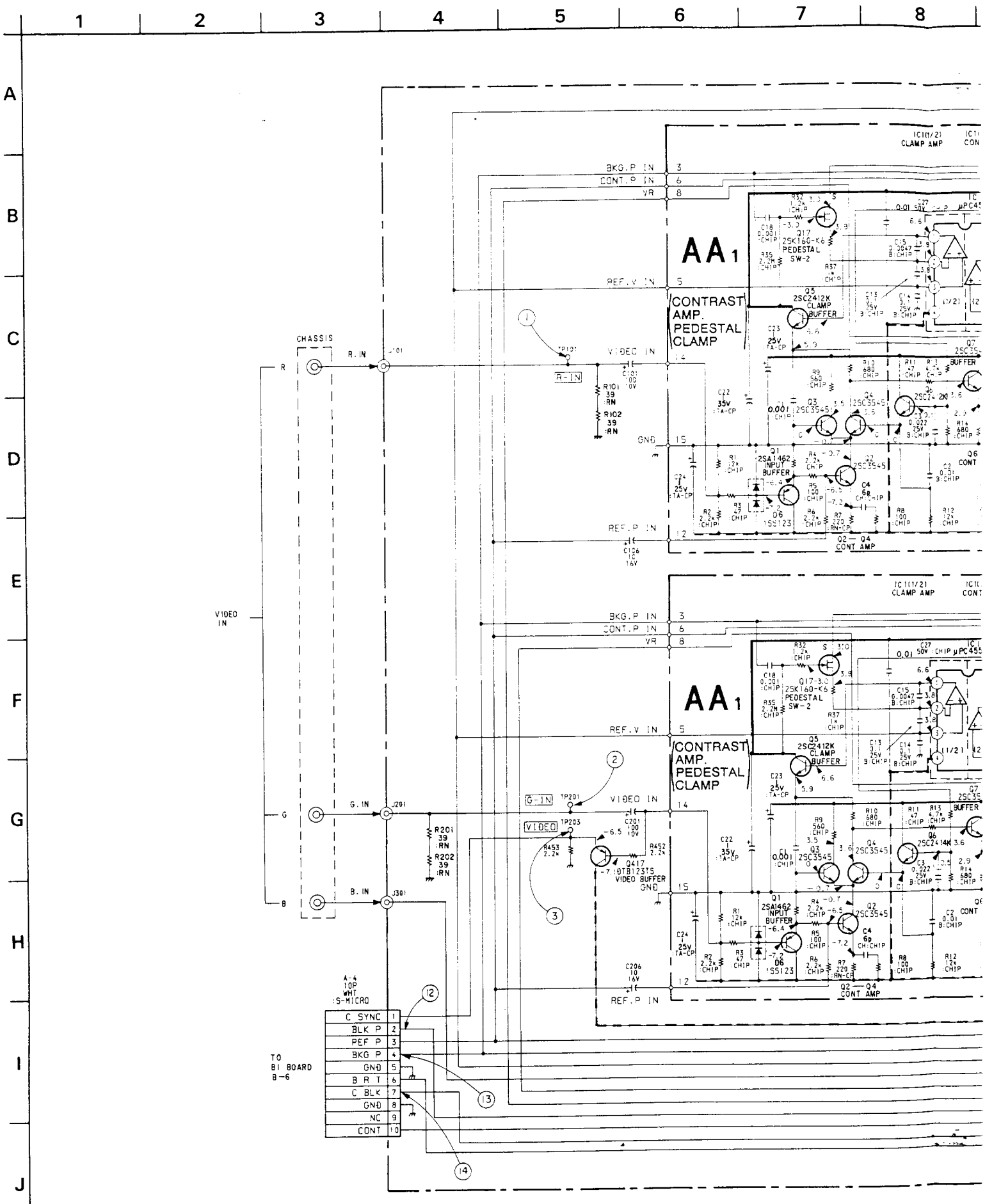
• : Pattern from the side which enables seeing.
• : Pattern of the rear side.

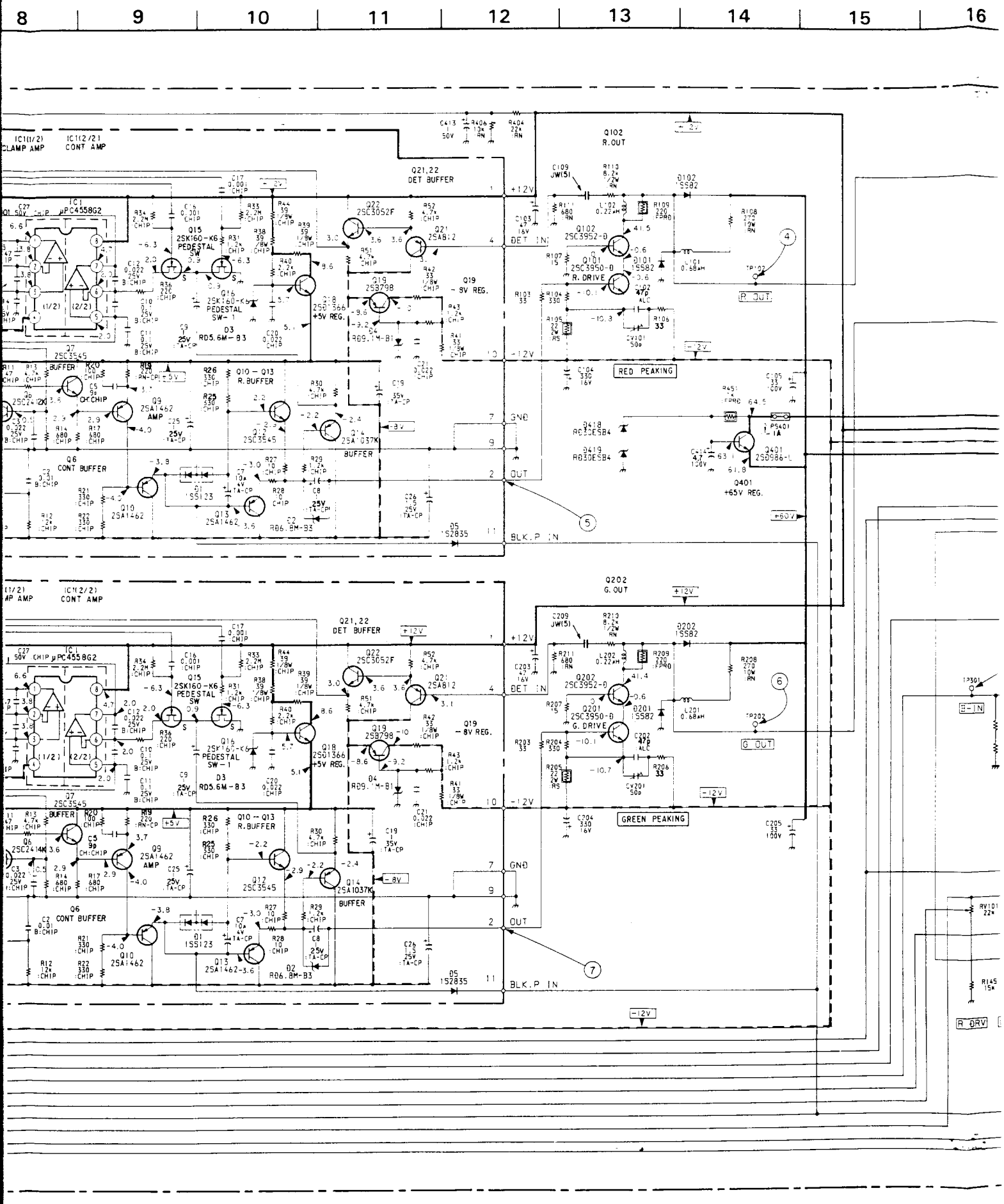
C [ARC SUPPRESSION]



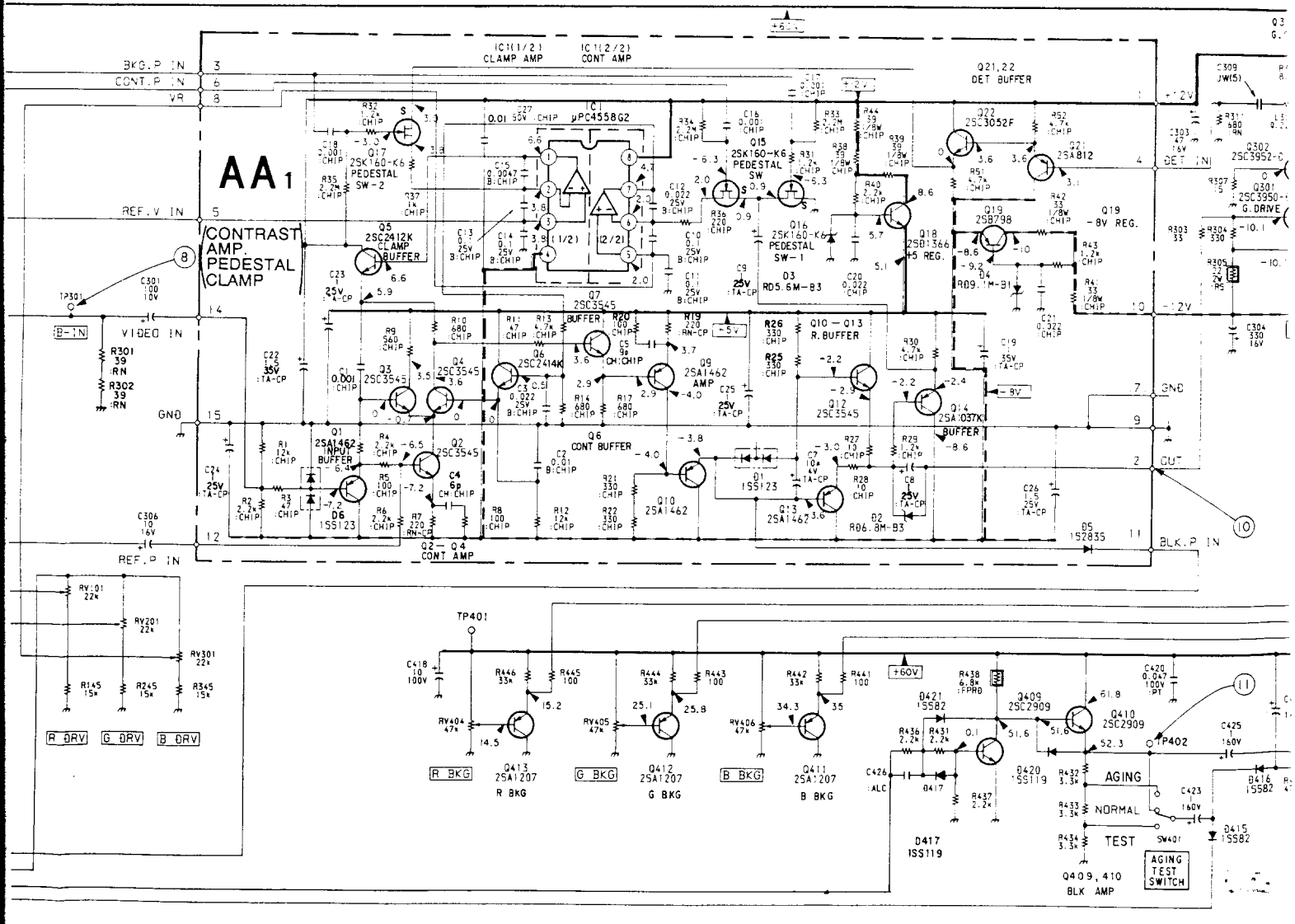
A BOARD WAVEFORMS

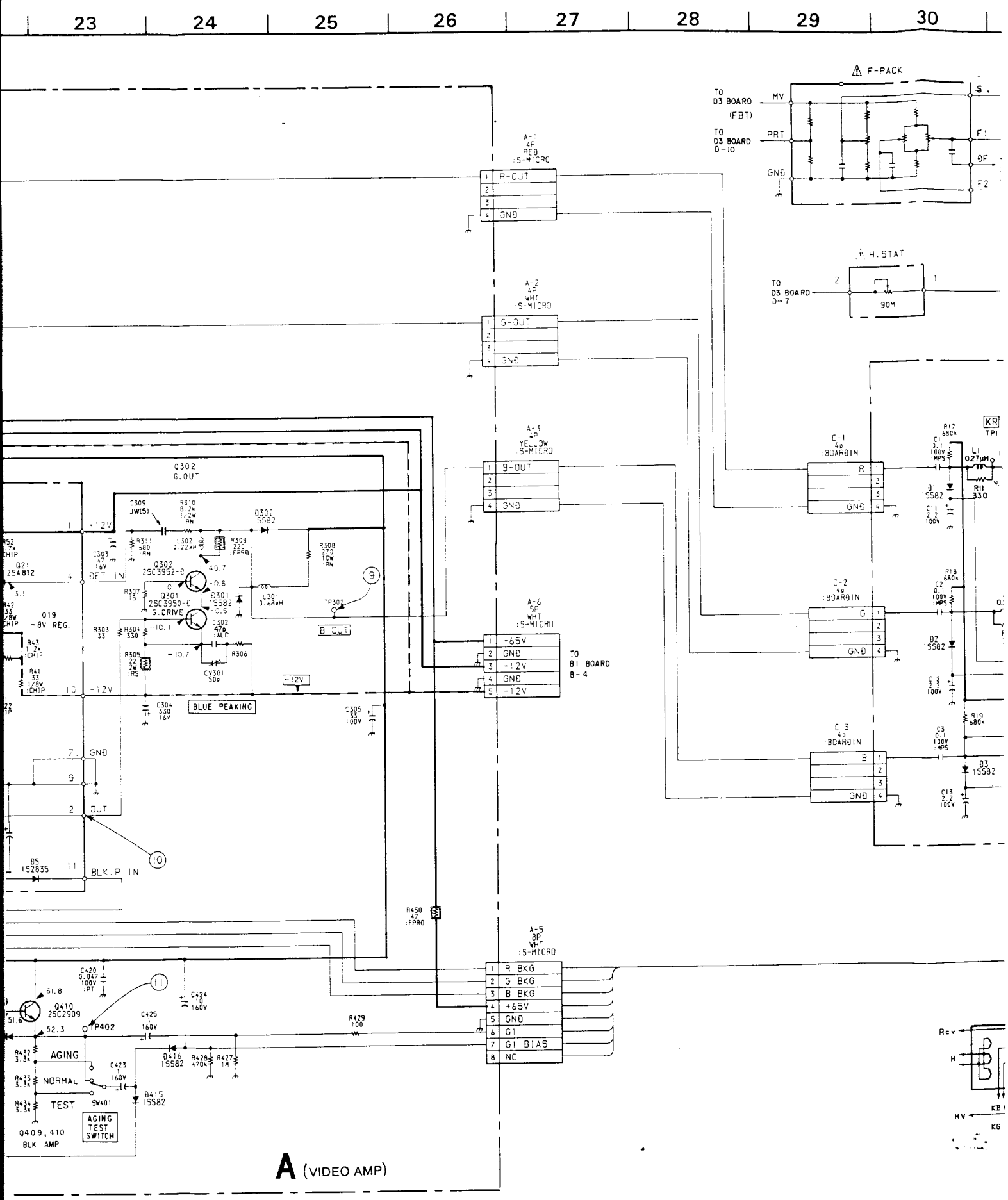
① 0.8Vp-p(H)	⑧ 0.8Vp-p(H)
② 1.0Vp-p(H)	⑨ 39Vp-p(H)
③ 1.0Vp-p(H)	⑩ 5.2Vp-p(H)
④ 36Vp-p(H)	⑪ 36Vp-p(H)
⑤ 5.2Vp-p(H)	⑫ 20Vp-p(H)
⑥ 38Vp-p(H)	⑬ 11Vp-p(H)
⑦ 5.2Vp-p(H)	⑭ 3.3Vp-p(H)


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
J
CHASSIS
R
G
B
R. IN
G. IN
B. IN
J201
J301
VIDEO IN
TP101
TP201
TP203
R-IN
G-IN
VIDEO
R101 39 RN
R102 39 RN
R201 39 RN
R202 39 RN
R453 2.2k
R452 2.2k
C201 100 10V
C206 10 16V
C126 10 16V
Q417 2SB1237S VIDEO BUFFER
BKG.P IN
CONT.P IN
VR
REF.V IN
REF.P IN
GND
AA1
CONTRAST AMP. PEDESTAL CLAMP
Q17 2SK160-K6 PEDESTAL SW-2
Q5 2SC2412K CLAMP BUFFER
Q1 2SA1462 INPUT BUFFER
Q2 — Q4 CONT AMP
Q6 1SS123
IC1(1/2) CLAMP AMP
A-4 10P WHT S-MICRO
C SYNC 1
BLK P 2
PEF P 3
BKG P 4
GND 5
B R T 6
C BLK 7
GND 8
NC 9
CONT 10
TO BI BOARD B-6
12
13
14

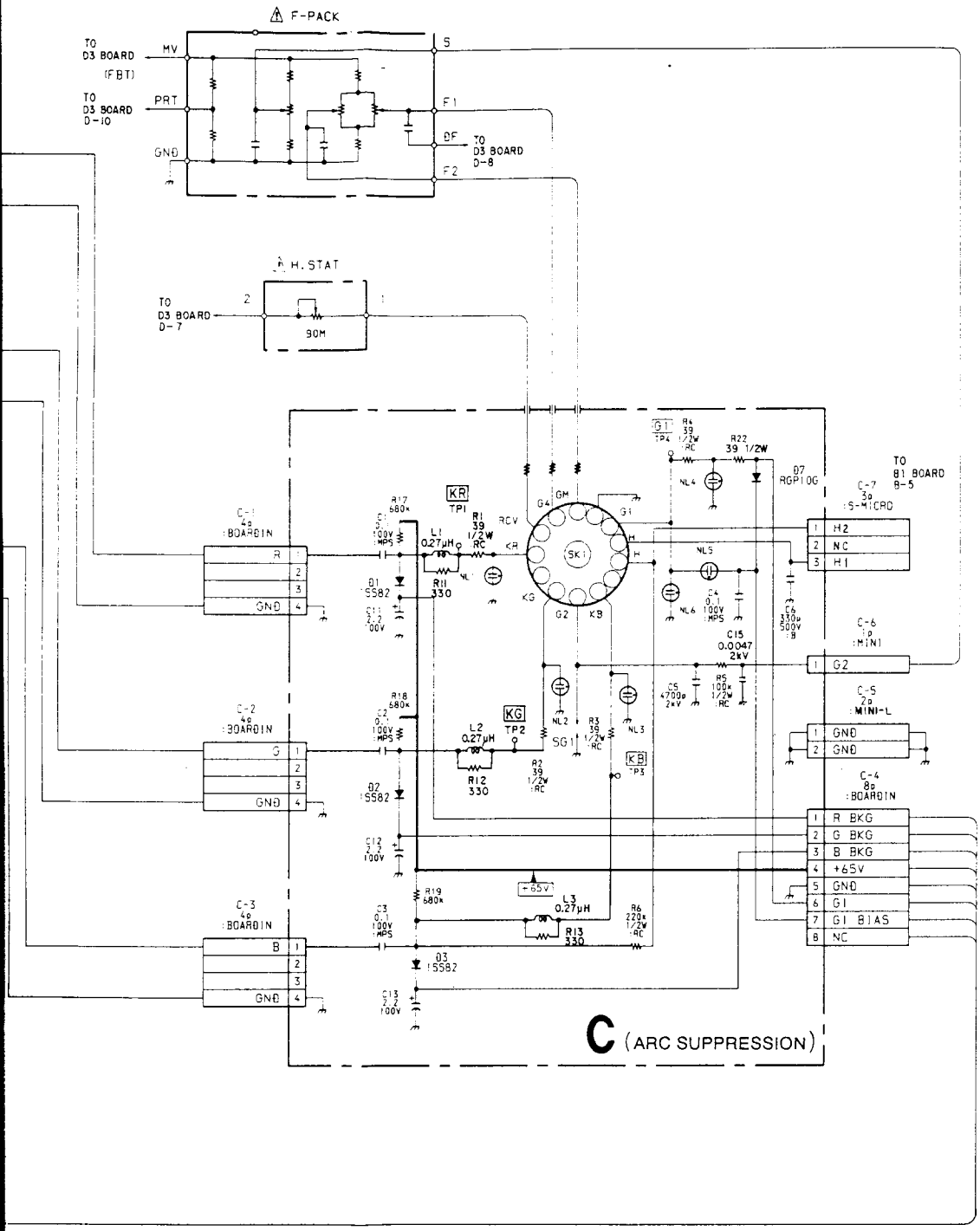

8
9
10
11
12
13
14
15
16
IC1(1/2) CLAMP AMP
IC1(2/2) CONT AMP
Q21,22 DET BUFFER
Q102 R.OUT
Q202 G.OUT
Q19 -8V REG.
Q18 2SD1366 +5V REG.
Q401 +65V REG.
RED PEAKING
GREEN PEAKING
R.DRIVE
G.DRIVE
R.BUFFER
CONT BUFFER
PEDESTAL SW
R OUT
G OUT
B-IN
R DRV
DET IN
BLK.P IN
+12V
-12V
-8V
+5V
+60V
GND
OUT

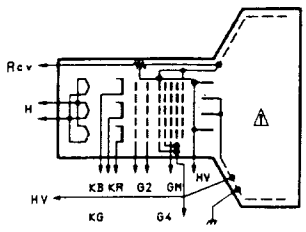
16 17 18 19 20 21 22 23



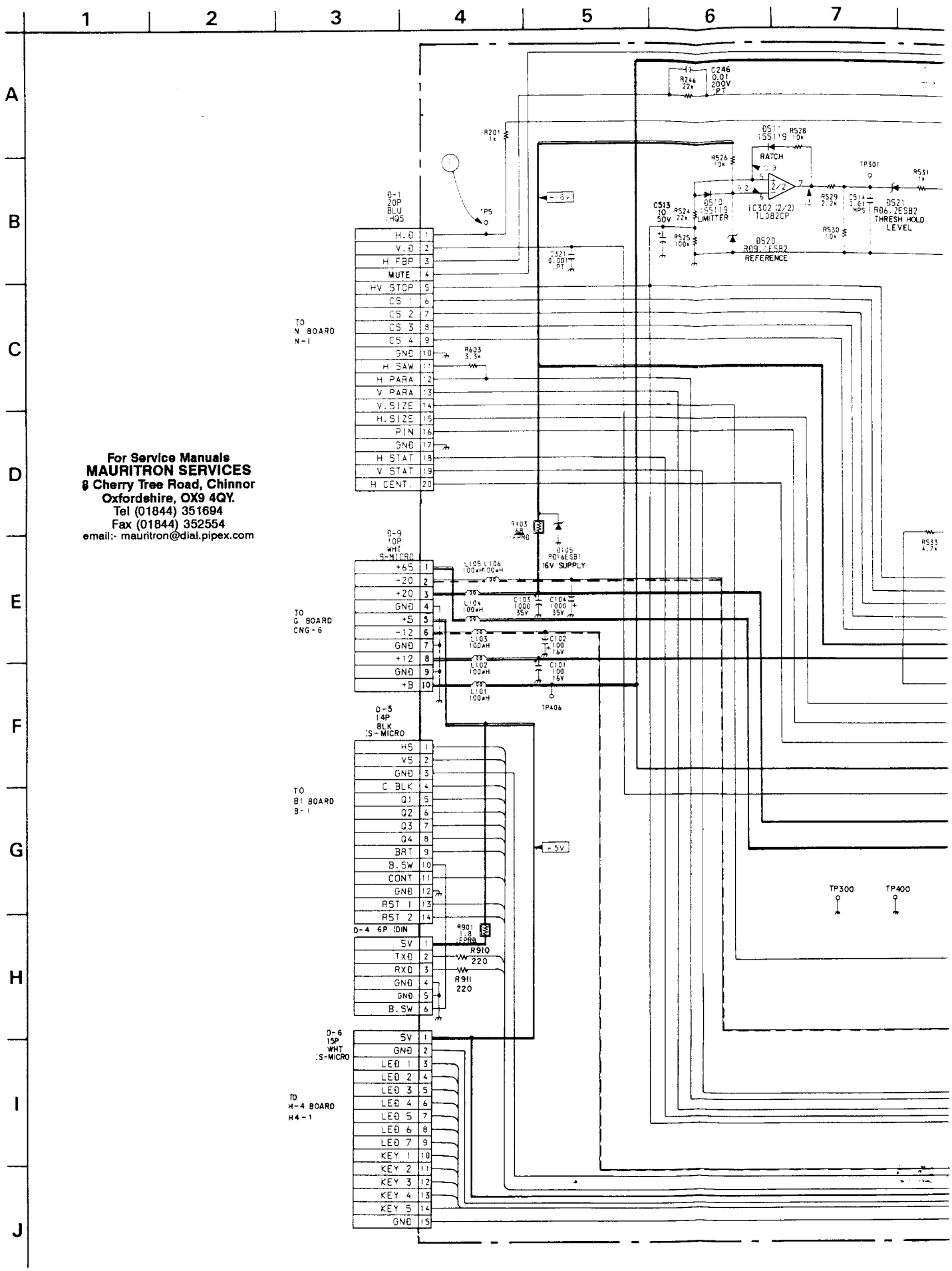

23
24
25
26
27
28
29
30
F-PACK
TO D3 BOARD (FBT)
HV
PRT
GND
TO D3 BOARD D-10
F1
F2
H. STAT
TO D3 BOARD D-7
90M
A-1 4P RED :S-MICRO
R-OUT
GND
A-2 4P WHT :S-MICRO
G-OUT
GND
A-3 4P YELLOW :S-MICRO
B-OUT
GND
A-6 5P WHT :S-MICRO
+65V
GND
+12V
GND
-12V
TO B1 BOARD B-4
A-5 8P WHT :S-MICRO
R BKG
G BKG
B BKG
+65V
GND
G1
G1 BIAS
NC
C-1 4P :BOARD IN
C-2 4P :BOARD IN
C-3 4P :BOARD IN
R
G
B
GND
KR
TP1
Q302 G.OUT
+12V
DET IN
Q21 2SA812
Q19 -8V REG.
Q302 2SC3952-D
Q301 2SC3950-D G.DRIVE
B OUT
-12V
BLUE PEAKING
GND
OUT
BLK.P IN
D5 1S2835
Q410 2SC2909
TP402
AGING
NORMAL
TEST
SW401
AGING TEST SWITCH
Q409, 410 BLK AMP
A (VIDEO AMP)

28 | 29 | 30 | 31 | 32 | 33 | 34 | 35

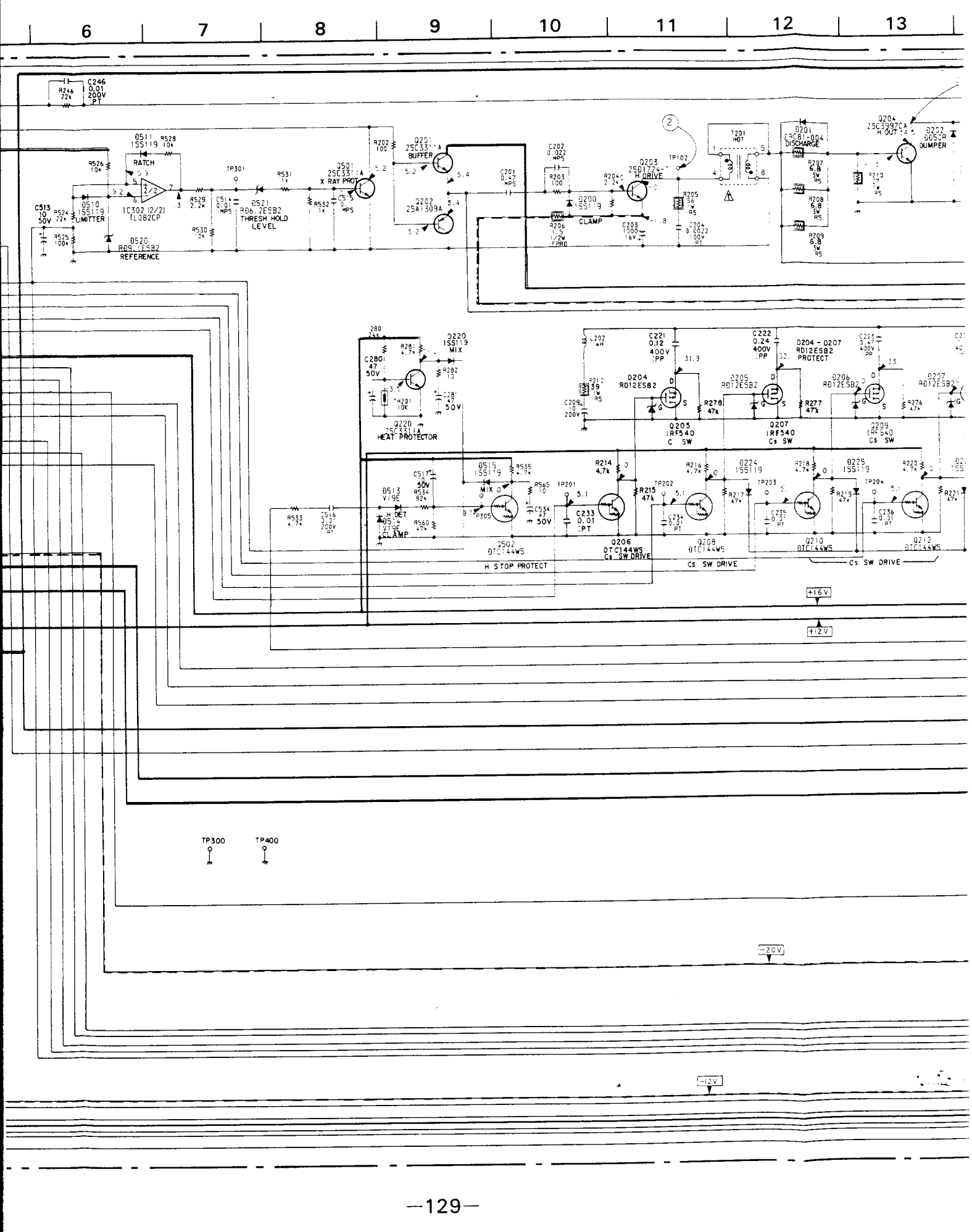


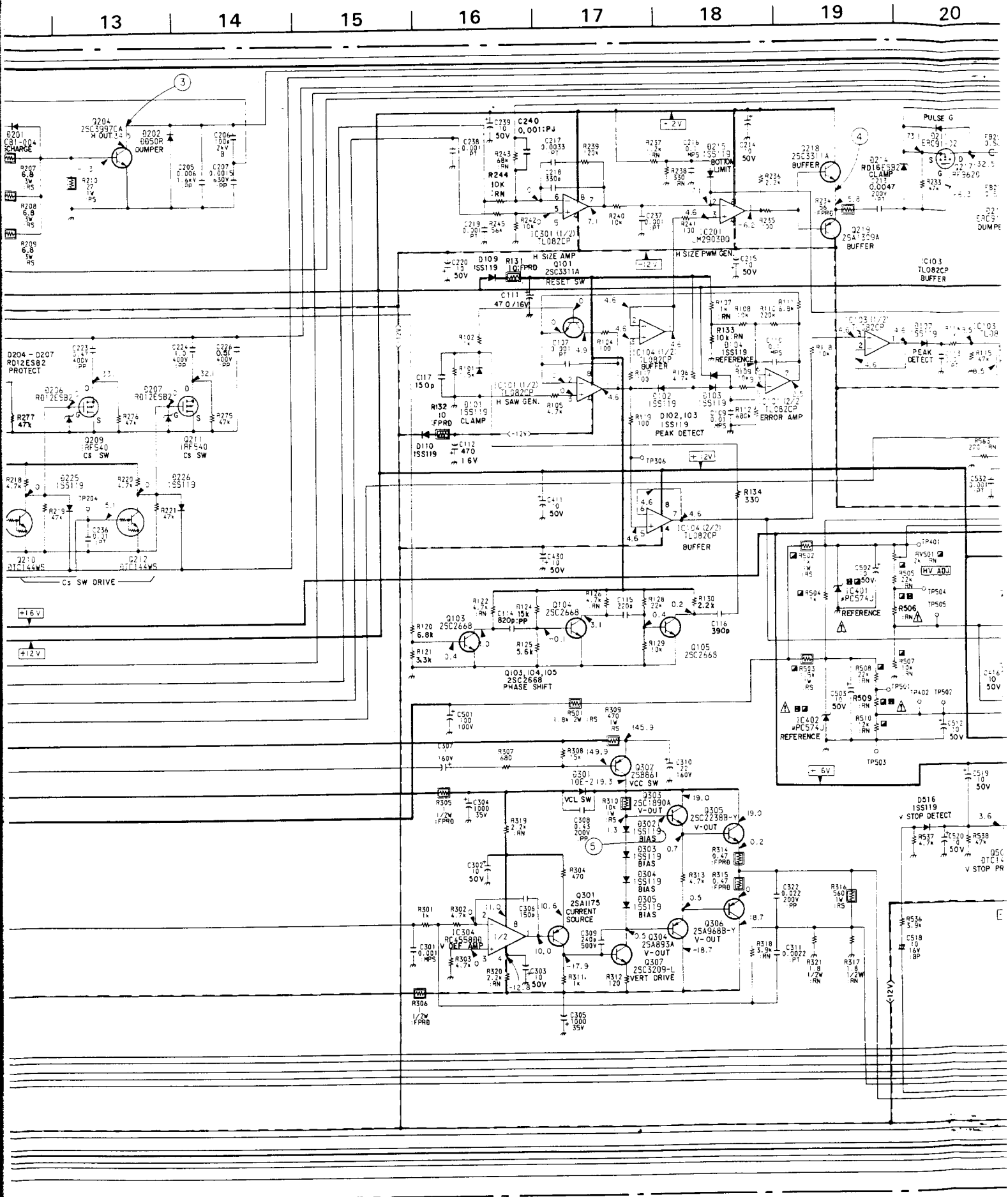


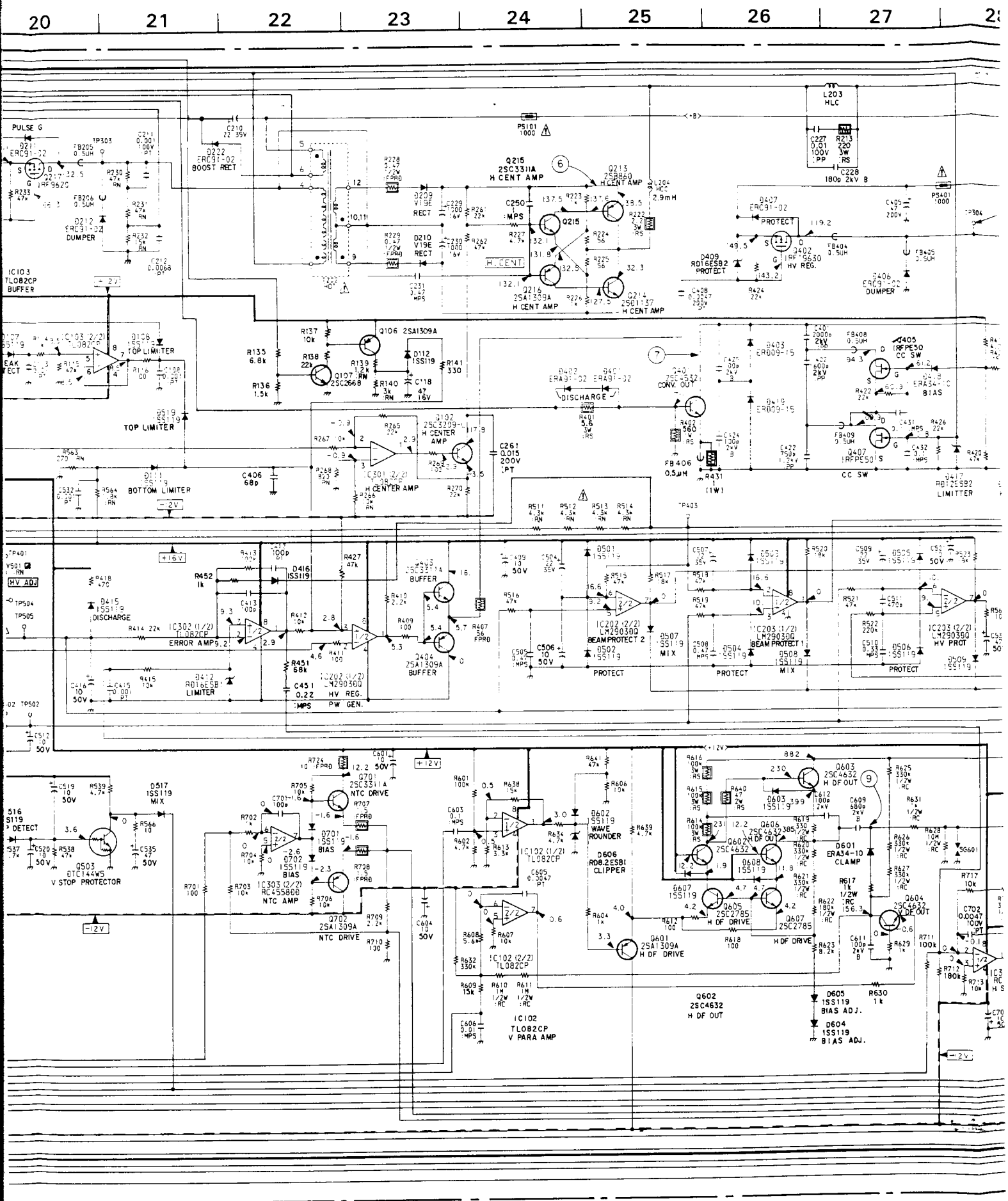
PICTURE TUBE
M49KHH16X (P)



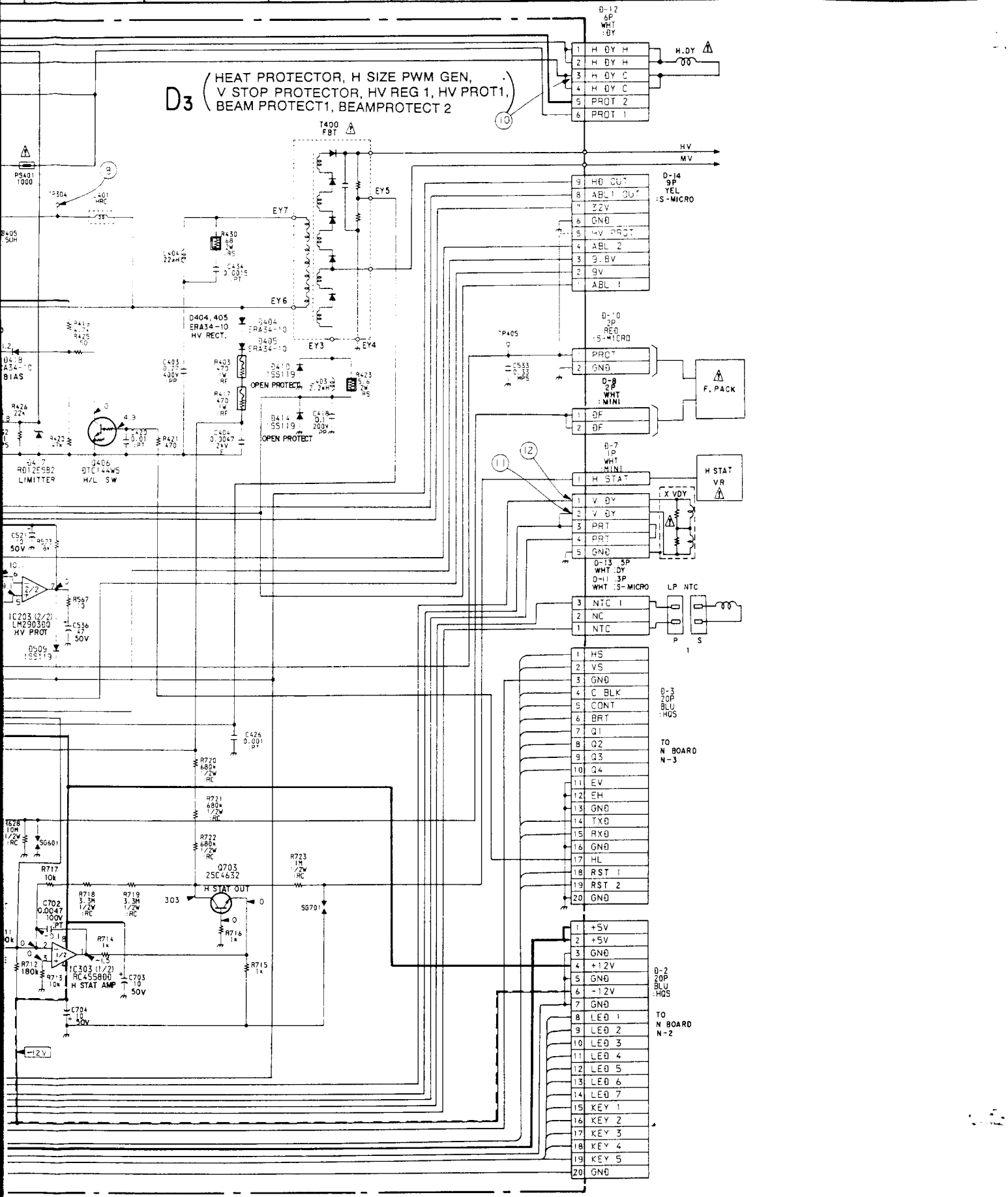
For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- mauritron@dial.pipex.com


6
7
8
9
10
11
12
13
C246 0.01 200V PT
R246 22k
D511 1SS119
R528 10k
RATCH
R526 10k
TP301
R531 1k
Q501 2SC3311A X RAY PROT
R202 100
Q201 2SC3311A BUFFER
Q202 2SA1309A
C202 0.022 MPS
C201 0.47 MPS
R203 100
Q203 2SD1724 H DRIVE
R204 2.2k
TP102
T201 HOT
Q201 ERG81-004 DISCHARGE
Q204 2SC3997GA H OUT
Q202 60SCR DUMPER
R207 6.8 5W RS
R208 6.8 5W RS
R209 6.8 5W RS
R210 47 5W RS
C513 10 50V
R524 22k
D510 1SS119 LIMITTER
R525 100k
IC302 (2/2) TL082CP
D520 RD9.1ESB2 REFERENCE
R529 2.2k
R530 10k
C514 0.01 MPS
D521 RD6.2ESB2 THRESH HOLD LEVEL
R532 1k
C515 0.1 MPS
Q200 1SS119 CLAMP
R206 1.5 1/2W FPRD
C203 1000 16V
C204 0.0022 100V PT
R205 56 5W RS
L202 4uH
C221 0.12 400V PP
C222 0.24 400V PP
D204 - D207 RD12ESB2 PROTECT
D204 RD12ESB2
D205 RD12ESB2
D206 RD12ESB2
D207 RD12ESB2
R212 39 1W RS
C209 10 200V
R278 47k
R277 47k
R276 47k
Q205 IRF540 C SW
Q207 IRF540 Cs SW
Q209 IRF540 Cs SW
C280 47 50V
R281 4.7k
Q220 1SS119 MIX
R282 10
R283 10k
C228 47 50V
Q220 2SC3311A HEAT PROTECTOR
C517 0.1 50V
R534 82k
D513 V19E H DET
D514 V19E CLAMP
R560 47k
R533 4.7k
C516 0.1 200V PT
D515 1SS119 MIX
R535 4.7k
R565 10
C534 47 50V
P305
TP201
C233 0.01 PT
R214 4.7k
R215 47k
Q206 DTC144WS Cs SW DRIVE
Q502 DTC144WS H STOP PROTECT
TP202
C234 0.01 PT
R216 4.7k
Q208 DTC144WS
Q224 1SS119
R217 47k
TP203
C235 0.01 PT
R218 4.7k
Q210 DTC144WS
Q225 1SS119
R219 47k
TP204
C236 0.01 PT
R220 4.7k
Q212 DTC144WS
R221 47k
Cs SW DRIVE
+16V
+12V
TP300
TP400
-20V
-12V


13
14
15
16
17
18
19
20
H SIZE AMP
H SIZE PWM GEN.
H SAW GEN.
PEAK DETECT
ERROR AMP
BUFFER
RESET SW
CLAMP
REFERENCE
PHASE SHIFT
CURRENT SOURCE
V OUT
V DEF AMP
VERT DRIVE
VCC SW
VCL SW
BIAS
V STOP DETECT
PULSE G
HV ADJ
Cs SW DRIVE
PROTECT
DUMPER
CHARGE
+16V
+12V
-12V
-6V


20
21
22
23
24
25
26
27
PULSE G
BOOST RECT
DUMPER
IC103 TL082CP BUFFER
TOP LIMITER
BOTTOM LIMITER
H CENTER AMP
Q215 2SC3311A H CENT AMP
Q216 2SA1309A H CENT AMP
Q213 2SB860 H CENT AMP
Q214 2SD1137 H CENT AMP
H.CENT
L203 HLC
PROTECT
HV REG.
CC SW
BIAS
LIMITTER
CONV. OUT
DISCHARGE
BUFFER
ERROR AMP
HV REG. PW GEN.
BEAM PROTECT 2
BEAM PROTECT 1
MIX
HV PROT
HV ADJ
V STOP PROTECTOR
NTC DRIVE
NTC AMP
BIAS
WAVE ROUNDER
CLIPPER
H DF DRIVE
H DF OUT
CLAMP
V PARA AMP
BIAS ADJ.
+27
+16V
+12V
-12V
-2V

28 29 30 31 32 33 34 35

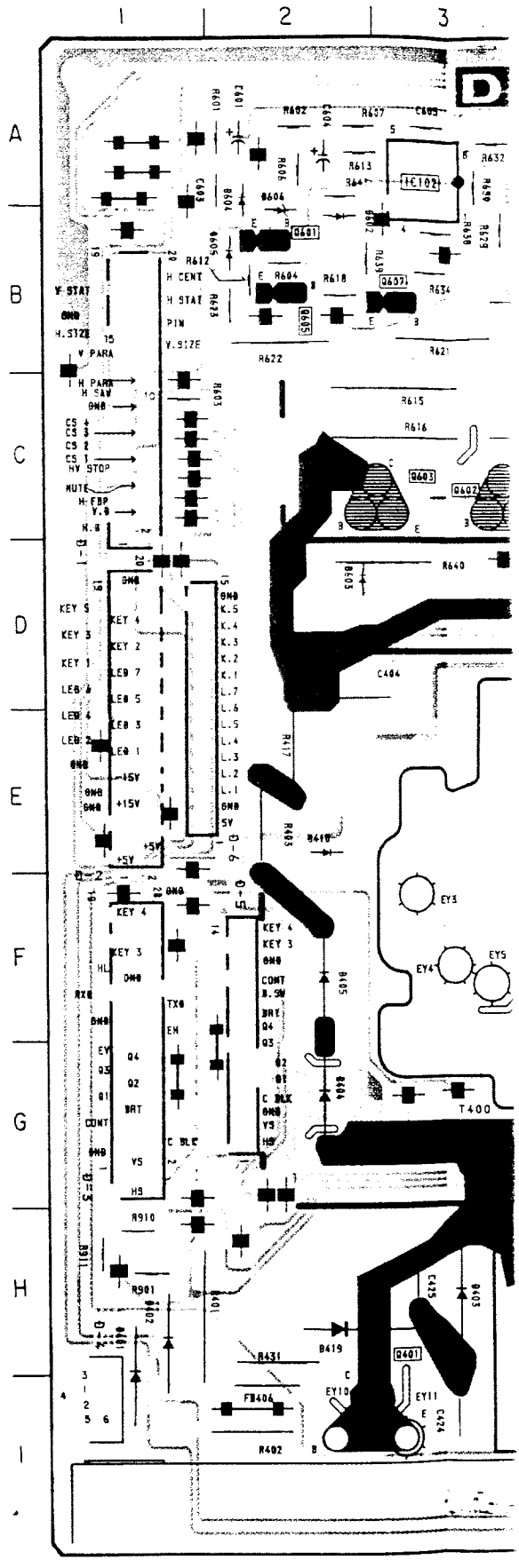


① 11V p-p(H)	⑦ 1030Vp-p(H)
② 35Vp-p(H)	⑧ 150Vp-p(H)
③ 1080Vp-p(H)	⑨ 942V p-p(V)
④ 24V p-p(H)	⑩ 70V p-p(H)
⑤ 80Vp-p(V)	⑪ 2Vp-p(V)
⑥ 165Vp-p(H)	⑫ 110Vp-p(V)

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

– D3 BOARD –

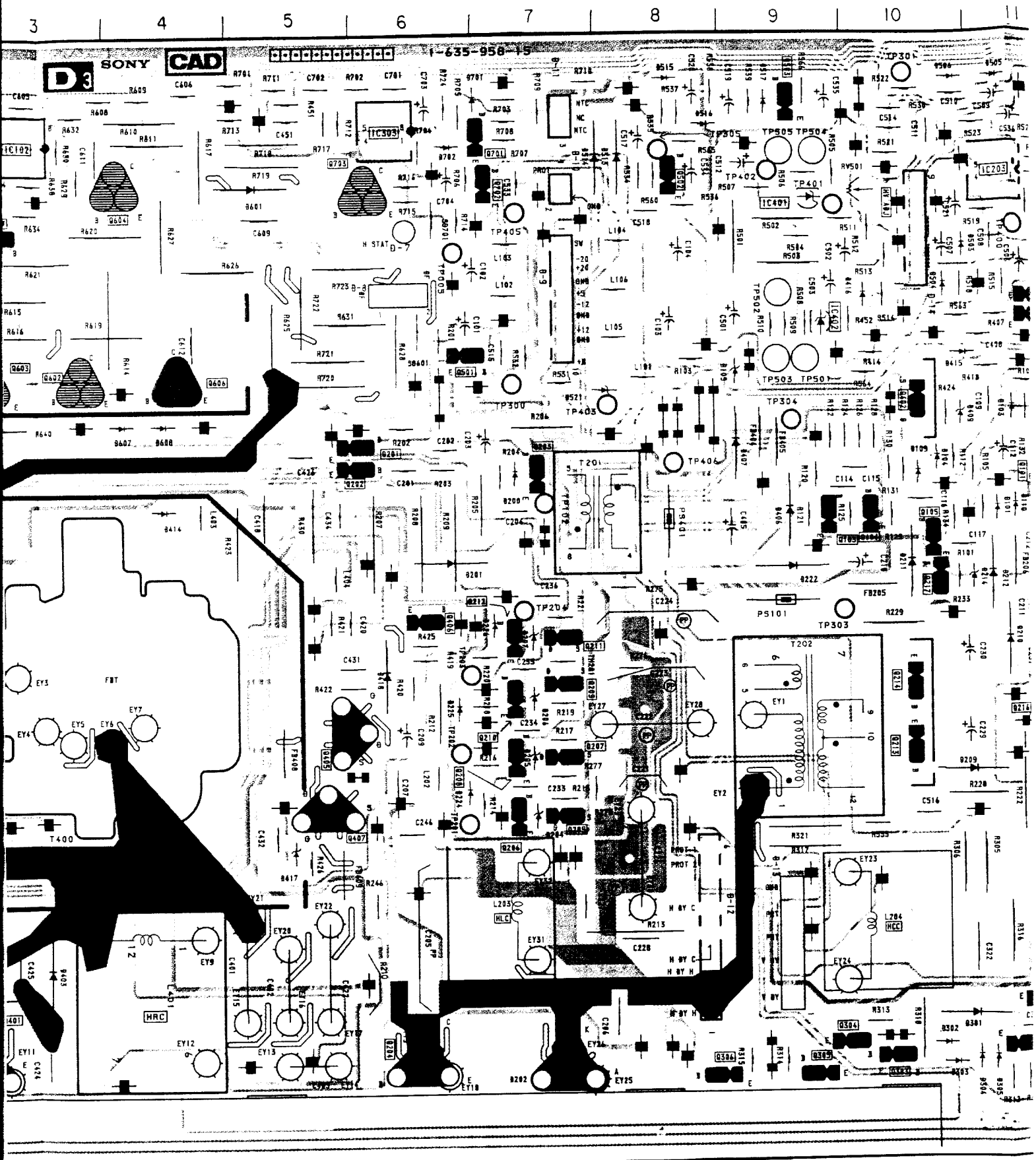
(CONDUCTOR SIDE)

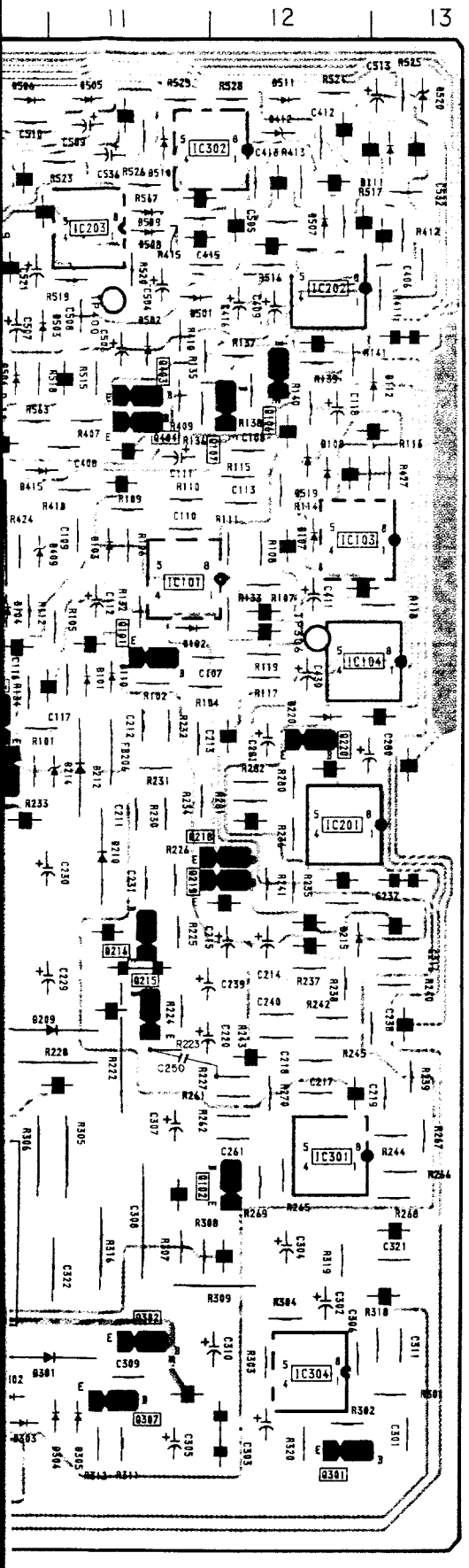


D3

[HEAT PROTECTOR, H SIZE PWM GEN, V STOP PROTECTOR, HV REG 1, HV PROT1, BEAM PROTECT1, BEAMPROTECT 2]

(OR SIDE)





D3 BOARD LOCATION

IC

IC101	D-11
IC102	A-3
IC103	D-12
IC104	D-12
IC201	E-12
IC202	B-12
IC203	B-11
IC301	G-12
IC302	A-11
IC303	A-6
IC304	I-12
IC401	B-9
IC402	C-9

TRANSISTOR

Q101	D-11
Q102	G-12
Q103	D-9
Q104	D-10
Q105	D-10
Q106	C-12
Q107	C-12
Q201	D-5
Q202	D-5
Q203	D-7
Q204	I-6
Q205	G-7
Q206	G-7
Q207	F-7
Q208	F-7
Q209	F-7
Q210	F-7
Q211	E-7
Q212	E-7
Q213	F-10
Q214	F-10
Q215	F-11
Q216	F-11
Q217	E-10
Q218	E-12
Q219	F-12
Q220	E-12
Q301	I-12
Q302	H-11
Q303	I-10
Q304	I-10
Q305	I-9
Q306	I-9
Q307	I-11
Q401	I-2
Q402	C-10
Q403	C-11
Q404	C-11
Q405	F-5
Q406	E-6
Q407	G-5
Q501	C-6
Q502	B-8
Q503	A-9
Q601	B-2
Q602	C-3
Q603	C-3
Q604	B-4
Q605	B-2
Q606	C-4
Q607	B-3
Q701	A-7
Q702	B-7
Q703	B-6

DIODE

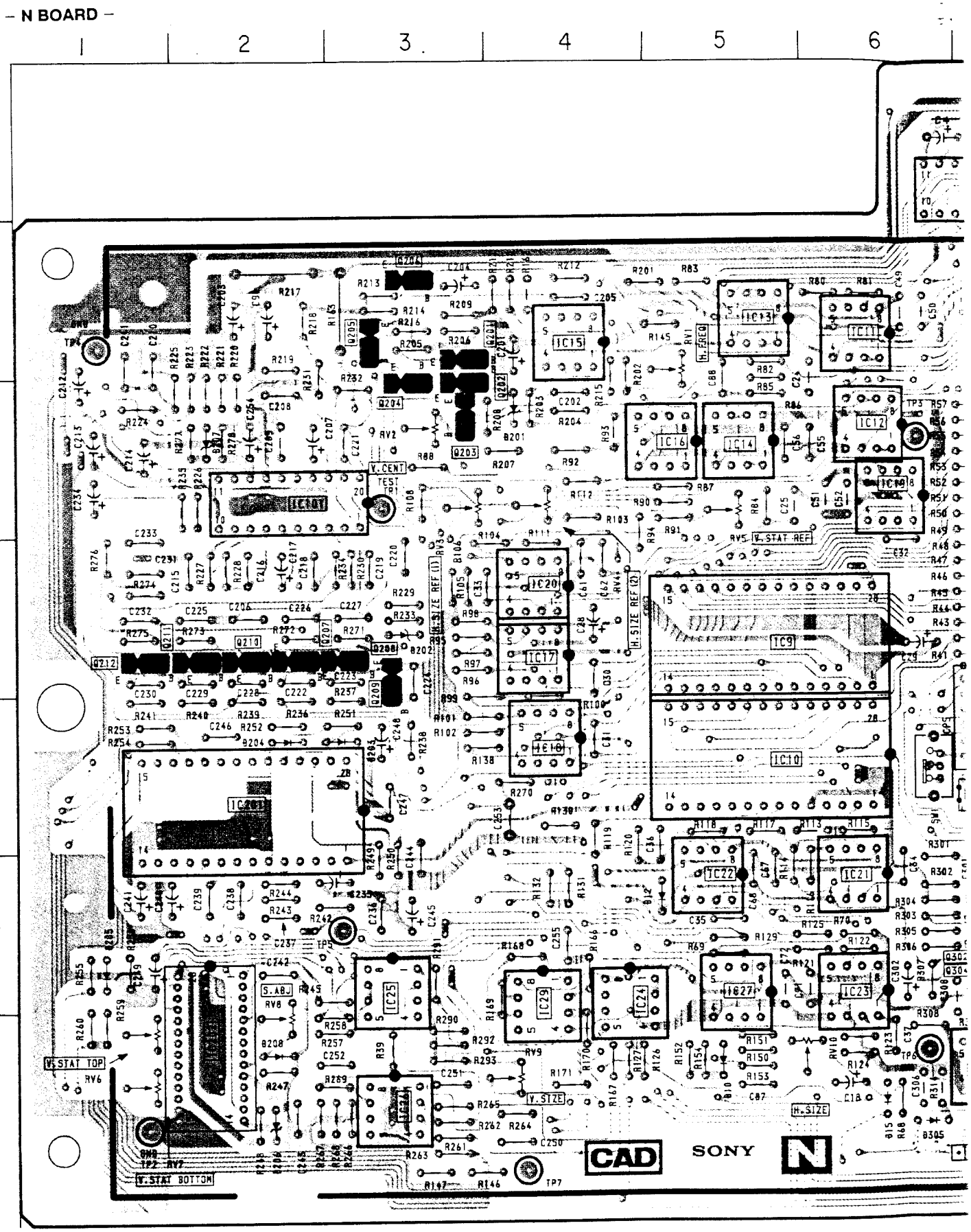
D101	D-11
D102	D-11
D103	D-11
D104	D-10
D105	C-9
D107	D-12
D108	C-12
D109	D-10
D110	D-11
D111	A-13
D112	C-13
D200	D-7
D201	E-6
D202	I-7
D204	G-7
D205	F-7
D206	F-7
D207	E-7
D209	F-11
D210	E-11
D211	E-10
D212	E-11
D214	D-11
D215	F-12
D220	D-12
D222	E-9
D224	G-6
D225	F-6
D226	E-7
D301	I-11
D302	I-10
D303	I-10
D304	I-11
D305	I-11
D401	H-1
D402	H-1
D403	H-3
D404	G-2
D405	F-2
D406	D-9
D407	D-9
D409	D-10
D410	E-2
D412	A-12
D414	D-4
D415	C-10
D416	C-10
D417	G-5
D418	E-6
D419	H-2
D501	B-11
D502	B-11
D503	B-10
D504	C-10
D505	A-11
D506	A-10
D507	B-12
D508	B-11
D509	B-11
D510	A-11
D511	A-12
D513	B-8
D514	B-7
D515	A-8
D516	A-8
D517	A-9
D519	C-12
D520	A-13
D521	C-8
D601	B-5
D602	B-2
D603	D-2
D604	B-2
D605	B-2
D606	B-2
D607	D-4
D608	D-4
D701	A-7
D702	A-6

VARIABLE RESISTOR

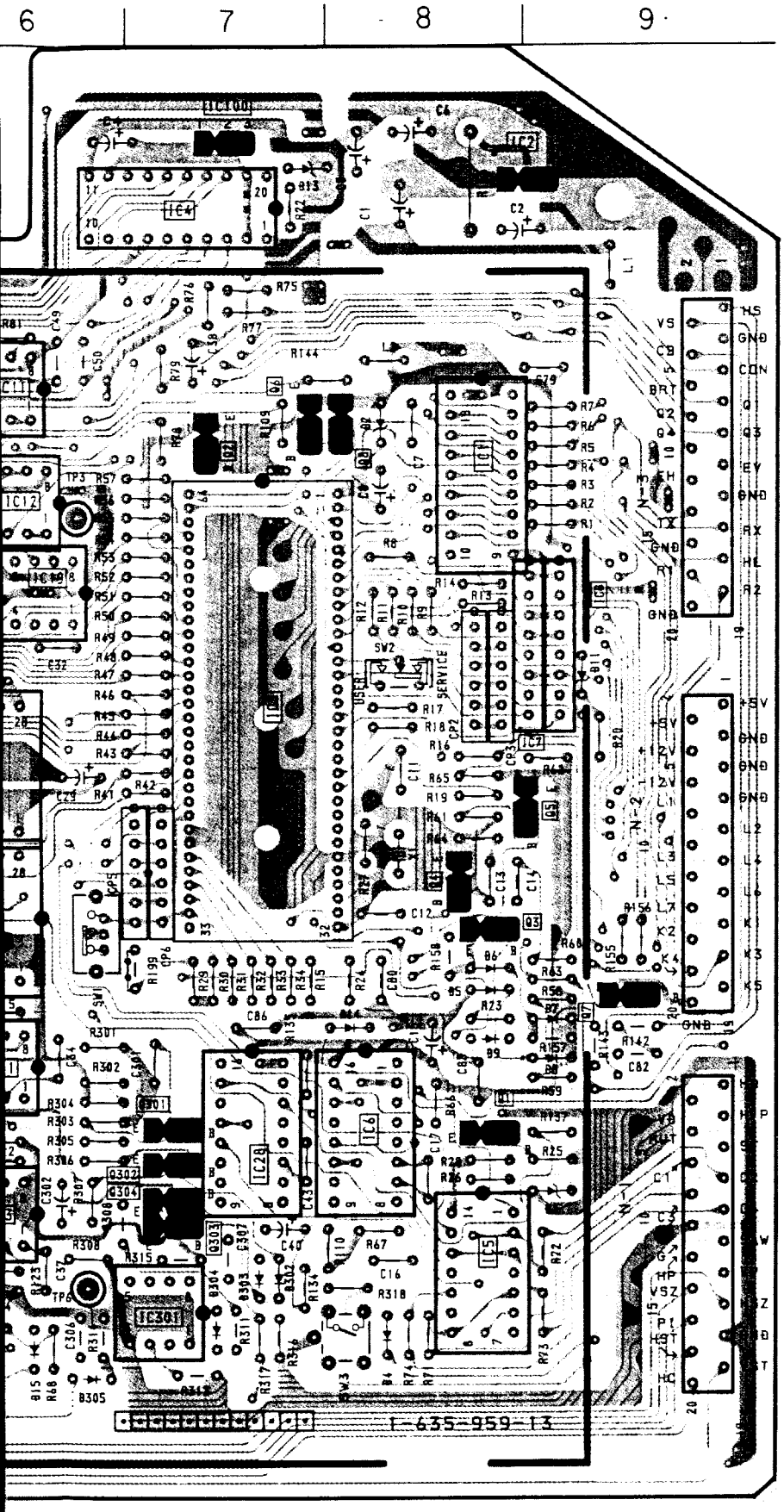
RV501	B-10

N (V SIZE PARA SAW DIGITAL ATT, V SAW PARA DC DIGITAL ATT, E² PROM, CPU)

– N BOARD –



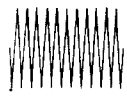
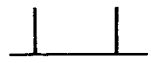
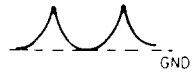
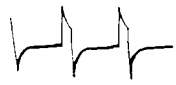
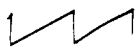
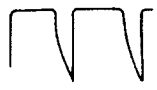
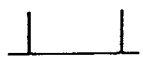
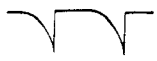
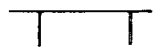
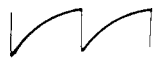
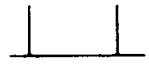
N BOARD LOCATION



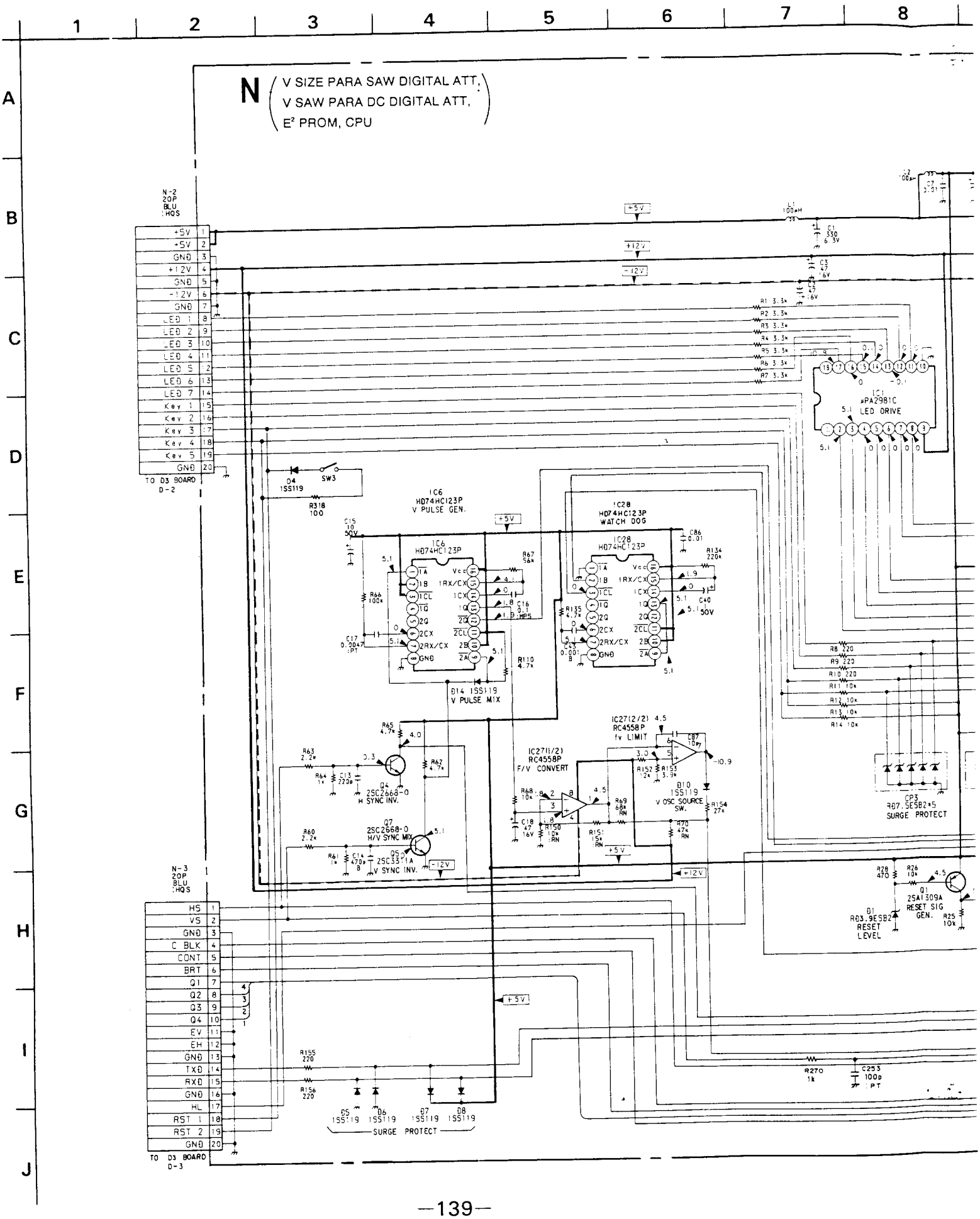
IC		DIODE	
IC1	C-8	D1	F-9
IC2	A-8	D2	B-8
IC3	D-7	D4	G-8
IC4	A-7	D5	E-8
IC5	G-8	D6	E-8
IC6	F-8	D7	E-9
IC7	D-9	D8	F-9
IC8	C-9	D10	G-5
IC9	D-5	D11	D-9
IC10	E-5	D12	F-5
IC11	B-6	D13	A-7
IC12	C-6	D14	E-8
IC13	B-5	D201	C-4
IC14	C-5	D202	D-3
IC15	B-4	D203	E-3
IC16	C-5	D204	E-2
IC17	D-4	D205	F-1
IC18	E-4	D206	G-2
IC19	C-6	D207	C-2
IC20	D-4	D208	G-2
IC21	F-6	D302	G-7
IC22	F-5		
IC23	F-6	**VARIABLE RESISTOR**	
IC24	F-4		
IC25	F-3		
IC26	G-3	RV1	B-5
IC27	F-5	RV2	C-3
IC28	F-7	RV3	C-3
IC29	F-4	RV4	C-4
IC100	A-7	RV5	C-5
IC101	C-2	RV6	G-1
IC201	E-2	RV7	G-1
IC202	G-2	RV8	G-2
		RV9	G-4
TRANSISTOR		RV10	G-5
Q1	F-8		
Q2	B-7		
Q3	E-8		
Q4	E-8		
Q5	D-9		
Q6	B-7		
Q8	B-8		
Q201	B-3		
Q202	C-3		
Q203	C-3		
Q204	C-3		
Q205	B-3		
Q206	B-3		
Q207	D-2		
Q208	D-3		
Q209	D-3		
Q210	D-2		
Q211	D-1		
Q212	D-1		
Q301	F-7		
Q302	F-7		
Q303	F-7		
Q304	F-7		

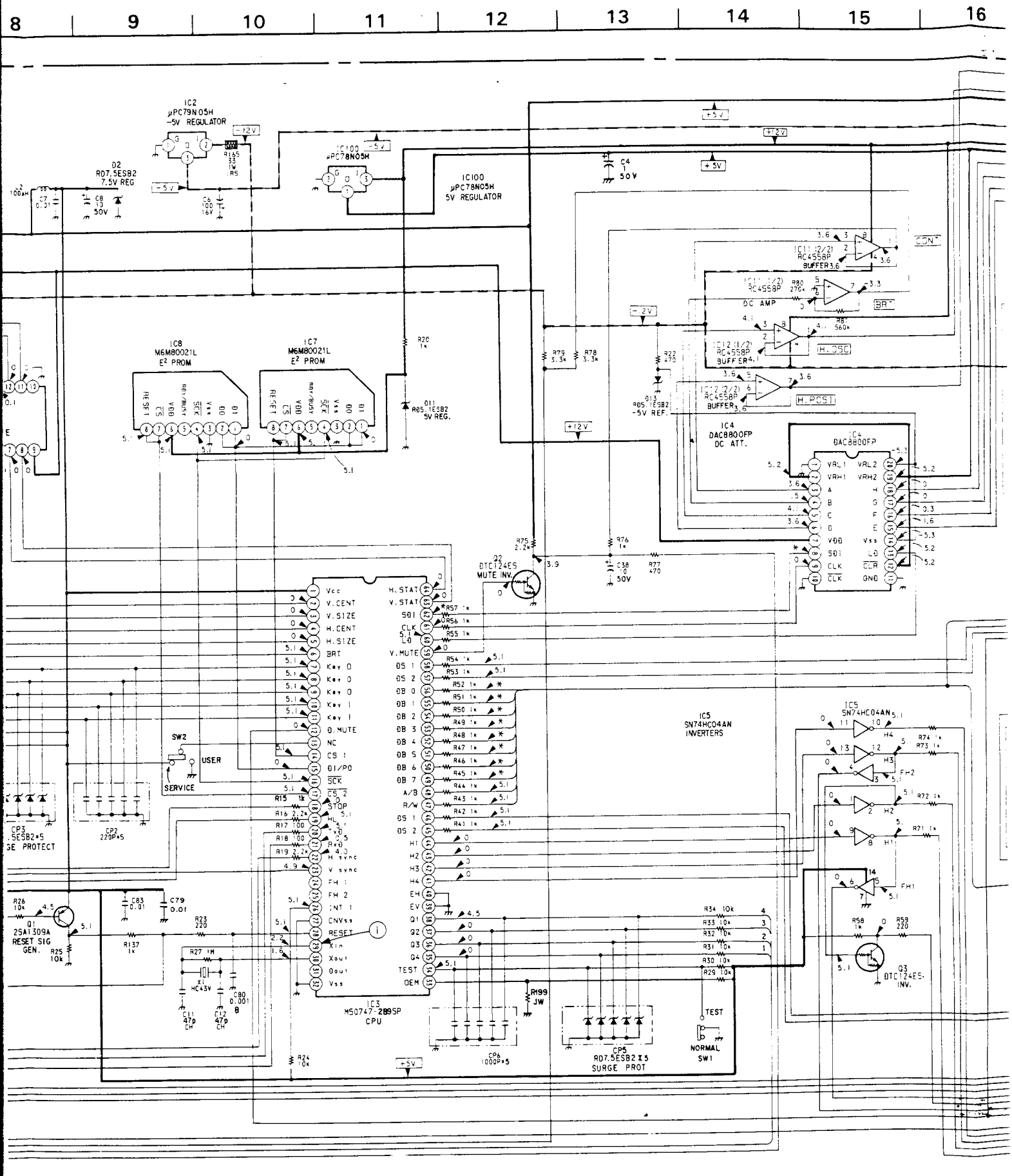
- : Pattern from the side which enables seeing
- : Pattern of the rear side.

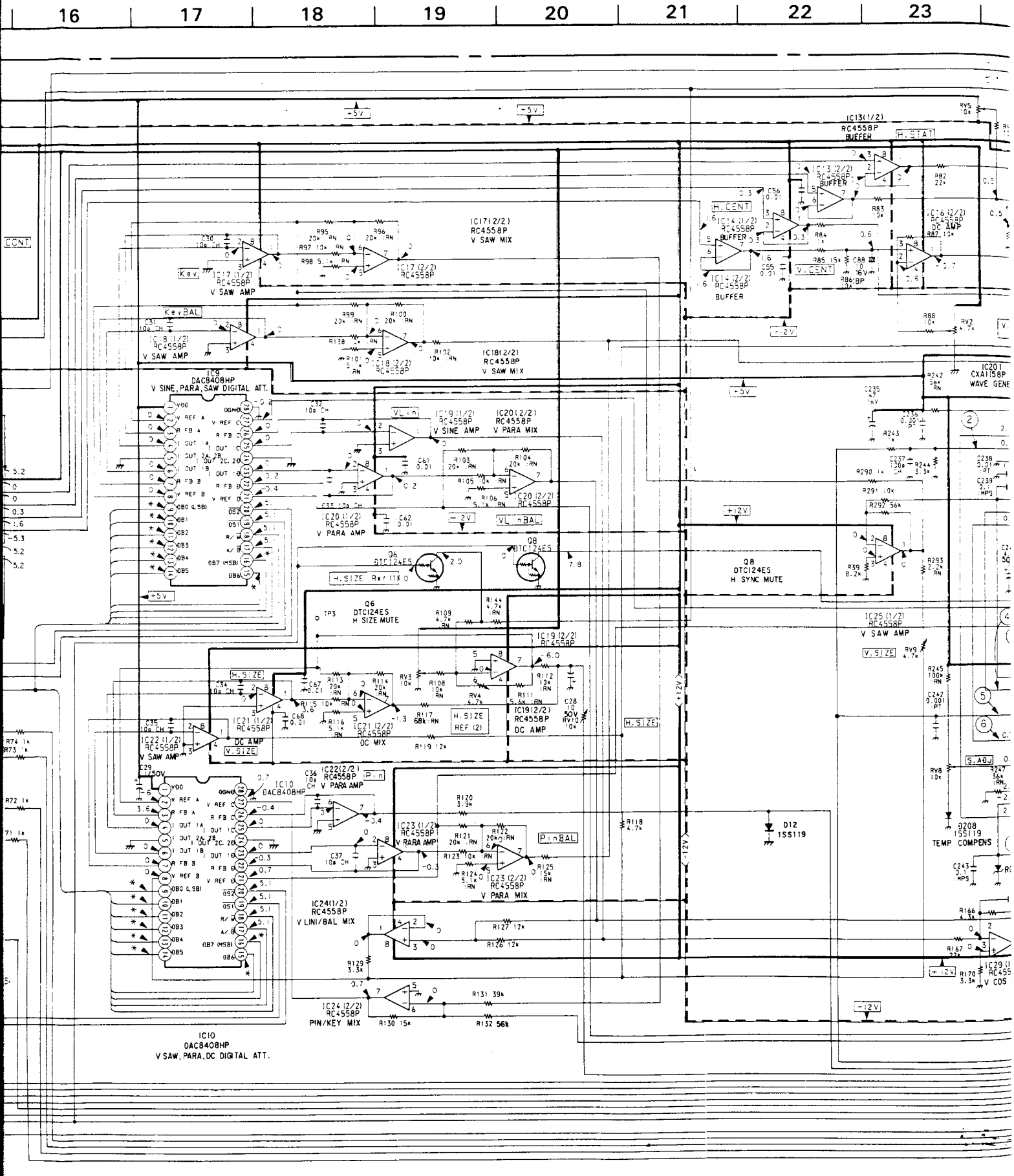
N BOARD WAVEFORMS

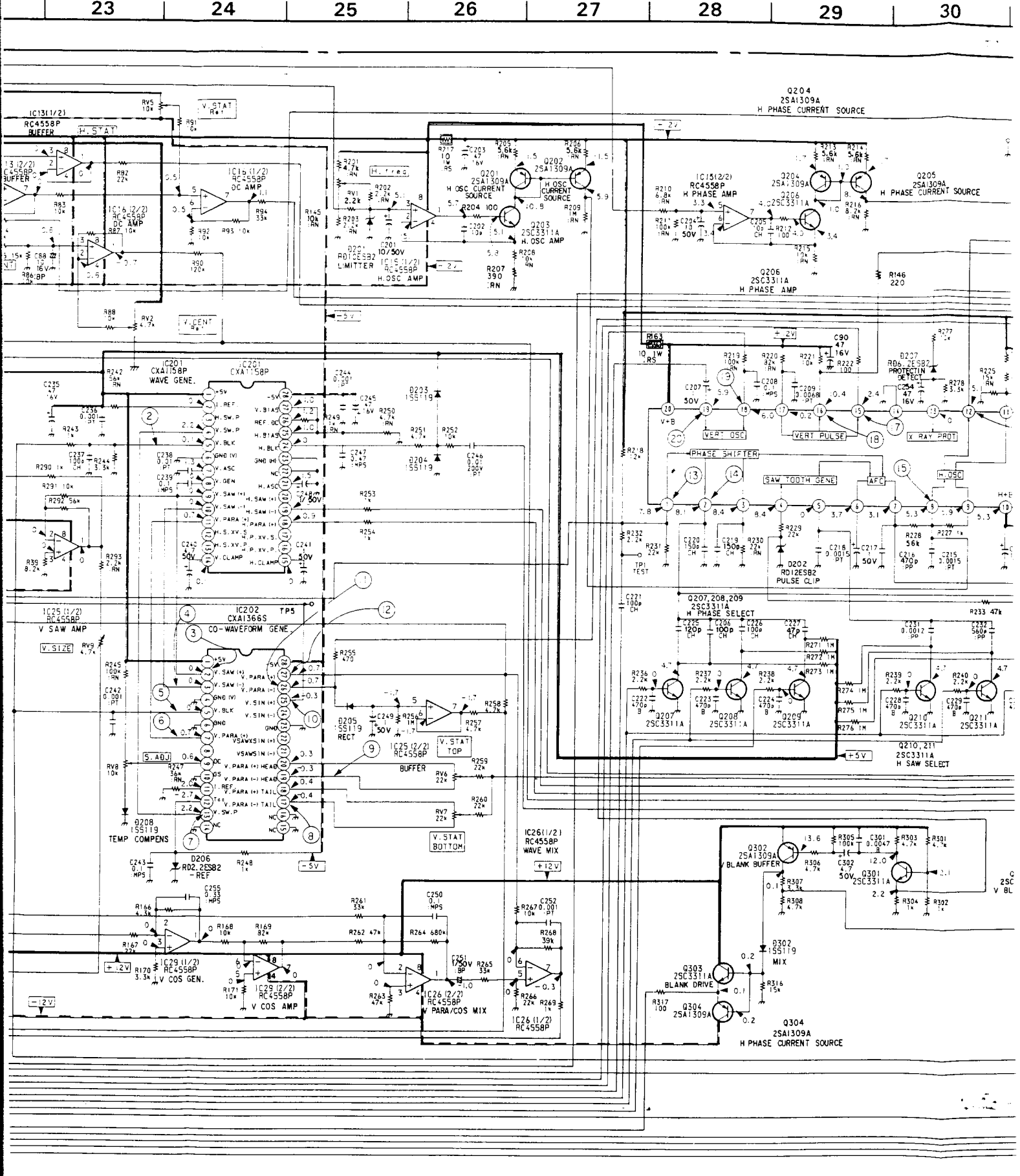
①  4MHz 7.3Vp-p	⑪  GND 2.4Vp-p(V)
②  3.8Vp-p(V)	⑫  GND 2.4Vp-p(V)
③  2.4Vp-p(V)	⑬  4Vp-p(H)
④  2.4Vp-p(V)	⑭  4.4Vp-p(H)
⑤  4.8Vp-p(V)	⑮  4.4Vp-p(H)
⑥  GND 2.4Vp-p(V)	⑯  11Vp-p(H)
⑦  6.0Vp-p(V)	⑰  1.2Vp-p(H)
⑧  2.0Vp-p(V)	⑱  10Vp-p(H)
⑨  2.0Vp-p(V)	⑲  3.8Vp-p(V)
⑩  2.4Vp-p(V)	⑳  1.3Vp-p(V)

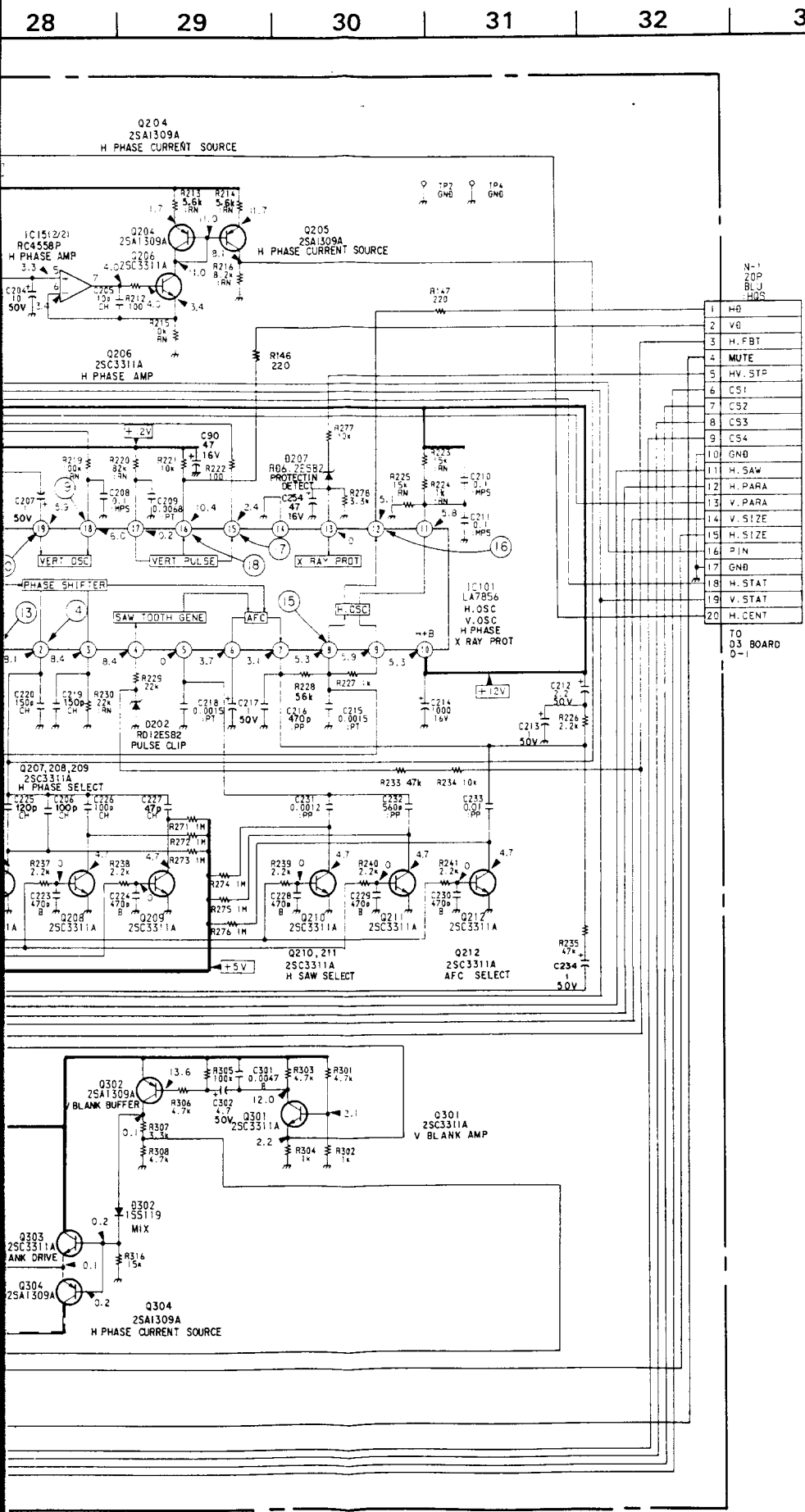
les seeing.

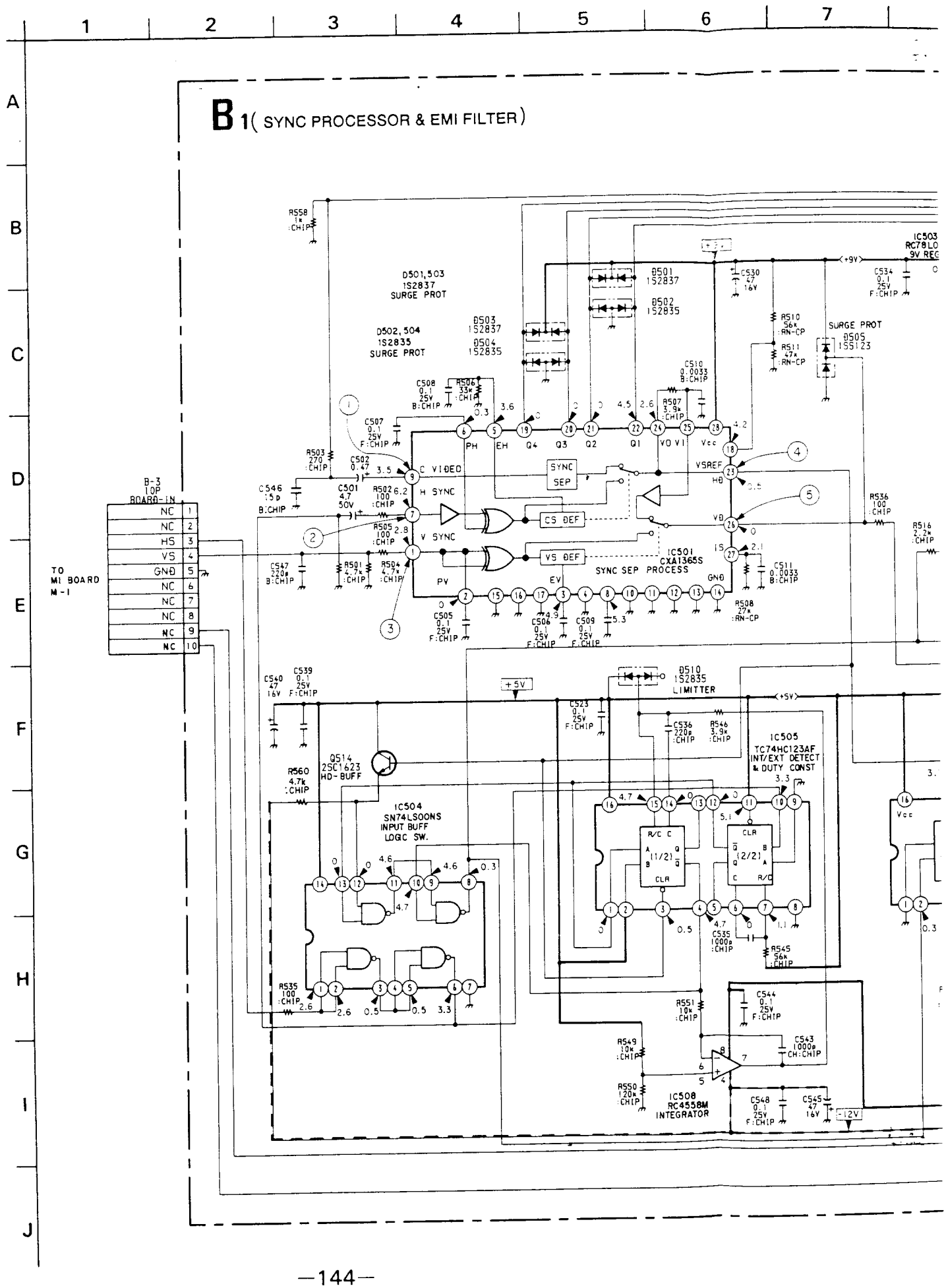

N
V SIZE PARA SAW DIGITAL ATT,
V SAW PARA DC DIGITAL ATT,
E² PROM, CPU
N-2
20P
BLU
:HQS
+5V 1
+5V 2
GND 3
+12V 4
GND 5
-12V 6
GND 7
LED 1 8
LED 2 9
LED 3 10
LED 4 11
LED 5 12
LED 6 13
LED 7 14
Key 1 15
Key 2 16
Key 3 17
Key 4 18
Key 5 19
GND 20
TO D3 BOARD
D-2
D4
1SS119
SW3
R318
100
IC6
HD74HC123P
V PULSE GEN.
D14 1SS119
V PULSE MIX
IC28
HD74HC123P
WATCH DOG
IC27(2/2) 4.5
RC4558P
fv LIMIT
IC27(1/2)
RC4558P
F/V CONVERT
D10
1SS119
V OSC SOURCE
SW.
Q4
2SC2668-O
H SYNC INV.
Q7
2SC2668-O
H/V SYNC MIX
Q5
2SC3311A
V SYNC INV.
IC1
μPA2981C
LED DRIVE
CP3
R07.5ESB2×5
SURGE PROTECT
Q1
2SA1309A
RESET SIG
GEN.
D1
R03.9ESB2
RESET
LEVEL
N-3
20P
BLU
:HQS
HS 1
VS 2
GND 3
C BLK 4
CONT 5
BRT 6
Q1 7
Q2 8
Q3 9
Q4 10
EV 11
EH 12
GND 13
TXD 14
RXD 15
GND 16
HL 17
RST 1 18
RST 2 19
GND 20
TO D3 BOARD
D-3
D5 1SS119
D6 1SS119
D7 1SS119
D8 1SS119
SURGE PROTECT
+5V
+12V
-12V

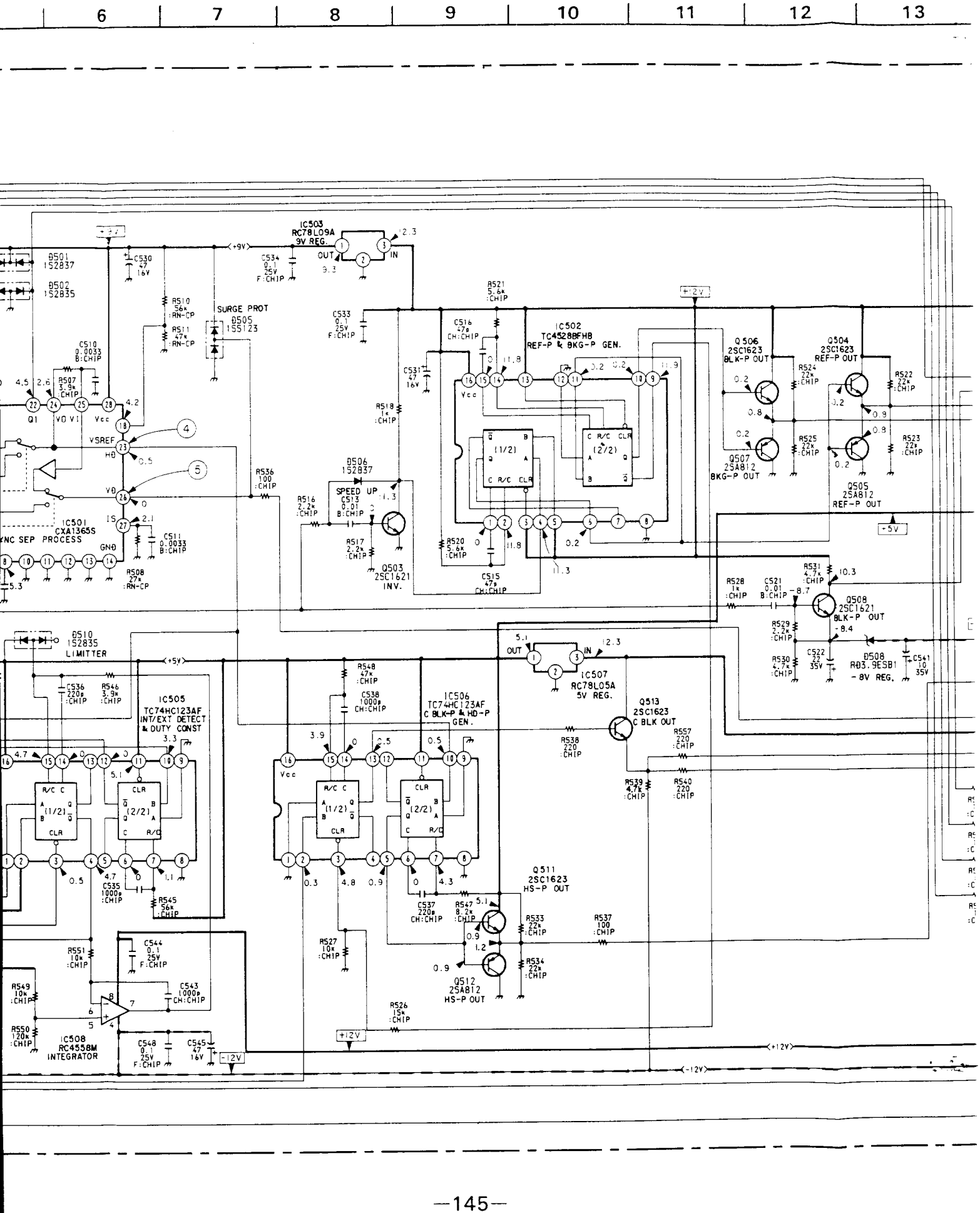

8
9
10
11
12
13
14
15
16
IC2
μPC79N05H
-5V REGULATOR
D2
RD7.5ESB2
7.5V REG
IC100
μPC78N05H
5V REGULATOR
C4
1
50V
+5V
+12V
-12V
-5V
IC8
M6M80021L
E² PROM
IC7
M6M80021L
E² PROM
R20
1k
D11
RD5.1ESB2
5V REG.
R79
3.3k
R78
3.3k
R22
470
D13
RD5.1ESB2
-5V REF.
IC11 (1/2)
RC4558P
BUFFER
IC11 (2/2)
RC4558P
DC AMP
R80
270k
R81
560k
IC12 (1/2)
RC4558P
BUFFER
IC12 (2/2)
RC4558P
BUFFER
CONT
BRT
H.OSC
H.POSI
IC4
DAC8800FP
DC ATT.
R75
2.2k
R76
1k
C38
0
50V
R77
470
Q2
DTC124ES
MUTE INV.
IC3
M50747-289SP
CPU
SW2
USER
SERVICE
R15
1k
R16
2.2k
R17
100
R18
100
R19
2.2k
R24
10k
R25
10k
R26
10k
Q1
2SA1309A
RESET SIG
GEN.
R137
1k
C83
0.01
C79
0.01
R23
220
R27
1M
X1
HC43V
C11
47p
CH
C12
47p
CH
C80
0.001
B
R199
JW
CP2
220P*5
CP3
.5ESB2*5
GE PROTECT
CP6
1000P*5
CP5
RD7.5ESB2*5
SURGE PROT
IC5
SN74HC04AN
INVERTERS
R34 10k
R33 10k
R32 10k
R31 10k
R30 10k
R29 10k
TEST
NORMAL
SW1
R74 1k
R73 1k
R72 1k
R71 1k
R58
1k
R59
220
Q3
DTC124ES
INV.
Vcc
V.CENT
V.SIZE
H.CENT
H.SIZE
BRT
Key 0
Key 0
Key 0
Key 1
Key 1
Ø.MUTE
NC
CS 1
OI/PO
SCK
CS 2
STOP
HL
Rx0
H sync
V sync
FH 1
FH 2
INT 1
CNVss
RESET
Xin
Xout
Vout
Vss
H.STAT
V.STAT
SDI
CLK
LO
V.MUTE
OS 1
OS 2
OB 0
OB 1
OB 2
OB 3
OB 4
OB 5
OB 6
OB 7
A/B
R/W
OS 1
OS 2
H1
H2
H3
H4
EH
EV
Q1
Q2
Q3
Q4
TEST
OEM

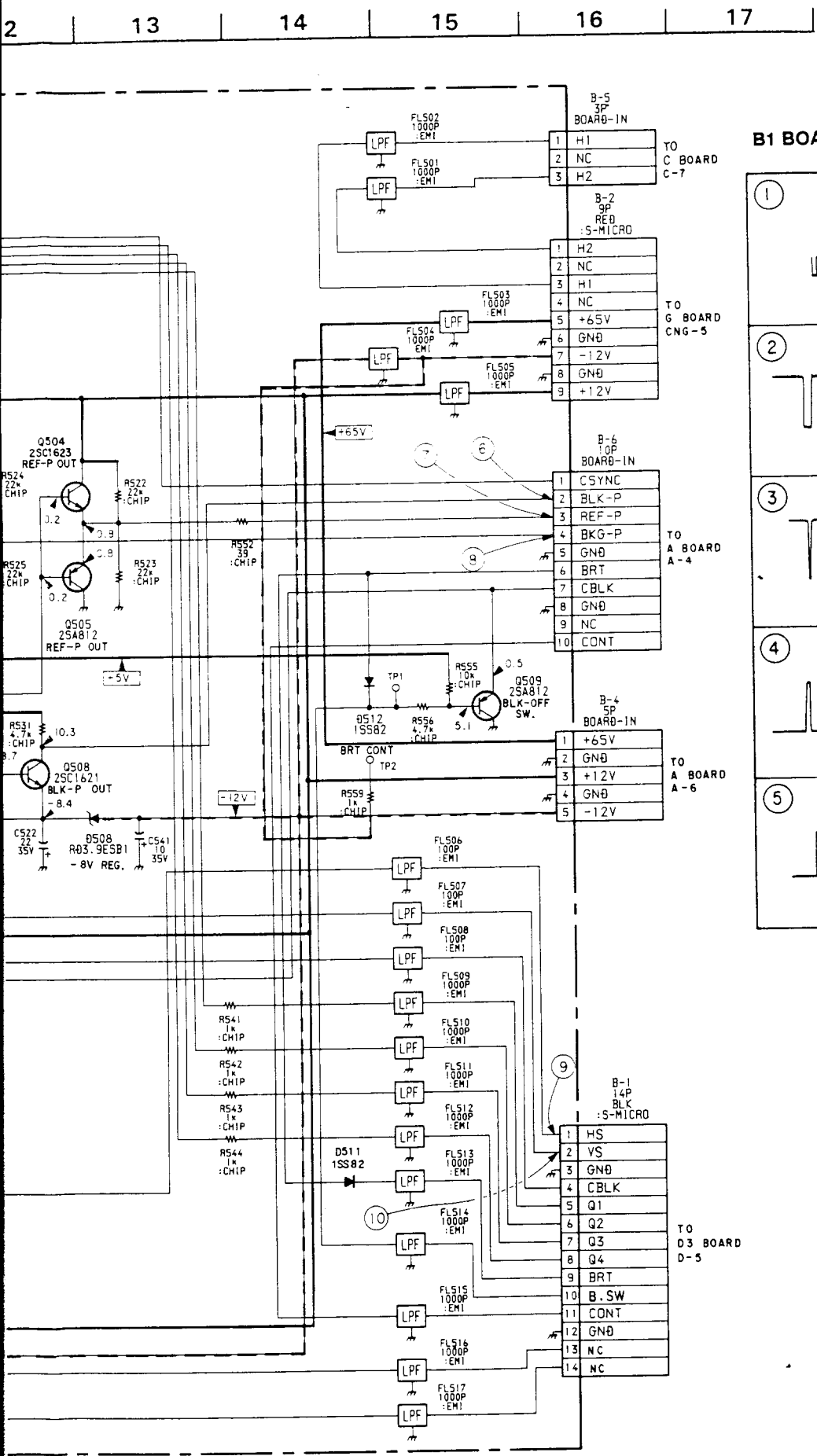

16
17
18
19
20
21
22
23
IC9
DAC8408HP
V SINE, PARA, SAW DIGITAL ATT.
IC10
DAC8408HP
V SAW, PARA, DC DIGITAL ATT.
IC17(2/2)
RC4558P
V SAW MIX
IC17(1/2)
RC4558P
V SAW AMP
IC18(2/2)
RC4558P
V SAW MIX
IC18(1/2)
RC4558P
V SAW AMP
IC19(1/2)
RC4558P
V SINE AMP
IC20(2/2)
RC4558P
V PARA MIX
IC20(1/2)
RC4558P
V PARA AMP
IC21(1/2)
RC4558P
DC AMP
IC21(2/2)
RC4558P
DC MIX
IC19(2/2)
RC4558P
DC AMP
IC22(1/2)
RC4558P
V SAW AMP
IC22(2/2)
RC4558P
V PARA AMP
IC23(1/2)
RC4558P
V PARA AMP
IC23(2/2)
RC4558P
V PARA MIX
IC24(1/2)
RC4558P
V LINI/BAL MIX
IC24(2/2)
RC4558P
PIN/KEY MIX
IC13(1/2)
RC4558P
BUFFER
IC13(2/2)
RC4558P
BUFFER
IC14(1/2)
RC4558P
BUFFER
IC14(2/2)
RC4558P
BUFFER
IC6(2/2)
RC4558P
DC AMP
IC25(1/2)
RC4558P
V SAW AMP
IC201
CXA1158P
WAVE GENE
Q6
DTC124ES
H SIZE MUTE
Q8
DTC124ES
H SYNC MUTE
D12
1SS119
D208
1SS119
TEMP COMPENS
Key
Key BAL
H.SIZE
V.SIZE
H.CENT
V.CENT
H.STAT
S.ADJ
PinBAL
VL inBAL
+5V
-5V
+12V
-12V
-2V


23
24
25
26
27
28
29
30
IC13(1/2) RC4558P BUFFER
H. STAT
V. STAT
IC16(1/2) RC4558P DC AMP
IC15(1/2) RC4558P DC AMP
IC15(2/2) RC4558P H PHASE AMP
Q204 2SA1309A H PHASE CURRENT SOURCE
Q205 2SA1309A H PHASE CURRENT SOURCE
Q201 2SA1309A H OSC CURRENT SOURCE
Q202 2SA1309A H OSC CURRENT SOURCE
Q203 2SC3311A H. OSC AMP
Q206 2SC3311A H PHASE AMP
D201 RD12ESB2 LIMITTER
IC15(1/2) RC4558P H.OSC AMP
H. freq
V. CENT
IC201 CXA1158P WAVE GENE.
IC202 CXA1366S CO-WAVEFORM GENE.
TP5
IC25(1/2) RC4558P V SAW AMP
V. SIZE
S. ADJ
Q208 1SS119 TEMP COMPENS
D206 RD2.2ESB2 -REF
D203 1SS119
D204 1SS119
D205 1SS119 RECT
IC25(2/2) RC4558P BUFFER
V. STAT TOP
V. STAT BOTTOM
IC26(1/2) RC4558P WAVE MIX
IC29(1/2) RC4558P V COS GEN.
IC29(2/2) RC4558P V COS AMP
IC26(2/2) RC4558P V PARA/COS MIX
IC26(1/2) RC4558P
+12V
-12V
+5V
-5V
+2V
-2V
C90 47 16V
D227 RD6.2ESB2 PROTECTIN DETECT
VERT OSC
VERT PULSE
X RAY PROT
PHASE SHIFTER
SAW TOOTH GENE
AFC
H. OSC
D202 RD12ESB2 PULSE CLIP
Q207,208,209 2SC3311A H PHASE SELECT
Q210,211 2SC3311A H SAW SELECT
Q302 2SA1309A V BLANK BUFFER
Q301 2SC3311A
Q302 1SS119 MIX
Q303 2SC3311A BLANK DRIVE
Q304 2SA1309A
Q304 2SA1309A H PHASE CURRENT SOURCE

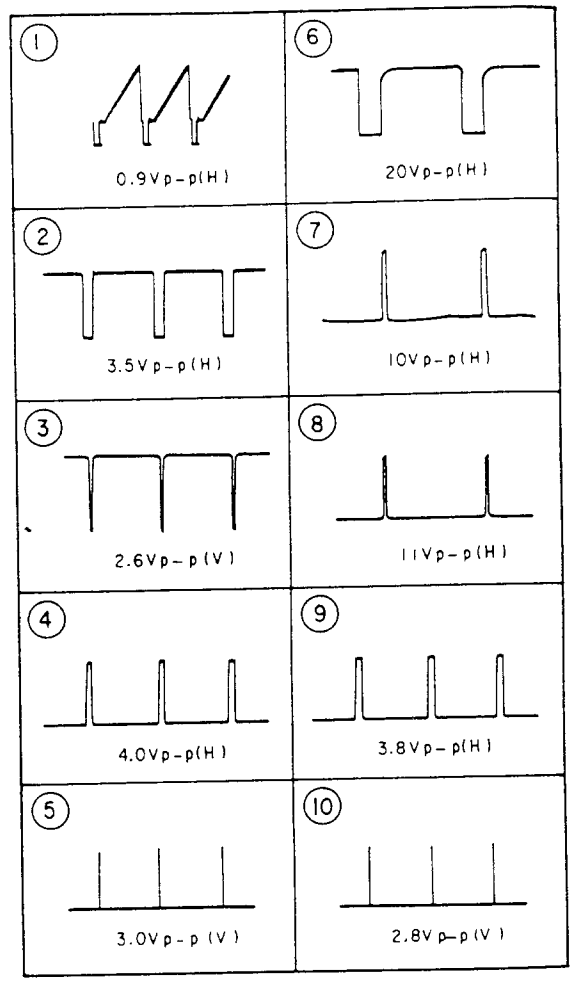

28
29
30
31
32
33
34
35
Q204
2SA1309A
H PHASE CURRENT SOURCE
Q205
2SA1309A
H PHASE CURRENT SOURCE
Q206
2SC3311A
H PHASE AMP
IC15(2/2)
RC4558P
H PHASE AMP
R146
220
R147
220
C90
47
16V
D207
RD6.2ESB2
PROTECTIN
DETECT
C254
47
16V
VERT OSC
VERT PULSE
X RAY PROT
PHASE SHIFTER
SAW TOOTH GENE
AFC
H.OSC
IC101
LA7856
H.OSC
V.OSC
H PHASE
X RAY PROT
D202
RD12ESB2
PULSE CLIP
Q207,208,209
2SC3311A
H PHASE SELECT
Q208
2SC3311A
Q209
2SC3311A
Q210
2SC3311A
Q211
2SC3311A
Q212
2SC3311A
AFC SELECT
Q210,211
2SC3311A
H SAW SELECT
+5V
+12V
+B
N-1
20P
BLU
HDS
1 HΦ
2 VΦ
3 H.FBT
4 MUTE
5 HV.STP
6 CS1
7 CS2
8 CS3
9 CS4
10 GND
11 H.SAW
12 H.PARA
13 V.PARA
14 V.SIZE
15 H.SIZE
16 PIN
17 GND
18 H.STAT
19 V.STAT
20 H.CENT
TO
D3 BOARD
D-1
Q302
2SA1309A
V BLANK BUFFER
Q301
2SC3311A
V BLANK AMP
D302
1SS119
MIX
Q303
2SC3311A
ANK DRIVE
Q304
2SA1309A
Q304
2SA1309A
H PHASE CURRENT SOURCE


B 1(SYNC PROCESSOR & EMI FILTER)
D501,503 1S2837 SURGE PROT
D502,504 1S2835 SURGE PROT
D503 1S2837
D504 1S2835
D501 1S2837
D502 1S2835
SURGE PROT
D505 1SS123
IC503 RC78L09 9V REG
+9V
C530 47 16V
C534 0.1 25V F:CHIP
R510 56k :RN-CP
R511 47k :RN-CP
C510 0.0033 B:CHIP
C508 0.1 25V B:CHIP
R506 33k :CHIP
C507 0.1 25V F:CHIP
R507 3.9k :CHIP
R503 270 :CHIP
C502 0.47
C546 15p B:CHIP
C501 4.7 50V
R502 100 :CHIP
R505 100 :CHIP
C547 220p B:CHIP
R501 4.7k :CHIP
R504 4.7k :CHIP
C505 0.1 25V F:CHIP
C506 0.1 25V F:CHIP
C509 0.1 25V F:CHIP
C511 0.0033 B:CHIP
R508 27k :RN-CP
R536 100 :CHIP
R516 2.2k :CHIP
C VIDEO
H SYNC
V SYNC
SYNC SEP
CS DEF
VS DEF
PH
EH
Q4
Q3
Q2
Q1
VO
V1
Vcc
VSREF
HΘ
VΘ
IS
PV
EV
GNΘ
IC501 CXA1365S SYNC SEP PROCESS
B-3 10P BOARD-IN
NC 1
NC 2
HS 3
VS 4
GNΘ 5
NC 6
NC 7
NC 8
NC 9
NC 10
TO MI BOARD M-1
+5V
C560 47 16V
C539 0.1 25V F:CHIP
C523 0.1 25V F:CHIP
D510 1S2835 LIMITTER
C536 220p :CHIP
R546 3.9k :CHIP
IC505 TC74HC123AF INT/EXT DETECT & DUTY CONST
Q514 2SC1623 HD-BUFF
R560 4.7k :CHIP
IC504 SN74LS00NS INPUT BUFF LOGIC SW.
R/C C
CLR
(1/2)
(2/2)
C535 1000p :CHIP
R545 56k :CHIP
R535 100 :CHIP
R551 10k :CHIP
C544 0.1 25V F:CHIP
R549 10k :CHIP
R550 120k :CHIP
C543 1000p CH:CHIP
IC508 RC4558M INTEGRATOR
C548 0.1 25V F:CHIP
C545 47 16V
-12V


6
7
8
9
10
11
12
13
IC503
RC78L09A
9V REG.
IC502
TC45288FHB
REF-P & BKG-P GEN.
IC501
CXA1365S
SYNC SEP PROCESS
IC505
TC74HC123AF
INT/EXT DETECT
& DUTY CONST
IC506
TC74HC123AF
C BLK-P & HD-P
GEN.
IC507
RC79L05A
5V REG.
IC508
RC4558M
INTEGRATOR
SURGE PROT
D505
1SS123
SPEED UP
Q503
2SC1621
INV.
Q504
2SC1623
REF-P OUT
Q505
2SA812
REF-P OUT
Q506
2SC1623
BLK-P OUT
Q507
2SA812
BKG-P OUT
Q508
2SC1621
BLK-P OUT
Q511
2SC1623
HS-P OUT
Q512
2SA812
HS-P OUT
Q513
2SC1623
C BLK OUT
D508
RB3.9ESB1
-8V REG.
LIMITTER
+9V
+12V
+5V
-12V



B1 BOARD WAVEFORMS

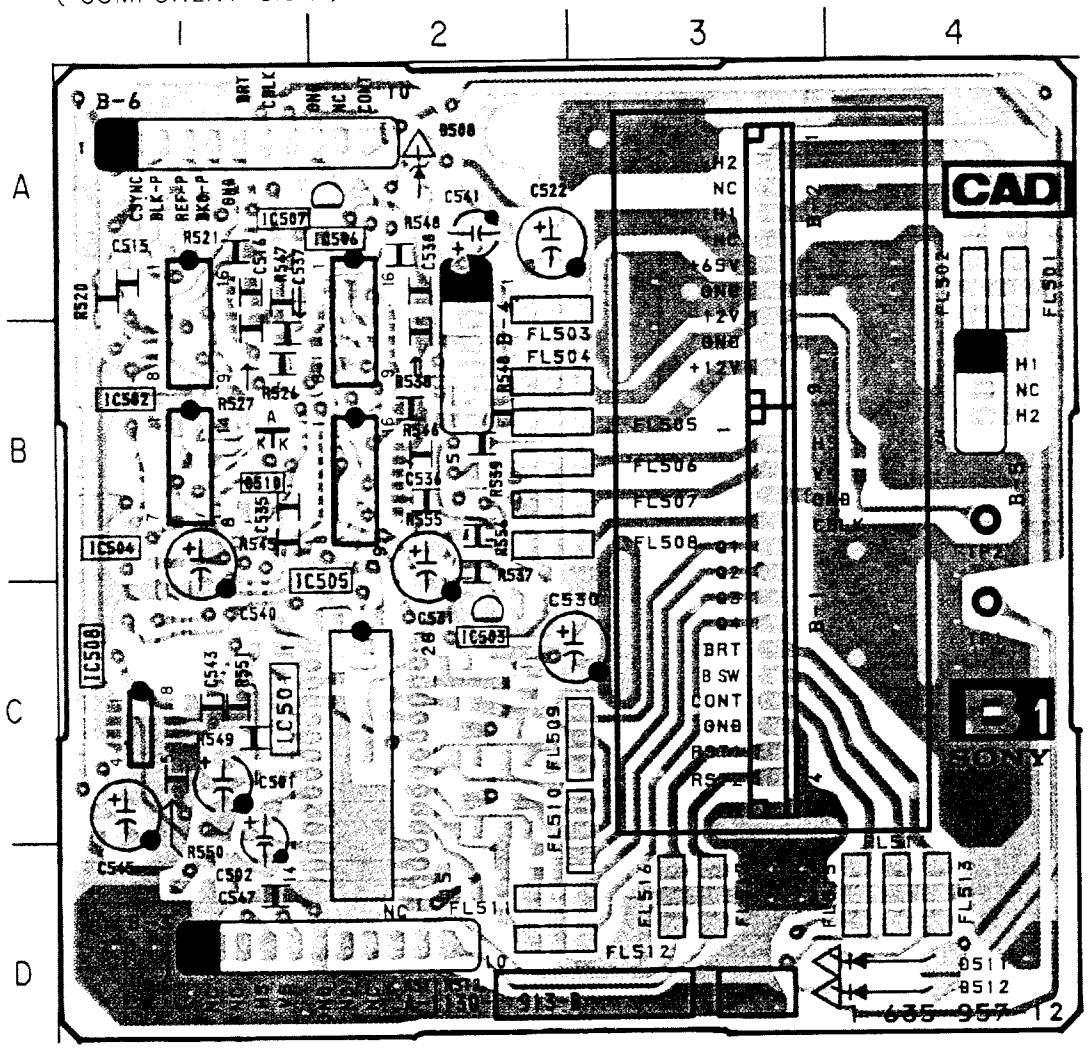


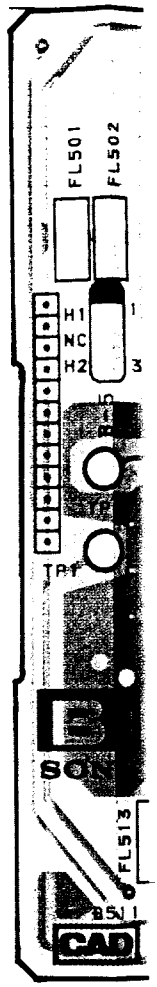
B1

[SYNC PROCESSOR & EMI FILTER]

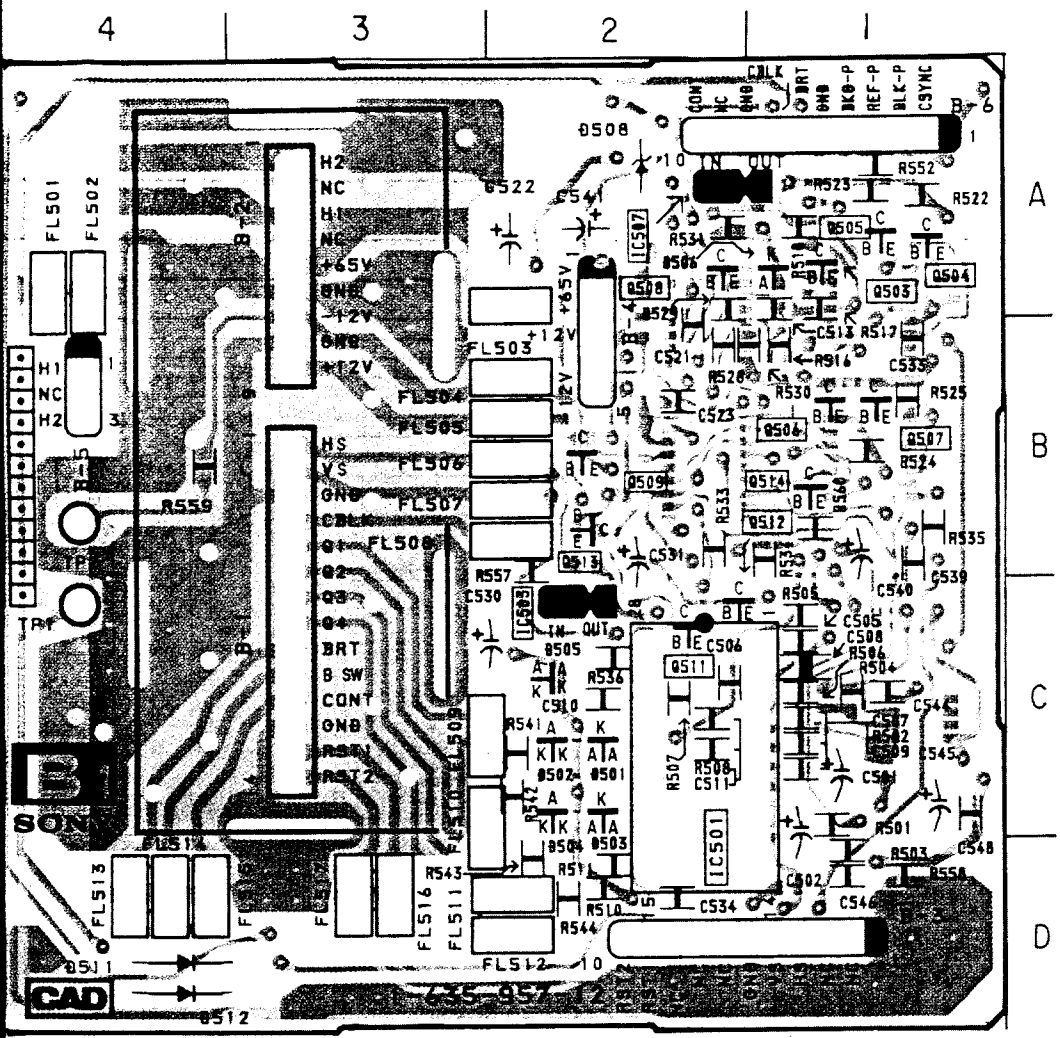
– B1 BOARD –

(COMPONENT SIDE)





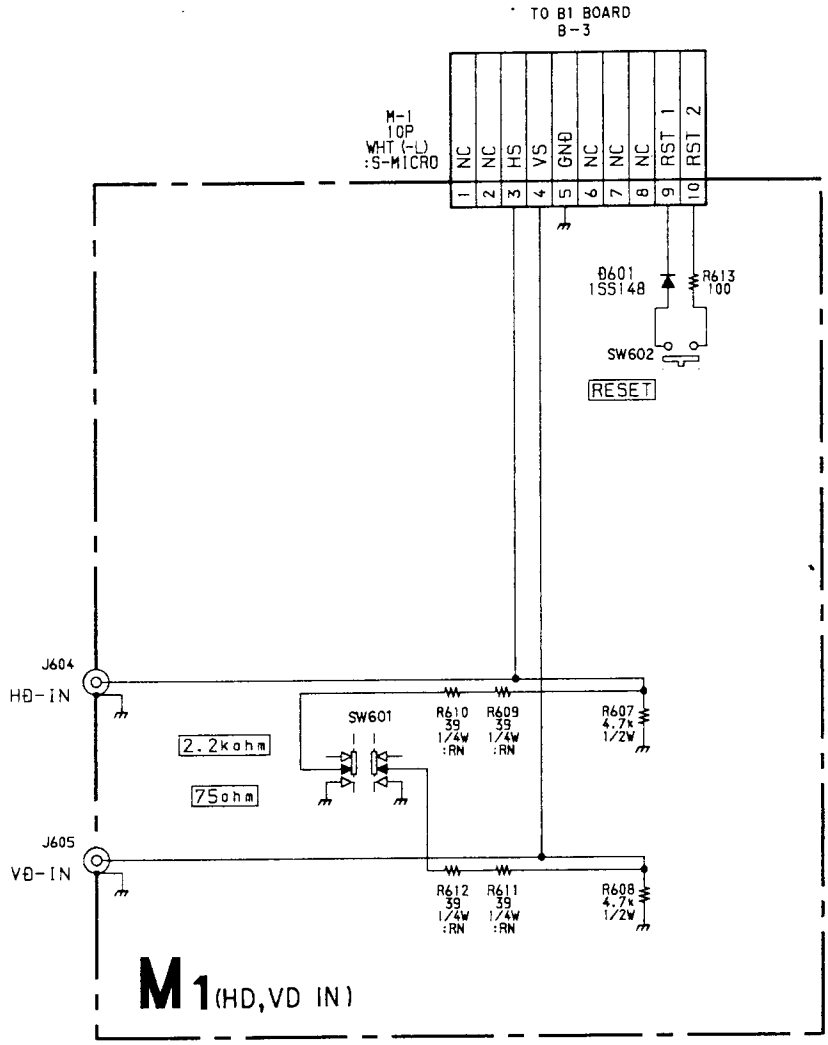
CONDUCTOR SIDE)

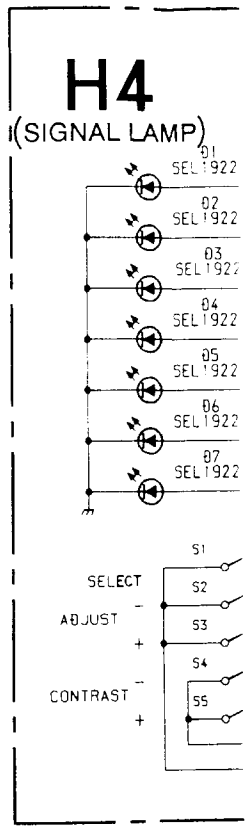


B1 BOARD LOCATION

IC	
IC501	C-2
IC502	B-1
IC503	C-2
IC504	B-1
IC505	B-2
IC506	A-2
IC507	A-2
IC508	C-1
TRANSISTOR	
Q503	A-1
Q504	A-1
Q505	A-1
Q506	B-1
Q507	B-1
Q508	A-2
Q509	B-2
Q511	C-2
Q512	C-2
Q513	B-2
Q514	B-1
DIODE	
D501	C-2
D502	C-2
D503	C-2
D504	C-2
D505	C-2
D506	A-1
D508	A-2
D510	B-1
D511	D-4
D512	D-4

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

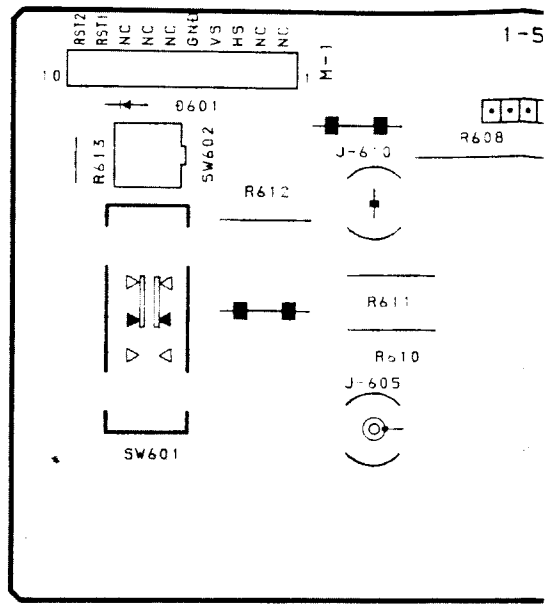

TO B1 BOARD
B-3
M-1
10P
WHT (-L)
:S-MICRO
NC
NC
HS
VS
GND
NC
NC
NC
RST 1
RST 2
1
2
3
4
5
6
7
8
9
10
D601
1SS148
R613
100
SW602
RESET
J604
HD-IN
2.2kohm
75ohm
SW601
R610
39
1/4W
:RN
R609
39
1/4W
:RN
R607
4.7k
1/2W
J605
VD-IN
R612
39
1/4W
:RN
R611
39
1/4W
:RN
R608
4.7k
1/2W
M1 (HD,VD IN)

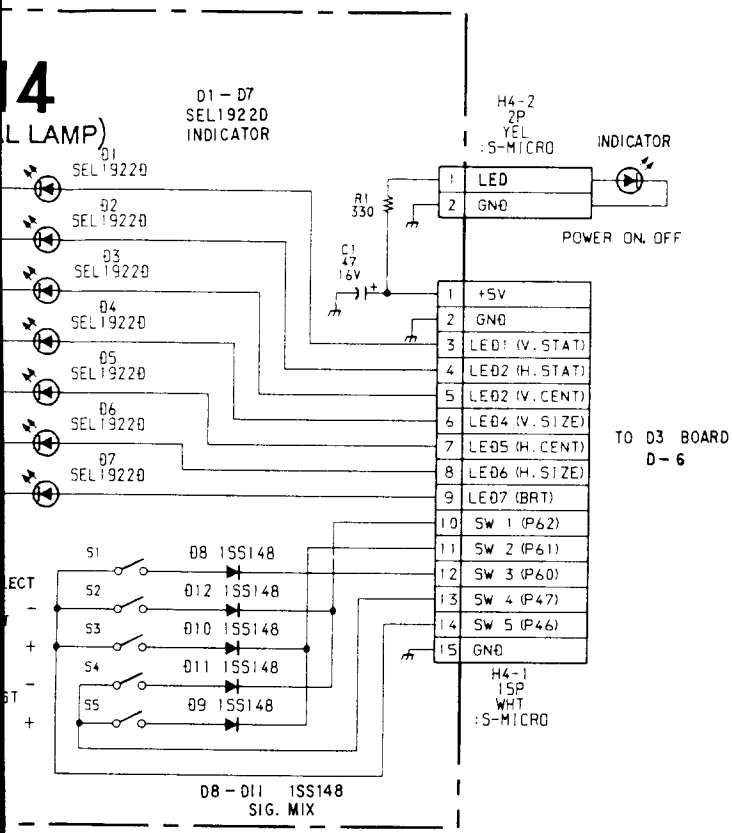

H4
(SIGNAL LAMP)
D1
SEL1922
D2
SEL1922
D3
SEL1922
D4
SEL1922
D5
SEL1922
D6
SEL1922
D7
SEL1922
S1
SELECT
S2
ADJUST
S3
S4
CONTRAST
S5

8 9 10 11

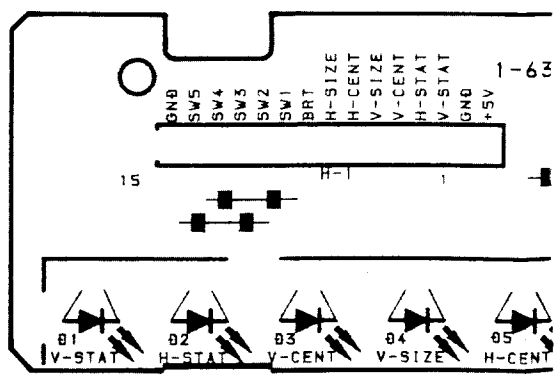
M1 [HD, VD IN]

– M1 BOARD –

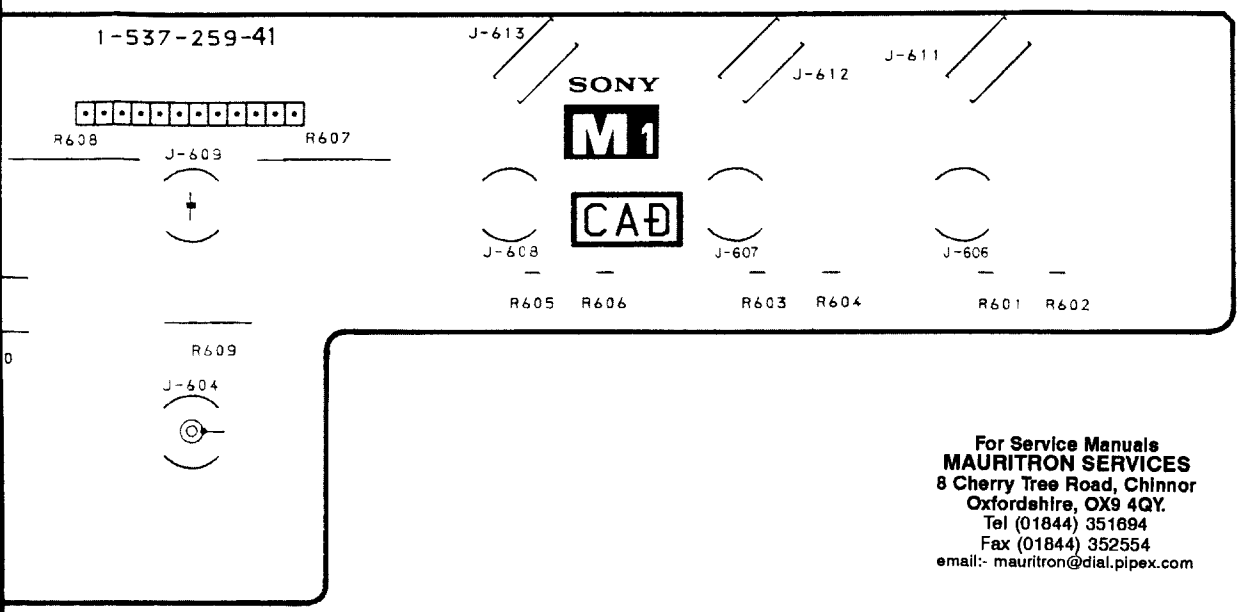


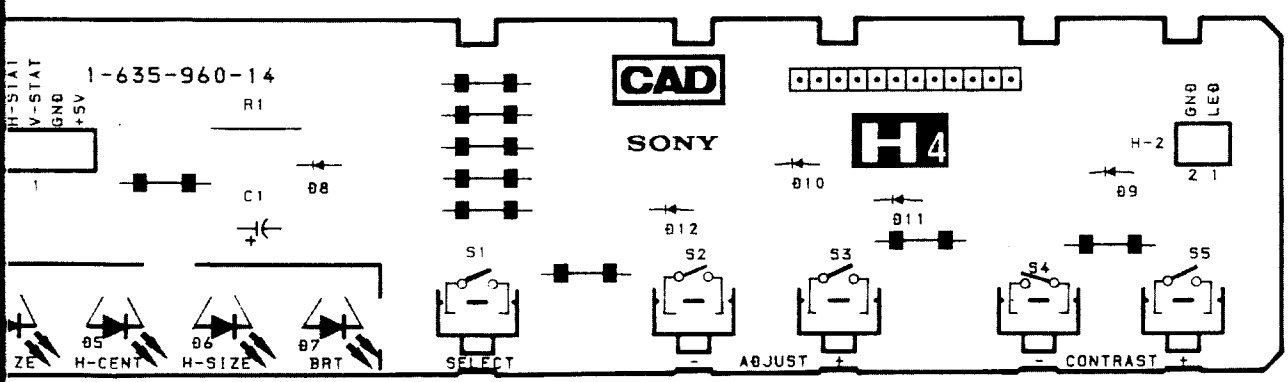


– H4 BOARD –



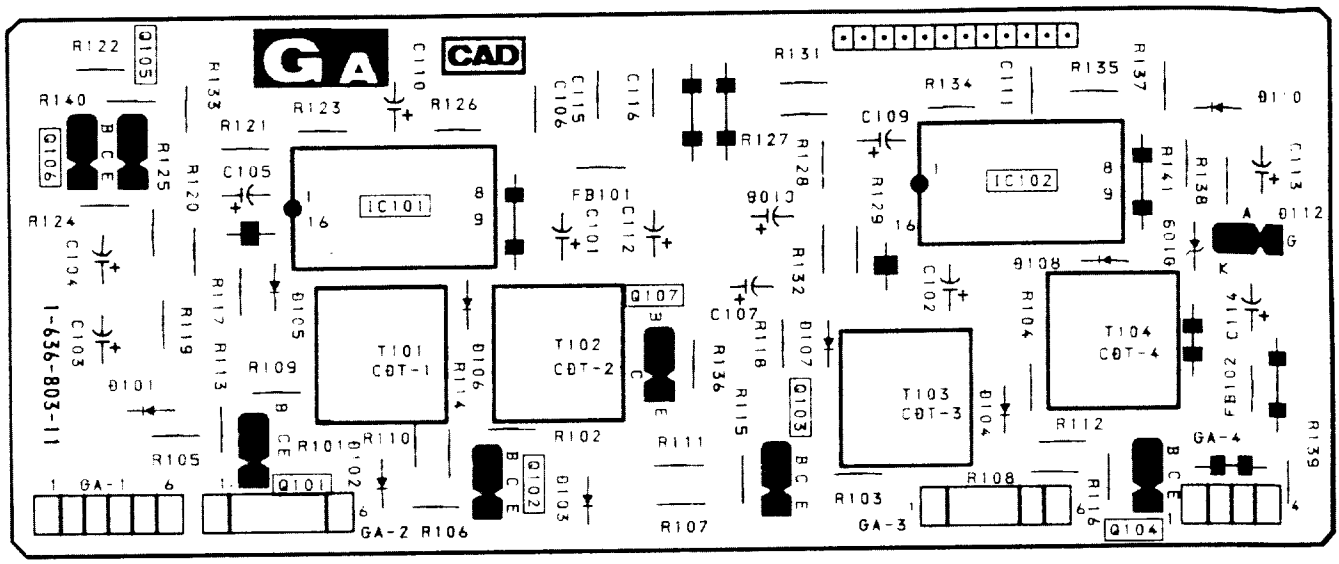
H4 [SIGNAL LAMP]



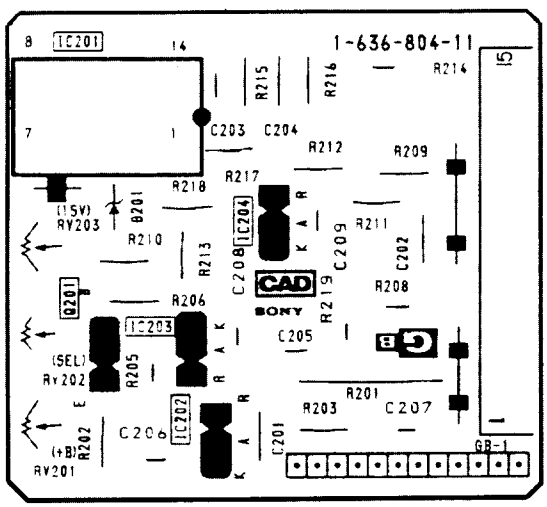


GA [POWER CONTROL] **GB** [CONSTANT-VOLTAGE]

– GA BOARD –

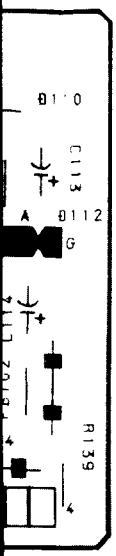


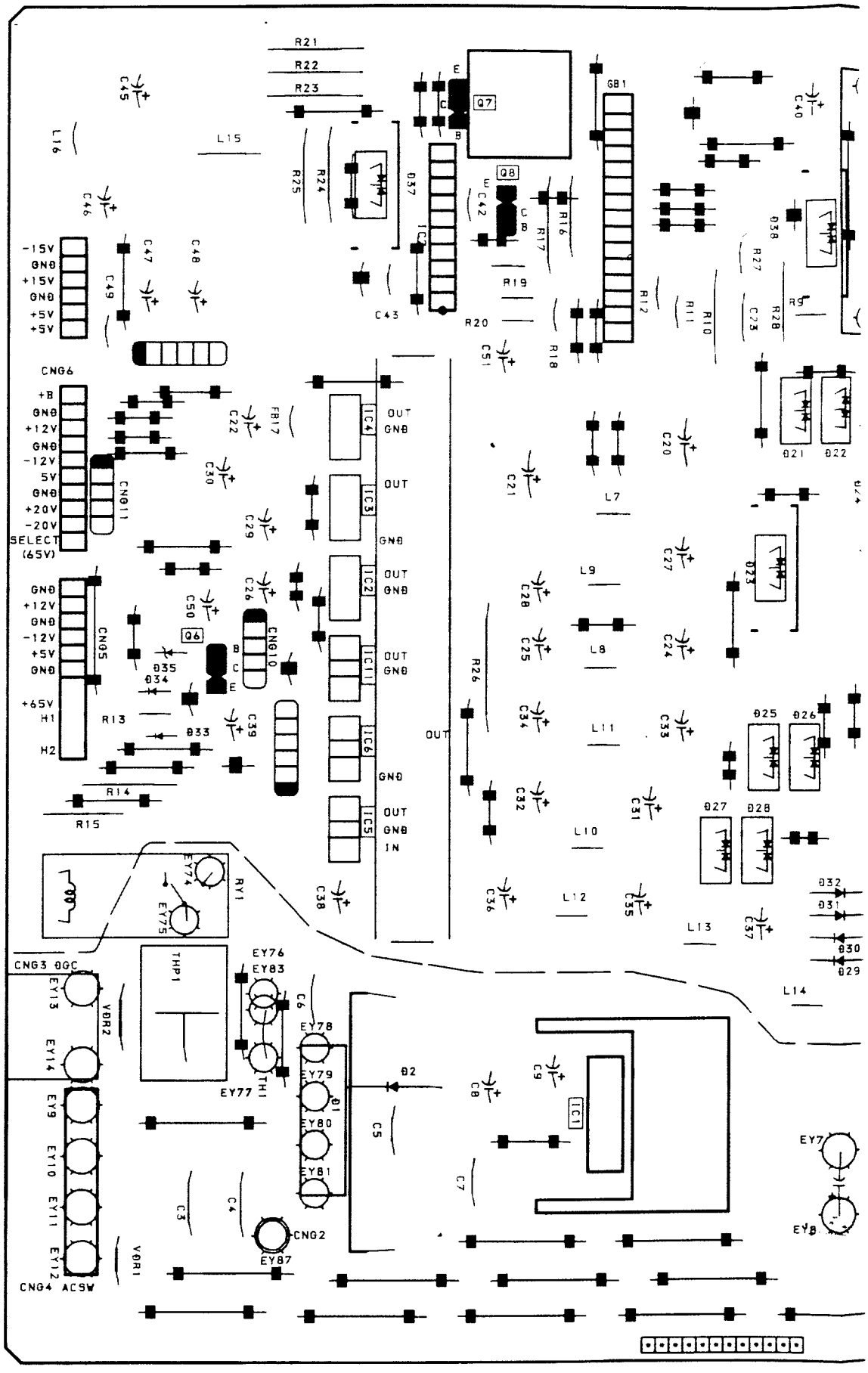
– GB BOARD –

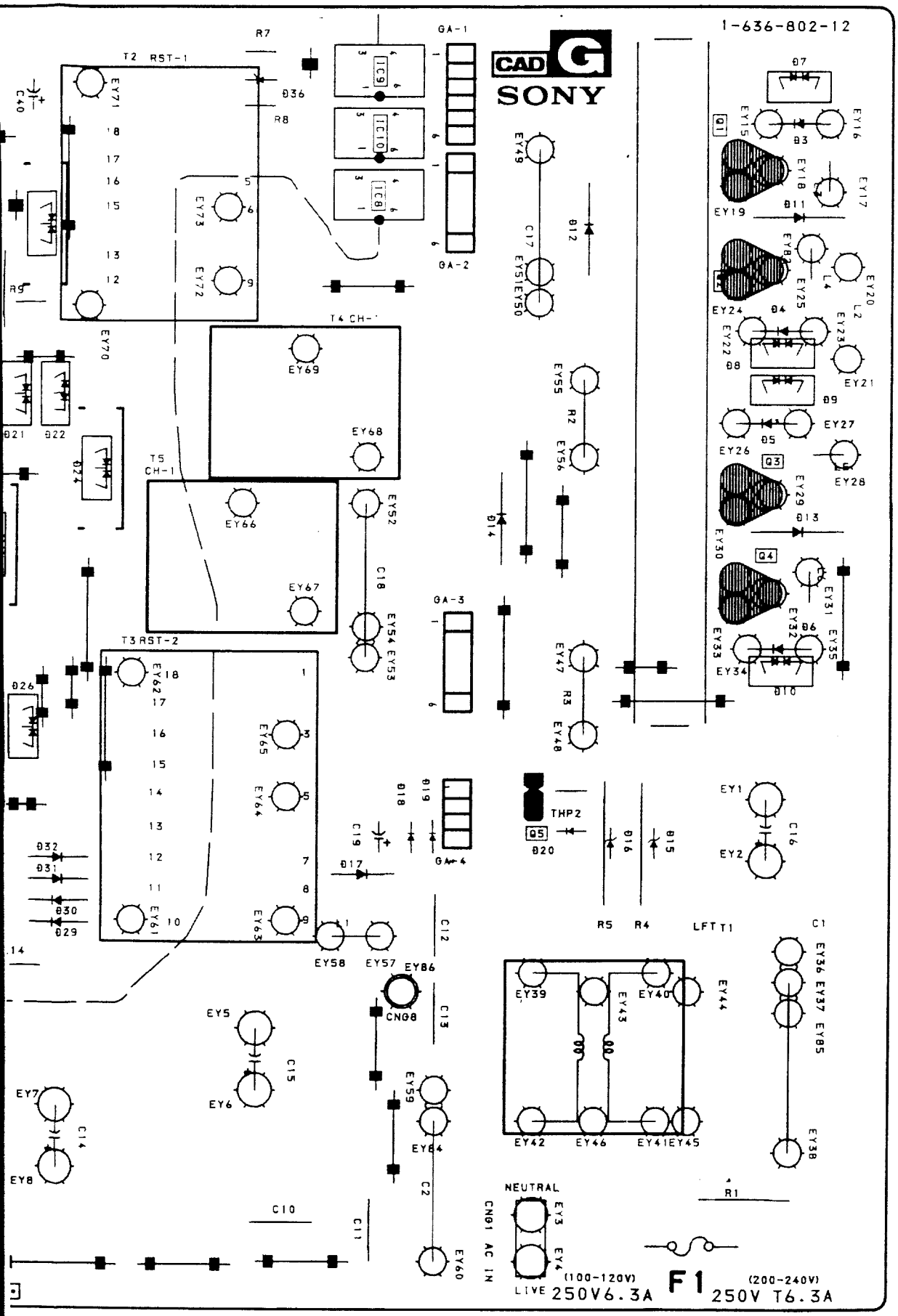


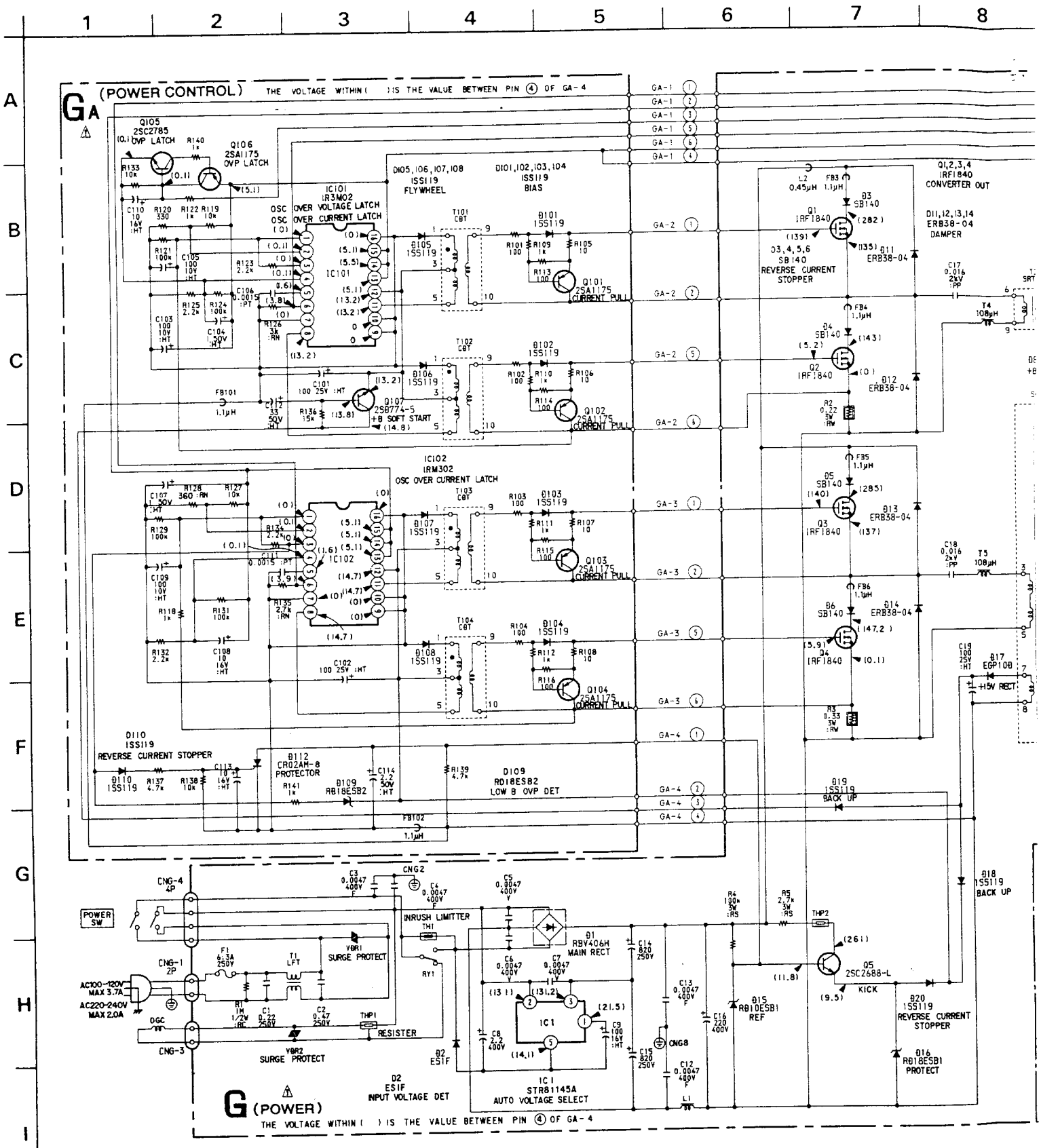
G [POWER]

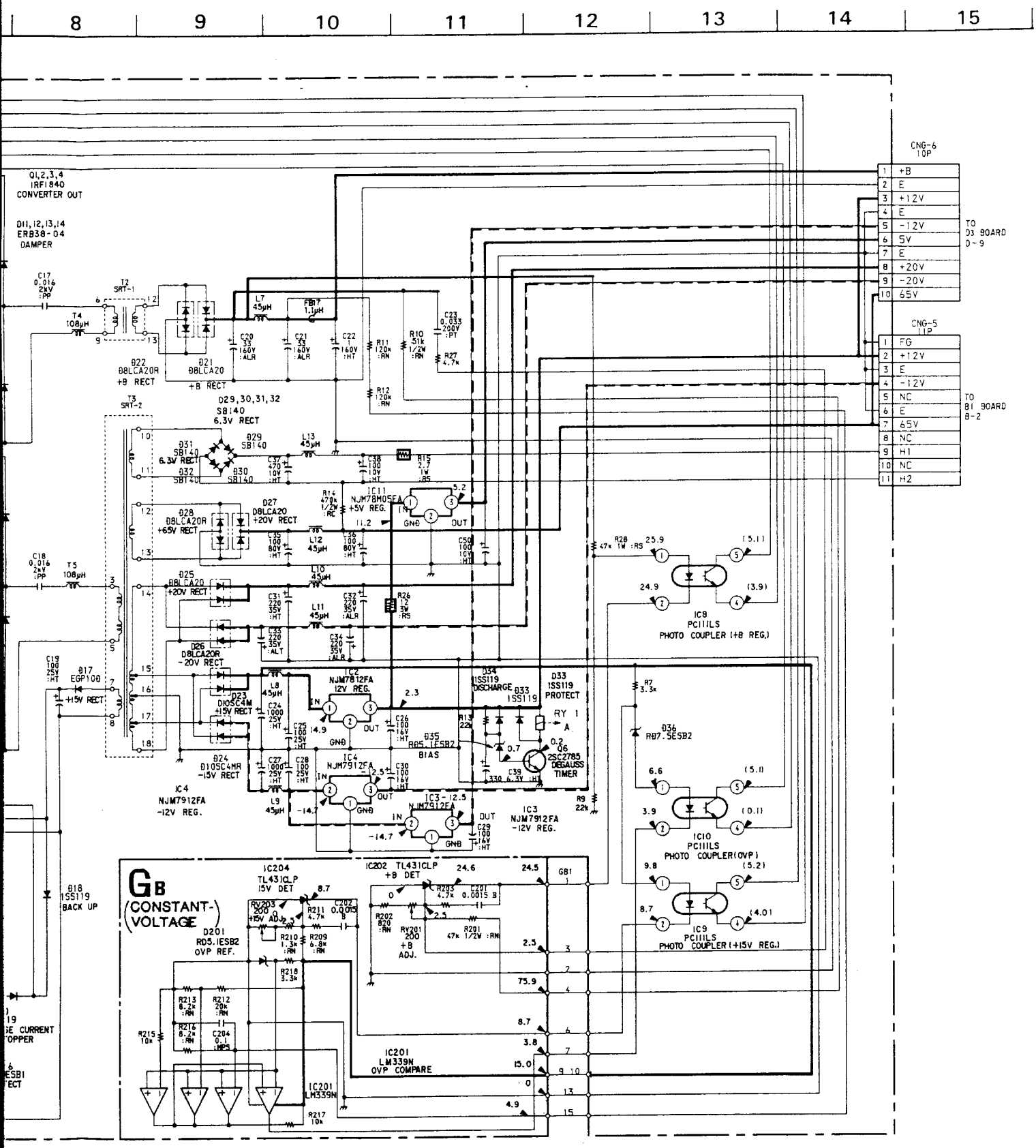
– G BOARD –





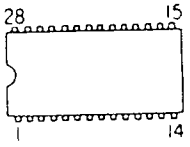

1-636-802-12
SONY
CAD
T2 RST-1
T4 CH-1
T5 CH-1
T3 RST-2
GA-1
GA-2
GA-3
GA-4
IC9
IC10
IC8
R7
R8
R6
C40
EY71
EY73
EY72
EY70
EY69
EY68
EY66
EY67
EY52
EY54 EY53
EY49
EY51 EY50
EY55
EY56
EY47
EY48
C17
C18
C19
D12
D14
D18
D19
D16
D15
D17
D26
D32
D31
D30
D29
D21
D22
D24
THP2
Q5
D20
EY62
EY65
EY64
EY61
EY63
EY58
EY57
EY86
CN98
C12
C13
EY5
EY6
C15
EY7
EY8
C14
EY59
EY84
C2
C10
C11
EY60
R5
R4
LFT T1
EY39
EY40
EY43
EY42
EY46
EY41 EY45
EY44
C1
EY36 EY37 EY85
EY38
R1
NEUTRAL
CN91 AC IN
EY3
EY4
LIVE
(100-120V)
250V 6.3A
F1
(200-240V)
250V T6.3A
D7
Q1
EY15
EY16
D3
EY18
EY17
EY19
D11
Q2
EY24
EY25
L4
EY20
L2
EY22
D8
EY23
EY21
D9
EY27
D5
EY26
Q3
EY28
EY29
D13
EY30
Q4
EY31
EY35
EY32
D6
EY33
EY34
D10
EY1
EY2
C16


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
J
GA (POWER CONTROL) THE VOLTAGE WITHIN ( ) IS THE VALUE BETWEEN PIN ④ OF GA-4
Q105 2SC2785 OVP LATCH
Q106 2SA1175 OVP LATCH
IC101 IR3M02 OSC OVER VOLTAGE LATCH OSC OVER CURRENT LATCH
IC102 IR3M02 OSC OVER CURRENT LATCH
D105,106,107,108 1SS119 FLYWHEEL
D101,102,103,104 1SS119 BIAS
Q101 2SA1175 CURRENT PULL
Q102 2SA1175 CURRENT PULL
Q103 2SA1175 CURRENT PULL
Q104 2SA1175 CURRENT PULL
Q107 2SD774-5 +B SOFT START
Q1,2,3,4 IRFI840 CONVERTER OUT
D1,2,3,4 SB140 REVERSE CURRENT STOPPER
D11,12,13,14 ERB38-04 DAMPER
D110 1SS119 REVERSE CURRENT STOPPER
D112 CR02AM-8 PROTECTOR
D109 RD18ES82 LOW B OVP DET
D19 1SS119 BACK UP
D18 1SS119 BACK UP
D20 1SS119 REVERSE CURRENT STOPPER
D16 RD18ES81 PROTECT
D15 RB18ES81 REF
D17 EGP10B +5V RECT
D1 RBV406H MAIN RECT
Q5 2SC2688-L KICK
Q2 ESIF
IC1 STR81145A AUTO VOLTAGE SELECT
D2 ESIF INPUT VOLTAGE DET
G (POWER) THE VOLTAGE WITHIN ( ) IS THE VALUE BETWEEN PIN ④ OF GA-4
POWER SW
CNG-4 4P
CNG-1 2P
CNG-3
CNG2
CNG8
AC100-120V MAX 3.7A
AC220-240V MAX 2.0A
INRUSH LIMITTER
SURGE PROTECT
RESISTER
GA-1
GA-2
GA-3
GA-4


8
9
10
11
12
13
14
15
Q1,2,3,4
IRFI840
CONVERTER OUT
D11,12,13,14
ERB38-04
DAMPER
CNG-6
10P
1 +B
2 E
3 +12V
4 E
5 -12V
6 5V
7 E
8 +20V
9 -20V
10 65V
TO
03 BOARD
0-9
CNG-5
11P
1 FG
2 +12V
3 E
4 -12V
5 NC
6 E
7 65V
8 NC
9 H1
10 NC
11 H2
TO
01 BOARD
B-2
D22
B8LCA20R
+B RECT
D21
B8LCA20
+B RECT
D29,30,31,32
SB140
6.3V RECT
D31
SB140
6.3V RECT
D32
SB140
D29
SB140
D28
B8LCA20R
+65V RECT
D27
B8LCA20
+20V RECT
D25
B8LCA20
+20V RECT
D26
B8LCA20R
-20V RECT
D23
DIOSC4M
+15V RECT
D24
DIOSC4MR
-15V RECT
D18
1SS119
BACK UP
D17
EGP10D
+15V RECT
D34
1SS119
DISCHARGE
D33
1SS119
PROTECT
D35
RD5.1ESB2
BIAS
D36
RD7.5ESB2
D201
RD5.1ESB2
OVP REF.
IC1
NJM78M05FA
+5V REG.
IC2
NJM7812FA
12V REG.
IC3
NJM7912FA
-12V REG.
IC4
NJM7912FA
-12V REG.
IC8
PC111LS
PHOTO COUPLER (+B REG.)
IC10
PC111LS
PHOTO COUPLER(OVP)
IC9
PC111LS
PHOTO COUPLER(+15V REG.)
IC201
LM339N
OVP COMPARE
IC202 TL431CLP
+B DET
IC204
TL431CLP
15V DET
2SC2785
DEGAUSS
TIMER
RY 1
GB
(CONSTANT-
VOLTAGE)
+B
ADJ.
T2
SRT-1
T3
SRT-2
T4
108μH
T5
108μH
L7
45μH
FB17
1.1μH
L8
45μH
L9
45μH
L10
45μH
L11
45μH
L12
45μH
L13
45μH

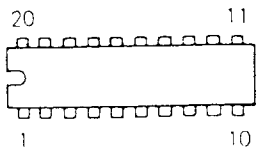
7-5. SEMICONDUCTORS

CXA1158P
CXA1365S
CXA1366S
DAC8408HP



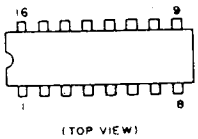
(Top view)

DAC8800FP
LA7856



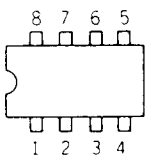
(Top view)

HD74HC123P
IR3M02
TC74HC123AF
TC74HC123AP
TC74HC123F



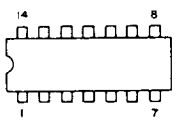
(TOP VIEW)

LM2903DQ
RC4558P
TL082ACP
TL082CP



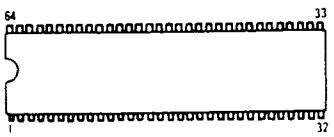
(Top view)

LM339N
SN74HC04AN
SN74LS00NS



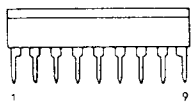
(TOP VIEW)

M50747-2B9SP

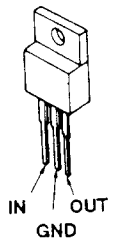


(Top view)

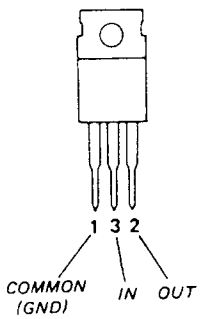
M6M80021L



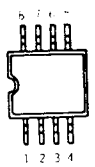
NJM7812FA
NJM78M05FA



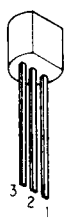
NJM7912FA



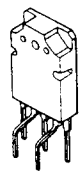
RC4558DD
RC4558M
μPC4558G2



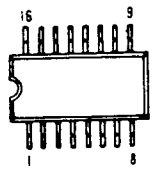
RC78L05A
RC78L09A



STR-80145FA

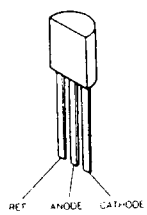


MC14528BF
TC4528BFHB

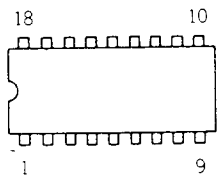


(TOP VIEW)

TL431CLP

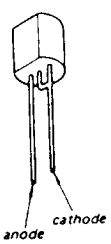


μPA2981C

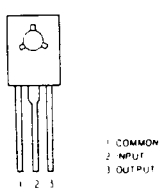


(Top view)

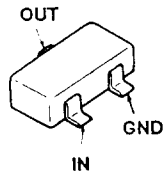
μPC574J



μPC79N05H
μPC79N05H

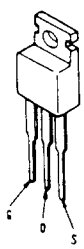


DTB123TS

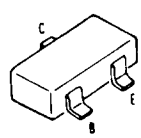


DTA124ES
DTC124ES
DTC144WS
2SC2668
2SC2668-O
2SC2668-Y

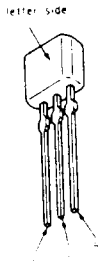
IRFI840
IRFI9630
IRFPE50
IRF540
IRF9620



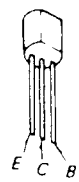
2SA1037K-QR
2SA1162-G
2SA1462
2SA812
2SC1621
2SC1623-L6
2SC2412K
2SC2412K-QR
2SC3052F
2SC3545



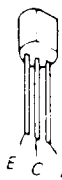
2SA1175
2SA1175-HFE
2SA1309A
2SA1309A-R
2SA1309A-QRS
2SC2785
2SC2785-HFE
2SC3311A
2SC3311A-R
2SC3311A-QRS



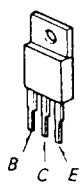
2SA1207
2SC1890A
2SC2909



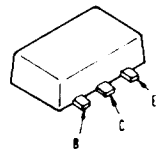
2SA893A



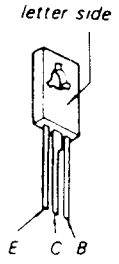
2SA968B-O
2SA968B-Y
2SB860
2SB861
2SC2238B-O
2SC4632-CB7
2SD1137



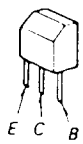
2SB798
2SB798-DL
2SD1366A



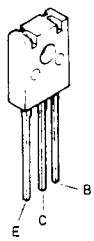
2SC2688
2SD986-L



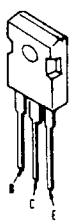
2SC3209-L
2SC3209-LK
2SD774-5



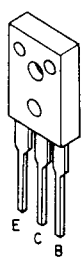
2SC3950-D
2SC3952-D



2SC3997CA
2SC4532

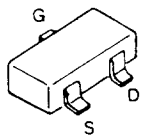


2SD1724

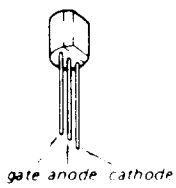


2SK1342

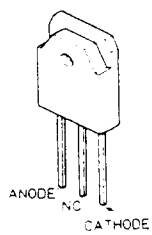
2SK160-K6



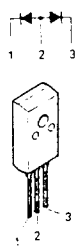
CR02AM-4
CR02AM-8



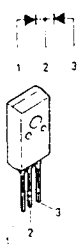
DD50R



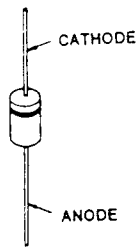
D8LCA20
D10SC4MR



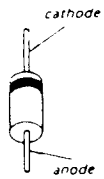
D8LCA20R
D10SC4M



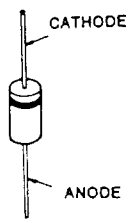
EGP10D
ERA34-10
ERA91-02
ERB38-04
ERC38-06
ERC81-004
ERC91-02
RGP10G
RU-3AM



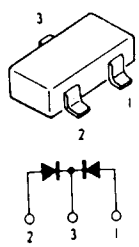
ERD09-15



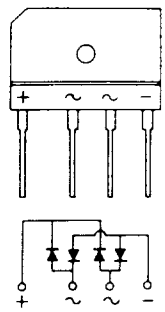
ES1F
SB140
1SS82
1SS83
10E2



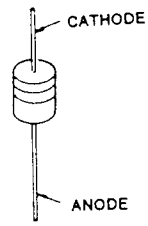
MA152WK
1S2837



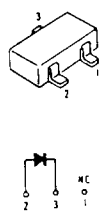
RBV-406H-01



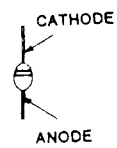
RD10ES-B1
RD10ES-B2
RD12ES-B2
RD16ES-B1
RD16ES-B2
RD16ES-B3
RD18ES-B1
RD18ES-B2
RD2.2ES-B2
RD3.9ES-B1
RD3.9ES-B2
RD30ES-B2
RD30ES-B4
RD5.1ES-B2
RD6.2ES-B2
RD7.5ES-B2
RD8.2ES-B1
RD9.1ES-B2
1SS119
1SS148



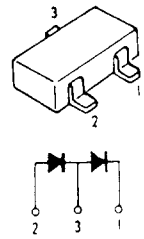
RD5.6M-B3
RD6.8M-B3
RD9.1M-B1



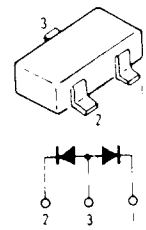
V19E



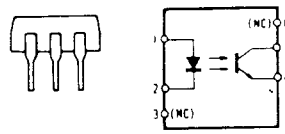
1SS123
1SS226



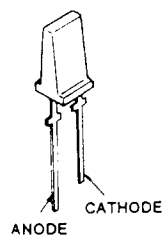
1S2835
1S2836



PC111LS



SEL1922D-C



SECTION 8
EXPLODED VIEWS

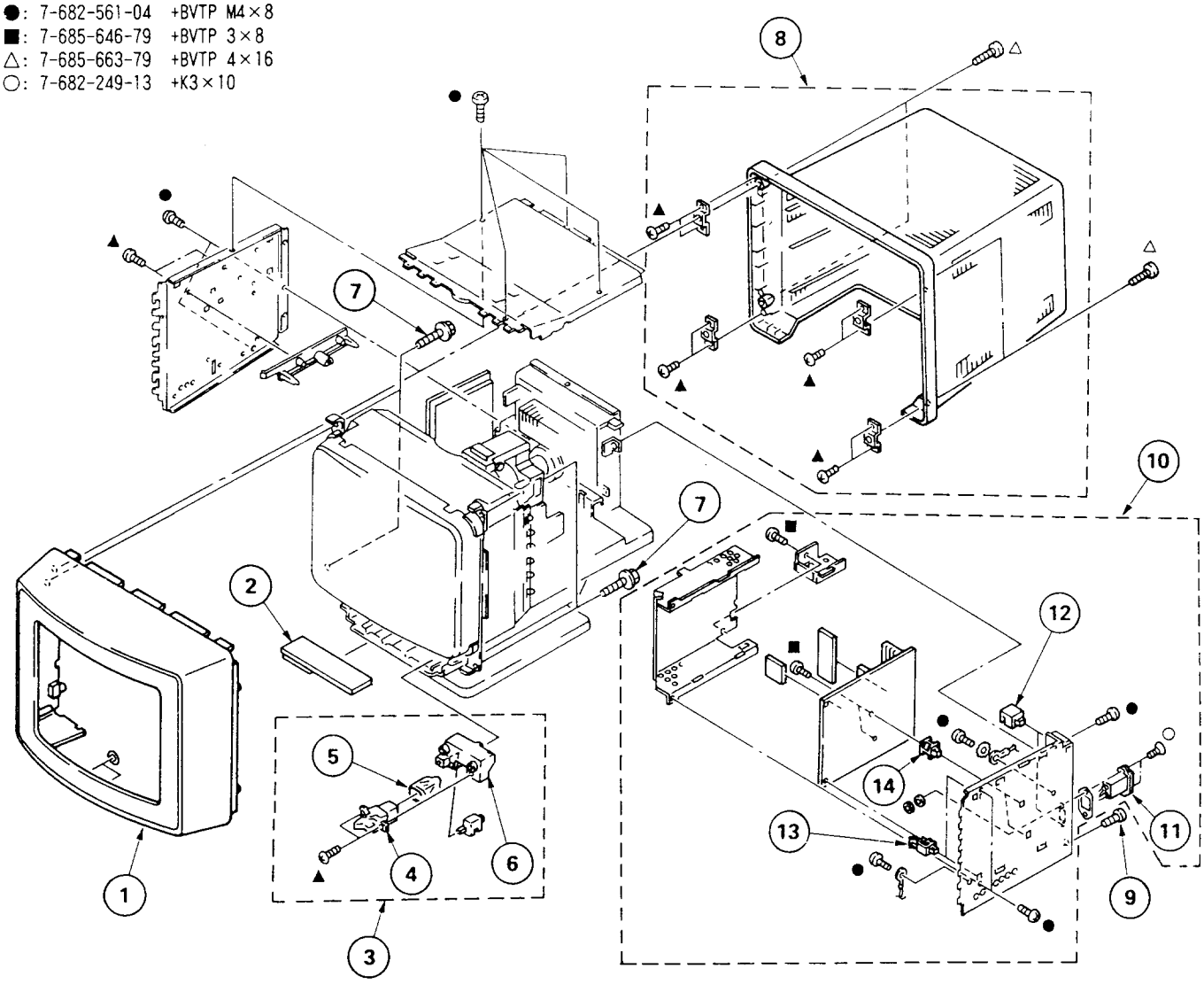
NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

8-1. BEZEL, CABINET

▲: 7-685-648-79 +BVTP 3×12
●: 7-682-561-04 +BVTP M4×8
■: 7-685-646-79 +BVTP 3×8
△: 7-685-663-79 +BVTP 4×16
○: 7-682-249-13 +K3×10



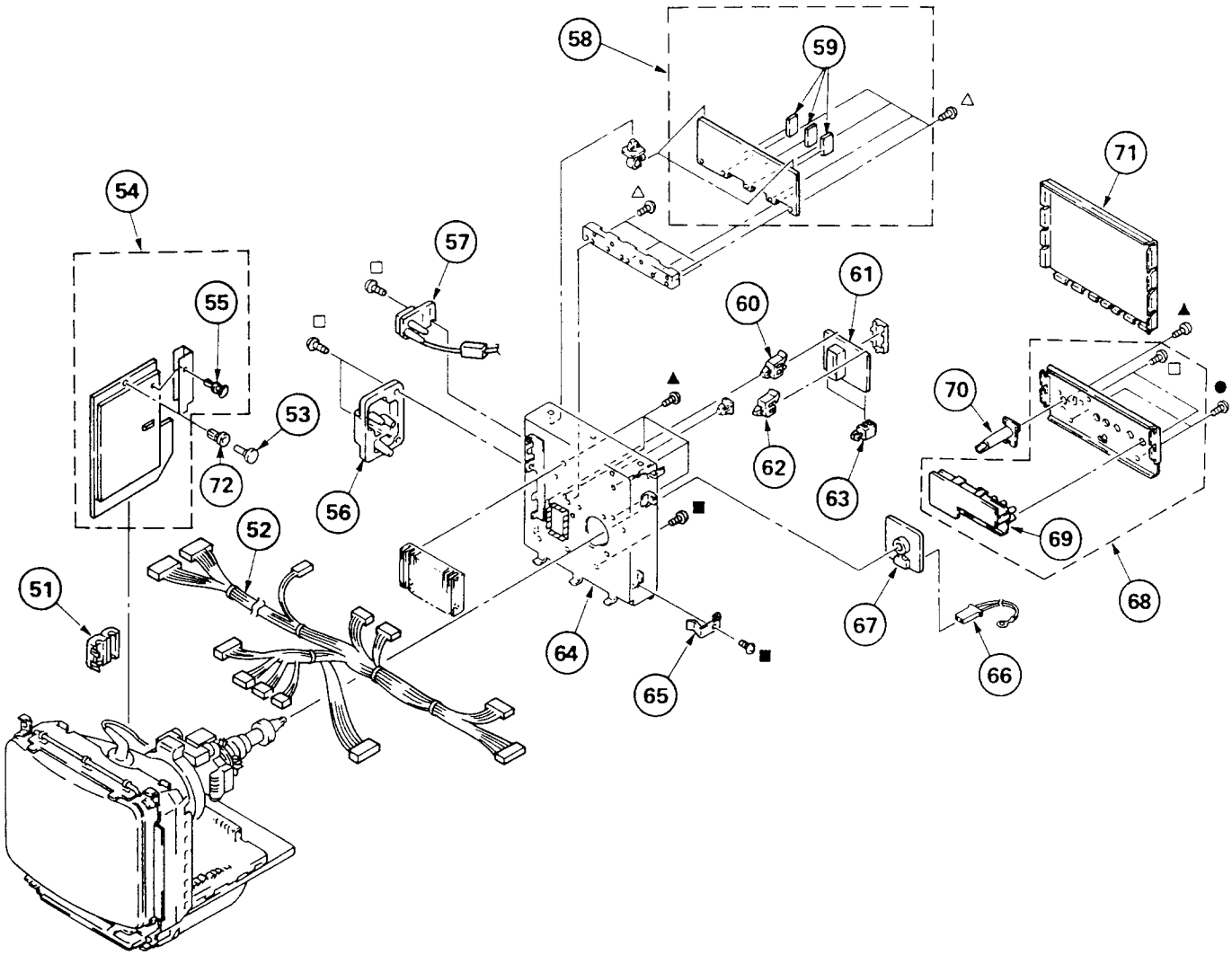
REF.NO.	PART NO.	DESCRIPTION	REMARK
1	X-4030-146-1	BEZEL ASSY	
2	*A-1500-161-A	H4 BOARD, COMPLETE	
3	*A-1404-584-A	SW ASSY, POWER	4-6
4	⚠1-570-778-31	SWITCH, SEESAW (AC POWER)	
5	*4-381-806-01	COVER, SWITCH	
6	*4-395-845-01	BRACKET, POWER SWITCH	
7	4-365-808-01	SCREW (5), TAPPING	
8	X-4030-151-1	CABINET ASSY	
9	4-389-025-01	SCREW (M4X8) (EXT TOOTH WASHER)	
10	⚠.A-1500-160-A	REGULATOR, SWITCHING (CB-100D)	11-14
11	⚠.1-540-157-11	INLET, AC (3P WITH NOISE FLTER)	
12	*3-701-903-00	HOLDER, PC BOARD	
13	*3-703-141-00	HOLDER, PCB	
14	*4-303-473-01	SUPPORT, PC	

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

8-2. CHASSIS

▲: 7-685-648-79 +BVTP 3×12
●: 7-682-561-04 +BVTP M4×8
■: 7-685-646-79 +BVTP 3×8
△: 7-685-663-79 +BVTP 4×16
□: 7-682-548-04 +BTP 3×8



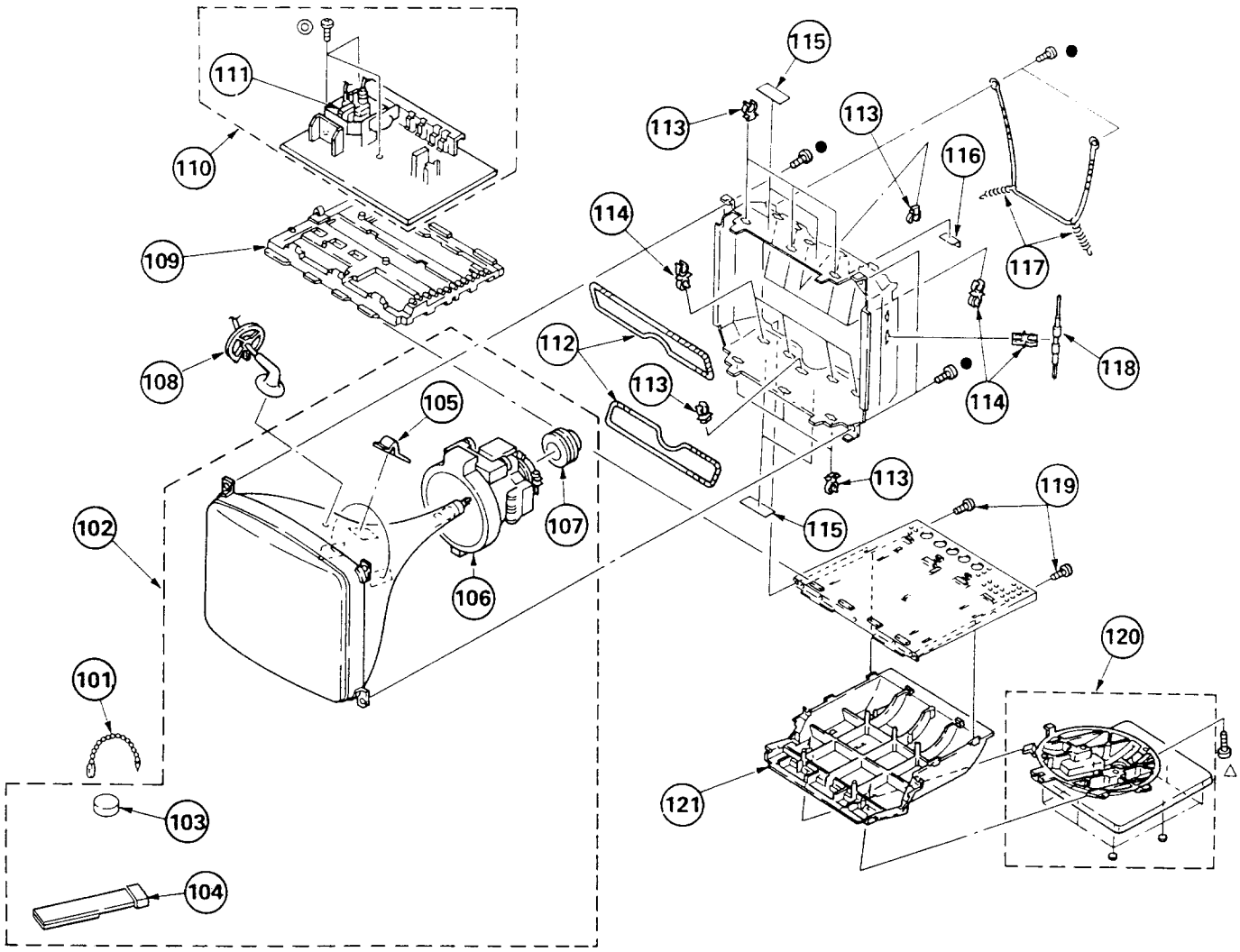
REF.NO.	PART NO.	DESCRIPTION	REMARK
51	1-543-653-11	CORE ASSY, BEAD	
52	*1-946-557-12	HARNESS (MAIN (B))	
53	3-609-177-03	GROMMET	
54	*A-1500-358-A	N BLOCK ASSY	55
55	3-531-576-01	RIVET	
56 ⚠	1-238-745-21	RESISTOR ASSY, HIGH-VOLTAGE (FOCUS)	
57 ⚠	1-237-344-11	RESISTOR ASSY, HIGH-VOLTAGE (H-STAT)	
58	*A-1500-328-A	A BOARD, COMPLETE	59
59	A-1291-930-A	AA1 BOARD, COMPLETE	
60	*3-703-141-00	HOLDER, PCB	
61	*A-1500-158-A	B1 BOARD, COMPLETE	
62	*4-321-929-00	HOLDER, PC BOARD	
63	*3-701-903-00	HOLDER, PC BOARD	
64	*4-395-831-05	CASE, SHIELD, ABC	
65	*4-395-810-01	RETAINER	
66	*1-941-641-01	CONNECTOR ASSY, MINIATURE 2P	
67	*A-1500-087-A	C BOARD, COMPLETE	
68	*A-1500-360-A	PANEL ASSY, CONNECTOR ("M1")	69
69	1-537-259-41	TERMINAL ASSY, INPUT OUTPUT	
70	*4-395-803-01	GUIDE, SCREW	
71	*X-4395-814-2	LID ASSY, ABC SHIELD	
72	*4-927-131-01	SOLENOID	

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

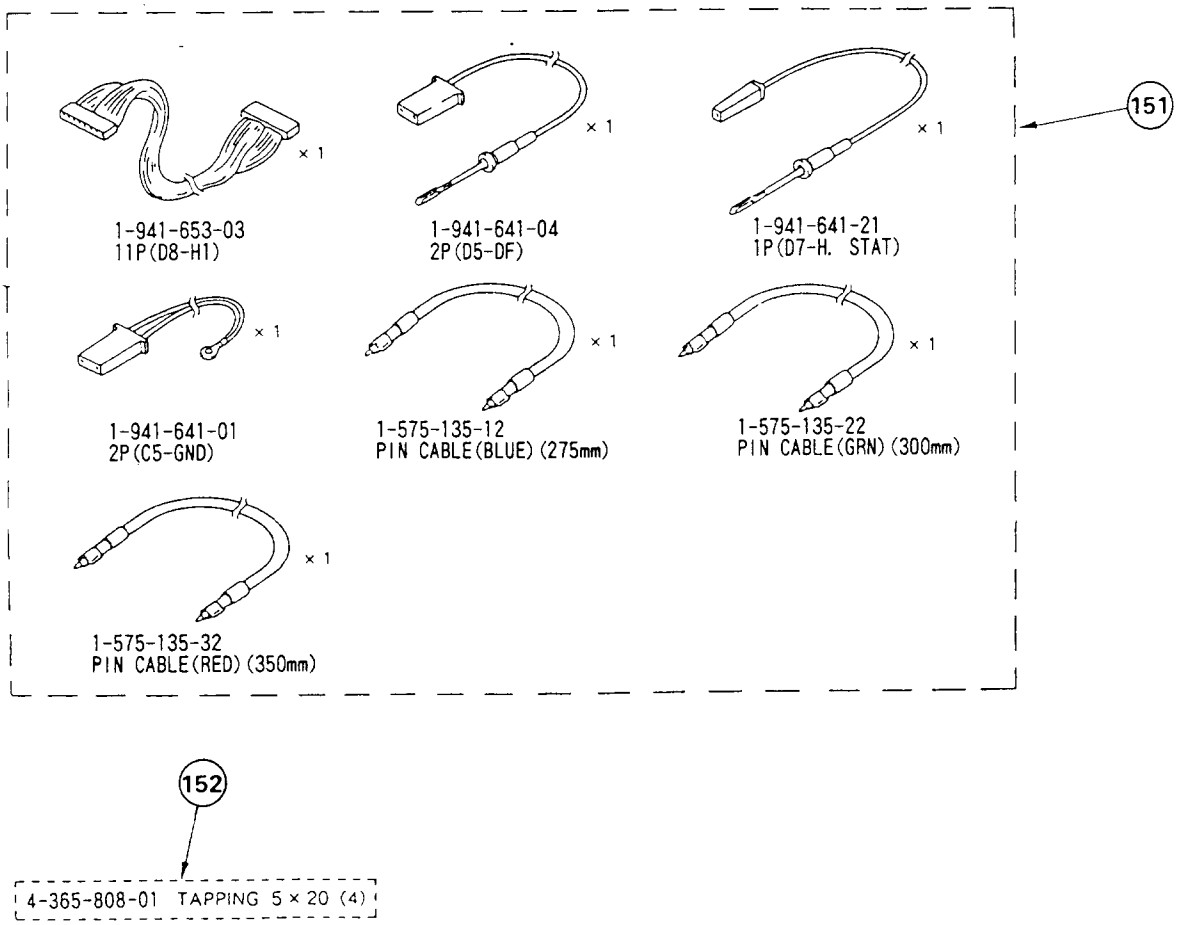
8-3. PICTURE TUBE

●: 7-682-561-04 +BVTP M4×8
△: 7-685-663-79 +BVTP 4×16
◎: 7-685-647-79 +BVTP 3×10



REF.NO.	PART NO.	DESCRIPTION	REMARK
101	4-308-870-00	CLIP, LEAD WIRE	
102 ⚠	*738-041-80	PICTURE TUBE ASSY (CRT,DY,NA)	103-107
103	1-452-032-00	MAGNET,DISK; 10MMφ	
104	X-4029-622-1	PERMALLOY ASSY, CORRECTION	
105	3-703-003-00	SPACER, DY	
106 ⚠	1-451-399-21	DEFRECTION YOKE (KY-6411S)	
107 ⚠	1-452-337-22	NECK ASSY, PICTURE TUBE (NA304)	
108	*3-704-372-01	HOLDER, HV CABLE	
109	*4-029-289-01	BRACKET, PCB	
110	*A-1500-357-A	D3 BOARDD, COMPLETE	111
111 ⚠	1-439-516-11	TRANSFORMER ASSY, FLYBACK (NX-2414)	
112 ⚠	1-426-449-11	COIL, DEMAGNETIZATION	
113	*4-395-824-01	HOLDER, DEGAUSSING COIL	
114	*4-322-922-00	HOLDER, COIL, DEGAUSSER	
115	3-831-441-XX	CUSHION	
116	*4-035-517-01	SHEET, PROTECTION	
117	4-369-318-00	SPRING, TENSION	
118	4-382-826-01	SCREW DRAIVER, ADJUSTMENT	
119	4-389-025-01	SCREW (M4X8)(EXT TOOTH WASHER)	
120	X-4029-226-1	STAND ASSY	
121	4-034-719-11	COVER, BOTTOM	

8-4. KIT



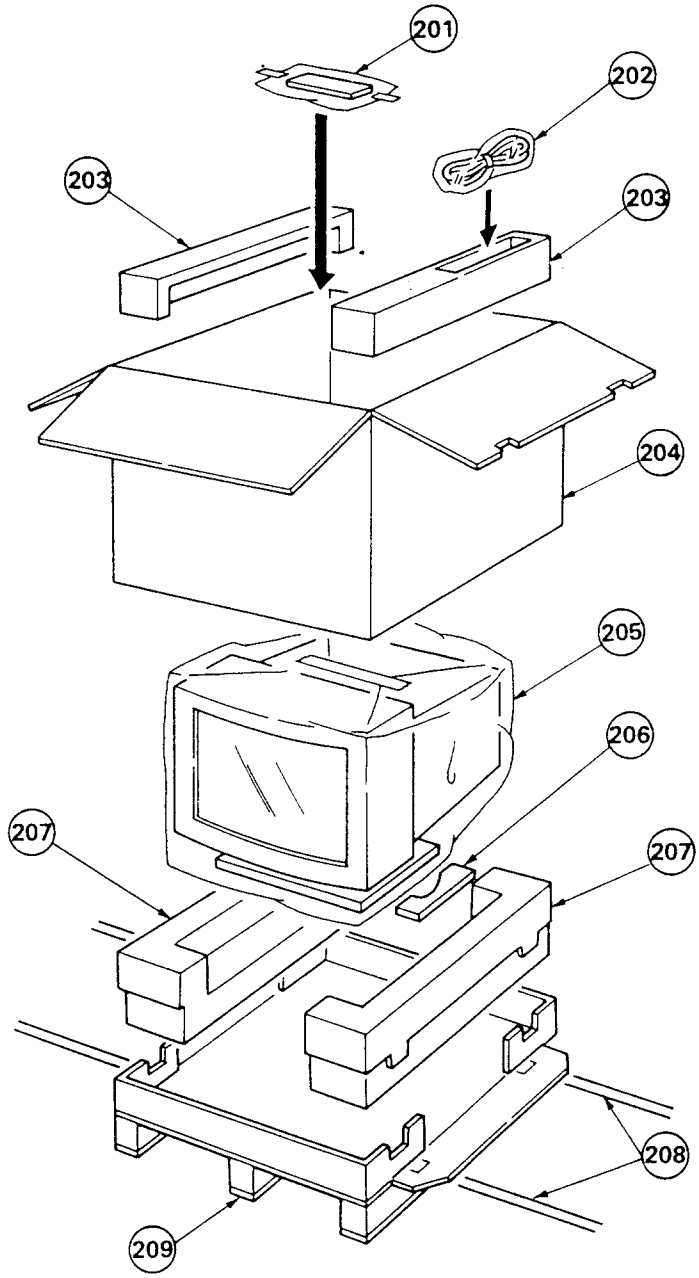
REF.NO.	PART NO.	DESCRIPTION	REMARK
151	*A-1499-989-A	CABLE ASSY	
152	*A-1500-013-A	CRT MOUNTING PARTS	

note: Each part in these kits is not available to order individually.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

8-5. ACCESSORIES & PACKING MATERIALS



REF.NO.	PART NO.	DESCRIPTION	REMARK
201	*3-754-590-41	MANUAL, INSTRUCTION	
202	⚠ 1-690-649-11	CORD SET, POWER (10.0A/250V)	
203	*4-395-851-01	CUSHION (UPPER) (ASSY)	
204	*4-034-279-01	INDIVIDUAL CARTON	
205	*4-368-079-01	BAG, PROTECTION	
206	*4-029-335-01	PAT, TILT FIXED	
207	*4-395-852-01	CUSHION (LOWER) (ASSY)	
208	*4-383-707-01	BAND	
209	*X-4395-809-1	TABLE ASSY, BOTTOM	

B1

SECTION 9
ELECTRICAL PARTS LIST

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

- The components identified by ✖ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- ✱ : Selected to yield optimum performance.
- There are some cases the reference number on one board overlaps on the other board. Therefore, when ordering parts by the reference number, please include the board name.

REF.NO.	PART NO.	DESCRIPTION			REMARK
	*A-1500-158-A	B1 BOARD, COMPETE			
		**********			
	*1-564-512-11	PLUG, CONNECTOR 9P			
	*1-564-595-21	PLUG, CONNECTOR 14P			
		<CAPACITOR>			
C501	1-126-163-11	ELECT 4.7MF	20%	50V	
C502	1-124-465-00	ELECT 0.47MF	20%	50V	
C505	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C506	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C507	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C508	1-163-077-00	CERAMIC CHIP 0.1MF	10%	25V	
C509	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C510	1-164-182-11	CERAMIC CHIP 0.0033MF	10%	50V	
C511	1-164-182-11	CERAMIC CHIP 0.0033MF	10%	50V	
C513	1-164-232-11	CERAMIC CHIP 0.01MF	10%	50V	
C515	1-163-243-11	CERAMIC CHIP 47PF	5%	50V	
C516	1-163-243-11	CERAMIC CHIP 47PF	5%	50V	
C521	1-164-232-11	CERAMIC CHIP 0.01MF	10%	50V	
C522	1-124-916-11	ELECT 22MF	20%	35V	
C523	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C530	1-124-589-11	ELECT 47MF	20%	16V	
C531	1-124-589-11	ELECT 47MF	20%	16V	
C533	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C534	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C535	1-163-275-11	CERAMIC CHIP 0.001MF	5%	50V	
C536	1-163-125-00	CERAMIC CHIP 220PF	5%	50V	
C537	1-163-125-00	CERAMIC CHIP 220PF	5%	50V	
C538	1-163-275-11	CERAMIC CHIP 0.001MF	5%	50V	
C539	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C540	1-124-589-11	ELECT 47MF	20%	16V	
C541	1-126-096-11	ELECT 10MF	20%	35V	
C543	1-163-275-11	CERAMIC CHIP 0.001MF	5%	50V	
C544	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C545	1-124-589-11	ELECT 47MF	20%	16V	
C546	1-163-097-00	CERAMIC CHIP 15PF	5%	50V	
C547	1-163-001-11	CERAMIC CHIP 220PF	10%	50V	
C548	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
		<DIODE>			
D501	8-719-400-18	DIODE MA152WK			
D502	8-719-104-34	DIODE 1S2836			
D503	8-719-400-18	DIODE MA152WK			
D504	8-719-104-34	DIODE 1S2836			
D505	8-719-800-76	DIODE 1SS226			
D506	8-719-400-18	DIODE MA152WK			
D508	8-719-109-71	DIODE RD3.9ES-B1			
D510	8-719-104-34	DIODE 1S2836			
D511	8-719-901-83	DIODE 1SS83			
D512	8-719-901-83	DIODE 1SS83			
		<FILTER>			
FL501	1-236-163-11	ENCAPSULATED COMPONENT			
FL502	1-236-163-11	ENCAPSULATED COMPONENT			
FL503	1-236-163-11	ENCAPSULATED COMPONENT			
FL504	1-236-163-11	ENCAPSULATED COMPONENT			
FL505	1-236-163-11	ENCAPSULATED COMPONENT			
FL506	1-236-058-21	ENCAPSULATED COMPONENT			
FL507	1-236-058-21	ENCAPSULATED COMPONENT			
FL508	1-236-058-21	ENCAPSULATED COMPONENT			
FL509	1-236-163-11	ENCAPSULATED COMPONENT			
FL510	1-236-163-11	ENCAPSULATED COMPONENT			
FL511	1-236-163-11	ENCAPSULATED COMPONENT			
FL512	1-236-163-11	ENCAPSULATED COMPONENT			
FL513	1-236-163-11	ENCAPSULATED COMPONENT			
FL514	1-236-163-11	ENCAPSULATED COMPONENT			
FL515	1-236-163-11	ENCAPSULATED COMPONENT			
FL516	1-236-163-11	ENCAPSULATED COMPONENT			
FL517	1-236-163-11	ENCAPSULATED COMPONENT			
		<IC>			
IC501	8-752-037-31	IC CXA1365S			
IC502	8-759-009-46	IC TC4528BF			
IC503	8-759-982-25	IC RC78L09A			
IC504	8-759-929-73	IC SN74LS00NS			
IC505	8-759-206-28	IC TC74HC123AF			
IC506	8-759-206-28	IC TC74HC123AF			
IC507	8-759-982-21	IC RC78L05A			
IC508	8-759-981-92	IC RC4558M			
		<TRANSISTOR>			
Q503	8-729-162-13	TRANSISTOR 2SC1621-B3			
Q504	8-729-100-66	TRANSISTOR 2SC1623			
Q505	8-729-216-22	TRANSISTOR 2SA1162-G			
Q506	8-729-100-66	TRANSISTOR 2SC1623			
Q507	8-729-216-22	TRANSISTOR 2SA1162-G			
Q508	8-729-162-13	TRANSISTOR 2SC1621-B3			
Q509	8-729-216-22	TRANSISTOR 2SA1162-G			
Q511	8-729-100-66	TRANSISTOR 2SC1623			
Q512	8-729-216-22	TRANSISTOR 2SA1162-G			
Q513	8-729-100-66	TRANSISTOR 2SC1623			
Q514	8-729-100-66	TRANSISTOR 2SC1623			
		<RESISTOR>			
R501	1-216-065-00	METAL GLAZE 4.7K	5%	1/10W	
R502	1-216-025-00	METAL GLAZE 100	5%	1/10W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R503	1-216-035-00	METAL GLAZE	270	5%	1/10W	
R504	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R505	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R506	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R507	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W	
R508	1-216-685-11	METAL CHIP	27K	0.50%	1/10W	
R510	1-216-693-11	METAL CHIP	56K	0.50%	1/10W	
R511	1-216-691-11	METAL CHIP	47K	0.50%	1/10W	
R516	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R517	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R518	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R520	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W	
R521	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W	
R522	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R523	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R524	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R525	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R526	1-216-077-00	METAL GLAZE	15K	5%	1/10W	
R527	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R528	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R529	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R530	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R531	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R533	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R534	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R535	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R536	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R537	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R538	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R539	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R540	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R541	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R542	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R543	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R544	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R545	1-216-091-00	METAL GLAZE	56K	5%	1/10W	
R546	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W	
R547	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W	
R548	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R549	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R550	1-216-099-00	METAL GLAZE	120K	5%	1/10W	
R551	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R552	1-216-015-00	METAL GLAZE	39	5%	1/10W	
R555	1-216-073-00	METAL GLAZE	10K	5%	1/10W	
R556	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R557	1-216-033-00	METAL GLAZE	220	5%	1/10W	
R558	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R559	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R560	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	

****

*A-1500-328-A	A BOARD, COMPLETE	
	**********	
	(INCLUDING AA1 BOARD)	
1-564-507-11	PLUG, CONNECTOR 4P	
*1-564-508-11	PLUG, CONNECTOR 5P	
*1-564-511-11	PLUG, CONNECTOR 8P	
*1-564-513-11	PLUG, CONNECTOR 10P	
4-033-035-01	SCREW (3X8), TAPPING	
*4-381-901-01	SPRING (A)	
*4-381-902-01	SPRING (B)	
*4-381-910-01	INSULATOR (D)	
4-382-854-01	SCREW (M3X8), P, SW (+)	

REF.NO.	PART NO.	DESCRIPTION				REMARK
		<CAPACITOR>				
C101	1-126-101-11	ELECT	100MF	20%	10V	
C102	1-162-215-31	CERAMIC	47PF	5%	50V	
C103	1-124-126-00	ELECT	47MF	20%	16V	
C104	1-126-541-11	ELECT	330MF	20%	16V	
C105	1-124-930-11	ELECT	33MF	20%	100V	
C106	1-124-915-11	ELECT	10MF	20%	16V	
C201	1-126-101-11	ELECT	100MF	20%	10V	
C202	1-162-215-31	CERAMIC	47PF	5%	50V	
C203	1-124-126-00	ELECT	47MF	20%	16V	
C204	1-126-541-11	ELECT	330MF	20%	16V	
C205	1-124-930-11	ELECT	33MF	20%	100V	
C206	1-124-915-11	ELECT	10MF	20%	16V	
C301	1-126-101-11	ELECT	100MF	20%	10V	
C302	1-162-215-31	CERAMIC	47PF	5%	50V	
C303	1-124-126-00	ELECT	47MF	20%	16V	
C304	1-126-541-11	ELECT	330MF	20%	16V	
C305	1-124-930-11	ELECT	33MF	20%	100V	
C306	1-124-915-11	ELECT	10MF	20%	16V	
C413	1-124-791-11	ELECT	1MF	20%	50V	
C414	1-124-794-51	ELECT	4.7MF	20%	100V	
C418	1-124-667-11	ELECT	10MF	20%	100V	
C420	1-108-634-11	MYLAR	0.047MF	10%	100V	
C423	1-124-798-11	ELECT	1MF	20%	160V	
C424	1-124-046-00	ELECT	10MF	20%	160V	
C425	1-124-798-11	ELECT	1MF	20%	160V	
C426	1-162-290-31	CERAMIC	470PF	10%	50V	
		<TRIMMER>				
CV101	1-141-436-11	CAP, ADJ				
CV201	1-141-436-11	CAP, ADJ				
CV301	1-141-436-11	CAP, ADJ				
		<DIODE>				
D101	8-719-901-83	DIODE 1SS83				
D102	8-719-901-83	DIODE 1SS83				
D201	8-719-901-83	DIODE 1SS83				
D202	8-719-901-83	DIODE 1SS83				
D301	8-719-901-83	DIODE 1SS83				
D302	8-719-901-83	DIODE 1SS83				
D415	8-719-901-83	DIODE 1SS83				
D416	8-719-901-83	DIODE 1SS83				
D417	8-719-911-19	DIODE 1SS119				
D418	8-719-110-72	DIODE RD30ES-B2				
D419	8-719-110-72	DIODE RD30ES-B2				
D420	8-719-911-19	DIODE 1SS119				
D421	8-719-901-83	DIODE 1SS83				
		<JACK>				
J101	1-568-548-11	JACK, MINIATUER PIN				
J201	1-568-548-11	JACK, MINIATUER PIN				
J301	1-568-548-11	JACK, MINIATUER PIN				
		<COIL>				
L101	1-410-315-21	INDUCTOR	0.68UH			
L102	1-410-312-11	INDUCTOR	0.22UH			
L201	1-410-315-21	INDUCTOR	0.68UH			
L202	1-410-312-11	INDUCTOR	0.22UH			
L301	1-410-315-21	INDUCTOR	0.68UH			

A AA1

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION				REMARK
L302	1-410-312-11	INDUCTOR	0.22UH			
		<IC LINK>				
PS401⚠	1-532-839-21	LINK, IC				
		<TRANSISTOR>				
Q101	8-729-809-22	TRANSISTOR 2SC3950-D				
Q102	8-729-809-37	TRANSISTOR 2SC3952-D				
Q201	8-729-809-22	TRANSISTOR 2SC3950-D				
Q202	8-729-809-37	TRANSISTOR 2SC3952-D				
Q301	8-729-809-22	TRANSISTOR 2SC3950-D				
Q302	8-729-809-37	TRANSISTOR 2SC3952-D				
Q401	8-729-112-68	TRANSISTOR 2SD986-L				
Q409	8-729-821-01	TRANSISTOR 2SC2909				
Q410	8-729-821-01	TRANSISTOR 2SC2909				
Q411	8-729-821-00	TRANSISTOR 2SA1207				
Q412	8-729-821-00	TRANSISTOR 2SA1207				
Q413	8-729-821-00	TRANSISTOR 2SA1207				
Q417	8-729-930-85	TRANSISTOR DTB123TS				
		<RESISTOR>				
R101	1-215-387-00	METAL	39	1%	1/4W	
R102	1-215-387-00	METAL	39	1%	1/4W	
R103	1-249-399-11	CARBON	33	5%	1/4W	
R104	1-249-411-11	CARBON	330	5%	1/4W	
R105	1-215-882-00	METAL OXIDE	22	5%	2W	F
R106	1-249-399-11	CARBON	33	5%	1/4W	
R107	1-249-395-11	CARBON	15	5%	1/4W	
R108	1-216-736-11	METAL	270	1%	10W	
R109	1-249-409-11	CARBON	220	5%	1/4W	F
R110	1-214-886-00	METAL	8.2K	1%	1/2W	
R111	1-215-417-00	METAL	680	1%	1/4W	
R145	1-249-431-11	CARBON	15K	5%	1/4W	
R201	1-215-387-00	METAL	39	1%	1/4W	
R202	1-215-387-00	METAL	39	1%	1/4W	
R203	1-249-399-11	CARBON	33	5%	1/4W	
R204	1-249-411-11	CARBON	330	5%	1/4W	
R205	1-215-882-00	METAL OXIDE	22	5%	2W	F
R206	1-249-399-11	CARBON	33	5%	1/4W	
R207	1-249-395-11	CARBON	15	5%	1/4W	
R208	1-216-736-11	METAL	270	1%	10W	
R209	1-249-409-11	CARBON	220	5%	1/4W	F
R210	1-214-886-00	METAL	8.2K	1%	1/2W	
R211	1-215-417-00	METAL	680	1%	1/4W	
R245	1-249-431-11	CARBON	15K	5%	1/4W	
R301	1-215-387-00	METAL	39	1%	1/4W	
R302	1-215-387-00	METAL	39	1%	1/4W	
R303	1-249-399-11	CARBON	33	5%	1/4W	
R304	1-249-411-11	CARBON	330	5%	1/4W	
R305	1-215-882-00	METAL OXIDE	22	5%	2W	F
R306	1-249-399-11	CARBON	33	5%	1/4W	
R307	1-249-395-11	CARBON	15	5%	1/4W	
R308	1-216-736-11	METAL	270	1%	10W	
R309	1-249-409-11	CARBON	220	5%	1/4W	F
R310	1-214-886-00	METAL	8.2K	1%	1/2W	
R311	1-215-417-00	METAL	680	1%	1/4W	
R345	1-249-431-11	CARBON	15K	5%	1/4W	
R404	1-215-453-00	METAL	22K	1%	1/4W	
R406	1-215-445-00	METAL	10K	1%	1/4W	
R427	1-247-903-00	CARBON	1M	5%	1/4W	
R428	1-247-895-00	CARBON	470K	5%	1/4W	
R429	1-249-405-11	CARBON	100	5%	1/4W	
R431	1-249-421-11	CARBON	2.2K	5%	1/4W	
R432	1-249-423-11	CARBON	3.3K	5%	1/4W	
R433	1-249-423-11	CARBON	3.3K	5%	1/4W	
R434	1-249-423-11	CARBON	3.3K	5%	1/4W	
R436	1-249-421-11	CARBON	2.2K	5%	1/4W	
R437	1-249-421-11	CARBON	2.2K	5%	1/4W	
R438	1-249-427-11	CARBON	6.8K	5%	1/4W	F
R441	1-249-405-11	CARBON	100	5%	1/4W	
R442	1-249-435-11	CARBON	33K	5%	1/4W	
R443	1-249-405-11	CARBON	100	5%	1/4W	
R444	1-249-435-11	CARBON	33K	5%	1/4W	
R445	1-249-405-11	CARBON	100	5%	1/4W	
R446	1-249-435-11	CARBON	33K	5%	1/4W	
R450	1-249-401-11	CARBON	47	5%	1/4W	F
R451	1-249-417-11	CARBON	1K	5%	1/4W	F
R452	1-249-421-11	CARBON	2.2K	5%	1/4W	
R453	1-249-421-11	CARBON	2.2K	5%	1/4W	
		<VARIABLE RESISTOR>				
RV101	1-230-234-11	RES, ADJ, CERAMIC CARBON 22K				
RV201	1-230-234-11	RES, ADJ, CERAMIC CARBON 22K				
RV301	1-230-234-11	RES, ADJ, CERAMIC CARBON 22K				
RV404	1-230-236-11	RES, ADJ, CERAMIC CARBON 47K				
RV405	1-230-236-11	RES, ADJ, CERAMIC CARBON 47K				
RV406	1-230-236-11	RES, ADJ, CERAMIC CARBON 47K				
		<SWITCH>				
SW401	1-572-707-11	SWITCH, LEVER				
		**********				
	A-1291-930-A	AA1 BOARD, COMPLETE				
		**********				
		<CAPACITOR>				
C1	1-163-141-00	CERAMIC CHIP 0.001MF		5%	50V	
C2	1-164-232-11	CERAMIC CHIP 0.01MF		10%	50V	
C3	1-163-037-11	CERAMIC CHIP 0.022MF		10%	25V	
C4	1-163-089-00	CERAMIC CHIP 6PF		0.5PF	50V	
C5	1-163-092-00	CERAMIC CHIP 9PF		0.25PF	50V	
C7	1-135-201-11	TANTAL. CHIP 10MF		20%	4V	
C8	1-135-177-21	TANTAL. CHIP 1MF		20%	25V	
C9	1-135-177-21	TANTAL. CHIP 1MF		20%	25V	
C10	1-164-004-11	CERAMIC CHIP 0.1MF		10%	25V	
C11	1-164-004-11	CERAMIC CHIP 0.1MF		10%	25V	
C12	1-163-037-11	CERAMIC CHIP 0.022MF		10%	25V	
C13	1-164-004-11	CERAMIC CHIP 0.1MF		10%	25V	
C14	1-164-004-11	CERAMIC CHIP 0.1MF		10%	25V	
C15	1-163-017-00	CERAMIC CHIP 0.0047MF		10%	50V	
C16	1-163-141-00	CERAMIC CHIP 0.001MF		5%	50V	
C17	1-163-141-00	CERAMIC CHIP 0.001MF		5%	50V	
C18	1-163-141-00	CERAMIC CHIP 0.001MF		5%	50V	
C19	1-135-076-21	TANTAL. CHIP 1MF		20%	35V	
C20	1-163-037-11	CERAMIC CHIP 0.022MF		10%	25V	
C21	1-163-037-11	CERAMIC CHIP 0.022MF		10%	25V	
C22	1-135-076-21	TANTAL. CHIP 1MF		20%	35V	
C23	1-135-177-21	TANTAL. CHIP 1MF		20%	25V	
C24	1-135-177-21	TANTAL. CHIP 1MF		20%	25V	
C25	1-135-177-21	TANTAL. CHIP 1MF		20%	25V	

REF.NO.	PART NO.	DESCRIPTION			REMARK
C26	1-135-152-21	TANTAL. CHIP 1.5MF	20%	25V	
C27	1-164-232-11	CERAMIC CHIP 0.01MF	10%	50V.	
		<DIODE>			
D1	8-719-800-76	DIODE 1SS226			
D2	8-719-106-18	DIODE RD6.8M-B3			
D3	8-719-105-92	DIODE RD5.6M-B3			
D4	8-719-106-43	DIODE RD9.1M-B1			
D5	8-719-104-34	DIODE 1S2836			
D6	8-719-800-76	DIODE 1SS226			
		<IC>			
IC1	8-759-981-92	IC RC4558M			
		<TRANSISTOR>			
Q1	8-729-112-65	TRANSISTOR 2SA1462			
Q2	8-729-107-31	TRANSISTOR 2SC3545			
Q3	8-729-107-31	TRANSISTOR 2SC3545			
Q4	8-729-107-31	TRANSISTOR 2SC3545			
Q5	8-729-920-74	TRANSISTOR 2SC2412K-QR			
Q6	8-729-920-74	TRANSISTOR 2SC2412K-QR			
Q7	8-729-107-31	TRANSISTOR 2SC3545			
Q9	8-729-112-65	TRANSISTOR 2SA1462			
Q10	8-729-112-65	TRANSISTOR 2SA1462			
Q12	8-729-107-31	TRANSISTOR 2SC3545			
Q13	8-729-112-65	TRANSISTOR 2SA1462			
Q14	8-729-216-22	TRANSISTOR 2SA1037K-QR			
Q15	8-729-116-06	TRANSISTOR 2SK160-K6			
Q16	8-729-116-06	TRANSISTOR 2SK160-K6			
Q17	8-729-116-06	TRANSISTOR 2SK160-K6			
Q18	8-729-302-74	TRANSISTOR 2SD1366A-C			
Q19	8-729-101-07	TRANSISTOR 2SB798-DL			
Q21	8-729-216-22	TRANSISTOR 2SA1037K-QR			
Q22	8-729-920-74	TRANSISTOR 2SC2412K-QR			
		<RESISTOR>			
R1	1-216-075-00	METAL GLAZE	12K	5%	1/10W
R2	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R3	1-216-017-00	METAL GLAZE	47	5%	1/10W
R4	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R5	1-216-025-00	METAL GLAZE	100	5%	1/10W
R6	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R7	1-216-033-00	METAL GLAZE	220	5%	1/10W
R8	1-216-025-00	METAL GLAZE	100	5%	1/10W
R9	1-216-043-00	METAL GLAZE	560	5%	1/10W
R10	1-216-045-00	METAL GLAZE	680	5%	1/10W
R11	1-216-017-00	METAL GLAZE	47	5%	1/10W
R12	1-216-075-00	METAL GLAZE	12K	5%	1/10W
R13	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R14	1-216-045-00	METAL GLAZE	680	5%	1/10W
R17	1-216-045-00	METAL GLAZE	680	5%	1/10W
R19	1-216-033-00	METAL GLAZE	220	5%	1/10W
R20	1-216-025-00	METAL GLAZE	100	5%	1/10W
R21	1-216-037-00	METAL GLAZE	330	5%	1/10W
R22	1-216-037-00	METAL GLAZE	330	5%	1/10W
R25	1-216-037-00	METAL GLAZE	330	5%	1/10W
R26	1-216-037-00	METAL GLAZE	330	5%	1/10W
R27	1-216-001-00	METAL GLAZE	10	5%	1/10W
R28	1-216-001-00	METAL GLAZE	10	5%	1/10W
R29	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R30	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R31	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R32	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R33	1-216-129-00	METAL GLAZE	2.2M	5%	1/10W
R34	1-216-129-00	METAL GLAZE	2.2M	5%	1/10W
R35	1-216-129-00	METAL GLAZE	2.2M	5%	1/10W
R36	1-216-033-00	METAL GLAZE	220	5%	1/10W
R37	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R38	1-216-164-00	METAL GLAZE	39	5%	1/8W
R39	1-216-164-00	METAL GLAZE	39	5%	1/8W
R40	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R41	1-216-162-00	METAL GLAZE	33	5%	1/8W
R42	1-216-162-00	METAL GLAZE	33	5%	1/8W
R43	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R44	1-216-164-00	METAL GLAZE	39	5%	1/8W
R51	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R52	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
		<CONNECTOR>			
W1	*1-691-121-11	PIN, CONNECTOR (PC BOARD) 10P			
W2	*1-691-120-11	PIN, CONNECTOR (PC BOARD) 5P			
		**********			
	*A-1500-357-A	D3 BOARD, COMPLETE			
		**********			
	*1-508-767-00	PIN, CONNECTOR (5MM PITCH) 5P			
	*1-508-784-00	PIN, CONNECTOR (5MM PITCH) 1P			
	*1-508-786-00	PIN, CONNECTOR (5MM PITCH) 2P			
	*1-564-505-11	PLUG, CONNECTOR 2P			
	*1-564-506-11	PLUG, CONNECTOR 3P			
	*1-564-512-11	PLUG, CONNECTOR 9P			
	*1-564-513-11	PLUG, CONNECTOR 10P			
	*1-564-595-21	PLUG, CONNECTOR 14P			
	*1-564-596-11	PLUG, CONNECTOR 15P			
	*1-568-536-11	PLUG (MINIATURE DY) 6P			
	*1-580-314-11	CONNECTOR, HINGE (PLUG) 20P			
	1-580-431-11	SOCKET, DIN 6P			
	*4-035-555-01	HEAT SINK			
	*4-341-752-01	EYELET			
	*4-381-904-01	SPRING (C)			
	*4-381-907-01	INSULATOR (A)			
	*4-381-908-01	INSULATOR (B)			
	*4-381-909-02	INSULATOR (C)			
	*4-381-995-01	SPRING (E)			
	4-382-854-01	SCREW (M3X8), P, SW (+)			
		<CAPACITOR>			
C101	1-126-101-11	ELECT	100MF	20%	16V
C102	1-126-101-11	ELECT	100MF	20%	16V
C103	1-126-105-11	ELECT	1000MF	20%	35V
C104	1-126-105-11	ELECT	1000MF	20%	35V
C107	1-108-792-11	MYLAR	0.001MF	5%	50V
C108	1-108-792-11	MYLAR	0.001MF	5%	50V
C109	1-136-153-00	FILM	0.01MF	5%	50V
C110	1-136-165-00	FILM	0.1MF	5%	50V
C111	1-126-103-11	ELECT	470MF	20%	16V
C112	1-126-103-11	ELECT	470MF	20%	16V
C113	1-130-483-00	MYLAR	0.01MF	5%	50V
C114	1-130-017-00	FILM	820PF	5%	50V
C115	1-102-978-00	CERAMIC	220PF	5%	50V
C116	1-102-822-00	CERAMIC	390PF	5%	50V
C117	1-101-361-00	CERAMIC	150PF	5%	50V

D3

REF.NO.	PART NO.	DESCRIPTION				REMARK
C118	1-124-477-11	ELECT	47MF	20%	16V	
C201	1-136-173-00	FILM	0.47MF	5%	50V	
C202	1-136-157-00	FILM	0.022MF	5%	50V	
C203	1-124-360-00	ELECT	1000MF	20%	16V	
C204	1-106-351-00	MYLAR	0.0022MF	10%	100V	
C205	1-136-137-11	FILM	0.006MF	3%	1.6KV	
C206	1-162-558-11	CERAMIC	100PF	10%	2KV	
C207	1-136-553-11	FILM	0.0015MF	5%	630V	
C209	1-124-808-51	ELECT	10MF	20%	200V	
C210	1-126-233-11	ELECT	22MF	20%	35V	
C211	1-108-680-11	MYLAR	0.001MF	10%	100V	
C212	1-108-802-11	MYLAR	0.0068MF	5%	50V	
C213	1-108-688-11	MYLAR	0.0047MF	10%	200V	
C214	1-124-907-11	ELECT	10MF	20%	50V	
C215	1-124-907-11	ELECT	10MF	20%	50V	
C216	1-136-165-00	FILM	0.1MF	5%	50V	
C217	1-108-798-11	MYLAR	0.0033MF	5%	50V	
C218	1-102-820-00	CERAMIC	330PF	5%	50V	
C219	1-108-792-11	MYLAR	0.001MF	5%	50V	
C220	1-124-907-11	ELECT	10MF	20%	50V	
C221	1-136-131-00	FILM	0.12MF	5%	400V	
C222	1-137-223-11	FILM	0.24MF	5%	400V	
C223	1-136-122-00	FILM	0.47MF	5%	400V	
C224	1-136-127-00	FILM	1MF	5%	400V	
C226	1-137-225-11	FILM	0.51MF	5%	400V	
C227	1-130-736-11	FILM	0.01MF	2%	100V	
C228	1-162-130-11	CERAMIC	180PF	10%	2KV	
C229	1-124-360-00	ELECT	1000MF	20%	16V	
C230	1-124-360-00	ELECT	1000MF	20%	16V	
C231	1-136-173-00	FILM	0.47MF	5%	50V	
C233	1-130-483-00	MYLAR	0.01MF	5%	50V	
C234	1-130-483-00	MYLAR	0.01MF	5%	50V	
C235	1-130-483-00	MYLAR	0.01MF	5%	50V	
C236	1-130-483-00	MYLAR	0.01MF	5%	50V	
C237	1-108-792-11	MYLAR	0.001MF	5%	50V	
C238	1-108-792-11	MYLAR	0.001MF	5%	50V	
C239	1-124-907-11	ELECT	10MF	20%	50V	
C240	1-108-792-11	MYLAR	0.001MF	5%	50V	
C246	1-108-692-11	MYLAR	0.01MF	10%	200V	
C250	1-136-177-00	FILM	1MF	5%	50V	
C261	1-106-371-00	MYLAR	0.015MF	10%	200V	
C280	1-124-910-11	ELECT	47MF	20%	50V	
C281	1-124-910-11	ELECT	47MF	20%	50V	
C301	1-130-471-00	MYLAR	0.001MF	5%	50V	
C302	1-124-907-11	ELECT	10MF	20%	50V	
C303	1-124-907-11	ELECT	10MF	20%	50V	
C304	1-126-105-11	ELECT	1000MF	20%	35V	
C305	1-126-105-11	ELECT	1000MF	20%	35V	
C306	1-101-361-00	CERAMIC	150PF	5%	50V	
C307	1-124-798-11	ELECT	1MF	20%	160V	
C308	1-136-108-00	FILM	0.43MF	5%	200V	
C309	1-102-830-00	CERAMIC	240PF	10%	500V	
C310	1-124-340-00	ELECT	22MF	20%	160V	
C311	1-108-796-11	MYLAR	0.0022MF	5%	50V	
C321	1-108-792-11	MYLAR	0.001MF	5%	50V	
C322	1-130-202-00	FILM	0.022MF	10%	200V	
C401	1-136-064-00	FILM	0.002MF	3%	2KV	
C402	1-136-619-11	FILM	0.0016MF	3%	2KV	
C403	1-136-121-00	FILM	0.27MF	5%	400V	
C404	1-162-114-00	CERAMIC	0.0047MF		2KV	
C405	1-124-562-11	ELECT	47MF	20%	200V	
C406	1-101-888-00	CERAMIC	68PF	5%	50V	
C408	1-108-688-11	MYLAR	0.0047MF	10%	200V	
C409	1-124-907-11	ELECT	10MF	20%	50V	
C411	1-124-907-11	ELECT	10MF	20%	50V	
C412	1-102-973-00	CERAMIC	100PF	5%	50V	
C413	1-102-973-00	CERAMIC	100PF	5%	50V	
C415	1-108-792-11	MYLAR	0.001MF	5%	50V	
C416	1-124-907-11	ELECT	10MF	20%	50V	
C418	1-136-103-00	FILM	0.1MF	5%	200V	
C420	1-130-483-00	MYLAR	0.01MF	5%	50V	
C422	1-137-230-11	FILM	750PF	3%	1.2KV	
C424	1-162-558-11	CERAMIC	100PF	10%	2KV	
C425	1-162-558-11	CERAMIC	100PF	10%	2KV	
C426	1-108-792-11	MYLAR	0.001MF	5%	50V	
C430	1-124-907-11	ELECT	10MF	20%	50V	
C431	1-136-165-00	FILM	0.1MF	5%	50V	
C432	1-136-165-00	FILM	0.1MF	5%	50V	
C434	1-108-794-11	MYLAR	0.0015MF	5%	50V	
C451	1-136-169-00	FILM	0.22MF	5%	50V	
C501	1-123-605-00	ELECT	100MF	20%	100V	
C502	1-124-907-11	ELECT	10MF	20%	50V	
C503	1-124-907-11	ELECT	10MF	20%	50V	
C504	1-126-233-11	ELECT	22MF	20%	35V	
C505	1-136-173-00	FILM	0.47MF	5%	50V	
C506	1-124-907-11	ELECT	10MF	20%	50V	
C507	1-126-233-11	ELECT	22MF	20%	35V	
C508	1-136-173-00	FILM	0.47MF	5%	50V	
C509	1-126-233-11	ELECT	22MF	20%	35V	
C510	1-136-171-00	FILM	0.33MF	5%	50V	
C511	1-102-824-00	CERAMIC	470PF	5%	50V	
C512	1-124-907-11	ELECT	10MF	20%	50V	
C513	1-124-907-11	ELECT	10MF	20%	50V	
C514	1-136-153-00	FILM	0.01MF	5%	50V	
C515	1-136-165-00	FILM	0.1MF	5%	50V	
C516	1-108-692-11	MYLAR	0.01MF	10%	200V	
C517	1-124-907-11	ELECT	10MF	20%	50V	
C518	1-126-320-11	ELECT	10MF	20%	16V	
C519	1-124-907-11	ELECT	10MF	20%	50V	
C520	1-124-907-11	ELECT	10MF	20%	50V	
C521	1-124-907-11	ELECT	10MF	20%	50V	
C532	1-108-792-11	MYLAR	0.001MF	5%	50V	
C533	1-136-171-00	FILM	0.33MF	5%	50V	
C534	1-124-910-11	ELECT	47MF	20%	50V	
C535	1-124-910-11	ELECT	47MF	20%	50V	
C536	1-124-910-11	ELECT	47MF	20%	50V	
C601	1-124-907-11	ELECT	10MF	20%	50V	
C603	1-136-165-00	FILM	0.1MF	5%	50V	
C604	1-124-907-11	ELECT	10MF	20%	50V	
C605	1-106-359-00	MYLAR	0.0047MF	5%	50V	
C606	1-136-153-00	FILM	0.01MF	5%	50V	
C609	1-162-116-00	CERAMIC	680PF	10%	2KV	
C611	1-162-558-11	CERAMIC	100PF	10%	2KV	
C612	1-162-558-11	CERAMIC	100PF	10%	2KV	
C701	1-102-973-00	CERAMIC	100PF	5%	50V	
C702	1-108-622-11	MYLAR	0.0047MF	10%	100V	
C703	1-124-907-11	ELECT	10MF	20%	50V	
C704	1-124-907-11	ELECT	10MF	20%	50V	

<DIODE>

D101	8-719-911-19	DIODE	1SS119
D102	8-719-911-19	DIODE	1SS119
D103	8-719-911-19	DIODE	1SS119
D104	8-719-911-19	DIODE	1SS119
D105	8-719-110-44	DIODE	RD16ES-B1
D107	8-719-911-19	DIODE	1SS119

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

- The components identified by ⧓ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION	REMARK
D108	8-719-911-19	DIODE 1SS119	
D109	8-719-911-19	DIODE 1SS119	
D110	8-719-911-19	DIODE 1SS119	
D111	8-719-911-19	DIODE 1SS119	
D112	8-719-911-19	DIODE 1SS119	
D200	8-719-911-19	DIODE 1SS119	
D201	8-719-981-00	DIODE ERC81-004	
D202	8-719-970-89	DIODE DD50R	
D204	8-719-110-31	DIODE RD12ES-B2	
D205	8-719-110-31	DIODE RD12ES-B2	
D206	8-719-110-31	DIODE RD12ES-B2	
D207	8-719-110-31	DIODE RD12ES-B2	
D209	8-719-991-18	DIODE EGP30GL-6072	
D210	8-719-991-18	DIODE EGP30GL-6072	
D211	8-719-920-67	DIODE ERC91-02	
D212	8-719-920-67	DIODE ERC91-02	
D214	8-719-110-46	DIODE RD16ES-B2	
D215	8-719-911-19	DIODE 1SS119	
D220	8-719-911-19	DIODE 1SS119	
D222	8-719-920-67	DIODE ERC91-02	
D224	8-719-911-19	DIODE 1SS119	
D225	8-719-911-19	DIODE 1SS119	
D226	8-719-911-19	DIODE 1SS119	
D301	8-719-200-02	DIODE 10E2	
D302	8-719-911-19	DIODE 1SS119	
D303	8-719-911-19	DIODE 1SS119	
D304	8-719-911-19	DIODE 1SS119	
D305	8-719-911-19	DIODE 1SS119	
D401	8-719-951-30	DIODE ERA91-02	
D402	8-719-951-30	DIODE ERA91-02	
D403	8-719-973-95	DIODE ERD09-15	
D404	8-719-974-48	DIODE ERA34-10	
D405	8-719-974-48	DIODE ERA34-10	
D406	8-719-920-67	DIODE ERC91-02	
D407	8-719-920-67	DIODE ERC91-02	
D409	8-719-110-46	DIODE RD16ES-B2	
D410	8-719-911-19	DIODE 1SS119	
D412	8-719-110-44	DIODE RD16ES-B1	
D414	8-719-911-19	DIODE 1SS119	
D415	8-719-911-19	DIODE 1SS119	
D416	8-719-911-19	DIODE 1SS119	
D417	8-719-110-31	DIODE RD12ES-B2	
D418	8-719-974-48	DIODE ERA34-10	
D419	8-719-973-95	DIODE ERD09-15	
D501	8-719-911-19	DIODE 1SS119	
D502	8-719-911-19	DIODE 1SS119	
D503	8-719-911-19	DIODE 1SS119	
D504	8-719-911-19	DIODE 1SS119	
D505	8-719-911-19	DIODE 1SS119	
D506	8-719-911-19	DIODE 1SS119	
D507	8-719-911-19	DIODE 1SS119	
D508	8-719-911-19	DIODE 1SS119	
D509	8-719-911-19	DIODE 1SS119	
D510	8-719-911-19	DIODE 1SS119	
D511	8-719-911-19	DIODE 1SS119	
D513	8-719-971-20	DIODE ERC38-06	
D514	8-719-971-20	DIODE ERC38-06	
D515	8-719-911-19	DIODE 1SS119	
D516	8-719-911-19	DIODE 1SS119	
D517	8-719-911-19	DIODE 1SS119	
D519	8-719-911-19	DIODE 1SS119	
D520	8-719-110-13	DIODE RD9.1ES-B2	
D521	8-719-109-93	DIODE RD6.2ES-B2	
D601	8-719-974-48	DIODE ERA34-10	
D602	8-719-911-19	DIODE 1SS119	
D603	8-719-911-19	DIODE 1SS119	
D604	8-719-911-19	DIODE 1SS119	
D605	8-719-911-19	DIODE 1SS119	
D606	8-719-110-06	DIODE RD8.2ES-B1	
D607	8-719-911-19	DIODE 1SS119	
D608	8-719-911-19	DIODE 1SS119	
D701	8-719-911-19	DIODE 1SS119	
D702	8-719-911-19	DIODE 1SS119	
		<FERRITE BEAD>	
FB205	1-410-396-41	FERRITE BEAD INDUCTOR	
FB206	1-410-396-41	FERRITE BEAD INDUCTOR	
FB404	1-410-396-41	FERRITE BEAD INDUCTOR	
FB405	1-410-396-41	FERRITE BEAD INDUCTOR	
FB406	1-410-396-41	FERRITE BEAD INDUCTOR	
FB408	1-410-396-41	FERRITE BEAD INDUCTOR	
FB409	1-410-396-41	FERRITE BEAD INDUCTOR	
		<IC>	
IC101	8-759-990-82	IC TL082CP	
IC102	8-759-990-82	IC TL082CP	
IC103	8-759-990-82	IC TL082CP	
IC104	8-759-990-82	IC TL082CP	
IC201	8-759-981-64	IC LM2903DQ	
IC202	8-759-981-64	IC LM2903DQ	
IC203	8-759-981-64	IC LM2903DQ	
IC301	8-759-990-82	IC TL082CP	
IC302	8-759-990-82	IC TL082CP	
IC303	8-759-981-90	IC RC4558DD	
IC304	8-759-981-90	IC RC4558DD	
⧓IC401⚠		IC UPC574J	
⧓IC402⚠		IC UPC574J	
		<COIL>	
L101	1-412-537-31	INDUCTOR 100UH	
L102	1-412-537-31	INDUCTOR 100UH	
L103	1-412-537-31	INDUCTOR 100UH	
L104	1-412-537-31	INDUCTOR 100UH	
L105	1-412-537-31	INDUCTOR 100UH	
L106	1-412-537-31	INDUCTOR 100UH	
L202	1-424-321-11	COIL, CHOKE 1000UH	
L203	1-460-315-11	COIL,HORIZONTAL LINEARITY(HLC)	
L204	1-459-644-11	COIL, CHOKE 2.9MMH	
L401	1-460-142-11	CHOKE, FERRITE (H.R.C)	
L403	1-412-045-11	INDUCTOR 2.2MMH	
L404	1-459-433-00	COIL (WITH CORE)	
		<IC LINK>	
PS101⚠	1-532-839-21	LINK, IC	
PS401⚠	1-532-839-21	LINK, IC	
		<TRANSISTOR>	
Q101	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q102	8-729-140-50	TRANSISTOR 2SC3209-LK	
Q103	8-729-266-83	TRANSISTOR 2SC2668-Y	
Q104	8-729-266-83	TRANSISTOR 2SC2668-Y	
Q105	8-729-266-83	TRANSISTOR 2SC2668-Y	

D3

REF.NO.	PART NO.	DESCRIPTION	REMARK
Q106	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q107	8-729-266-83	TRANSISTOR 2SC2668-Y	
Q201	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q202	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q203	8-729-820-40	TRANSISTOR 2SD1724-T	
Q204	8-729-821-07	TRANSISTOR 2SC3997	
Q205	8-729-924-78	TRANSISTOR IRF540	
Q206	8-729-900-85	TRANSISTOR DTC144WS	
Q207	8-729-924-78	TRANSISTOR IRF540	
Q208	8-729-900-85	TRANSISTOR DTC144WS	
Q209	8-729-924-78	TRANSISTOR IRF540	
Q210	8-729-900-85	TRANSISTOR DTC144WS	
Q211	8-729-924-78	TRANSISTOR IRF540	
Q212	8-729-900-85	TRANSISTOR DTC144WS	
Q213	8-729-300-80	TRANSISTOR 2SB860	
Q214	8-729-300-70	TRANSISTOR 2SD1137	
Q215	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q216	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q217	8-729-923-07	TRANSISTOR IRF9620	
Q218	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q219	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q220	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q301	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q302	8-729-386-12	TRANSISTOR 2SB861-C	
Q303	8-729-309-08	TRANSISTOR 2SC1890A	
Q304	8-729-309-36	TRANSISTOR 2SA893A	
Q305	8-729-203-81	TRANSISTOR 2SC2238B	
Q306	8-729-206-81	TRANSISTOR 2SA968B-Y	
Q307	8-729-140-50	TRANSISTOR 2SC3209-LK	
Q401	8-729-232-01	TRANSISTOR 2SC4532	
Q402	8-729-927-09	TRANSISTOR IRFI9630	
Q403	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q404	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q405	8-729-015-26	TRANSISTOR 2SK1342	
Q406	8-729-900-85	TRANSISTOR DTC144WS	
Q407	8-729-015-26	TRANSISTOR 2SK1342	
Q501	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q502	8-729-900-85	TRANSISTOR DTC144WS	
Q503	8-729-900-85	TRANSISTOR DTC144WS	
Q601	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q602	8-729-823-81	TRANSISTOR 2SC4632-CB7	
Q603	8-729-823-81	TRANSISTOR 2SC4632-CB7	
Q604	8-729-823-81	TRANSISTOR 2SC4632-CB7	
Q605	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q606	8-729-823-81	TRANSISTOR 2SC4632-CB7	
Q607	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q701	8-729-423-37	TRANSISTOR 2SC3311A-QRS	
Q702	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q703	8-729-823-81	TRANSISTOR 2SC4632-CB7	

<RESISTOR>

R101	1-249-419-11	CARBON	1.5K	5%	1/4W	
R102	1-249-417-11	CARBON	1K	5%	1/4W	
R103	1-249-403-11	CARBON	68	5%	1/4W	F
R104	1-249-405-11	CARBON	100	5%	1/4W	
R105	1-249-425-11	CARBON	4.7K	5%	1/4W	
R106	1-249-425-11	CARBON	4.7K	5%	1/4W	
R107	1-215-421-00	METAL	1K	1%	1/4W	
R108	1-249-429-11	CARBON	10K	5%	1/4W	
R109	1-249-429-11	CARBON	10K	5%	1/4W	
R110	1-247-887-00	CARBON	220K	5%	1/4W	
R111	1-249-427-11	CARBON	6.8K	5%	1/4W	
R112	1-247-899-11	CARBON	680K	5%	1/4W	
R114	1-249-417-11	CARBON	1K	5%	1/4W	
R115	1-249-437-11	CARBON	47K	5%	1/4W	
R116	1-249-405-11	CARBON	100	5%	1/4W	
R117	1-249-405-11	CARBON	100	5%	1/4W	
R118	1-249-429-11	CARBON	10K	5%	1/4W	
R119	1-249-405-11	CARBON	100	5%	1/4W	
R120	1-249-427-11	CARBON	6.8K	5%	1/4W	
R121	1-249-423-11	CARBON	3.3K	5%	1/4W	
R122	1-215-437-00	METAL	4.7K	1%	1/4W	
R124	1-249-431-11	CARBON	15K	5%	1/4W	
R125	1-249-426-11	CARBON	5.6K	5%	1/4W	
R126	1-215-437-00	METAL	4.7K	1%	1/4W	
R128	1-249-433-11	CARBON	22K	5%	1/4W	
R129	1-249-429-11	CARBON	10K	5%	1/4W	
R130	1-249-421-11	CARBON	2.2K	5%	1/4W	
R131	1-249-393-11	CARBON	10	5%	1/4W	F
R132	1-249-393-11	CARBON	10	5%	1/4W	F
R133	1-215-445-00	METAL	10K	1%	1/4W	
R134	1-249-411-11	CARBON	330	5%	1/4W	
R135	1-249-427-11	CARBON	6.8K	5%	1/4W	
R136	1-249-419-11	CARBON	1.5K	5%	1/4W	
R137	1-249-429-11	CARBON	10K	5%	1/4W	
R138	1-249-433-11	CARBON	22K	5%	1/4W	
R139	1-215-423-00	METAL	1.2K	1%	1/4W	
R140	1-215-432-00	METAL	3K	1%	1/4W	
R141	1-249-411-11	CARBON	330	5%	1/4W	
R201	1-249-417-11	CARBON	1K	5%	1/4W	
R202	1-249-405-11	CARBON	100	5%	1/4W	
R203	1-249-405-11	CARBON	100	5%	1/4W	
R204	1-249-421-11	CARBON	2.2K	5%	1/4W	
R205	1-216-425-11	METAL OXIDE	56	5%	1W	F
R206	1-249-476-11	CARBON	1.5	5%	1/2W	F
R207	1-216-399-00	METAL OXIDE	6.8	5%	3W	F
R208	1-216-399-00	METAL OXIDE	6.8	5%	3W	F
R209	1-216-399-00	METAL OXIDE	6.8	5%	3W	F
R210	1-216-423-11	METAL OXIDE	27	5%	1W	F
R212	1-216-424-11	METAL OXIDE	39	5%	1W	F
R213	1-215-913-11	METAL OXIDE	220	5%	3W	F
R214	1-249-425-11	CARBON	4.7K	5%	1/4W	
R215	1-249-437-11	CARBON	47K	5%	1/4W	
R216	1-249-425-11	CARBON	4.7K	5%	1/4W	
R217	1-249-437-11	CARBON	47K	5%	1/4W	
R218	1-249-425-11	CARBON	4.7K	5%	1/4W	
R219	1-249-437-11	CARBON	47K	5%	1/4W	
R220	1-249-425-11	CARBON	4.7K	5%	1/4W	
R221	1-249-437-11	CARBON	47K	5%	1/4W	
R222	1-216-393-00	METAL OXIDE	2.2	5%	3W	F
R223	1-249-417-11	CARBON	1K	5%	1/4W	
R224	1-249-402-11	CARBON	56	5%	1/4W	
R225	1-249-402-11	CARBON	56	5%	1/4W	
R226	1-249-417-11	CARBON	1K	5%	1/4W	
R227	1-249-425-11	CARBON	4.7K	5%	1/4W	
R228	1-249-470-11	CARBON	0.47	5%	1/2W	F
R229	1-249-470-11	CARBON	0.47	5%	1/2W	F
R230	1-215-461-00	METAL	47K	1%	1/4W	
R231	1-215-461-00	METAL	47K	1%	1/4W	
R232	1-215-449-00	METAL	15K	1%	1/4W	
R233	1-249-437-11	CARBON	47K	5%	1/4W	
R234	1-249-402-11	CARBON	56	5%	1/4W	F
R235	1-249-405-11	CARBON	100	5%	1/4W	
R236	1-249-421-11	CARBON	2.2K	5%	1/4W	
R237	1-215-423-00	METAL	1.2K	1%	1/4W	
R238	1-215-409-00	METAL	330	1%	1/4W	

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

• The components identified by ⧓ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION				REMARK
R239	1-247-881-00	CARBON	120K	5%	1/4W	
R240	1-249-429-11	CARBON	10K	5%	1/4W	
R241	1-249-405-11	CARBON	100	5%	1/4W	
R242	1-249-429-11	CARBON	10K	5%	1/4W	
R243	1-215-465-00	METAL	68K	1%	1/4W	
R244	1-215-445-00	METAL	10K	1%	1/4W	
R245	1-249-438-11	CARBON	56K	5%	1/4W	
R246	1-249-433-11	CARBON	22K	5%	1/4W	
R261	1-249-433-11	CARBON	22K	5%	1/4W	
R262	1-249-437-11	CARBON	47K	5%	1/4W	
R265	1-249-433-11	CARBON	22K	5%	1/4W	
R266	1-215-445-00	METAL	10K	1%	1/4W	
R267	1-249-429-11	CARBON	10K	5%	1/4W	
R268	1-215-419-00	METAL	820	1%	1/4W	
R269	1-249-405-11	CARBON	100	5%	1/4W	
R270	1-249-433-11	CARBON	22K	5%	1/4W	
R275	1-249-437-11	CARBON	47K	5%	1/4W	
R276	1-249-437-11	CARBON	47K	5%	1/4W	
R277	1-249-437-11	CARBON	47K	5%	1/4W	
R278	1-249-437-11	CARBON	47K	5%	1/4W	
R280	1-247-864-11	CARBON	24K	5%	1/4W	
R281	1-249-425-11	CARBON	4.7K	5%	1/4W	
R282	1-249-393-11	CARBON	10	5%	1/4W	
R301	1-249-417-11	CARBON	1K	5%	1/4W	
R302	1-249-425-11	CARBON	4.7K	5%	1/4W	
R303	1-249-425-11	CARBON	4.7K	5%	1/4W	
R304	1-249-413-11	CARBON	470	5%	1/4W	
R305	1-249-474-11	CARBON	1	5%	1/2W	F
R306	1-249-474-11	CARBON	1	5%	1/2W	F
R307	1-249-415-11	CARBON	680	5%	1/4W	
R308	1-249-431-11	CARBON	15K	5%	1/4W	
R309	1-215-867-00	METAL OXIDE	470	5%	1W	F
R310	1-215-875-11	METAL OXIDE	10K	5%	1W	F
R311	1-249-417-11	CARBON	1K	5%	1/4W	
R312	1-249-406-11	CARBON	120	5%	1/4W	
R313	1-249-425-11	CARBON	4.7K	5%	1/4W	
R314	1-249-377-11	CARBON	0.47	5%	1/4W	F
R315	1-249-377-11	CARBON	0.47	5%	1/4W	F
R316	1-216-431-11	METAL OXIDE	560	5%	1W	F
R317	1-214-798-21	METAL	1.8	1%	1/2W	
R318	1-215-435-00	METAL	3.9K	1%	1/4W	
R319	1-215-429-00	METAL	2.2K	1%	1/4W	
R320	1-215-429-00	METAL	2.2K	1%	1/4W	
R321	1-214-798-21	METAL	1.8	1%	1/2W	
R401	1-216-398-11	METAL OXIDE	5.6	5%	3W	F
R402	1-216-431-11	METAL OXIDE	560	5%	1W	F
R403	1-217-501-00	FUSIBLE	470	5%	1W	F
R407	1-249-402-11	CARBON	56	5%	1/4W	F
R409	1-249-405-11	CARBON	100	5%	1/4W	
R410	1-249-421-11	CARBON	2.2K	5%	1/4W	
R411	1-249-405-11	CARBON	100	5%	1/4W	
R412	1-249-429-11	CARBON	10K	5%	1/4W	
R413	1-249-441-11	CARBON	100K	5%	1/4W	
R414	1-249-433-11	CARBON	22K	5%	1/4W	
R415	1-249-429-11	CARBON	10K	5%	1/4W	
R417	1-217-501-00	FUSIBLE	470	5%	1W	F
R418	1-249-413-11	CARBON	470	5%	1/4W	
R419	1-249-425-11	CARBON	4.7K	5%	1/4W	
R420	1-249-437-11	CARBON	47K	5%	1/4W	
R421	1-249-413-11	CARBON	470	5%	1/4W	
R422	1-249-433-11	CARBON	22K	5%	1/4W	
R423	1-216-378-11	METAL OXIDE	5.6	5%	2W	F
R424	1-249-433-11	CARBON	22K	5%	1/4W	
R425	1-249-407-11	CARBON	150	5%	1/4W	
R426	1-249-433-11	CARBON	22K	5%	1/4W	
R427	1-249-437-11	CARBON	47K	5%	1/4W	
R430	1-215-885-00	METAL OXIDE	68	5%	2W	F
R431	1-216-349-00	METAL OXIDE	1	5%	1W	F
R451	1-249-439-11	CARBON	68K	5%	1/4W	
R452	1-249-417-11	CARBON	1K	5%	1/4W	
R501	1-216-458-11	METAL OXIDE	1.8K	5%	2W	F
R502	1-215-869-11	METAL OXIDE	1K	5%	1W	F
R503	1-215-870-11	METAL OXIDE	1.5K	5%	1W	F
R504	1-249-417-11	CARBON	1K	5%	1/4W	
R505	1-215-453-00	METAL	22K	1%	1/4W	
⧓R506 ⚠		METAL			1/4W	
R507	1-215-445-00	METAL	10K	1%	1/4W	
R508	1-215-453-00	METAL	22K	1%	1/4W	
⧓R509 ⚠		METAL			1/4W	
R510 ⚠	1-215-447-91	METAL	12K	1%	1/4W	
R511 ⚠	1-215-436-91	METAL	4.3K	1%	1/4W	
R512 ⚠	1-215-436-91	METAL	4.3K	1%	1/4W	
R513 ⚠	1-215-436-91	METAL	4.3K	1%	1/4W	
R514 ⚠	1-215-436-91	METAL	4.3K	1%	1/4W	
R515	1-249-437-11	CARBON	47K	5%	1/4W	
R516	1-249-437-11	CARBON	47K	5%	1/4W	
R517	1-249-432-11	CARBON	18K	5%	1/4W	
R518	1-249-437-11	CARBON	47K	5%	1/4W	
R519	1-249-437-11	CARBON	47K	5%	1/4W	
R520	1-249-432-11	CARBON	18K	5%	1/4W	
R521	1-249-437-11	CARBON	47K	5%	1/4W	
R522	1-247-887-00	CARBON	220K	5%	1/4W	
R523	1-249-432-11	CARBON	18K	5%	1/4W	
R524	1-249-433-11	CARBON	22K	5%	1/4W	
R525	1-249-441-11	CARBON	100K	5%	1/4W	
R526	1-249-429-11	CARBON	10K	5%	1/4W	
R528	1-249-429-11	CARBON	10K	5%	1/4W	
R529	1-249-421-11	CARBON	2.2K	5%	1/4W	
R530	1-249-429-11	CARBON	10K	5%	1/4W	
R531	1-249-417-11	CARBON	1K	5%	1/4W	
R532	1-249-417-11	CARBON	1K	5%	1/4W	
R533	1-249-425-11	CARBON	4.7K	5%	1/4W	
R534	1-249-440-11	CARBON	82K	5%	1/4W	
R535	1-249-425-11	CARBON	4.7K	5%	1/4W	
R536	1-249-424-11	CARBON	3.9K	5%	1/4W	
R537	1-249-425-11	CARBON	4.7K	5%	1/4W	
R538	1-249-437-11	CARBON	47K	5%	1/4W	
R539	1-249-425-11	CARBON	4.7K	5%	1/4W	
R560	1-249-437-11	CARBON	47K	5%	1/4W	
R563	1-215-407-00	METAL	270	1%	1/4W	
R564	1-215-427-00	METAL	1.8K	1%	1/4W	
R565	1-249-393-11	CARBON	10	5%	1/4W	
R566	1-249-393-11	CARBON	10	5%	1/4W	
R567	1-249-393-11	CARBON	10	5%	1/4W	
R601	1-249-441-11	CARBON	100K	5%	1/4W	
R602	1-249-425-11	CARBON	4.7K	5%	1/4W	
R603	1-249-423-11	CARBON	3.3K	5%	1/4W	
R604	1-249-417-11	CARBON	1K	5%	1/4W	
R606	1-249-429-11	CARBON	10K	5%	1/4W	
R607	1-249-429-11	CARBON	10K	5%	1/4W	
R608	1-249-426-11	CARBON	5.6K	5%	1/4W	
R609	1-249-431-11	CARBON	15K	5%	1/4W	
R610	1-202-719-00	SOLID	1M	10%	1/2W	
R611	1-202-719-00	SOLID	1M	10%	1/2W	
R612	1-249-405-11	CARBON	100	5%	1/4W	
R613	1-249-423-11	CARBON	3.3K	5%	1/4W	
R614	1-215-929-11	METAL OXIDE	100K	5%	3W	F

D3 **H4** **N**

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION				REMARK
R615	1-215-929-11	METAL OXIDE	100K	5%	3W	F
R616	1-215-929-11	METAL OXIDE	100K	5%	3W	F
R617	1-202-818-00	SOLID	1K	10%	1/2W	
R618	1-249-405-11	CARBON	100	5%	1/4W	
R619	1-202-561-00	SOLID	330	10%	1/2W	
R620	1-202-844-00	SOLID	330K	10%	1/2W	
R621	1-202-844-00	SOLID	330K	10%	1/2W	
R622	1-202-841-00	SOLID	180K	10%	1/2W	
R623	1-249-428-11	CARBON	8.2K	5%	1/4W	
R625	1-202-844-00	SOLID	330K	10%	1/2W	
R626	1-202-844-00	SOLID	330K	10%	1/2W	
R627	1-202-844-00	SOLID	330K	10%	1/2W	
R628	1-202-731-00	SOLID	10M	10%	1/2W	
R629	1-249-417-11	CARBON	1K	5%	1/4W	
R630	1-249-417-11	CARBON	1K	5%	1/4W	
R631	1-202-818-00	SOLID	1K	10%	1/2W	
R632	1-247-891-00	CARBON	330K	5%	1/4W	
R634	1-249-425-11	CARBON	4.7K	5%	1/4W	
R638	1-249-431-11	CARBON	15K	5%	1/4W	
R639	1-249-425-11	CARBON	4.7K	5%	1/4W	
R640	1-215-884-11	METAL OXIDE	47	5%	2W	F
R641	1-249-437-11	CARBON	47K	5%	1/4W	
R701	1-249-405-11	CARBON	100	5%	1/4W	
R702	1-249-417-11	CARBON	1K	5%	1/4W	
R703	1-249-429-11	CARBON	10K	5%	1/4W	
R704	1-249-429-11	CARBON	10K	5%	1/4W	
R705	1-249-429-11	CARBON	10K	5%	1/4W	
R706	1-249-429-11	CARBON	10K	5%	1/4W	
R707	1-249-383-11	CARBON	1.5	5%	1/4W	F
R708	1-249-383-11	CARBON	1.5	5%	1/4W	F
R709	1-249-421-11	CARBON	2.2K	5%	1/4W	
R710	1-249-405-11	CARBON	100	5%	1/4W	
R711	1-249-441-11	CARBON	100K	5%	1/4W	
R712	1-247-885-00	CARBON	180K	5%	1/4W	
R713	1-249-429-11	CARBON	10K	5%	1/4W	
R714	1-249-417-11	CARBON	1K	5%	1/4W	
R715	1-249-417-11	CARBON	1K	5%	1/4W	
R716	1-249-417-11	CARBON	1K	5%	1/4W	
R717	1-249-429-11	CARBON	10K	5%	1/4W	
R718	1-202-725-00	SOLID	3.3M	10%	1/2W	
R719	1-202-725-00	SOLID	3.3M	10%	1/2W	
R720	1-202-848-00	SOLID	680K	10%	1/2W	
R721	1-202-848-00	SOLID	680K	10%	1/2W	
R722	1-202-848-00	SOLID	680K	10%	1/2W	
R723	1-202-719-00	SOLID	1M	10%	1/2W	
R724	1-249-393-11	CARBON	10	5%	1/4W	F
R901	1-249-384-11	CARBON	1.8	5%	1/4W	F
R910	1-249-409-11	CARBON	220	5%	1/4W	
R911	1-249-409-11	CARBON	220	5%	1/4W	

<VARIABLE RESISTOR>

RV501	1-237-516-21	RES, ADJ, METAL FILM 2K

<SPARK GAP>

SG601	1-519-063-XX	DISCHARGING GAP
SG701	1-519-063-XX	DISCHARGING GAP

<TRANSFORMER>

T201 ⚠	1-437-206-11	TRANSFORMER, HORIZONTAL DRIVE
T202 ⚠	1-437-207-12	TRANSFORMER, FERRITE (HOT)
T400 ⚠	1-439-516-11	TRANSFORMER ASSY, FLYBACK (NX-2414)

REF.NO.	PART NO.	DESCRIPTION	REMARK

<THERMISTOR>

TH201	1-807-796-11	THERMISTOR

****

*A-1500-161-A	H4 BOARD, COMPLETE	
	**********	
*1-564-505-11	PLUG, CONNECTOR 2P	
*1-564-596-11	PLUG, CONNECTOR 15P	
*4-029-284-01	HOLDER, LED	

<CAPACITOR>

C1	1-124-477-11	ELECT	47MF	20%	16V

<DIODE>

D1	8-719-311-90	DIODE SEL1922D-C
D2	8-719-311-90	DIODE SEL1922D-C
D3	8-719-311-90	DIODE SEL1922D-C
D4	8-719-311-90	DIODE SEL1922D-C
D5	8-719-311-90	DIODE SEL1922D-C
D6	8-719-311-90	DIODE SEL1922D-C
D7	8-719-311-90	DIODE SEL1922D-C
D8	8-719-911-19	DIODE 1SS119
D9	8-719-911-19	DIODE 1SS119
D10	8-719-911-19	DIODE 1SS119
D11	8-719-911-19	DIODE 1SS119
D12	8-719-911-19	DIODE 1SS119

<RESISTOR>

R1	1-247-706-11	CARBON	330	5%	1/4W

<SWITCH>

S1	1-571-532-21	SWITCH, TACTIL
S2	1-571-532-21	SWITCH, TACTIL
S3	1-571-532-21	SWITCH, TACTIL
S4	1-571-532-21	SWITCH, TACTIL
S5	1-571-532-21	SWITCH, TACTIL

****

*A-1500-358-A	N BOARD, COMPLETE	
	**********	
*1-580-315-11	CONNECTOR, HINGE 20P	
3-710-578-01	COVER, VOLUME, 6 MOLD	

<CAPACITOR>

C1	1-124-442-00	ELECT	330MF	20%	6.3V
C2	1-124-477-11	ELECT	47MF	20%	16V
C3	1-124-477-11	ELECT	47MF	20%	16V
C4	1-124-903-11	ELECT	1MF	20%	50V
C6	1-126-101-11	ELECT	100MF	20%	16V
C7	1-101-004-00	CERAMIC	0.01MF		50V
C8	1-124-907-11	ELECT	10MF	20%	50V
C11	1-101-880-00	CERAMIC	47PF	5%	50V
C12	1-101-880-00	CERAMIC	47PF	5%	50V
C13	1-102-978-00	CERAMIC	220PF	5%	50V
C14	1-102-114-00	CERAMIC	470PF	10%	50V

REF.NO.	PART NO.	DESCRIPTION				REMARK
C15	1-124-907-11	ELECT	10MF	20%	50V	
C16	1-136-165-00	FILM	0.1MF	5%	50V	
C17	1-106-359-00	MYLAR	0.0047MF	5%	50V	
C18	1-124-477-11	ELECT	47MF	20%	16V	
C28	1-124-907-11	ELECT	10MF	20%	50V	
C29	1-124-903-11	ELECT	1MF	20%	50V	
C30	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C31	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C32	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C33	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C34	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C35	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C36	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C37	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C38	1-124-907-11	ELECT	10MF	20%	50V	
C40	1-124-903-11	ELECT	1MF	20%	50V	
C43	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C55	1-101-004-00	CERAMIC	0.01MF		50V	
C56	1-101-004-00	CERAMIC	0.01MF		50V	
C61	1-101-004-00	CERAMIC	0.01MF		50V	
C62	1-101-004-00	CERAMIC	0.01MF		50V	
C67	1-101-004-00	CERAMIC	0.01MF		50V	
C68	1-101-004-00	CERAMIC	0.01MF		50V	
C79	1-101-004-00	CERAMIC	0.01MF		50V	
C80	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C83	1-101-004-00	CERAMIC	0.01MF		50V	
C86	1-101-004-00	CERAMIC	0.01MF		50V	
C87	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C88	1-126-320-11	ELECT	10MF	20%	16V	
C90	1-124-477-11	ELECT	47MF	20%	16V	
C201	1-124-907-11	ELECT	10MF	20%	50V	
C202	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C203	1-124-477-11	ELECT	47MF	20%	16V	
C204	1-124-907-11	ELECT	10MF	20%	50V	
C205	1-102-947-00	CERAMIC	10PF	0.5PF	50V	
C206	1-102-973-00	CERAMIC	100PF	5%	50V	
C207	1-124-903-11	ELECT	1MF	20%	50V	
C208	1-136-165-00	FILM	0.1MF	5%	50V	
C209	1-108-802-11	MYLAR	0.0068MF	5%	50V	
C210	1-136-165-00	FILM	0.1MF	5%	50V	
C211	1-136-165-00	FILM	0.1MF	5%	50V	
C212	1-124-925-11	ELECT	2.2MF	20%	50V	
C213	1-124-903-11	ELECT	1MF	20%	50V	
C214	1-124-360-00	ELECT	1000MF	20%	16V	
C215	1-136-570-11	FILM	0.0015MF	2%	50V	
C216	1-130-014-00	FILM	470PF	5%	50V	
C217	1-124-903-11	ELECT	1MF	20%	50V	
C218	1-108-794-11	MYLAR	0.0015MF	5%	50V	
C219	1-101-361-00	CERAMIC	150PF	5%	50V	
C220	1-101-361-00	CERAMIC	150PF	5%	50V	
C221	1-102-973-00	CERAMIC	100PF	5%	50V	
C222	1-102-114-00	CERAMIC	470PF	10%	50V	
C223	1-102-114-00	CERAMIC	470PF	10%	50V	
C224	1-102-114-00	CERAMIC	470PF	10%	50V	
C225	1-102-816-00	CERAMIC	120PF	5%	50V	
C226	1-102-973-00	CERAMIC	100PF	5%	50V	
C227	1-101-880-00	CERAMIC	47PF	5%	50V	
C228	1-102-114-00	CERAMIC	470PF	10%	50V	
C229	1-102-114-00	CERAMIC	470PF	10%	50V	
C230	1-102-114-00	CERAMIC	470PF	10%	50V	
C231	1-130-019-00	FILM	0.0012MF	5%	50V	
C232	1-130-015-00	FILM	560PF	5%	50V	
C233	1-136-153-00	FILM	0.01MF	5%	50V	
C234	1-124-903-11	ELECT	1MF	20%	50V	
C235	1-124-477-11	ELECT	47MF	20%	16V	
C236	1-108-792-11	MYLAR	0.001MF	5%	50V	
C237	1-102-973-00	CERAMIC	100PF	5%	50V	
C238	1-130-483-00	MYLAR	0.01MF	5%	50V	
C239	1-136-165-00	FILM	0.1MF	5%	50V	
C240	1-124-927-11	ELECT	4.7MF	20%	50V	
C241	1-124-903-11	ELECT	1MF	20%	50V	
C242	1-108-792-11	MYLAR	0.001MF	5%	50V	
C243	1-136-165-00	FILM	0.1MF	5%	50V	
C244	1-108-792-11	MYLAR	0.001MF	5%	50V	
C245	1-124-477-11	ELECT	47MF	20%	16V	
C246	1-108-692-11	MYLAR	0.01MF	10%	200V	
C247	1-136-173-00	FILM	0.47MF	5%	50V	
C248	1-124-903-11	ELECT	1MF	20%	50V	
C249	1-124-903-11	ELECT	1MF	20%	50V	
C250	1-136-165-00	FILM	0.1MF	5%	50V	
C251	1-124-499-11	ELECT	1MF	20%	50V	
C252	1-108-792-11	MYLAR	0.001MF	5%	50V	
C253	1-102-973-00	CERAMIC	100PF	5%	50V	
C254	1-124-477-11	ELECT	47MF	20%	16V	
C255	1-136-171-00	FILM	0.33MF	5%	50V	
C301	1-102-125-00	CERAMIC	0.0047MF	10%	50V	
C302	1-124-927-11	ELECT	4.7MF	20%	50V	

<COMPOSITION CIRCUIT BLOCK>

CP2	1-236-841-11	NETWORK, C
CP6	1-236-841-11	NETWORK, C

<DIODE>

D1	8-719-109-72	DIODE RD3.9ES-B2
D2	8-719-110-03	DIODE RD7.5ES-B2
D4	8-719-911-19	DIODE 1SS119
D5	8-719-911-19	DIODE 1SS119
D6	8-719-911-19	DIODE 1SS119
D7	8-719-911-19	DIODE 1SS119
D8	8-719-911-19	DIODE 1SS119
D10	8-719-911-19	DIODE 1SS119
D11	8-719-109-85	DIODE RD5.1ES-B2
D12	8-719-911-19	DIODE 1SS119
D13	8-719-109-85	DIODE RD5.1ES-B2
D14	8-719-911-19	DIODE 1SS119
D201	8-719-110-17	DIODE RD10ES-B2
D202	8-719-110-31	DIODE RD12ES-B2
D203	8-719-911-19	DIODE 1SS119
D204	8-719-911-19	DIODE 1SS119
D205	8-719-911-19	DIODE 1SS119
D206	8-719-109-54	DIODE RD2.2ES-B2
D207	8-719-109-93	DIODE RD6.2ES-B2
D208	8-719-911-19	DIODE 1SS119
D302	8-719-911-19	DIODE 1SS119

<IC>

IC1	8-759-141-62	IC UPA2981C
IC2	8-759-143-30	IC UPC79N05H
IC3	8-759-060-05	IC M50747-2B9SP
IC4	8-759-504-87	IC DAC8800FP
IC5	8-759-916-14	IC SN74HC04AN
IC6	8-759-054-26	IC HD74HC123AP
IC7	8-759-635-40	IC M6M80021L
IC8	8-759-635-40	IC M6M80021L
IC9	8-759-504-88	IC DAC8408HP

N

REF.NO.	PART NO.	DESCRIPTION	REMARK
IC10	8-759-504-88	IC DAC8408HP	
IC11	8-759-945-58	IC RC4558P	
IC12	8-759-945-58	IC RC4558P	
IC13	8-759-945-58	IC RC4558P	
IC14	8-759-945-58	IC RC4558P	
IC15	8-759-945-58	IC RC4558P	
IC16	8-759-945-58	IC RC4558P	
IC17	8-759-945-58	IC RC4558P	
IC18	8-759-945-58	IC RC4558P	
IC19	8-759-945-58	IC RC4558P	
IC20	8-759-945-58	IC RC4558P	
IC21	8-759-945-58	IC RC4558P	
IC22	8-759-945-58	IC RC4558P	
IC23	8-759-945-58	IC RC4558P	
IC24	8-759-945-58	IC RC4558P	
IC25	8-759-945-58	IC RC4558P	
IC26	8-759-945-58	IC RC4558P	
IC27	8-759-945-58	IC RC4558P	
IC28	8-759-054-26	IC HD74HC123AP	
IC29	8-759-945-58	IC RC4558P	
IC100	8-759-112-06	IC UPC78N05H	
IC101	8-759-822-53	IC LA7856	
IC201	8-752-033-65	IC CXA1158P	
IC202	8-752-037-32	IC CXA1366S	
		<COIL>	
L1	1-412-419-12	INDUCTOR 100UH	
L2	1-410-482-31	INDUCTOR 100UH	
		<TRANSISTOR>	
Q1	8-729-423-42	TRANSISTOR 2SA1309A-R	
Q2	8-729-900-63	TRANSISTOR DTA124ES	
Q3	8-729-900-63	TRANSISTOR DTA124ES	
Q4	8-729-266-82	TRANSISTOR 2SC2668-O	
Q5	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q6	8-729-900-63	TRANSISTOR DTA124ES	
Q8	8-729-900-63	TRANSISTOR DTA124ES	
Q201	8-729-423-42	TRANSISTOR 2SA1309A-R	
Q202	8-729-423-42	TRANSISTOR 2SA1309A-R	
Q203	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q204	8-729-423-42	TRANSISTOR 2SA1309A-R	
Q205	8-729-423-42	TRANSISTOR 2SA1309A-R	
Q206	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q207	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q208	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q209	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q210	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q211	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q212	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q301	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q302	8-729-423-42	TRANSISTOR 2SA1309A-R	
Q303	8-729-423-35	TRANSISTOR 2SC3311A-R	
Q304	8-729-423-42	TRANSISTOR 2SA1309A-R	
		<RESISTOR>	
R1	1-249-423-11	CARBON 3.3K 5% 1/4W	
R2	1-249-423-11	CARBON 3.3K 5% 1/4W	
R3	1-249-423-11	CARBON 3.3K 5% 1/4W	
R4	1-249-423-11	CARBON 3.3K 5% 1/4W	
R5	1-249-423-11	CARBON 3.3K 5% 1/4W	
R6	1-249-423-11	CARBON 3.3K 5% 1/4W	
R7	1-249-423-11	CARBON 3.3K 5% 1/4W	
R8	1-249-409-11	CARBON 220 5% 1/4W	
R9	1-249-409-11	CARBON 220 5% 1/4W	
R10	1-249-409-11	CARBON 220 5% 1/4W	
R11	1-249-429-11	CARBON 10K 5% 1/4W	
R12	1-249-429-11	CARBON 10K 5% 1/4W	
R13	1-249-429-11	CARBON 10K 5% 1/4W	
R14	1-249-429-11	CARBON 10K 5% 1/4W	
R15	1-249-417-11	CARBON 1K 5% 1/4W	
R16	1-249-421-11	CARBON 2.2K 5% 1/4W	
R17	1-249-405-11	CARBON 100 5% 1/4W	
R18	1-249-405-11	CARBON 100 5% 1/4W	
R19	1-249-421-11	CARBON 2.2K 5% 1/4W	
R20	1-249-417-11	CARBON 1K 5% 1/4W	
R22	1-249-413-11	CARBON 470 5% 1/4W	
R23	1-249-409-11	CARBON 220 5% 1/4W	
R24	1-249-429-11	CARBON 10K 5% 1/4W	
R25	1-249-429-11	CARBON 10K 5% 1/4W	
R26	1-249-429-11	CARBON 10K 5% 1/4W	
R27	1-247-903-00	CARBON 1M 5% 1/4W	
R28	1-249-413-11	CARBON 470 5% 1/4W	
R29	1-249-429-11	CARBON 10K 5% 1/4W	
R30	1-249-429-11	CARBON 10K 5% 1/4W	
R31	1-249-429-11	CARBON 10K 5% 1/4W	
R32	1-249-429-11	CARBON 10K 5% 1/4W	
R33	1-249-429-11	CARBON 10K 5% 1/4W	
R34	1-249-429-11	CARBON 10K 5% 1/4W	
R39	1-249-428-11	CARBON 8.2K 5% 1/4W	
R41	1-249-417-11	CARBON 1K 5% 1/4W	
R42	1-249-417-11	CARBON 1K 5% 1/4W	
R43	1-249-417-11	CARBON 1K 5% 1/4W	
R44	1-249-417-11	CARBON 1K 5% 1/4W	
R45	1-249-417-11	CARBON 1K 5% 1/4W	
R46	1-249-417-11	CARBON 1K 5% 1/4W	
R47	1-249-417-11	CARBON 1K 5% 1/4W	
R48	1-249-417-11	CARBON 1K 5% 1/4W	
R49	1-249-417-11	CARBON 1K 5% 1/4W	
R50	1-249-417-11	CARBON 1K 5% 1/4W	
R51	1-249-417-11	CARBON 1K 5% 1/4W	
R52	1-249-417-11	CARBON 1K 5% 1/4W	
R53	1-249-417-11	CARBON 1K 5% 1/4W	
R54	1-249-417-11	CARBON 1K 5% 1/4W	
R55	1-249-417-11	CARBON 1K 5% 1/4W	
R56	1-249-417-11	CARBON 1K 5% 1/4W	
R57	1-249-417-11	CARBON 1K 5% 1/4W	
R58	1-249-417-11	CARBON 1K 5% 1/4W	
R59	1-249-409-11	CARBON 220 5% 1/4W	
R60	1-249-421-11	CARBON 2.2K 5% 1/4W	
R61	1-249-417-11	CARBON 1K 5% 1/4W	
R62	1-249-425-11	CARBON 4.7K 5% 1/4W	
R63	1-249-421-11	CARBON 2.2K 5% 1/4W	
R64	1-249-417-11	CARBON 1K 5% 1/4W	
R65	1-249-425-11	CARBON 4.7K 5% 1/4W	
R66	1-249-441-11	CARBON 100K 5% 1/4W	
R67	1-249-438-11	CARBON 56K 5% 1/4W	
R68	1-249-429-11	CARBON 10K 5% 1/4W	
R69	1-215-465-00	METAL 68K 1% 1/4W	
R70	1-215-461-00	METAL 47K 1% 1/4W	
R71	1-249-417-11	CARBON 1K 5% 1/4W	
R72	1-249-417-11	CARBON 1K 5% 1/4W	
R73	1-249-417-11	CARBON 1K 5% 1/4W	
R74	1-249-417-11	CARBON 1K 5% 1/4W	
R75	1-249-421-11	CARBON 2.2K 5% 1/4W	
R76	1-249-417-11	CARBON 1K 5% 1/4W	

REF.NO.	PART NO.	DESCRIPTION				REMARK
R77	1-249-413-11	CARBON	470	5%	1/4W	
R78	1-249-423-11	CARBON	3.3K	5%	1/4W	
R79	1-249-423-11	CARBON	3.3K	5%	1/4W	
R80	1-247-889-00	CARBON	270K	5%	1/4W	
R81	1-247-897-11	CARBON	560K	5%	1/4W	
R82	1-249-433-11	CARBON	22K	5%	1/4W	
R83	1-249-429-11	CARBON	10K	5%	1/4W	
R84	1-249-417-11	CARBON	1K	5%	1/4W	
R85	1-249-431-11	CARBON	15K	5%	1/4W	
R86	1-249-429-11	CARBON	10K	5%	1/4W	
R87	1-249-429-11	CARBON	10K	5%	1/4W	
R88	1-249-429-11	CARBON	10K	5%	1/4W	
R90	1-247-881-00	CARBON	120K	5%	1/4W	
R91	1-249-429-11	CARBON	10K	5%	1/4W	
R92	1-249-429-11	CARBON	10K	5%	1/4W	
R93	1-249-429-11	CARBON	10K	5%	1/4W	
R94	1-249-435-11	CARBON	33K	5%	1/4W	
R95	1-215-452-00	METAL	20K	1%	1/4W	
R96	1-215-452-00	METAL	20K	1%	1/4W	
R97	1-215-445-00	METAL	10K	1%	1/4W	
R98	1-215-438-00	METAL	5.1K	1%	1/4W	
R99	1-215-452-00	METAL	20K	1%	1/4W	
R100	1-215-452-00	METAL	20K	1%	1/4W	
R101	1-215-438-00	METAL	5.1K	1%	1/4W	
R102	1-215-445-00	METAL	10K	1%	1/4W	
R103	1-215-452-00	METAL	20K	1%	1/4W	
R104	1-215-452-00	METAL	20K	1%	1/4W	
R105	1-215-445-00	METAL	10K	1%	1/4W	
R106	1-215-438-00	METAL	5.1K	1%	1/4W	
R108	1-215-445-00	METAL	10K	1%	1/4W	
R109	1-215-437-00	METAL	4.7K	1%	1/4W	
R110	1-249-425-11	CARBON	4.7K	5%	1/4W	
R111	1-215-439-00	METAL	5.6K	1%	1/4W	
R112	1-215-445-00	METAL	10K	1%	1/4W	
R113	1-215-452-00	METAL	20K	1%	1/4W	
R114	1-215-452-00	METAL	20K	1%	1/4W	
R115	1-215-445-00	METAL	10K	1%	1/4W	
R116	1-215-438-00	METAL	5.1K	1%	1/4W	
R117	1-215-465-00	METAL	68K	1%	1/4W	
R118	1-249-425-11	CARBON	4.7K	5%	1/4W	
R119	1-249-430-11	CARBON	12K	5%	1/4W	
R120	1-249-424-11	CARBON	3.9K	5%	1/4W	
R121	1-215-452-00	METAL	20K	1%	1/4W	
R122	1-215-452-00	METAL	20K	1%	1/4W	
R123	1-215-445-00	METAL	10K	1%	1/4W	
R124	1-215-438-00	METAL	5.1K	1%	1/4W	
R125	1-215-449-00	METAL	15K	1%	1/4W	
R126	1-249-430-11	CARBON	12K	5%	1/4W	
R127	1-249-430-11	CARBON	12K	5%	1/4W	
R129	1-249-423-11	CARBON	3.3K	5%	1/4W	
R130	1-249-431-11	CARBON	15K	5%	1/4W	
R131	1-249-436-11	CARBON	39K	5%	1/4W	
R132	1-249-438-11	CARBON	56K	5%	1/4W	
R134	1-247-887-00	CARBON	220K	5%	1/4W	
R135	1-249-425-11	CARBON	4.7K	5%	1/4W	
R137	1-249-417-11	CARBON	1K	5%	1/4W	
R138	1-215-445-00	METAL	10K	1%	1/4W	
R144	1-215-437-00	METAL	4.7K	1%	1/4W	
R145	1-215-445-00	METAL	10K	1%	1/4W	
R146	1-249-409-11	CARBON	220	5%	1/4W	
R147	1-249-409-11	CARBON	220	5%	1/4W	
R150	1-215-445-00	METAL	10K	1%	1/4W	
R151	1-215-449-00	METAL	15K	1%	1/4W	
R152	1-249-430-11	CARBON	12K	5%	1/4W	
R153	1-249-424-11	CARBON	3.9K	5%	1/4W	
R154	1-249-434-11	CARBON	27K	5%	1/4W	
R155	1-249-409-11	CARBON	220	5%	1/4W	
R156	1-249-409-11	CARBON	220	5%	1/4W	
R163	1-215-857-11	METAL OXIDE	10	5%	1W	F
R165	1-215-860-11	METAL OXIDE	33	5%	1W	F
R166	1-247-846-11	CARBON	4.3K	5%	1/4W	
R167	1-249-433-11	CARBON	22K	5%	1/4W	
R168	1-249-429-11	CARBON	10K	5%	1/4W	
R169	1-249-440-11	CARBON	82K	5%	1/4W	
R170	1-249-423-11	CARBON	3.3K	5%	1/4W	
R171	1-249-429-11	CARBON	10K	5%	1/4W	
R201	1-215-437-00	METAL	4.7K	1%	1/4W	
R202	1-215-429-00	METAL	2.2K	1%	1/4W	
R203	1-215-429-00	METAL	2.2K	1%	1/4W	
R204	1-249-405-11	CARBON	100	5%	1/4W	
R205	1-215-439-00	METAL	5.6K	1%	1/4W	
R206	1-215-439-00	METAL	5.6K	1%	1/4W	
R207	1-215-411-00	METAL	390	1%	1/4W	
R208	1-215-445-00	METAL	10K	1%	1/4W	
R209	1-215-493-00	METAL	1M	1%	1/4W	
R210	1-215-441-00	METAL	6.8K	1%	1/4W	
R211	1-215-469-00	METAL	100K	1%	1/4W	
R212	1-249-405-11	CARBON	100	5%	1/4W	
R213	1-215-439-00	METAL	5.6K	1%	1/4W	
R214	1-215-439-00	METAL	5.6K	1%	1/4W	
R215	1-215-445-00	METAL	10K	1%	1/4W	
R216	1-215-443-00	METAL	8.2K	1%	1/4W	
R217	1-215-857-11	METAL OXIDE	10	5%	1W	F
R218	1-249-430-11	CARBON	12K	5%	1/4W	
R219	1-215-469-00	METAL	100K	1%	1/4W	
R220	1-215-467-00	METAL	82K	1%	1/4W	
R221	1-249-429-11	CARBON	10K	5%	1/4W	
R222	1-249-405-11	CARBON	100	5%	1/4W	
R223	1-215-449-00	METAL	15K	1%	1/4W	
R224	1-215-421-00	METAL	1K	1%	1/4W	
R225	1-215-449-00	METAL	15K	1%	1/4W	
R226	1-249-421-11	CARBON	2.2K	5%	1/4W	
R227	1-249-417-11	CARBON	1K	5%	1/4W	
R228	1-249-438-11	CARBON	56K	5%	1/4W	
R229	1-249-433-11	CARBON	22K	5%	1/4W	
R230	1-215-453-00	METAL	22K	1%	1/4W	
R231	1-249-433-11	CARBON	22K	5%	1/4W	
R232	1-249-421-11	CARBON	2.2K	5%	1/4W	
R233	1-249-437-11	CARBON	47K	5%	1/4W	
R234	1-249-429-11	CARBON	10K	5%	1/4W	
R235	1-249-437-11	CARBON	47K	5%	1/4W	
R236	1-249-421-11	CARBON	2.2K	5%	1/4W	
R237	1-249-421-11	CARBON	2.2K	5%	1/4W	
R238	1-249-421-11	CARBON	2.2K	5%	1/4W	
R239	1-249-421-11	CARBON	2.2K	5%	1/4W	
R240	1-249-421-11	CARBON	2.2K	5%	1/4W	
R241	1-249-421-11	CARBON	2.2K	5%	1/4W	
R242	1-215-463-00	METAL	56K	1%	1/4W	
R243	1-249-417-11	CARBON	1K	5%	1/4W	
R244	1-249-423-11	CARBON	3.3K	5%	1/4W	
R245	1-215-469-00	METAL	100K	1%	1/4W	
R247	1-215-458-00	METAL	36K	1%	1/4W	
R248	1-249-417-11	CARBON	1K	5%	1/4W	
R249	1-215-421-00	METAL	1K	1%	1/4W	
R250	1-215-437-00	METAL	4.7K	1%	1/4W	
R251	1-249-425-11	CARBON	4.7K	5%	1/4W	
R252	1-249-429-11	CARBON	10K	5%	1/4W	

N C

REF.NO.	PART NO.	DESCRIPTION				REMARK
R253	1-249-417-11	CARBON	1K	5%	1/4W	
R254	1-249-417-11	CARBON	1K	5%	1/4W	
R255	1-249-413-11	CARBON	470	5%	1/4W	
R256	1-247-903-00	CARBON	1M	5%	1/4W	
R257	1-249-425-11	CARBON	4.7K	5%	1/4W	
R258	1-249-425-11	CARBON	4.7K	5%	1/4W	
R259	1-249-433-11	CARBON	22K	5%	1/4W	
R260	1-249-433-11	CARBON	22K	5%	1/4W	
R261	1-249-435-11	CARBON	33K	5%	1/4W	
R262	1-249-437-11	CARBON	47K	5%	1/4W	
R263	1-249-437-11	CARBON	47K	5%	1/4W	
R264	1-247-899-11	CARBON	680K	5%	1/4W	
R265	1-249-435-11	CARBON	33K	5%	1/4W	
R266	1-249-433-11	CARBON	22K	5%	1/4W	
R267	1-249-429-11	CARBON	10K	5%	1/4W	
R268	1-249-436-11	CARBON	39K	5%	1/4W	
R269	1-249-417-11	CARBON	1K	5%	1/4W	
R270	1-249-417-11	CARBON	1K	5%	1/4W	
R271	1-247-903-00	CARBON	1M	5%	1/4W	
R272	1-247-903-00	CARBON	1M	5%	1/4W	
R273	1-247-903-00	CARBON	1M	5%	1/4W	
R274	1-247-903-00	CARBON	1M	5%	1/4W	
R275	1-247-903-00	CARBON	1M	5%	1/4W	
R276	1-247-903-00	CARBON	1M	5%	1/4W	
R277	1-249-429-11	CARBON	10K	5%	1/4W	
R278	1-249-423-11	CARBON	3.3K	5%	1/4W	
R290	1-249-417-11	CARBON	1K	5%	1/4W	
R291	1-215-445-00	METAL	10K	1%	1/4W	
R292	1-215-463-00	METAL	56K	1%	1/4W	
R293	1-215-429-00	METAL	2.2K	1%	1/4W	
R301	1-249-425-11	CARBON	4.7K	5%	1/4W	
R302	1-249-417-11	CARBON	1K	5%	1/4W	
R303	1-249-425-11	CARBON	4.7K	5%	1/4W	
R304	1-249-417-11	CARBON	1K	5%	1/4W	
R305	1-249-441-11	CARBON	100K	5%	1/4W	
R306	1-249-425-11	CARBON	4.7K	5%	1/4W	
R307	1-249-423-11	CARBON	3.3K	5%	1/4W	
R308	1-249-425-11	CARBON	4.7K	5%	1/4W	
R316	1-249-431-11	CARBON	15K	5%	1/4W	
R317	1-249-405-11	CARBON	100	5%	1/4W	
R318	1-249-405-11	CARBON	100	5%	1/4W	

<VARIABLE RESISTOR>

RV1	1-228-991-00	RES, ADJ, METAL GLAZE	2.2K
RV2	1-228-993-00	RES, ADJ, METAL GLAZE	4.7K
RV3	1-228-994-00	RES, ADJ, METAL GLAZE	10K
RV4	1-228-993-00	RES, ADJ, METAL GLAZE	4.7K
RV5	1-228-994-00	RES, ADJ, METAL GLAZE	10K
RV6	1-228-995-00	RES, ADJ, METAL GLAZE	22K
RV7	1-228-995-00	RES, ADJ, METAL GLAZE	22K
RV8	1-228-994-00	RES, ADJ, METAL GLAZE	10K
RV9	1-228-993-00	RES, ADJ, METAL GLAZE	4.7K
RV10	1-228-994-00	RES, ADJ, METAL GLAZE	10K

<SWITCH>

SW1	1-571-738-11	SWITCH, SLIDE
SW2	1-553-977-00	SWITCH, SLIDE
SW3	1-554-174-00	SWITCH, KEY BOARD

<CRYSTAL>

X1	1-527-726-00	VIBRATOR, CRYSTAL

REF.NO.	PART NO.	DESCRIPTION	REMARK
	*A-1500-087-A	C BOARD, COMPLETE	
	1-560-435-00	HORIZONTAL PIN ASSY 2P	
	*1-564-506-11	PLUG, CONNECTOR 3P	

<CAPACITOR>

C1	1-130-777-00	FILM	0.1MF	10%	100V
C2	1-130-777-00	FILM	0.1MF	10%	100V
C3	1-130-777-00	FILM	0.1MF	10%	100V
C4	1-130-777-00	FILM	0.1MF	10%	100V
C5	1-162-114-00	CERAMIC	0.0047MF		2KV
C6	1-102-030-00	CERAMIC	330PF	10%	500V
C11	1-124-792-11	ELECT	2.2MF	20%	100V
C12	1-124-792-11	ELECT	2.2MF	20%	100V
C13	1-124-792-11	ELECT	2.2MF	20%	100V
C15	1-162-114-00	CERAMIC	0.0047MF		2KV

<DIODE>

D1	8-719-901-83	DIODE 1SS83
D2	8-719-901-83	DIODE 1SS83
D3	8-719-901-83	DIODE 1SS83
D7	8-719-300-33	DIODE RU-3AM

<COIL>

L1	1-410-749-41	INDUCTOR	0.27UH
L2	1-410-749-41	INDUCTOR	0.27UH
L3	1-410-749-41	INDUCTOR	0.27UH

<SPARK GAP>

NL1	1-519-504-11	GAP, DISCHARGE
NL2	1-519-504-11	GAP, DISCHARGE
NL3	1-519-504-11	GAP, DISCHARGE
NL4	1-519-504-11	GAP, DISCHARGE
NL5	1-519-504-11	GAP, DISCHARGE
NL6	1-519-504-11	GAP, DISCHARGE
SG1	1-519-063-XX	DISCHARGING GAP

<RESISTOR>

R1	1-202-539-00	SOLID	39	10%	1/2W
R2	1-202-539-00	SOLID	39	10%	1/2W
R3	1-202-539-00	SOLID	39	10%	1/2W
R4	1-202-539-00	SOLID	39	10%	1/2W
R5	1-202-838-00	SOLID	100K	10%	1/2W
R6	1-202-842-11	SOLID	220K	10%	1/2W
R11	1-249-411-11	CARBON	330	5%	1/4W
R12	1-249-411-11	CARBON	330	5%	1/4W
R13	1-249-411-11	CARBON	330	5%	1/4W
R17	1-247-899-11	CARBON	680K	5%	1/4W
R18	1-247-899-11	CARBON	680K	5%	1/4W
R19	1-247-899-11	CARBON	680K	5%	1/4W
R22	1-202-539-00	SOLID	39	10%	1/2W

<SOCKET>

SK1	1-540-159-11	SOCKET, PICTURE TUBE

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION	REMARK
	⚠.A-1500-160-A	SWITCHING REGULATOR("G")(CB-100D)	
		**********	
		(G, GA, GB BOARD INCLUDING)	
	⚠ 1-540-157-11	INLET, AC (3P WITH NOISE FILTER)	
	⚠ 3-701-809-41	SCREW, TERMINAL (M3X10)	
	⚠*3-701-903-01	HOLDER, PC BOARD	
	⚠*3-703-141-01	HOLDER, PCB	
	⚠*4-303-473-01	SUPPORT, PC	
	⚠*4-341-751-01	EYELET (EY15 - EY35,EY37,EY38 EY43 - EY49,EY51,EY52 EY54 - EY58,EY60 - EY75 EY77 - EY81,EY83,EY84)	
	⚠*4-341-752-01	EYELET (EY1 - EY14)	
	⚠ 4-381-964-01	SCREW (3X8), TAPPING	
	⚠*9-998-274-01	CONNECTOR ASSY, VH 3P (CNG1-AC)	
	⚠*9-998-275-01	CONNECTOR ASSY, MINATURE 1P (CNG2-GND)	
	⚠*9-998-276-01	CONNECTOR ASSY, MINATURE 1P (CNG8-GND)	

G BOARD, COMPLETE
****

<CAPACITOR>

C1	⚠ 1-137-109-11	FILM	0.22MF	20%	250V
C2	⚠ 1-137-110-11	FILM	0.47MF	20%	250V
C3	⚠ 1-161-953-51	CERAMIC	0.0047MF	20%	400V
C4	⚠ 1-161-953-51	CERAMIC	0.0047MF	20%	400V
C5	⚠ 1-162-579-51	CERAMIC	0.0047MF	%	400V
C6	⚠ 1-162-579-51	CERAMIC	0.0047MF	%	400V
C7	⚠ 1-162-579-51	CERAMIC	0.0047MF	%	400V
C8	⚠ 1-126-406-51	ELECT	2.2MF	20%	400V
C9	⚠ 1-126-101-51	ELECT	100MF	20%	16V
C12	⚠ 1-161-953-51	CERAMIC	0.0047MF	20%	400V
C13	⚠ 1-161-953-51	CERAMIC	0.0047MF	20%	400V
C14	⚠ 1-125-657-11	ELECT	820MF	20%	250V
C15	⚠ 1-125-657-11	ELECT	820MF	20%	250V
C16	⚠ 1-125-440-11	ELECT	220MF	20%	400V
C17	⚠ 1-136-085-11	FILM	0.016MF	3%	2KV
C18	⚠ 1-136-085-11	FILM	0.016MF	3%	2KV
C19	⚠ 1-126-375-41	ELECT	100MF	20%	25V
C20	⚠ 1-124-494-21	ELECT	33MF	20%	160V
C21	⚠ 1-124-494-21	ELECT	33MF	20%	160V
C22	⚠ 1-124-798-51	ELECT	1MF	20%	160V
C23	⚠ 1-108-427-51	FILM	0.033MF	10%	200V
C24	⚠ 1-126-776-51	ELECT	1000MF	20%	25V
C25	⚠ 1-126-375-41	ELECT	100MF	20%	25V
C26	⚠ 1-126-101-51	ELECT	100MF	20%	16V
C27	⚠ 1-126-776-51	ELECT	1000MF	20%	25V
C28	⚠ 1-126-375-41	ELECT	100MF	20%	25V
C29	⚠ 1-126-101-51	ELECT	100MF	20%	16V
C30	⚠ 1-126-101-51	ELECT	100MF	20%	16V
C31	⚠ 1-124-510-51	ELECT	220MF	20%	35V
C32	⚠ 1-124-510-51	ELECT	220MF	20%	35V
C33	⚠ 1-124-510-51	ELECT	220MF	20%	35V
C34	⚠ 1-124-510-51	ELECT	220MF	20%	35V
C35	⚠ 1-128-230-11	ELECT	100MF	20%	80V
C36	⚠ 1-128-230-11	ELECT	100MF	20%	80V
C37	⚠ 1-126-373-51	ELECT	470MF	20%	10V
C38	⚠ 1-124-123-51	ELECT	100MF	20%	10V
C39	⚠ 1-126-251-51	ELECT	330MF	20%	6.3V
C50	⚠ 1-124-123-51	ELECT	100MF	20%	10V

REF.NO.	PART NO.	DESCRIPTION	REMARK
		<CONNECTOR>	
CNG1	⚠*1-564-321-11	PIN, CONNECTOR 2P	
CNG2	⚠*1-508-784-12	PIN, CONNECTOR(5MM PICH) 1P	
CNG3	⚠*1-580-690-11	PIN, CONNECTOR (PC BOARD) 4P	
CNG4	⚠*1-566-664-11	PIN, CONNECTOR 4P	
CNG5	⚠*1-569-968-11	PLUG (WITH CONNECTOR) (L) 11P	
CNG6	⚠*1-580-376-11	PLUG (WITH CONNECTOR) (L) 10P	
CNG8	⚠*1-508-784-12	PIN, CONNECTOR(5MM PICH) 1P	
CNG10	⚠*9-998-273-01	CONNECTOR ASSY, BOARD IN 4P	
CNG11	⚠*9-998-273-01	CONNECTOR ASSY, BOARD IN 4P	
		<DIODE>	
D1	⚠ 8-719-311-72	DIODE RBV-406H-01	
D2	⚠ 8-719-300-65	DIODE ES1F	
D3	⚠ 8-719-975-76	DIODE SB140	
D4	⚠ 8-719-975-76	DIODE SB140	
D5	⚠ 8-719-975-76	DIODE SB140	
D6	⚠ 8-719-975-76	DIODE SB140	
D11	⚠ 8-719-987-84	DIODE ERB38-04	
D12	⚠ 8-719-987-84	DIODE ERB38-04	
D13	⚠ 8-719-987-84	DIODE ERB38-04	
D14	⚠ 8-719-987-84	DIODE ERB38-04	
D15	⚠ 8-719-110-16	DIODE RD10ESB1	
D16	⚠ 8-719-110-48	DIODE RD18ESB1	
D17	⚠ 8-719-979-58	DIODE EGP10D	
D18	⚠ 8-719-911-19	DIODE 1SS119	
D19	⚠ 8-719-911-19	DIODE 1SS119	
D20	⚠ 8-719-911-19	DIODE 1SS119	
D21	⚠ 8-719-500-41	DIODE D8LCA20	
D22	⚠ 8-719-500-42	DIODE D8LCA20R	
D23	⚠ 8-719-510-12	DIODE D10SC4M	
D24	⚠ 8-719-510-13	DIODE D10SC4MR	
D25	⚠ 8-719-500-41	DIODE D8LCA20	
D26	⚠ 8-719-500-42	DIODE D8LCA20R	
D27	⚠ 8-719-500-41	DIODE D8LCA20	
D28	⚠ 8-719-500-42	DIODE D8LCA20R	
D29	⚠ 8-719-975-76	DIODE SB140	
D30	⚠ 8-719-975-76	DIODE SB140	
D31	⚠ 8-719-975-76	DIODE SB140	
D32	⚠ 8-719-975-76	DIODE SB140	
D33	⚠ 8-719-911-19	DIODE 1SS119	
D34	⚠ 8-719-911-19	DIODE 1SS119	
D35	⚠ 8-719-109-85	DIODE RD5.1ESB2	
D36	⚠ 8-719-110-03	DIODE RD7.5ESB2	
		<FUSE>	
F1	⚠ 1-532-972-11	FUSE, GLASS TUBE 6.3A/250V	
	⚠ 1-533-190-11	CLIP, FUSE ; F1	
		<COIL>	
FB3	⚠ 1-410-397-11	FERRITE BEAD INDUCTOR	1.1UH
FB4	⚠ 1-410-397-11	FERRITE BEAD INDUCTOR	1.1UH
FB5	⚠ 1-410-397-11	FERRITE BEAD INDUCTOR	1.1UH
FB6	⚠ 1-410-397-11	FERRITE BEAD INDUCTOR	1.1UH
FB17	⚠ 1-410-397-11	FERRITE BEAD INDUCTOR	1.1UH
		<CONNECTOR>	
GA1	⚠*1-564-581-11	PLUG (L TYPE) 6P	
GA2	⚠*1-564-581-11	PLUG (L TYPE) 6P	
GA3	⚠*1-564-581-11	PLUG (L TYPE) 6P	

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

G **GA**

REF.NO.	PART NO.	DESCRIPTION	REMARK
GA4	⚠ *1-506-506-11	PLUG (L TYPE) 4P	
GB1	⚠ *1-564-350-11	PLUG (L TYPE) 15P	
		<IC>	
IC1	⚠ 8-749-922-70	IC STR81145A	
IC2	⚠ 8-759-701-79	IC NJM7812FA	
IC3	⚠ 8-759-701-88	IC NJM7912FA	
IC4	⚠ 8-759-701-88	IC NJM7912FA	
		<DIODE>	
IC8	⚠ 8-719-987-48	DIODE PC111LS	
IC9	⚠ 8-719-987-48	DIODE PC111LS	
IC10	⚠ 8-719-987-48	DIODE PC111LS	
		<IC>	
IC11	⚠ 8-759-701-56	IC NJM7805FA	
		<COIL>	
L1	⚠ 1-459-215-11	CORE, COIL	
L2	⚠ 1-410-396-51	FERRITE BEAD INDUCTOR	0.45UH
L7	⚠ 1-459-155-11	COIL, (WITH CORE)	45UH
L8	⚠ 1-459-155-11	COIL, (WITH CORE)	45UH
L9	⚠ 1-459-155-11	COIL, (WITH CORE)	45UH
L10	⚠ 1-459-155-11	COIL, (WITH CORE)	45UH
L11	⚠ 1-459-155-11	COIL, (WITH CORE)	45UH
L12	⚠ 1-459-155-11	COIL, (WITH CORE)	45UH
L13	⚠ 1-459-155-11	COIL, (WITH CORE)	45UH
		<TRANSISTOR>	
Q1	⚠ 8-729-927-08	TRANSISTOR IRFI-840	
Q2	⚠ 8-729-927-08	TRANSISTOR IRFI-840	
Q3	⚠ 8-729-927-08	TRANSISTOR IRFI-840	
Q4	⚠ 8-729-927-08	TRANSISTOR IRFI-840	
Q5	⚠ 8-729-168-83	TRANSISTOR 2SC2688-K	
Q6	⚠ 8-729-119-78	TRANSISTOR 2SC2785-HFE	
		<RESISTOR>	
R1	⚠ 1-202-719-51	SOLID 1M 10% 1/2W	
R2	⚠ 1-217-241-11	WIRE 0.22 10% 3W	
R3	⚠ 1-217-243-11	WIRE 0.33 10% 3W	
R4	⚠ 1-215-929-51	METAL OXIDE 100K 5% 3W	
R5	⚠ 1-216-483-51	METAL OXIDE 2.7K 5% 3W	
R7	⚠ 1-247-843-51	CARBON 3.3K 5% 1/4W	
R9	⚠ 1-247-863-51	CARBON 22K 5% 1/4W	
R10	⚠ 1-214-906-51	METAL 51K 1% 1/2W	
R11	⚠ 1-215-471-51	METAL 120K 1% 1/4W	
R12	⚠ 1-215-471-51	METAL 120K 1% 1/4W	
R13	⚠ 1-247-863-51	CARBON 22K 5% 1/4W	
R14	⚠ 1-202-846-51	SOLID 470K 10% 1/2W	
R15	⚠ 1-216-354-51	METAL OXIDE 2.7 5% 1W	
R26	⚠ 1-216-469-51	METAL OXIDE 12 5% 3W	
R27	⚠ 1-247-847-51	CARBON 4.7K 5% 1/4W	
R28	⚠ 1-215-879-51	METAL 47K 5% 1W	
		<RELAY>	
RY1	⚠ 1-515-669-21	RELAY	
		<TRANSFORMER>	
T1	⚠ 1-424-248-11	TRANSFORMER, LINE FILTER	
T2	⚠ 1-450-267-11	SRT1(CONVERTER TRANSFORMER-1)	
T3	⚠ 1-450-266-11	SRT2(CONVERTER TRANSFORMER-2)	
		<COIL>	
T4	⚠ 1-424-455-11	COIL, CHOKE 108UH	
T5	⚠ 1-424-455-11	COIL, CHOKE 108UH	
		<THERMISTOR>	
TH1	⚠ 1-809-260-11	THERMISTOR, POSWR	
THP1	⚠ 1-808-059-31	THERMISTOR, (POSITIVE)	
THP2	⚠ 1-806-449-21	THERMISTOR, (POSITIVE)	
		<VARISTOR>	
VDR1	⚠ 1-807-180-11	VARISTOR SNR-14A300K	
VDR2	⚠ 1-809-201-11	VARISTOR	

****

GA BOARD, COMOLETE
****

		<CAPACITOR>			
C101	⚠ 1-126-375-41	ELECT	100MF	20%	25V
C102	⚠ 1-126-375-41	ELECT	100MF	20%	25V
C103	⚠ 1-124-123-51	ELECT	100MF	20%	10V
C104	⚠ 1-124-038-51	ELECT	1MF	20%	50V
C105	⚠ 1-124-123-51	ELECT	100MF	20%	10V
C106	⚠ 1-130-473-51	FILM	0.0015MF	5%	50V
C107	⚠ 1-124-038-51	ELECT	1MF	20%	50V
C108	⚠ 1-124-039-51	ELECT	10MF	20%	16V
C109	⚠ 1-124-123-51	ELECT	100MF	20%	10V
C110	⚠ 1-124-039-51	ELECT	10MF	20%	16V
C111	⚠ 1-130-473-51	FILM	0.0015MF	5%	50V
C112	⚠ 1-124-512-51	ELECT	33MF	20%	50V
C113	⚠ 1-124-039-51	ELECT	10MF	20%	16V
C114	⚠ 1-124-043-51	ELECT	2.2MF	20%	50V
		<DIODE>			
D101	⚠ 8-719-911-19	DIODE 1SS119			
D102	⚠ 8-719-911-19	DIODE 1SS119			
D103	⚠ 8-719-911-19	DIODE 1SS119			
D104	⚠ 8-719-911-19	DIODE 1SS119			
D105	⚠ 8-719-911-19	DIODE 1SS119			
D106	⚠ 8-719-911-19	DIODE 1SS119			
D107	⚠ 8-719-911-19	DIODE 1SS119			
D108	⚠ 8-719-911-19	DIODE 1SS119			
D109	⚠ 8-719-110-49	DIODE RD18ESB2			
D110	⚠ 8-719-911-19	DIODE 1SS119			
		<THYRISTOR>			
D112	⚠ 8-719-000-24	THYRISTOR CR02AM-8			
		<COIL>			

GA GB

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

REF.NO.	PART NO.	DESCRIPTION				REMARK
FB101	⚠1-410-397-11	FERRITE BEAD INDUCTOR	1.1UH			
FB102	⚠1-410-397-11	FERRITE BEAD INDUCTOR	1.1UH			
		<IC>				
IC101	⚠8-759-506-79	IC IR3M02				
IC102	⚠8-759-506-79	IC IR3M02				
		<TRANSISTOR>				
Q101	⚠8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q102	⚠8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q103	⚠8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q104	⚠8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q105	⚠8-729-119-78	TRANSISTOR 2SC2785-HFE				
Q106	⚠8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q107	⚠8-729-177-44	TRANSISTOR 2SD774-5				
		<RESISTOR>				
R101	⚠1-247-807-51	CARBON	100	5%	1/4W	
R102	⚠1-247-807-51	CARBON	100	5%	1/4W	
R103	⚠1-247-807-51	CARBON	100	5%	1/4W	
R104	⚠1-247-807-51	CARBON	100	5%	1/4W	
R105	⚠1-247-783-51	CARBON	10	5%	1/4W	
R106	⚠1-247-783-51	CARBON	10	5%	1/4W	
R107	⚠1-247-783-51	CARBON	10	5%	1/4W	
R108	⚠1-247-783-51	CARBON	10	5%	1/4W	
R109	⚠1-247-831-51	CARBON	1K	5%	1/4W	
R110	⚠1-247-831-51	CARBON	1K	5%	1/4W	
R111	⚠1-247-831-51	CARBON	1K	5%	1/4W	
R112	⚠1-247-831-51	CARBON	1K	5%	1/4W	
R113	⚠1-247-807-51	CARBON	100	5%	1/4W	
R114	⚠1-247-807-51	CARBON	100	5%	1/4W	
R115	⚠1-247-807-51	CARBON	100	5%	1/4W	
R116	⚠1-247-807-51	CARBON	100	5%	1/4W	
R118	⚠1-247-831-51	CARBON	1K	5%	1/4W	
R119	⚠1-247-855-51	CARBON	10K	5%	1/4W	
R120	⚠1-247-819-51	CARBON	330	5%	1/4W	
R121	⚠1-247-879-51	CARBON	100K	5%	1/4W	
R122	⚠1-247-831-51	CARBON	1K	5%	1/4W	
R123	⚠1-247-839-51	CARBON	2.2K	5%	1/4W	
R124	⚠1-247-879-51	CARBON	100K	5%	1/4W	
R125	⚠1-247-839-51	CARBON	2.2K	5%	1/4W	
R126	⚠1-215-432-51	METAL	3K	1%	1/4W	
R127	⚠1-247-855-51	CARBON	10K	5%	1/4W	
R128	⚠1-215-410-51	METAL	360	1%	1/4W	
R129	⚠1-247-879-51	CARBON	100K	5%	1/4W	
R131	⚠1-247-879-51	CARBON	100K	5%	1/4W	
R132	⚠1-247-839-51	CARBON	2.2K	5%	1/4W	
R133	⚠1-247-855-51	CARBON	10K	5%	1/4W	
R134	⚠1-247-839-51	CARBON	2.2K	5%	1/4W	
R135	⚠1-215-431-51	METAL	2.7K	1%	1/4W	
R136	⚠1-247-859-51	CARBON	15K	5%	1/4W	
R137	⚠1-247-847-51	CARBON	4.7K	5%	1/4W	
R138	⚠1-247-855-51	CARBON	10K	5%	1/4W	
R139	⚠1-247-847-51	CARBON	4.7K	5%	1/4W	
R140	⚠1-247-831-51	CARBON	1K	5%	1/4W	
R141	⚠1-247-831-51	CARBON	1K	5%	1/4W	
		<TRANSFORMER>				
T101	⚠1-424-456-11	TRNSFORMER, FERRITE(CDT)				
T102	⚠1-424-456-11	TRNSFORMER, FERRITE(CDT)				
T103	⚠1-424-456-11	TRNSFORMER, FERRITE(CDT)				
T104	⚠1-424-456-11	TRNSFORMER, FERRITE(CDT)				

****

GB BOARD, COMPLETE
****

		<CAPACITOR>			
C201	⚠1-164-087-51	CERAMIC	0.0015MF	10%	50V
C202	⚠1-164-087-51	CERAMIC	0.0015MF	10%	50V
C204	⚠1-136-165-51	FILM	0.1MF	5%	50V
		<DIODE>			
D201	⚠8-719-109-85	DIODE RD5.1ESB2			
		<IC>			
IC201	⚠8-759-984-03	IC LM339N			
IC202	⚠8-759-908-15	IC TL431CLP			
IC204	⚠8-759-908-15	IC TL431CLP			
		<RESISTOR>			
R201	⚠1-214-905-51	METAL	47K	1%	1/2W
R202	⚠1-215-419-51	METAL	820	1%	1/4W
R203	⚠1-247-847-51	CARBON	4.7K	5%	1/4W
R209	⚠1-215-441-51	METAL	6.8K	1%	1/4W
R210	⚠1-215-424-51	METAL	1.3K	1%	1/4W
R211	⚠1-247-847-51	CARBON	4.7K	5%	1/4W
R212	⚠1-215-452-51	METAL	20K	1%	1/4W
R213	⚠1-215-443-51	METAL	8.2K	1%	1/4W
R215	⚠1-247-855-51	CARBON	10K	5%	1/4W
R216	⚠1-215-443-51	METAL	8.2K	1%	1/4W
R217	⚠1-247-855-51	CARBON	10K	5%	1/4W
R218	⚠1-247-843-51	CARBON	3.3K	5%	1/4W
		<VARIABLE RESISTOR>			
RV201	⚠1-238-542-11	RES, ADJ, CARBON 200			
RV203	⚠1-238-542-11	RES, ADJ, CARBON 200			

****

MISCELLANEOUS
****

⚠	A-1500-160-A	REGULATOR, SWITCHING (CB-100D)
⚠	1-237-344-11	RESISTOR ASSY, HIGH-VOLTAGE (H-STAT)
⚠	1-238-745-21	RESISTOR ASSY, HIGH-VOLTAGE (FOCUS)
⚠	1-426-449-11	COIL, DEMAGNETIZATION
⚠	1-451-399-21	DEFRECTION YOKE (KY-6411S)
	1-452-032-00	MAGNET,DISK; 10MMφ
⚠	1-452-337-22	NECK ASSY, PICTURE TUBE (NA304)
	1-537-259-41	TERMINAL ASSY, INPUT OUTPUT
	1-543-653-11	CORE ASSY, BEAD
⚠	1-570-778-31	SWITCH, SEESAW (AC POWER)
	*1-941-641-01	CONNECTOR ASSY, MINIATURE 2P
	*1-946-557-12	HARNESS (MAIN (B))
V901	⚠*738-041-80	PICTURE TUBE ASSY (CRT,DY,NA)

****