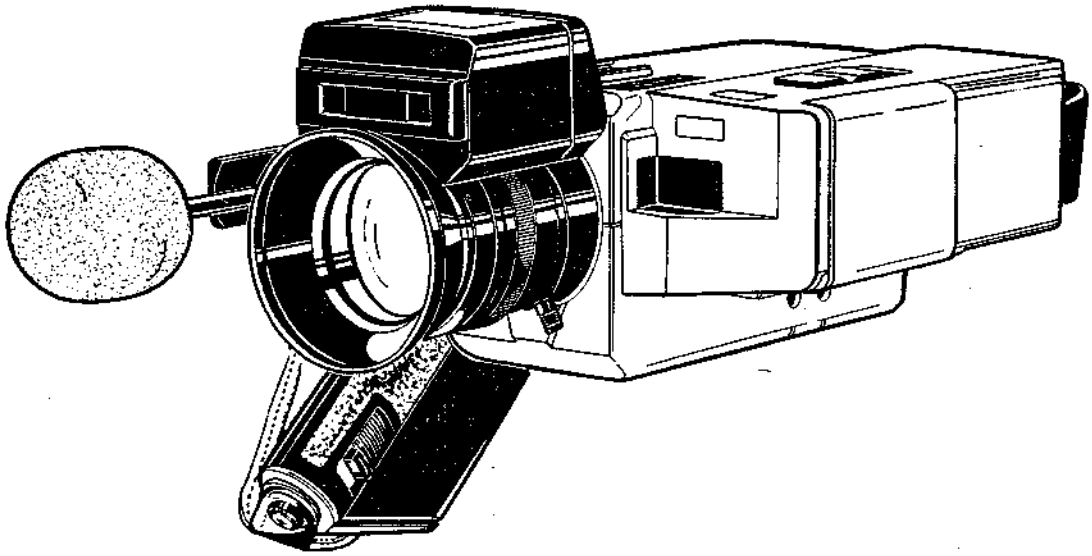
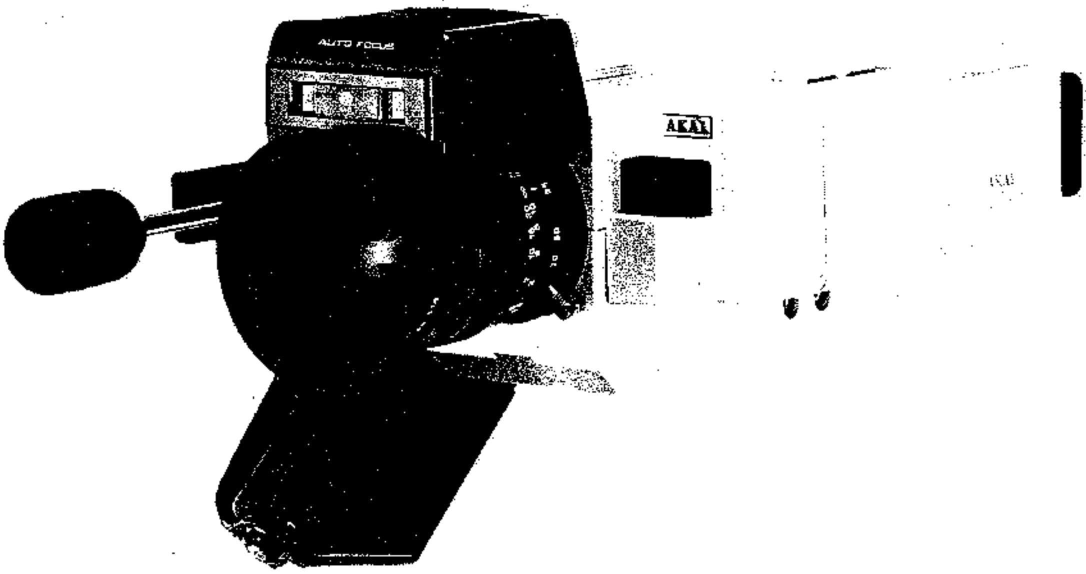
VC-X2E/U

AKAI SERVICE MANUAL



COLOR VIDEO CAMERA

MODEL **VC-X2E/U**



COLOR VIDEO CAMERA (PAL NTSC)

MODEL VC-X2E/U

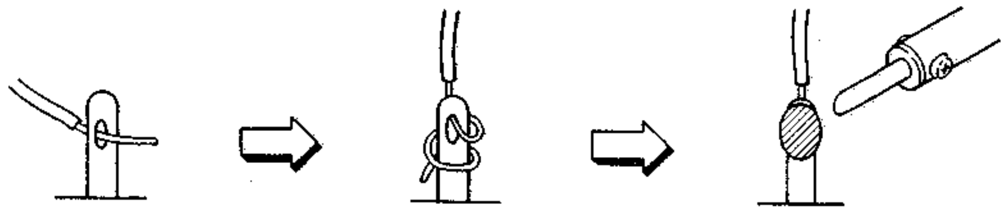
SAFETY INSTRUCTIONS

SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for [C] or [A], specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks, line-in-out jacks etc.)

PRECAUTIONS DURING SERVICING

1. Parts identified by the ⚠ symbol parts are critical for safety.
   Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
   Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers (Insulating Barriers)
   4) Insulation sheets for transistors
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

SECTION 1

SERVICE MANUAL

TABLE OF CONTENTS

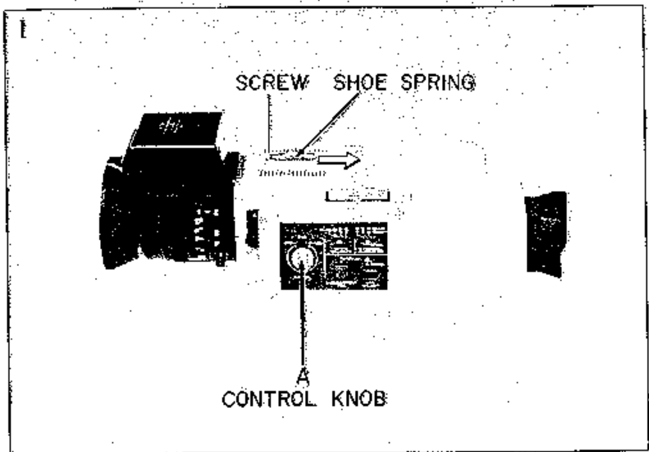
I. SPECIFICATIONS

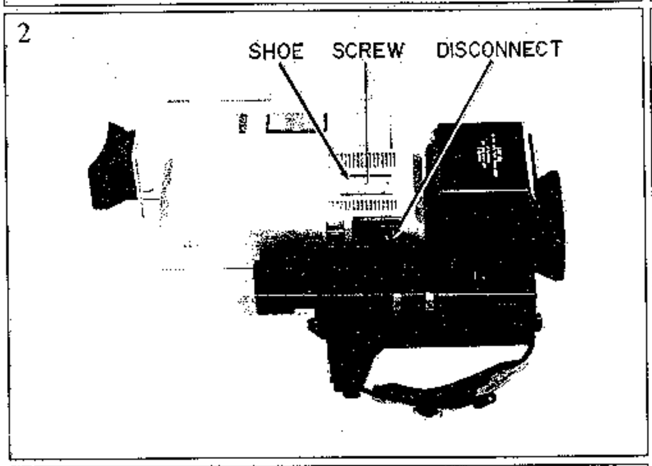
Pickup Tube	Single tube, 2/3″ SATICON
Pickup System	Uni-carrier Frequency Separation System
Scanning System	2:1 interlaced (525 lines: U type, 625 lines: E type)
Signal System	NTSC color system (U type), PAL color system (E type)
Horizontal Resolution	More than 300 lines (center)
Video S/N	More than 46 dB (AGC off)
Video Output	1.0 Vp-p, 75 ohms (Composit Video Signal)
Synchronization System	Internal Synchronization System (built-in Synchronization Signal Generator)
Automatic Sensitivity Adjustment Range	100 lux to 30,000 lux (ND filter: INDOOR position) 800 lux to 250,000 lux (ND filter: OUTDOOR position)
Color Temperature Auto	Incandescent lamp or Day light (automatically switchable)
Manual	Incandescent lamp, Fluorescence lamp and Day light (switchable)
Minimum Practical Illumination	More than 30 lux (F1.4)
Microphone	Uni-directional electret condenser microphone
Audio Output	−20 dB (low impedance)
External Microphone Input	2 kohms 3.5 mmϕ jack
Lens	F1.4 × 8 zoom lens (f=11 mm to 70 mm) with MACRO, Manual/2-speed motor driven Zooming control, Switchable
View Finder	1.5″ Electronic View Finder
Remote Control Jack	2.5 mmϕ
Special Features	One-touch fade-in and fade-out system, Switchable luminance and chrominance (color) signal polarities, Intermittent Recording
Operating Temperature	−10°C to 40°C (14°F to 104°F)
Power Requirement	12V DC
Power Consumption	7.6W (with Auto Focus at "MANU" position) 8.7W (with Auto Focus "AUTO" position)
Dimensions	8.4 (W) × 5.1 (H) × 13.0 (D) inches (213 × 130 × 330) mm (With lens and eye hood, auto focus unit hand grip and microphone retracted position)
Weight	5.3 lbs (2.4 kg) (with lens and eye hood, hand grip and microphone)

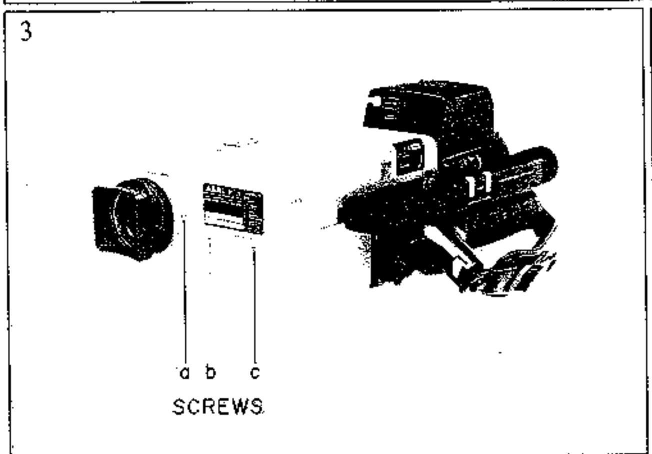
* For improvement purposes, specifications and design are subject to change without notice.

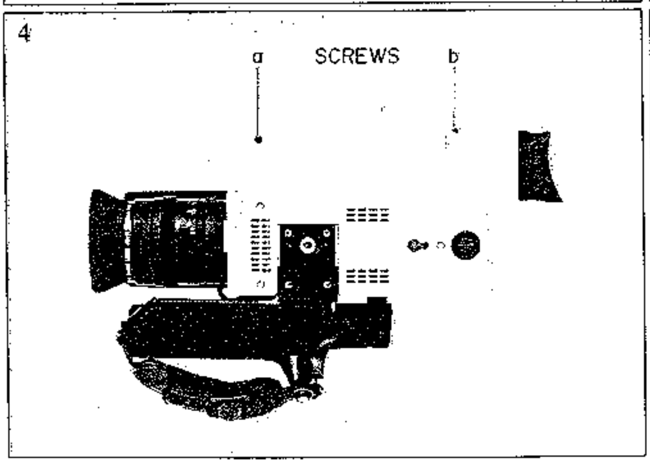
II. DISMANTLING OF UNIT

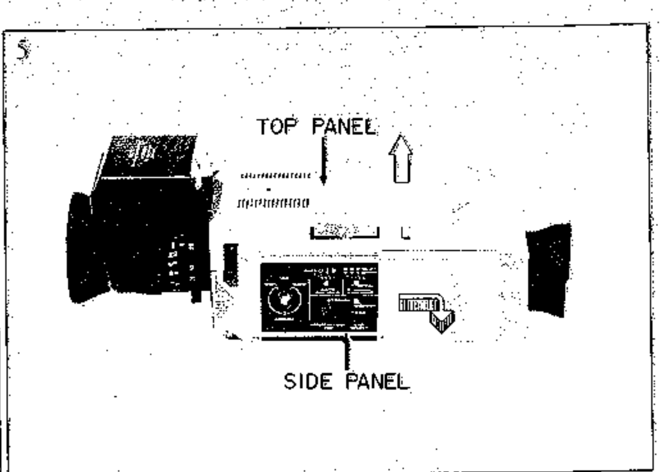
In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs.
Reassemble in reverse order.

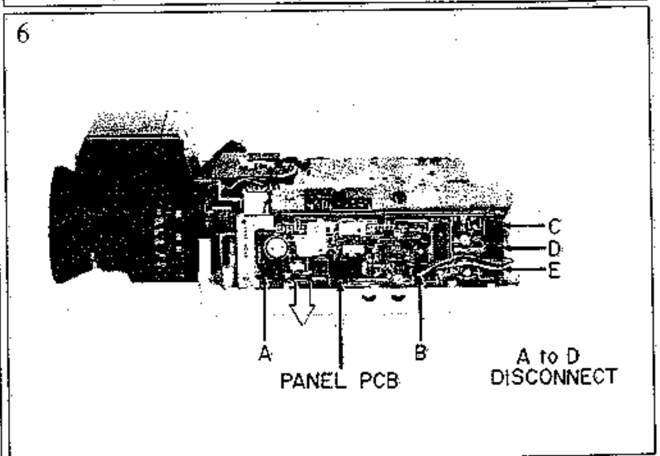


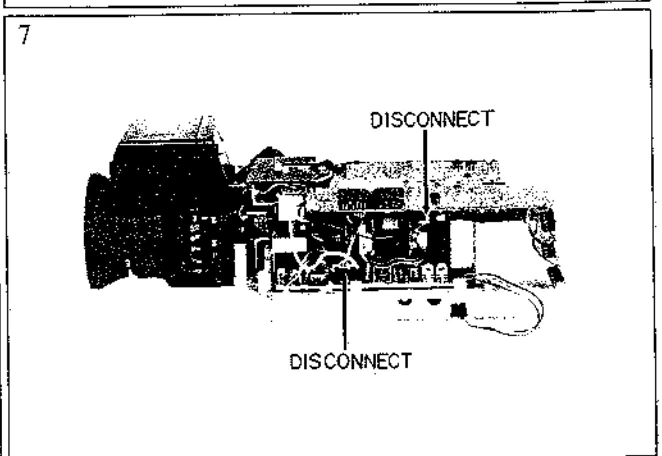


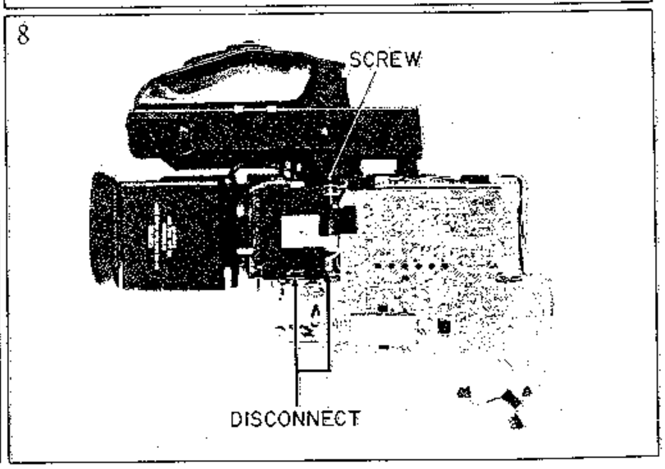












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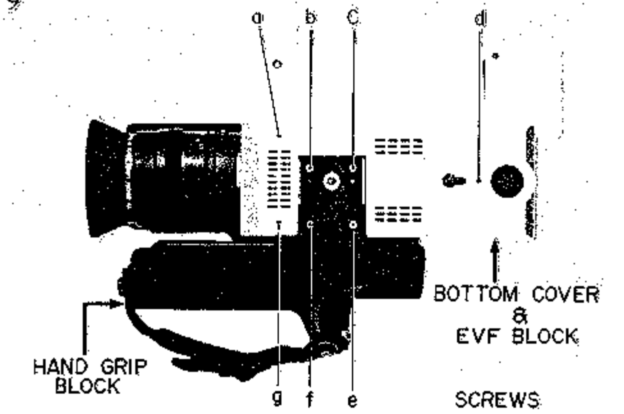

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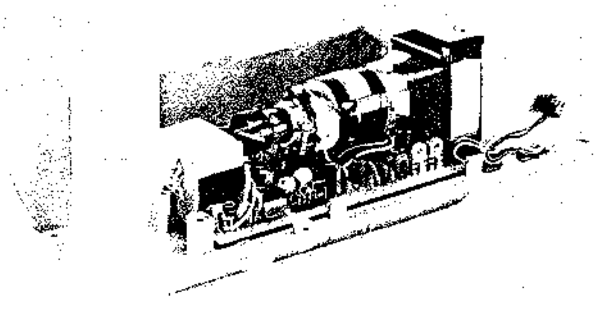
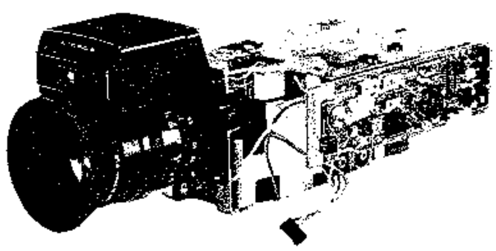


EVF BLOCK

10



* Assemble the panel PCB and connected the connectors with it.
(Remain the dismounted EVF block as it is)

III. CONTROLS

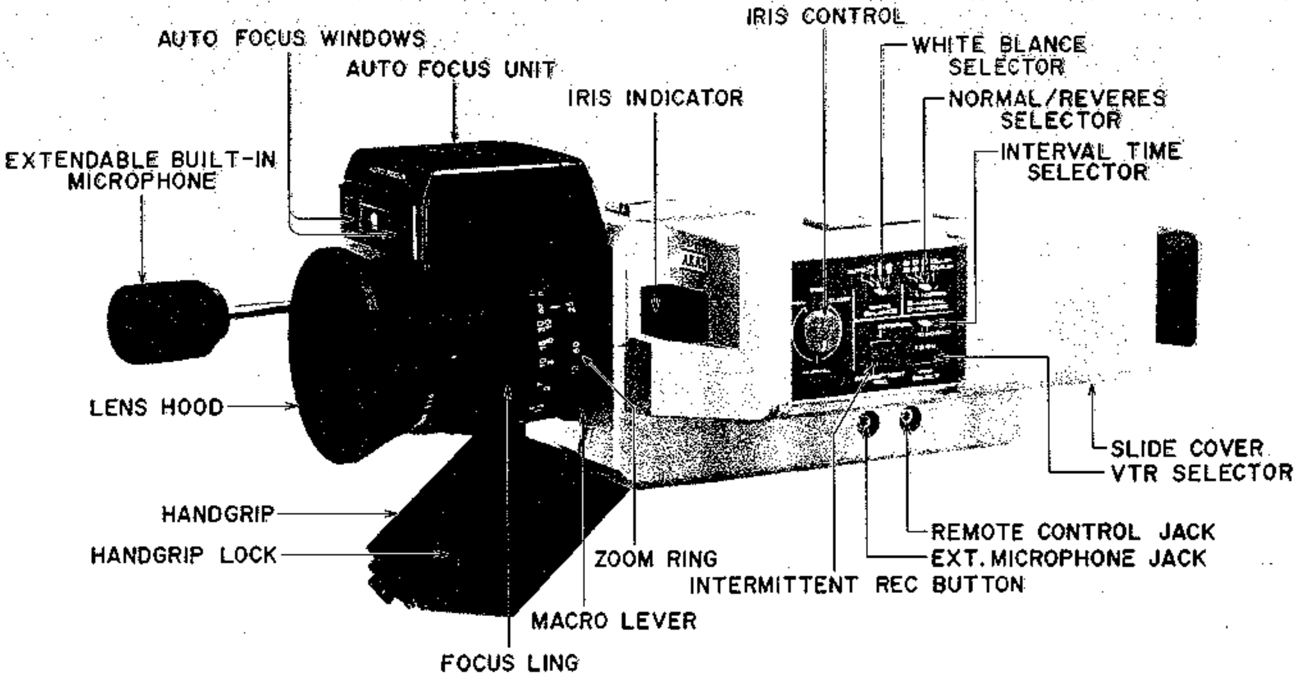


Fig. 3-1

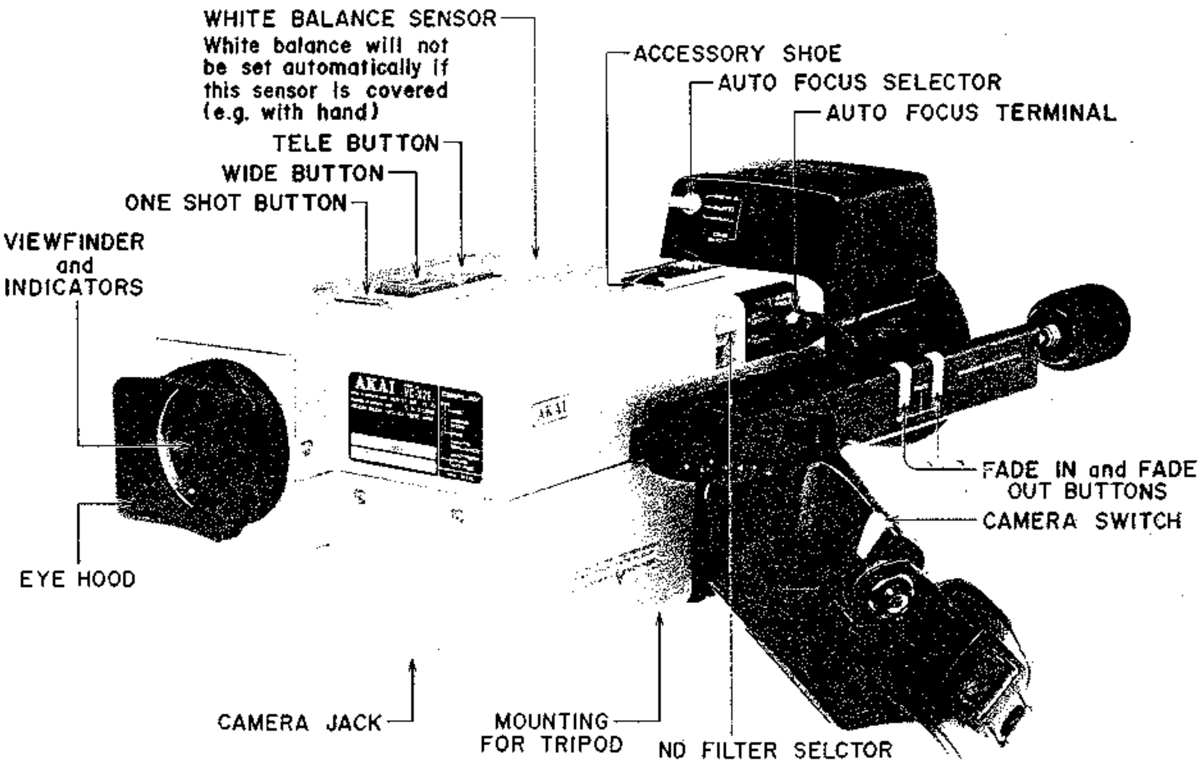


Fig. 3-2

IV. PRINCIPAL PARTS LOCATION

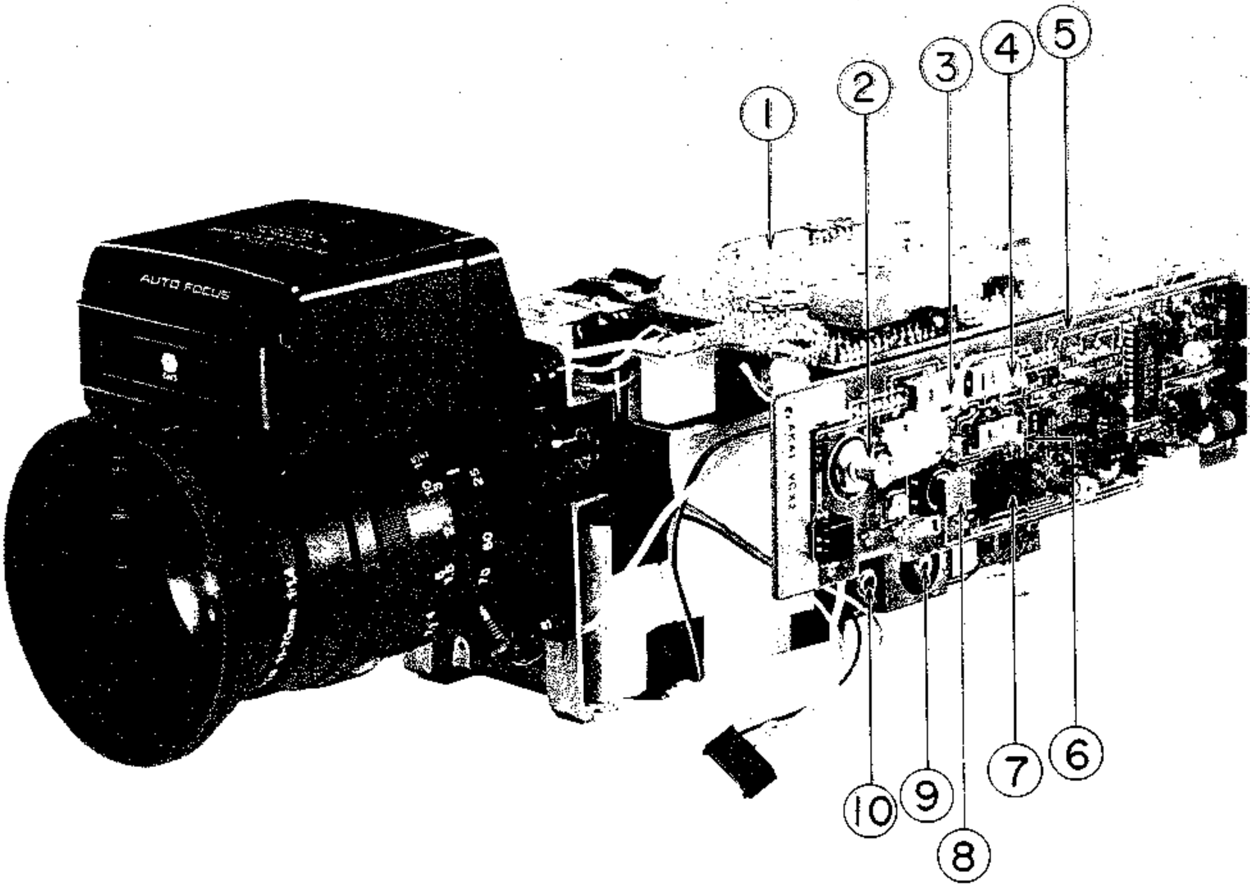


Fig. 4-1

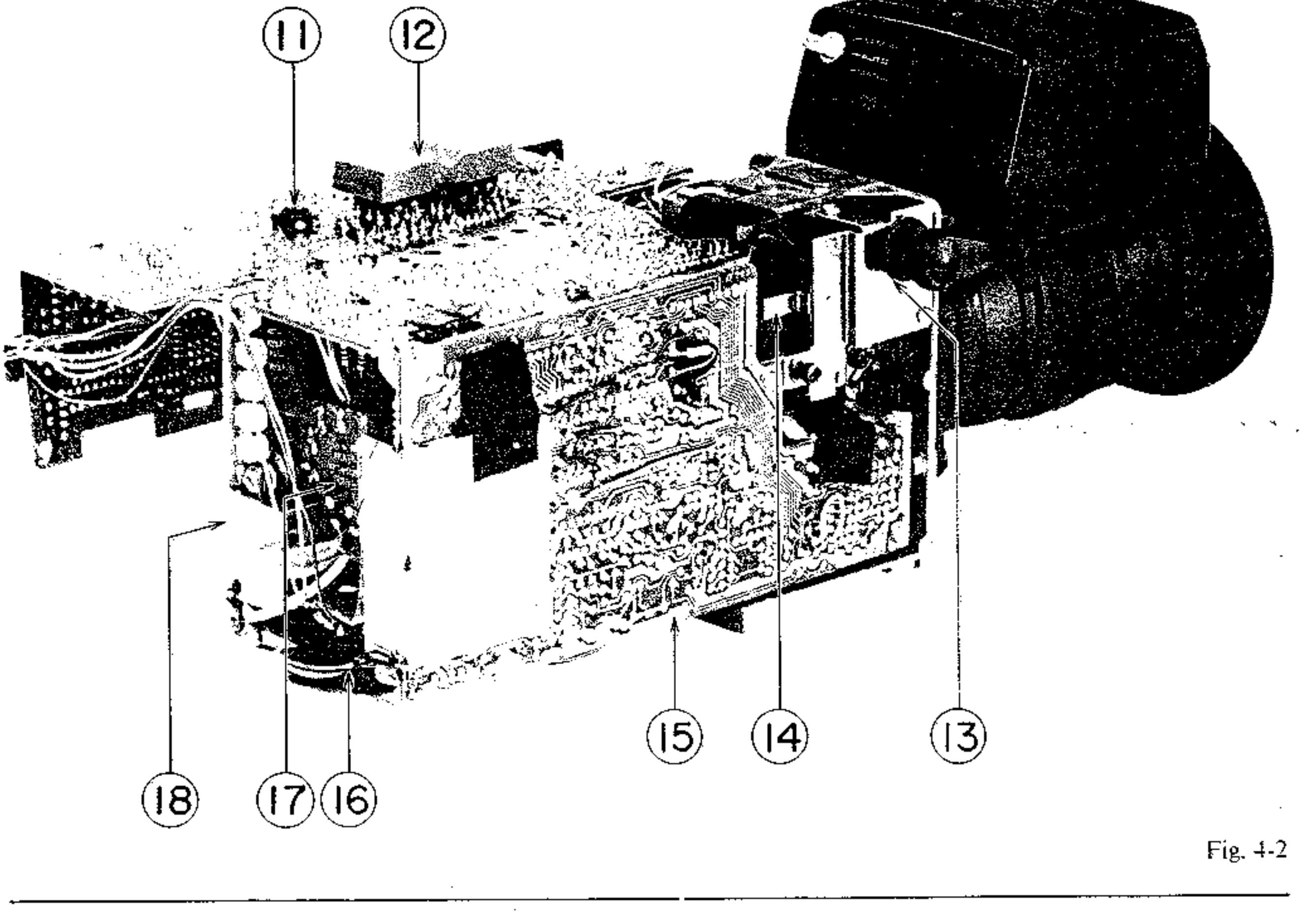


Fig. 4-2

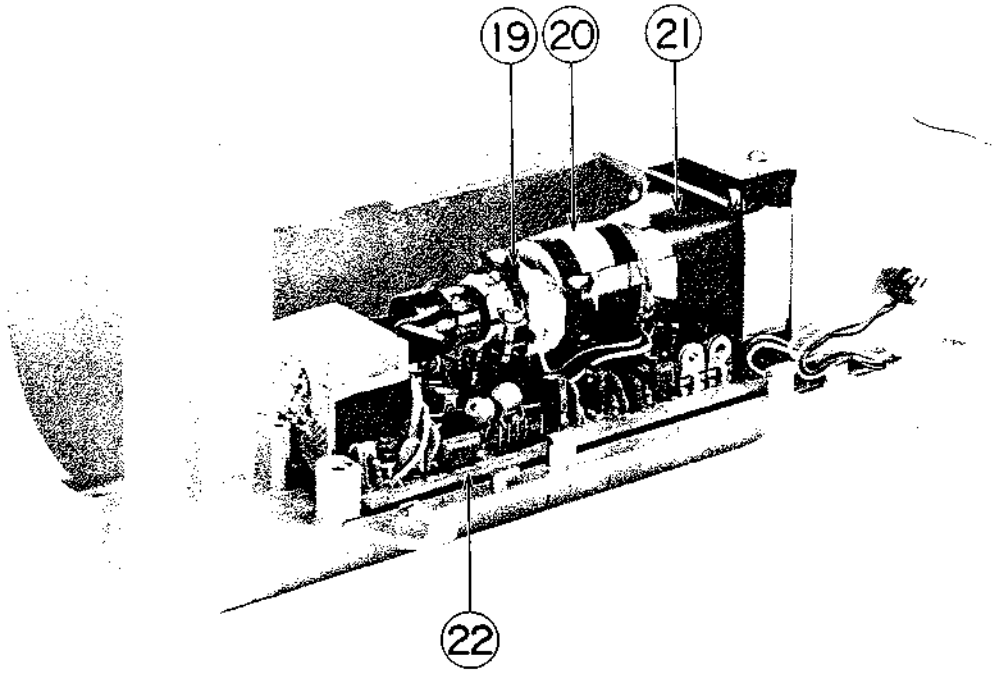


Fig. 4-3

1. VIDEO (2) PC BOARD V3004 A501B
2. IRIS CONTROL VOLUME
3. WHITE BALANCE SELECTOR SWITCH
4. NORMAL/REVERSE SELECTOR SWITCH
5. PANEL PC BOARD V3004C5030
6. INTERVAL TIME SELECTOR SWITCH
7. VTR SELECTOR SWITCH
8. INTERMITTENT REC SWITCH
9. REMOTO CONTROL JACK
10. EXTERNAL MICROPHONE JACK
11. ONE SHOT SWITCH
12. WIDE/TELE SWITCH
13. AUTO FOCUS TERMINAL
14. ND FILTER SELECTER LEVER
15. VIDEO (1) PC BOARD V3004A501A
16. CAMERA CONNECTOR
17. SOCKET PC BOARD V3004B502B
18. H & D PC BOARD V3004B502A
19. CENTERING MAGNET
20. DY ELY-15V101A
21. CRT 40CB4M
22. EVF PC BOARD V3003C5040

V. EXPLANATION OF VC-X2 CIRCUITRY

1. FEATURES OF VC-X2

1-1 Automatic Focus Control

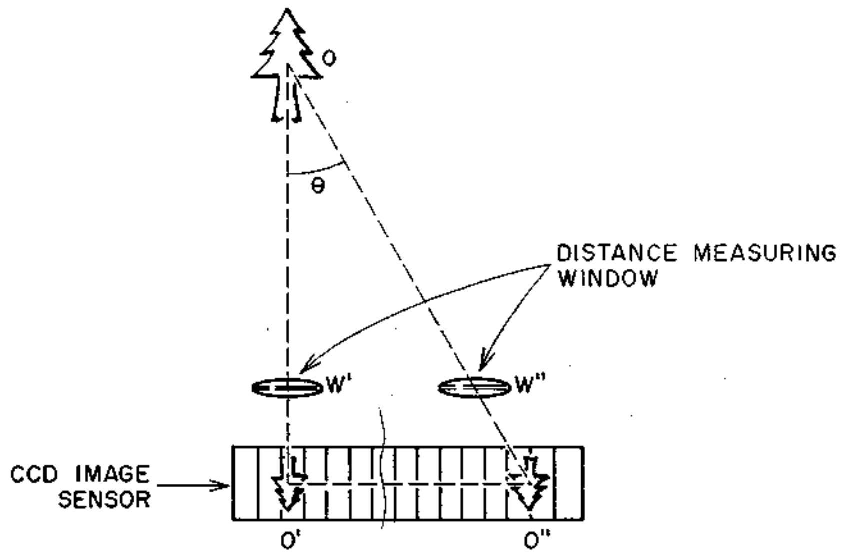


Fig. 5-1

The automatic focus adjusting unit employed on the VC-X2 provides focus adjustment in digital control mode through the use of a solid-state triangulation system (SSTS). Its major advantages are high accuracy, high sensitivity and elimination of unwanted noises.
The distance of the subject is measured in the same manner as in triangulation. As illustrated in Fig. 5 the image of the subject O, passes through the windows W' and W" and then is captured as images O' and O" on the CCD image sensor. The signal at O' is read out by means of a clock and subsequently the number of clocks needed to read the signal at O" is determined to calculate the angle O'-O-O" or Lθ, which then is used to compute the distance of the subject from the camera. Note that the longer the distance, the smaller the angle θ, or the shorter the distance, the larger the angle θ.* With VC-X2, for semi automatic focussing operating the ONE-SHOT control button is located on the upper portion of the camera case, which makes it possible for the user to hold the camera with both hands for greater stability.

1-2 Automatic White Balance Control

The adjustment of white balance poses the most difficult problem in shooting with a color camera. To overcome this difficulty, VC-X2 employes two photodiodes to measure the color temperature of ambient light so as to permit switching automatically between INDOOR (3000°K) and OUTDOOR (5500°K).
Use of the two-diode system helps to ensure "naturalness" especially in outdoor shooting and simplicity of circuit design.
On VC-X1, the two photodiodes are installed in a recess, whereas on VC-X2, they are situated on the upper part of the case.
In addition, an opalescent plate is used as the diffuser in place of the conventional pyramidtype prism, resulting in improved capability of descrimination.

1-3 Automatic Iris Control

The VC-X2 is provided with a VOLUME CONTROL for backlight control (BLC) to permit shooting against the light. The IRIS control is normally set at NORMAL position. This causes AGC in the video circuit to operate in the manner described below:
When shooting a dark scene, the iris is fully opened and then if gain is found still insufficient, the gain is increased electrically by means of AGC.

1-4 Fade In/Fade Out

The VC-X2 permits both fade-in and fade-out through one-touch operation. Particularly, the fade-in operation is performed in "reserved" mode in which the fade-in operation is started as soon as recording is started.
During the Rec. OFF period, the fade-out operation is not accepted.
Further, establishing the STAND-BY mode after fade-out causes a fade-in operation to be performed automatically, thereby making it easier to shoot the next scene.

1-5 Negative/Positive Reversal

	Y Signal	Chroma Signal	Picture
1	Normal	Normal	Normal Picture
2	Normal	Reverse	Gradation of brightness is reversed.
3	Reverse	Normal	Expression of complementary color
4	Reverse	Reverse	Same picture as that of color negative film

Fig. 5-2

In addition to normal pictures, special pictures may be produced through the three possible signal combinations shown in Fig. 5-2 below:
The mode "4" in Fig. 5-2 permits a negative color film to be viewed as positive color on the TV monitor.

1-6 LED Display in the Viewfinder

* When the viewfinder is warming-up, all three indicators will flash on and off. All three indicators will continue to flash on and off for 20 seconds if there is no light entering the video camera (lens cap is left on for example).

RED

On: The video cassette recorder is in recording mode.

Off: The video cassette recorder is in stop or pause mode.

GREEN

Flashing on and off very quickly: The NORMAL/REVERSE selector is not set to the normal LUM/COLOR position.
Flashing on and off at medium speed: The IRIS control is not set to the NORMAL position.
Flashing on and off slowly: The WHITE BALANCE selector is not set to the AUTO position.

On: The NORMAL/REVERSE selector is set to the normal LUM/COLOR position, the IRIS control is set to the NORMAL position and the WHITE BALANCE selector is set to the AUTO position.

* NORMAL/REVERSE indication takes top priority and then the IRIS indication and then the WHITE BALANCE indication.

ORANGE

Flashing on and off: The portable video cassette recorder's battery level is low.

On: The FADE button is in fade-in standby, during the fade-out operation or during intermittent recording.

Off: Neither of the above is happening.

1-7 Built-in ND Filter

Use of the larger-diameter, high-speed lens can often result in the automatic aperture control not being able to cover all conditions under which the camera is used outdoors. In view of this, VC-2 incorporates an ND-8 filter with a transmissivity of 12.5% so that shooting can be done even under quite-bright-light conditions.

1-8 Power Zooming

The VC-X2 is capable of continuous zooming from TELE to WIDE with zooming speed changeable in two steps: one for slow zooming and the other (further depression of the button) for fast zooming.

1-9 Boom Microphone

A boom microphone with a window screen (and with an additional window screen in case of a strong wind) is able to reduce significantly the sound of wind recorded.

1-10 Intermittent Recording

Two intermittent recording sequences with automatic repetition are available when using the INTERMITTENT REC button with the INTERVAL selector:

a) 2 seconds recording followed by 10 seconds standby.
b) 2 seconds recording followed by 90 seconds standby.

1-11 Saticon Tube

While VC-X1 uses the Vidicon, VC-X2 uses the Saticon, which helps to reduce the image persistence. Moreover the use of a Saticon with a stripe filter has increased the resolution to 300 lines (E Model) or 240 lines (U Model), making it possible to obtain very clear pictures.

1-12 Saticon Protection Circuit

The iris is closed during the waring-up period to prevent damage to the Saticon by the incident light.

1-13 VTR Selector Switch

The VTR selector switch is used to provide compatibility with VHS-type machines offered by other manufacturers. The following describes functions associated with each switch position and the currently available VTR types to which the VC-X2 may be connected:

Function \ S.W Position	1	2	3	4
VTR CONTROL	Tally	VTR Remote Control Terminal	Controlled on camera side only	Tally
REC Warning	–	○	–	–
VTR Remote control Terminal	RUN at LOW	RUN at LOW	RUN at LOW	RUN at HIGH
Intermittent REC.	≈ 4 Sec	≈ 2 Sec	≈ 4 Sec	≈ 4 Sec

Notes:

1. For Intermittent REC with switch positions 1, 3 and 4, recording time is 4 seconds, of which about 2 seconds are for rewinding as required by auto editing control (AEC); therefore, actual recording time is about 2 seconds.
2. The only difference between switch positions 1 and 4 is that the REC tape RUN on the VTR side is effected with either "LOW" or "HIGH".
3. Switch position 2 is dedicated to AKAI's VP7300-Series. All that must be done is to change the camera cable to the one intended for use with VC-X1U.
4. With switch position 3, tally check is not performed (i.e., it is not cheked whether VTR is in REC standby mode or not on camera), and thus the "REC tape RUN" control signal is merely output regardless of the mode established on the VTR whenever the REC switch on the camera is turned on or off. For this reason, it is necessary to check at REC time to see if the VTR is in the REC standby mode.

*** VTRs applicable to each switch position**

Switch position

1 Standardized VHS-type 1 : AKAI (VP-88, VP-66)
Hitachi (VT-6500, VT-7000)
Mitsubishi (HV-7000)
Sharp

2 AKAI VP-7300 Series : AKAI (VP-7300, VP-7350)
Note that the camera cable must be changed to the one for VC-X1U.

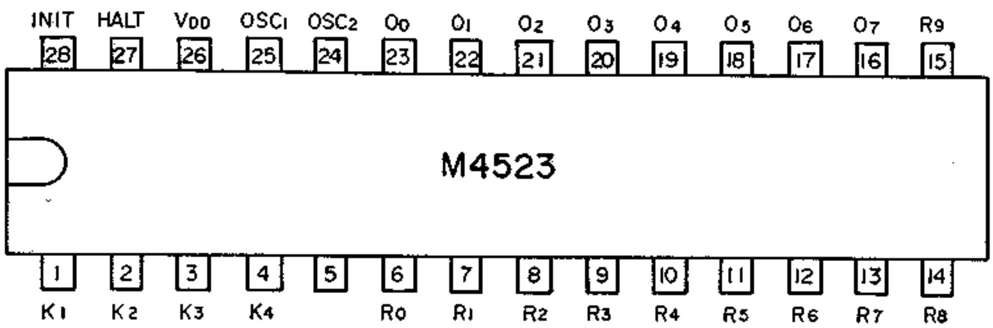
3 Conventional VHS-type VTRs : AKAI (VP-77) VP7100
JVC (HR-2200)

4 Standardized VHS-type 2 : Matsushita's VTRs
(NV-3000, NV-3200)

2. EXPLANATION OF CIRCUITRY

2-1 Panel P.C Board

The Various Features of VC-X2 are controlled by the microcomputer MP4523 (IC2), (Fig. 7)



$R_0 \sim R_4$	: Key scan clock	$O_0 \sim O_4$	: AGC output (5 bits)
R_5	: REC Trigger	OSC_1, OSC_2	Self-oscillation
$R_6 \sim R_8$	: LED lighting output	HALT	Microcomputer stops at "H" (GND'ed).
R_9	: Quick Fade out	INIT	Initialize

Fig. 5-3

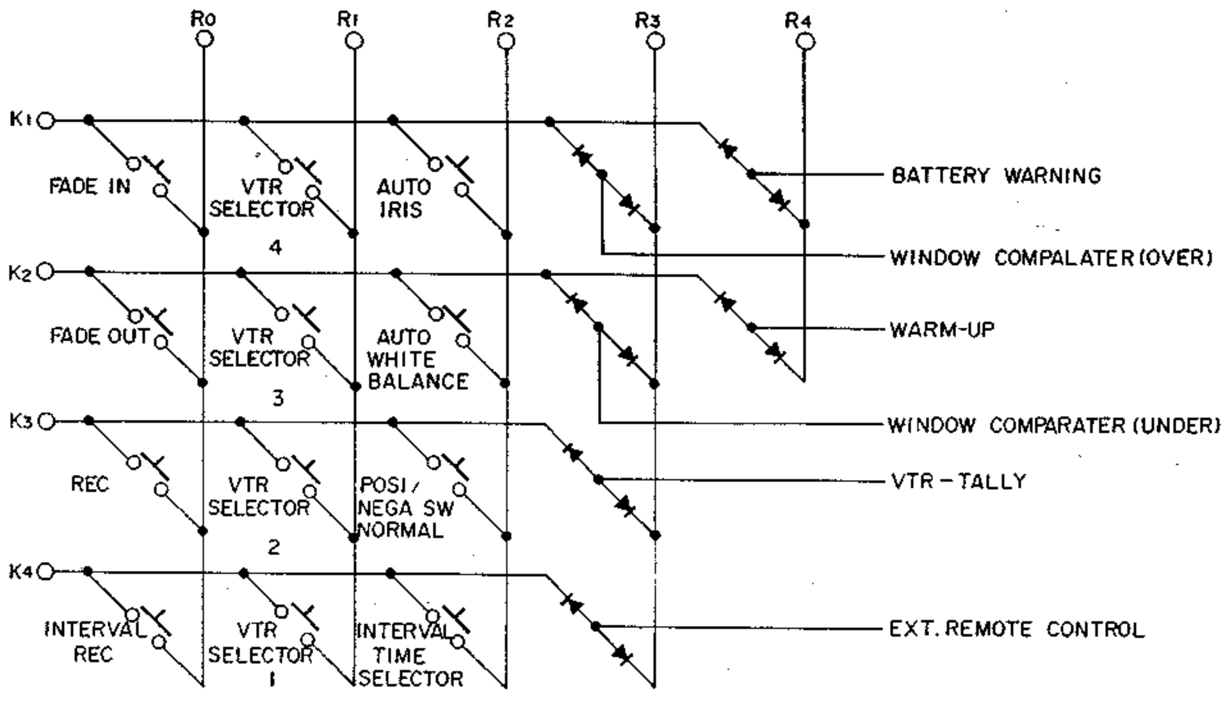


Fig. 5-4 Key matrix & Diode matrix

2-1-1 Diode Matrix Switch

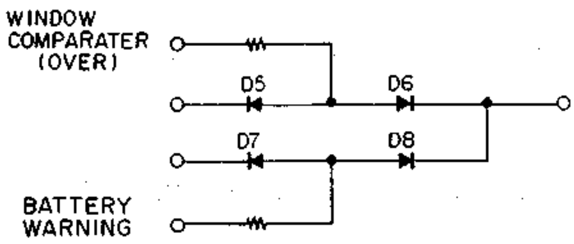


Fig. 5-5 Diode matrix

In Fig. 5-5, when R3 goes to "Positive" Diode D5 is tuned-off, permitting the window comparater output (over) signal to be supplied to K1 (I, C2). Similarly, the Battery warning signal is sent to K1 only when R4 is at "positive".

2-1-2 Window Comparater

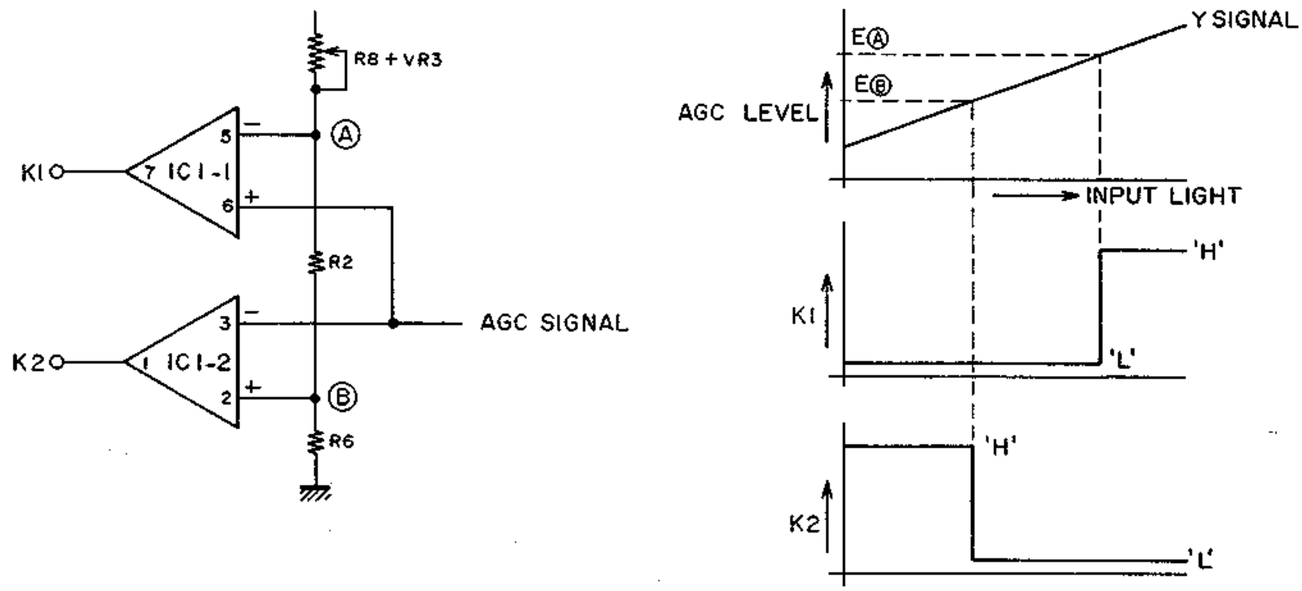


Fig. 5-6 Window Comparater

Fig. 5-6 shows the comparator circuit used to operate the AGC circuit. If the AGC signal level (input to the window comparator) is higher than voltage E Ⓐ at point Ⓐ, IC2-1 output goes to "H" level.
On the other hand, if the Y signal level is lower than voltage E Ⓑ at point Ⓑ, then IC1-2 output goes to "H" level.
Thus, output goes to "L" if the input signal E_Y is:

$$E_B < E_Y \leqslant E_A$$

2-1-3 Tally Check and VTR Selector Switch

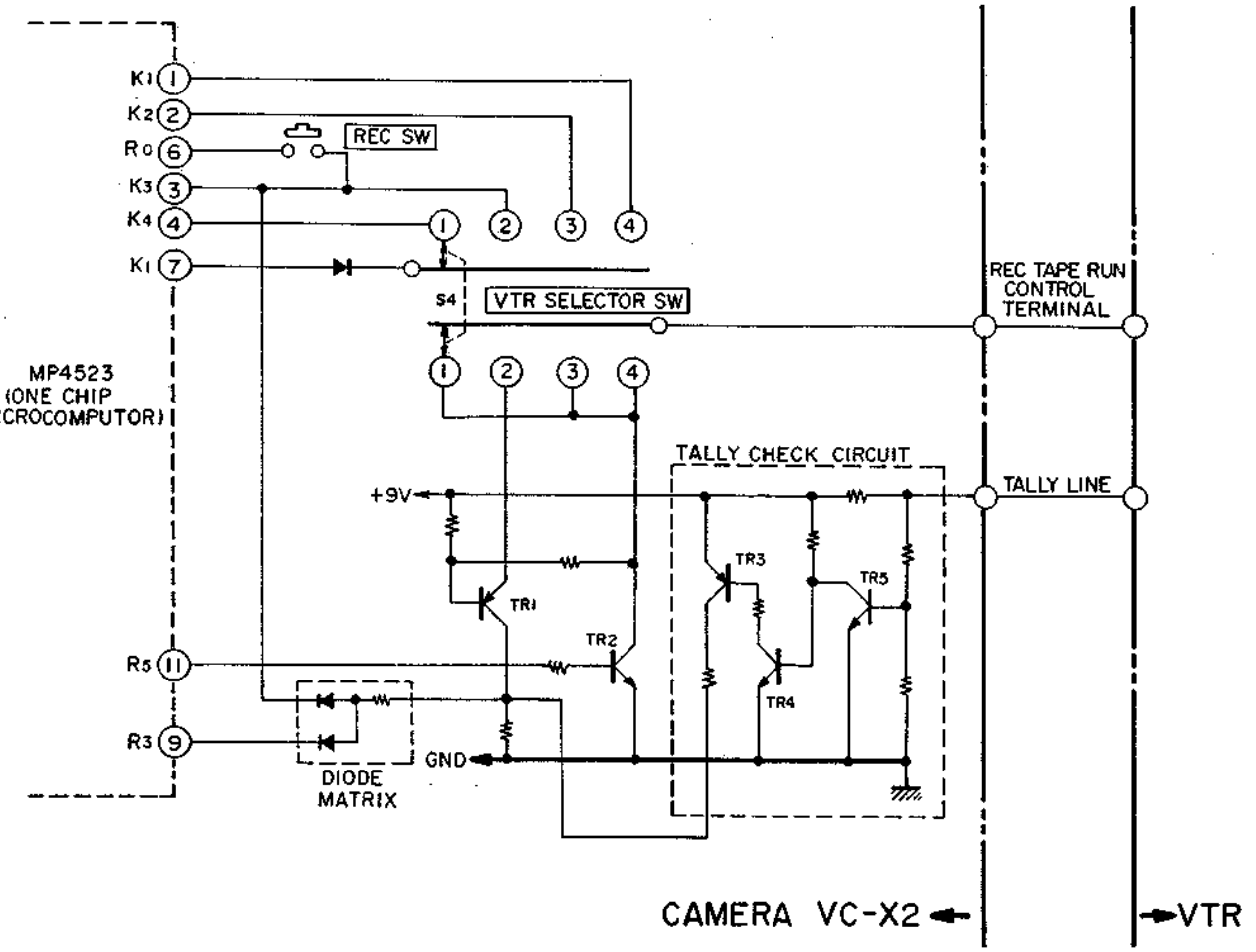


Fig. 5-7 Tally Check & VTR Selector Switch

When the VTR SELECTOR switch is set to position ①, the key scan pulse from R1 (pin ⑦) of IC2 is supplied to K4 (pin ④), and R5 (pin ⑪) is set to "LOW" if the camera's REC switch is OFF. Tally check is then conducted to see if the VTR is in the REC standby mode.
Suppose that the VTR is found to be in the REC standby mode. The tally line goes to "LOW" (setting: impedance of 2K ohms or less or DC level of 1V or less), causing TR5 to be turned OFF and TR4 and TR3 to be turned ON. This in turn establishes "HIGH" between diodes in the diode matrix. The key scan pulse from R3 (pin ⑨) is then supplied to K3 (pin ③), making it possible for the microcomputer to accept the signal from the camera's REC switch.
On the other hand, if the VTR is not in the REC standby mode (i.e., the tally line is at "high"), TR5 is turned ON, TR4 OFF, and TR3 OFF.
As a result, "LOW" is established between diodes in the diode matrix. In this case, the key scan pulse from R3 (pin ⑨) is not supplied to K3 (pin ③), and thus the microcomputer (IC2) does not respond even if the camera's REC switch is set to ON; the REC LED located in electric viewfinder (EVF) stays OFF, indicating that the VTR is not the REC standby mode.
Where REC is found to be acceptable upon tally check, setting the camera's REC switch to ON causes R5 (pin ⑪) to be changed from "LOW" to "HIGH", which in turn activates TR2. As a result, the "REC tape RUN" control signal goes to "LOW", changing the VTR mode from REC standby to REC-tape-RUN mode.
When the VTR selector switch is set to position ④, the tally check is performed in the same manner as with switch position ① except that the output signal from R5 (pin ⑪) is reversed (i.e., "high" with REC standby and "low" with camera REC switch "ON") since the REC-tape-RUN mode is established on the VTR when the "REC tape RUN" control signal goes to "high".
When the VTR selector switch is set to position ② (dedicated to AKAI's VP-7300 Series), R5 (pin ⑪) goes to "low". Then, if the camera's REC switch is set to "ON", R5 (Pin ⑪) goes to "high", activating TR2 and TR1. In this case, if the VTR is in the REC standby mode, the "REC tape Run" control terminal is at "high" level. Therefore, a potential difference produced by a resistance

connected to the collector of TR1 causes "high" to be established between diodes in the diode matrix. The key scan pulse from R3 (pin ⑨) is then supplied to K3 (pin ③). As a result, the signal from the camera's REC switch is accepted, the REC LED located in the EVF is activated, and the VTR is placed in the REC-tape-run mode. On the other hand, if the VTR is not in the REC standby mode, no voltage is supplied from the VTR to the "Rec tape Run" control terminal. Thus, even if TR1 is activated by setting the camera's REC switch to "ON", there is no potential difference developed by the resistor at the collector of TR1.

For this reason, "high" is not supplied to the diode matrix, resulting in the key scan pulse from R3 (pin ⑨) not being delivered to K3 (pin ③).
In this case, the microcomputer causes the REC LED to blink in the EVF, indicating that the VTR is not in the REC standby mode.
When the VTR selector switch is set to position ③ , R5 (pin ⑪) is set to "low". Setting the camera's REC switch to "ON" causes R5 (pin ⑪) to switch to "high", causing TR2 to be activated. The REC tape Run terminal goes to "LOW" and thus the VTR is placed in the REC tape run mode. In this case, the REC tape Run terminal is set to "low" even when the VTR is not in the standby mode. Therefore, when depressing the camera's REC switch, it is necessary to check that the VTR is in the REC standby mode.

2-1-4 Beam Current Detection (Warm-up warning)

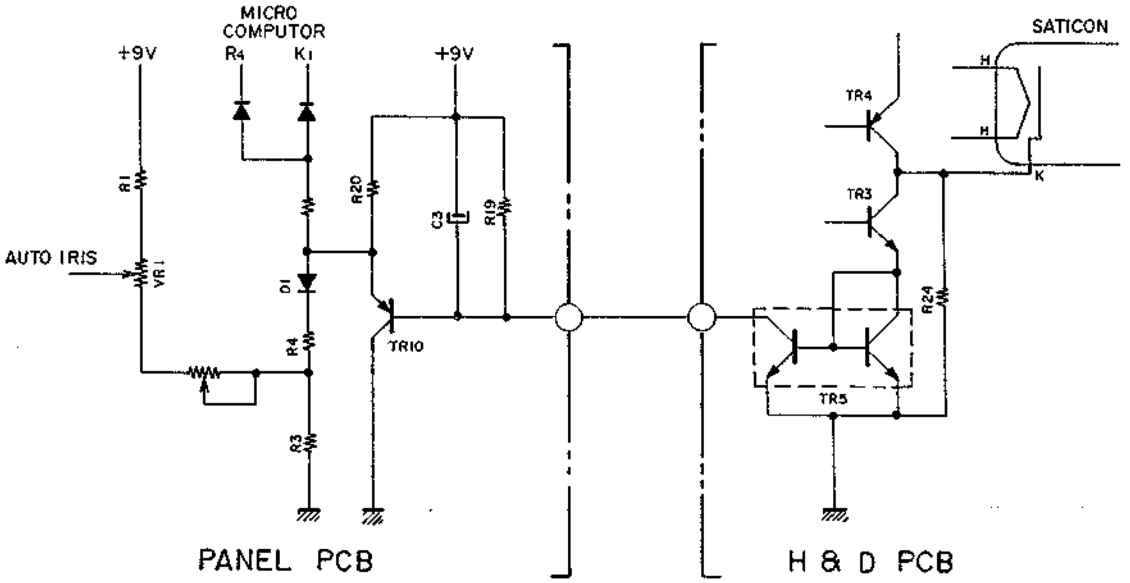


Fig. 5-8 Beam Detection Circuit

VC-X2 employs the Saticon, which will be more easily damaged than the Vidicon if exposed to a strong light when the beam current is not flowing. For this reason, the beam current detection circuit is incorporated to protect the Saticon by closing the auto iris during the warm-up period.

As soon as the beam current starts to flow due to the Saticon heater warming up, a voltage drop is developed across R19 (located on the panel P.C.B.) by the action of a current mirror circuit (TR5 on the High Voltage & Detection (H & D) P.C.B.). This causes the emitter potential of TR10 to fall. When this potential has fallen below the threshold level of the microcomputer, the warm-up warning (3 LEDs) is switched off.
At the same time, reduction of diode D1 current to zero increases the voltage on the top of VR1 which acts as a reference potential for the auto iris. This opens the iris.
C3 is for smoothing the blanking pulse, and thermistor TH1 is for temperature compensation of TR3's base current.

2-1-5 Automatic Gain Control (AGC)

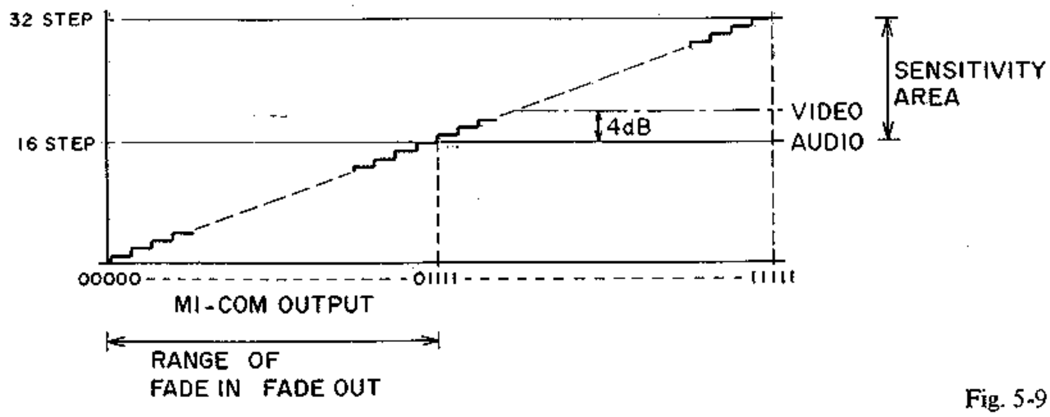


Fig. 5-9

Output from the AGC output ports $O_0 - O_4$ of the microcomputer is converted to an analog voltage by the staircase D-A converter circuit.
Further, when the FADE IN or FADE OUT button is depressed, the fade-in or fade-out operation is performed by changing the AGC output voltage as shown in Fig. 13. TR12 is for discharging C_7 to reduce the AGC output to zero for quick fade-out (with fade-in reserved, to start the fade-in operation at the same time that recording is started, it is necessary to start at video out "O").

2-2 Saticon Tube

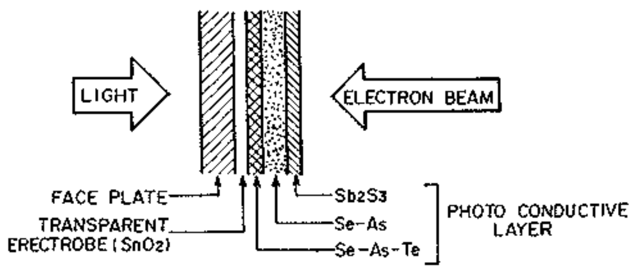


Fig. 5-10

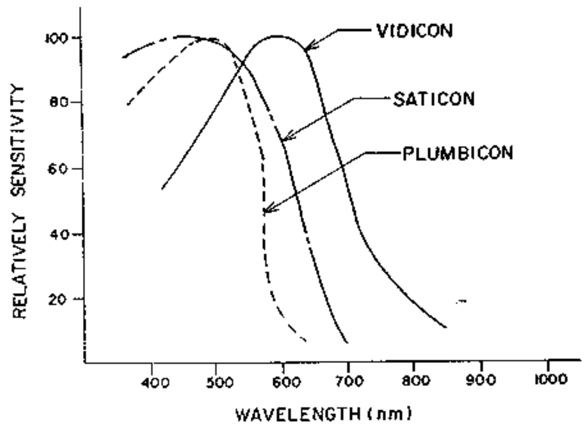


Fig. 5-11

The Saticon, which resembles a plumbicon, is a high-performance image pick-up tube almost always employed in a three-tube-type portable color TV camera intended for use at TV stations. The photo-conductive target of the Saticon is a film coating of amorphous materials primarily composed of Se (selenum), etc, departed by evaporation, as illustrated in Figure 5-10.
Since Se (selenium) itself is easily crystallized which causes damage to the film, and is insensitive to red light, As (arsenic) and Te (tellurium) are added to obtain the necessary improvement in properties.
However, if Se, As and Te are evenly distributed in the direction of film thickness to obtain sufficient "red-sensitivity" image persistence and ghosting increase. For this reason, Te is applied only in the layer exposed to the incoming light.

The scanning face is coated with an arsenic trisulphide (Sb_2S_3) layer to prevent intrusion of beam electrons and reduce the dark current so as to permit high speed scanning.
The incident visible light is almost entirely absorbed by the mixed Se-As-Te layer. A positive hole produced as a result of photo-excitation from a hole-electron pins, moves to the scanning side, while the electron moves to the signal electrode side. The results in a signal charge being accumulated.
The target voltage must be fixed at 50V to ensure that sufficient signal current is made available and ghosting is reduced.

As can be seen from Figure 5-11, the spectro-sensitivity is characterized by a high "blue" sensitivity, which indicates that the Saticon has well-balanced characteristics as a color image pick-up tube. The gamma (γ) is almost 1 but slightly smaller than 1 and image persistence is nearly always capacitive. With a 2/3-inch tube, if the initial signal current is 200 nA, the rate of image persistence is about 3% or less in the 3rd field after the light is cut off.

Further, the use of a low-image-persistence electron gun can halve the capacitive image persistence.
Another feature of the Saticon is reduced flare, with the dark current being 1 nA or less.
The photo-conductive film has a very high resolution, and even a 2/3-inch tube can provide the resolution characteristics required by TV broadcasting.
This helps to reduce the size of a color TV camera.

2-3 Pre-amplifier Circuit

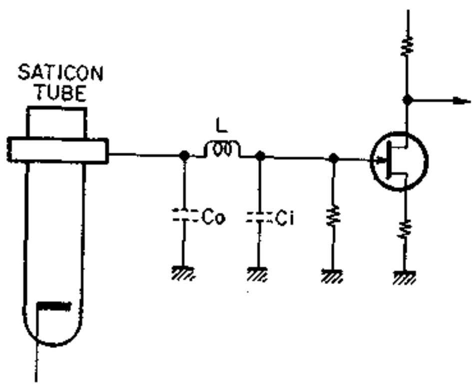


Fig. 5-12

The purpose of the pre-amprifier circuit is to amplify the very weak signals provided by the Saticon tube, and thereby facilitate signal handling in the circuitry that follows.
The Saticon tube output is equivalent to a noise-free constant current source. Therefore the signal/noise (S/N) ratio of the camera is dominated by the performance of this pre-amplifier.
To improve the S/N ratio, it is necessary:

a) To provide a high load resistance for the Saticon tube.
b) To minimize parallel capacitance.
c) To employ a device with a large mutual conductance in the first stage.

These reduce the equivalent noise resistance. Normally, an FET with an adequate noise figure is used in the first stage of the pre-amplifier.
In addition, a circuit known as the Pericival circuit is often used with the pre-amplifier. As shown in Figure 5-12, this circuit has a coil (L) inserted between the output of the Saticon tube and the input of the pre-amplifier. With the Percival circuit, the S/N ratio can be improved a few dB by separating the output capacitance of the Saticon tube from the input capacitance of the pre-amplifier by means of the Percival coil L.

2-4 Amplifier Circuit Summary

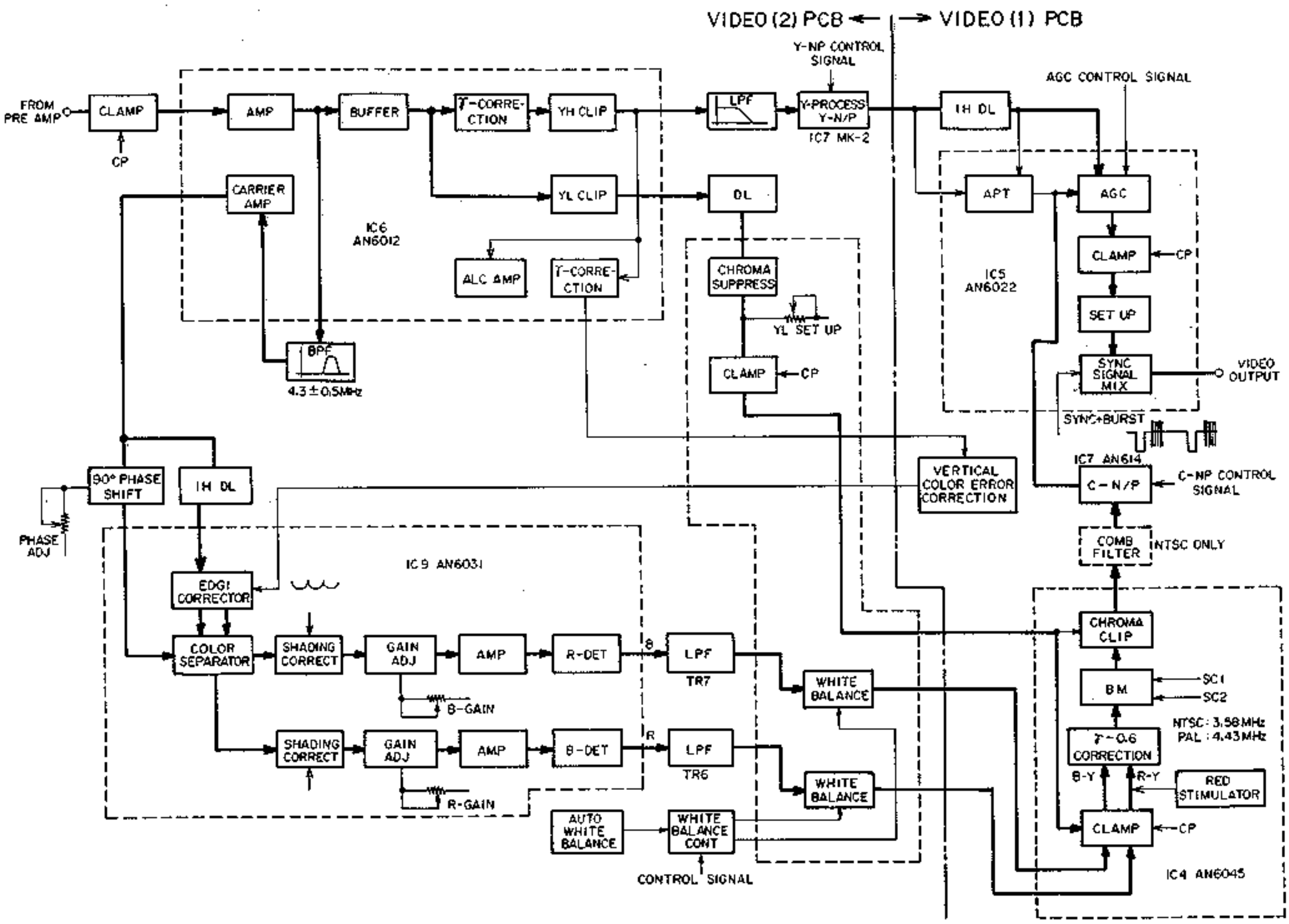


Fig. 5-13 Block Diagram of Process Amplifier

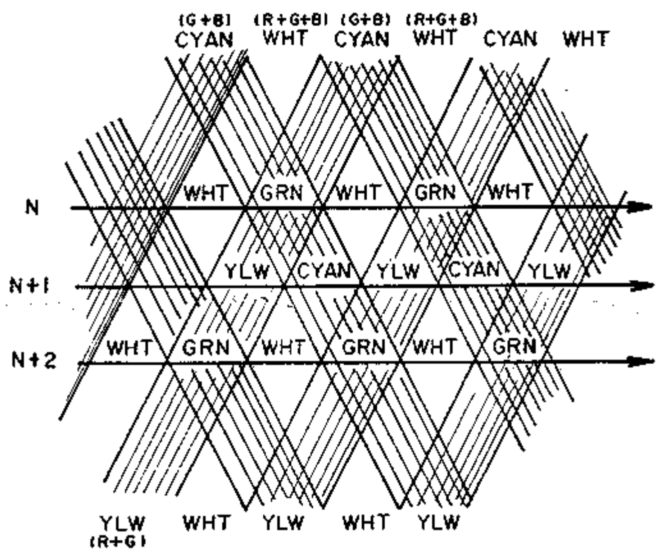


Fig. 5-14 Stripe Filter

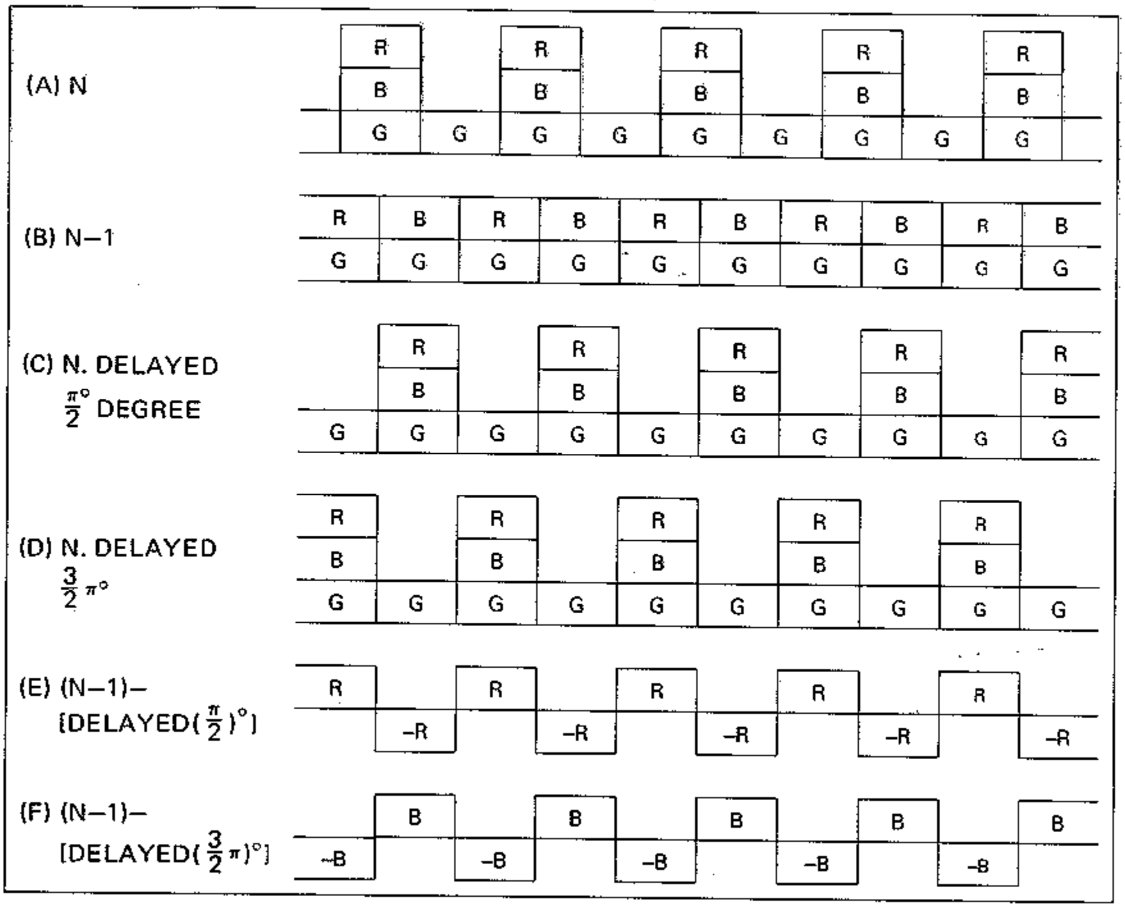


Fig. 5-15 Output Waveforms

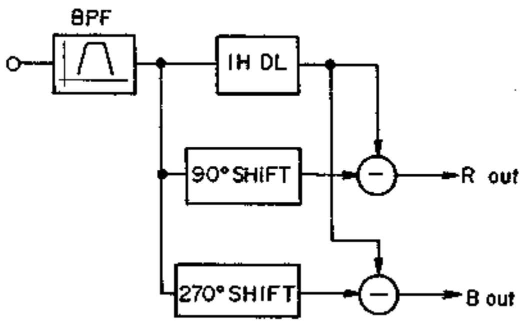


Fig. 5-16 Color Separation Circuit

On the stripe filter, yellow and cyan stripes intersect at a specified angle from the vertical as illustrated in Figure 5-14. Scanning takes place horizontally from left to right.

Suppose that a white subject is being shot. Various voltage waveforms resulting from photoelectric conversion through the stripe filter in the Saticon are shown in Figure 5-15.

The waveform in Figure 5-15, Ⓐ is produced when the repeated white/green portion on the stripe filter is scanned along a straight line.

Then, as the next scanning line passes over the repeated cyan/yellow portion, the waveform shown in Figure 5-15, Ⓑ is generated.

Subsequently, the horizontal scanning is repeated, resulting in these two waveforms alternating, and the output is amplified by the pre-amplifier.

The pre-amplifier output includes the color component centered on 4.3 MHz, and the Y-signal.

This output is then routed to a band pass filter (4.3 MHz ±0.5 MHz) to select only the color signal centered on 4.3 MHz or so, and supply it to the color separation circuit.

The basic circuit used for the purpose is shown in Figure 5-16. With VC-X2, a signal which has its phase shifted 270° is produced in IC9 AN6031. If waveform Ⓐ in Figure 5-15 is supplied to this color separation circuit, it will be shifted 90° by TR5, resulting in the waveform shown in Figure 5-15 Ⓒ being produced. In addition,

after being inverted and shifted 270° within IC9 AN6031, the waveform should appear as shown in Figure 5-15 Ⓓ. When the waveform Ⓑ, obtained by delaying waveform Ⓐ by 1H, is electrically subtracted from the waveforms Ⓒ and Ⓓ, the R-signal and B-signal are separated.
Subsequently, the signals are routed through the shading correction and gain adjustment circuits before being detected.
Since outputs appearing at pin ⑦ (red) and pin ⑫ (blue) of IC9 AN6031 have only undergone wave rectification during detection, TR6 and TR7 are converted in emitter-follower configuration and both serve as active filters.
The color signals (blue and red) that have been AM-detected are then supplied to their respective white balance circuits, where the white balance control signals (by way of the selector switch on the panel PCB) are used to change the gain of both the blue and red channel amplifiers, thereby balancing the blue and red signals with reference to the color temperature.
The outputs from the white balance circuits are supplied to IC4 AN6045 (color signal encoder) through its pin ③ (red signal) and pin ④ (blue signal). At the same time, the Y_L signal is supplied to pin ②. Each of these signals is clamped to produce B-Y and R-Y signals.
The AN6045 is provided with a circuit of single carrier frequency separation tube type to emphasize red and green which can be used to achieve good color reproduction.
However, with VC-X2, emphasizing both red and green results in degraded S/N of the chroma signal and thus provision is made so that only red is emphasized when the camera is used outdoors.
The color difference signals (B-Y and R-Y) are then gamma-corrected by the color process gamma circuit which gives $\gamma = 0.6$ when 3.3V is made available at pin ⑰.
After this, the signals are supplied to a balanced modulator, where they are converted to the reference TV color difference signal with the use of the reference TV signal subcarrier (NTSC = 3.5794 MHz; PAL = 4.433619 MHz).
The purpose of the chroma clip circuit that folows is to detect the Y_L signal level and effect chroma suppression at "high" and "low" levels. In addition, the edge error (vertical color error) detection signal is also involved.
The signal sent out from IC4 AN6045 through pin ⑫ is supplied to a comb filter, where an unnecessary luminance (Y-signal) component is removed (applicable only to NTSC, however).
The color subcarrier is then delivered to IC7 AN614 (chroma negative/positive reversal circuit) for reversal of the chroma signal by the negative/positive control signal from the panel PCB.
The output is mixed with the contour correction signal from the aperture circuit before being supplied to the AGC circuit to which the Y-signal is also supplied. After automatic gain control by control signals from the window comparator (panel PCB) and microcomputer, the signal is clamped and then supplied to the set-up circuit, where the blanking signal is added and the pedestal level is set. Then, in the SYNC signal mixing circuit, the SYNC and color burst signals are injected, to form a complete reference TV signal which is made available as an output at VIDEO OUT.
The Y-signal circuit functions as follows:
The output signal from the pre-amplifier contains the color component (around the 4.3 MHz carrier) as well as the Y-component, and therefore this color component is removed by a low-pass filter. This filtered luminance signal Y_H is then routed to the luminance (Y) process and Y negative/positive reversal circuits (IC7 MK-2) before being supplied to the AGC circuit via the aperture correction circuit in IC5 AM6022 for mixing with the chroma signal.

2-4-1 Clamp Circuits

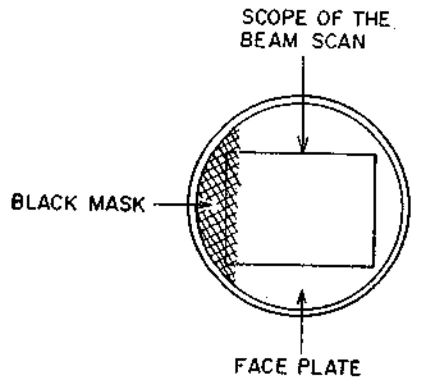
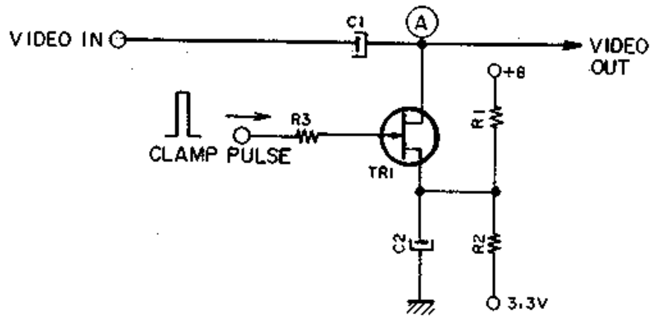


Fig. 5-17



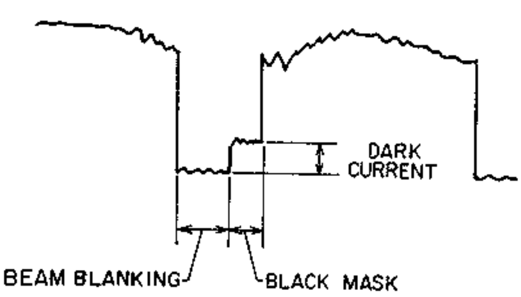


Fig. 5-18

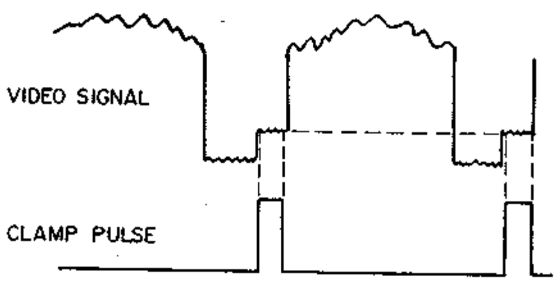


Fig. 5-19

The output level of the image pick-up tube includes a dark current. This is a beam current that flows even when there is no incident light. When the dark current fluctuates due to ambient temperature, etc, the black level also fluctuates. Also, since the DC component is lost as the video signal is passed through an AC circuit, black-level signals may fluctuate. The purpose of a clamp circuit is to ensure that the black level of the video signal always remains fixed at a specified level.
Clamp circuits are used at various places in video process circuitry because video processing, such as white-clip, γ-correction, etc., requires that the black level be stabilized.

To detect the dark current, a black mask is mounted on part of the image pick-up tube as illustrated in Figure 5-14. The purpose of the black mask is to prevent the incident light from entering the tube for part of the horizontal scanning time. A black current is the current that flows at the time the masked portion is scanned by the beam. The output waveform is shown in Figure 5-15. During the time when the dark current only is flowing, the black level of the video signal is maintained at a given level for a period of time during which the clamp pulse is supplied to the base of TR1, which forms part of a clamp circuit consisting of C1, C2, TR1, R1 and R2. (See Figure 5-16.)

2-4-2 Gamma Correction Circuit

The relationship between the luminosity of a fluorescent screen and the video input signal of a Braun tube is not "linear", with gamma (γ) being about 2.2, while the gamma characteristic of the Saticon tube itself is about "1". Therefore, to obtain a total system gamma characteristic of "1", it is necessary to make gamma correction on a circuit basis. It is further required that the gamma correction be made on the camera side.
A system's total gamma can be calculated using the equation:

$$\gamma = \gamma_1 \times \gamma_2 \times \gamma_3$$

where γ is the total gamma of a system, γ_1 is the gamma of a color Braun tube, γ_2 is the gamma of Saticon, and γ_3 is the gamma of a correction circuit.
For example, if $\gamma_1 = 2.2$ and $\gamma_2 = 1$, then a color camera with a Saticon requires a gamma correction of 0.45.
On VC-X2, gamma correction is made in ICs AN6012 and AN6045. The Y_H and Y_L signals in AN6012 can have their γ-value changed by a voltage applied to pin ②. In AN6045, the γ-value which is the process γ value of the chroma signal, can be changed by a voltage made available at pin ⑰.

2-4-3 White Balance Circuit

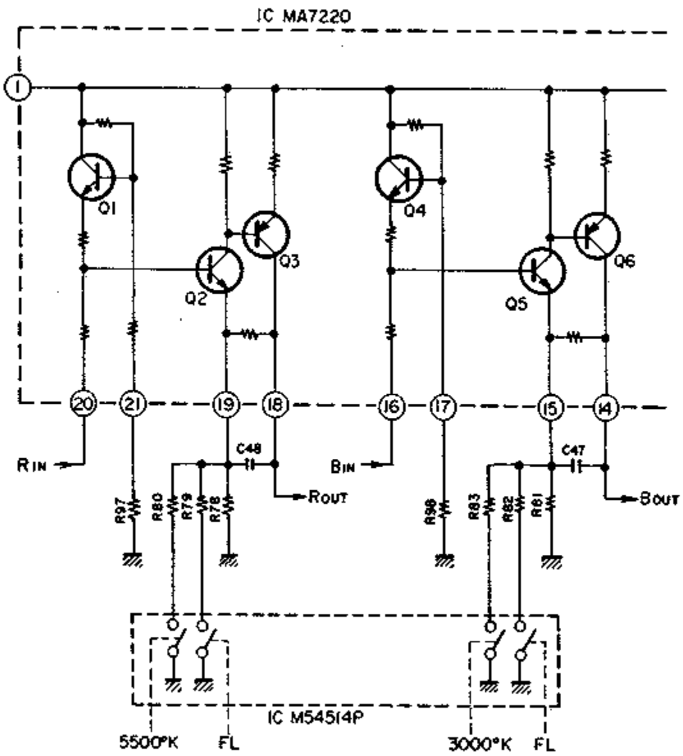


Fig. 5-20

The quality of light that illuminates a subject varies, depending on several factors:

a) Weather conditions (fine or cloudy)
b) Time of day (morning, noon, or evening)
c) Place (indoors or outdoors)
d) Light source (fluorescent or tungsten lamp, etc.)

In other words, a light can be reddish, bluish, and so forth. These tints of light can be represented by color temperatures expressed in degrees kelvin (°K).
The color temperature under direct sunlight on a fine day is about 6,000°K. It is between 7,000°K and 9,000°K in the shade, and is about 8,000°K under a cloudy sky.
An incandescent lamp has a color temperature of 3,200°K, while a fluorescent lamp has a color temperature of 4,500°K.
A color camera is normally factory-adjusted so that the colors of objects illuminated by a light source with a color temperature of 3,200K° can be reproduced accurately.
This means that the camera needs to be adjusted when shooting outdoors in sunlight.
The white balance circuit is employed to provide this adjustment by changing the gain of both red and blue signal circuits. As shown in Figure 5-17, control over color temperature is provided by changing the gain of both the RED signal amplifier (Q1 to Q3) and the BLUE signal amplifier (Q4 to Q6) through selection of resistors (R78 to R83). Switching between Fluorescent Lamp and 5,500°K (3,000°K with BLUE CH.) is made by means of a change-over switch on the panel PCB.
If this switch is set to "AUTO" position, either 3,000°K (INDOOR) or 5,500°K (OUTDOOR) is selected automatically by the ON/OFF state of TR14 which is determined by the control signal from the auto-white balance circuit.

2-4-4 Auto-White Balance Circuit

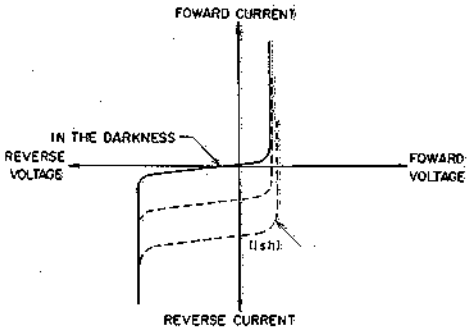


Fig. 5-21

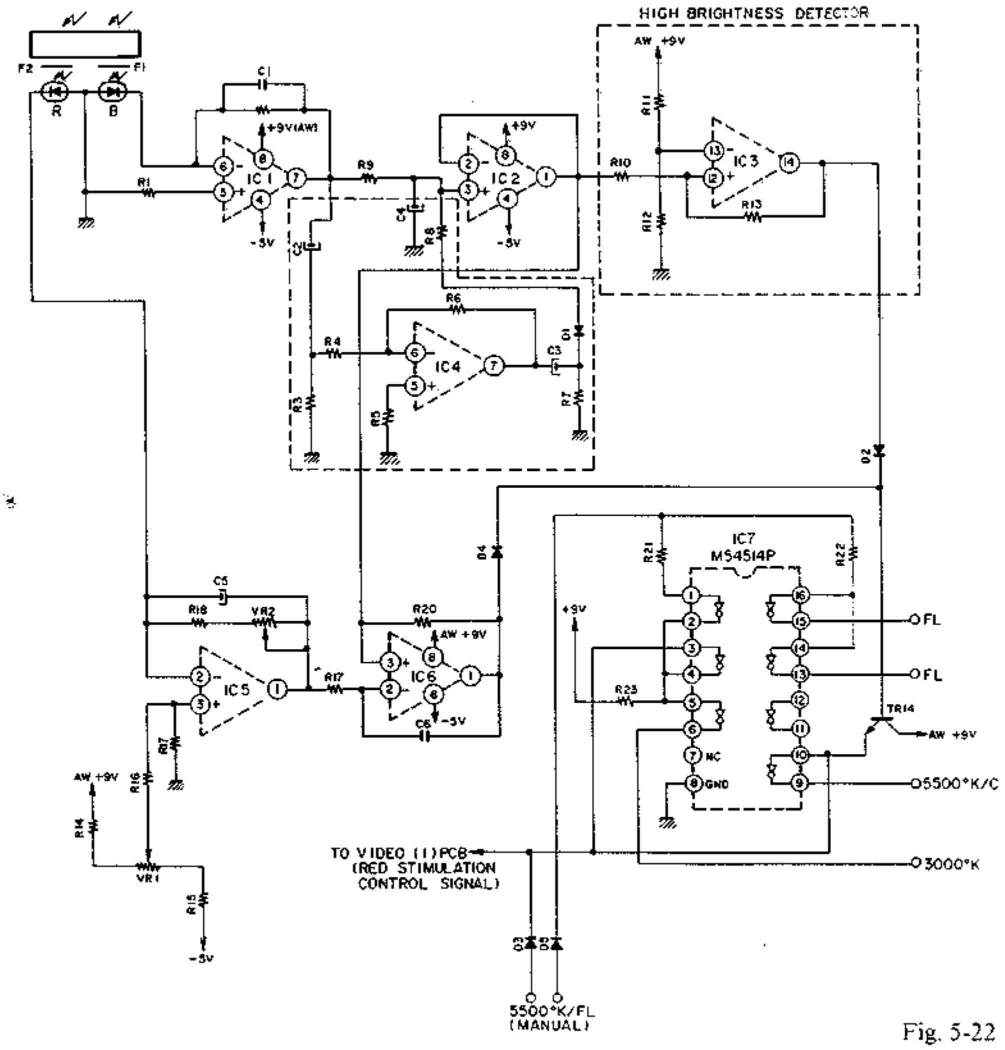


Fig. 5-22

The reverse current (ISh) of a photodiode increases in step with the increase of incident light. (See Figure 5-18.) If the amount of incident blue (OUTDOOR) light increases, the output voltage (ISh × R2) at pin ⑥ of IC1 increases. (See Figure 5-19.) This voltage is routed through a voltage follower (IC2) and is then compared in a comparator (IC6) with the output voltage derived from the incident red (INDOOR) light. In this case, since the blue (OUTDOOR) detection level is higher, the output at pin ① of IC6 goes to "H" and TR14 is activated. Pin ⑩ of IC7 also goes to "H" and then pin ⑨ gees to "L".
As a result, R80 goes to GND and the gain of the RED signal amplifier is increased. In this manner, the difference between OUTDOOR and INDOOR illumination can be detected.
When the camera is used under fluorescent lights, the blue output is accompanied by a flicker. If the flicker alone is amplified and routed to a buffer amplifier after deducting it from the blue output voltage, INDOOR may be selected because of reduced blue output voltage. (Note, however, that if there are many fluorescent lights, the flicker output is reduced, possibly resulting in OUTDOOR being selected.) IC4 is employed to serve this purpose.
IC3 is for sensing high luxes of illumination. At about 50,000 lux, OUTDOOR is selected automaticly.

2-4-5 Luminance Y-Signal Negative/Positive Reversal Circuit

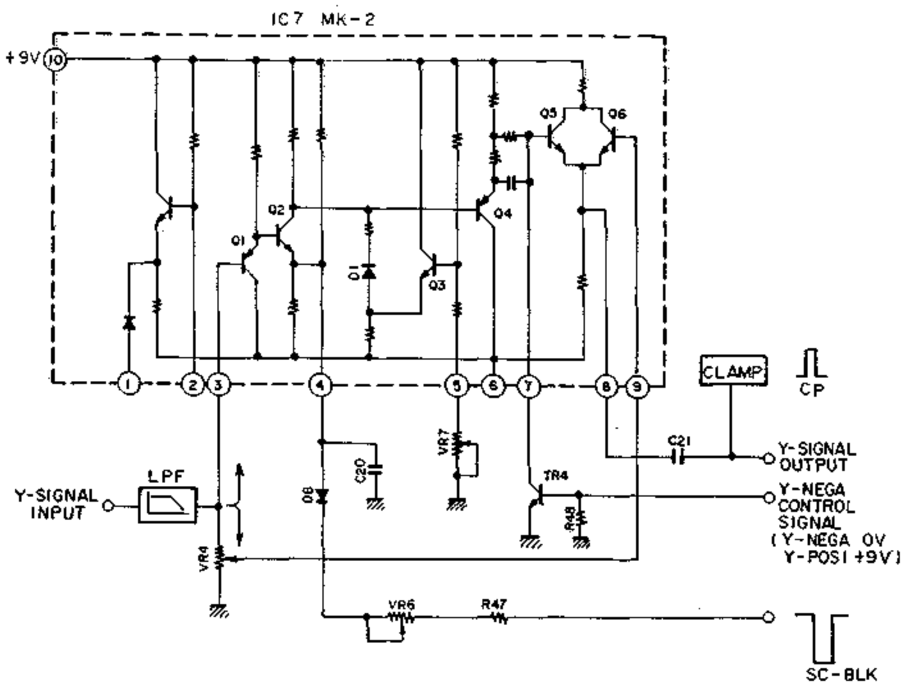


Fig. 5-23 Luminance (Y) Signal Negative/Positive Reversal Circuit

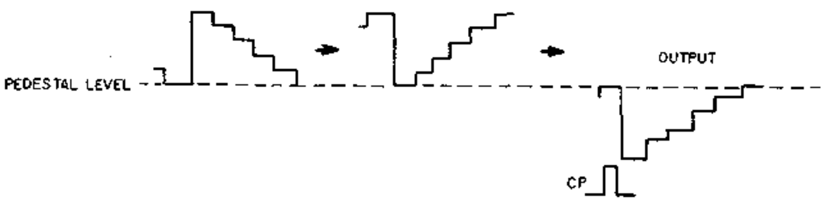


Fig. 5-24

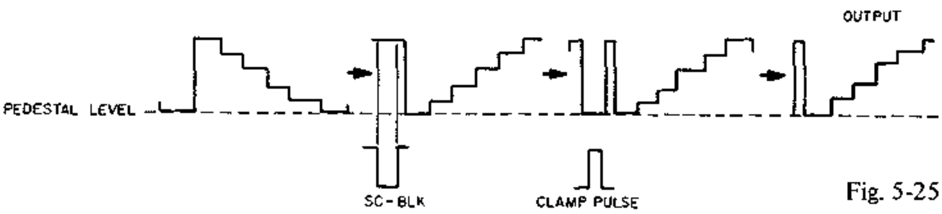


Fig. 5-25

An hybrid IC MK-2 is used for Y-signal negative/positive reversal. This IC circuit includes YH white compression in addition to the reversal amplifier and the Sub-Carrier Blanking Pulse Mixer (SC-BLK PULSE MIX) for determining the pedestal level during "negative" periods. The common-emitter transistors for negative/positive switching are also included.

In Figure 5-10, the Y-signal is passed through the low pan filter (LPF) and then routed through two different paths.

FIRST PATH

The Y-signal which is routed to Q1 is then reversed by Q2 and γ -corrected by a γ (gamma) correction circuit consisting of D1 and Q3. Since clamping the reversed signal as it is causes the output to be lost, a Sub-Carrier Blanking (SC-BLK) pulse is injected at the emitter of Q2 (see Figure 5-22) to determine the pedestal level prior to clamping.

The reversed signal which has been gamma-corrected by D1 and Q3 is then supplied via eimitter-follower Q4 to the base of Q5.

SECOND PATH

The Y-signal that is routed to VR4 after being passed through the LPF, is then applied to the base of Q6 as a "positive" signal.

EXPLANATION OF SWITCHING

If the Negative/Positive control signal from the panel PCB is at "H" (Y-Positive). TR4 is activated, causing Q5 to be cut off. This in turn cuts off the negative video-signal and causes the "positive" video signal from pin ⑨ to be made available at pin ⑧ via the emitter-follower circuit of Q6.

On the other hand, if the control signal from the panel PCB is at "L", TR4 is deactivated and the "negative" video signal from Q4 is made available at pin ⑧ via the emitter-follower circuit of Q5.

Since Q5 has a base bias higher than that of Q6 and its emitter current value is also higher, Q6 is automatically cut off, and so is the "positive" video signal.

2-4-6 Chroma Nega/Posi Reversal Circuit

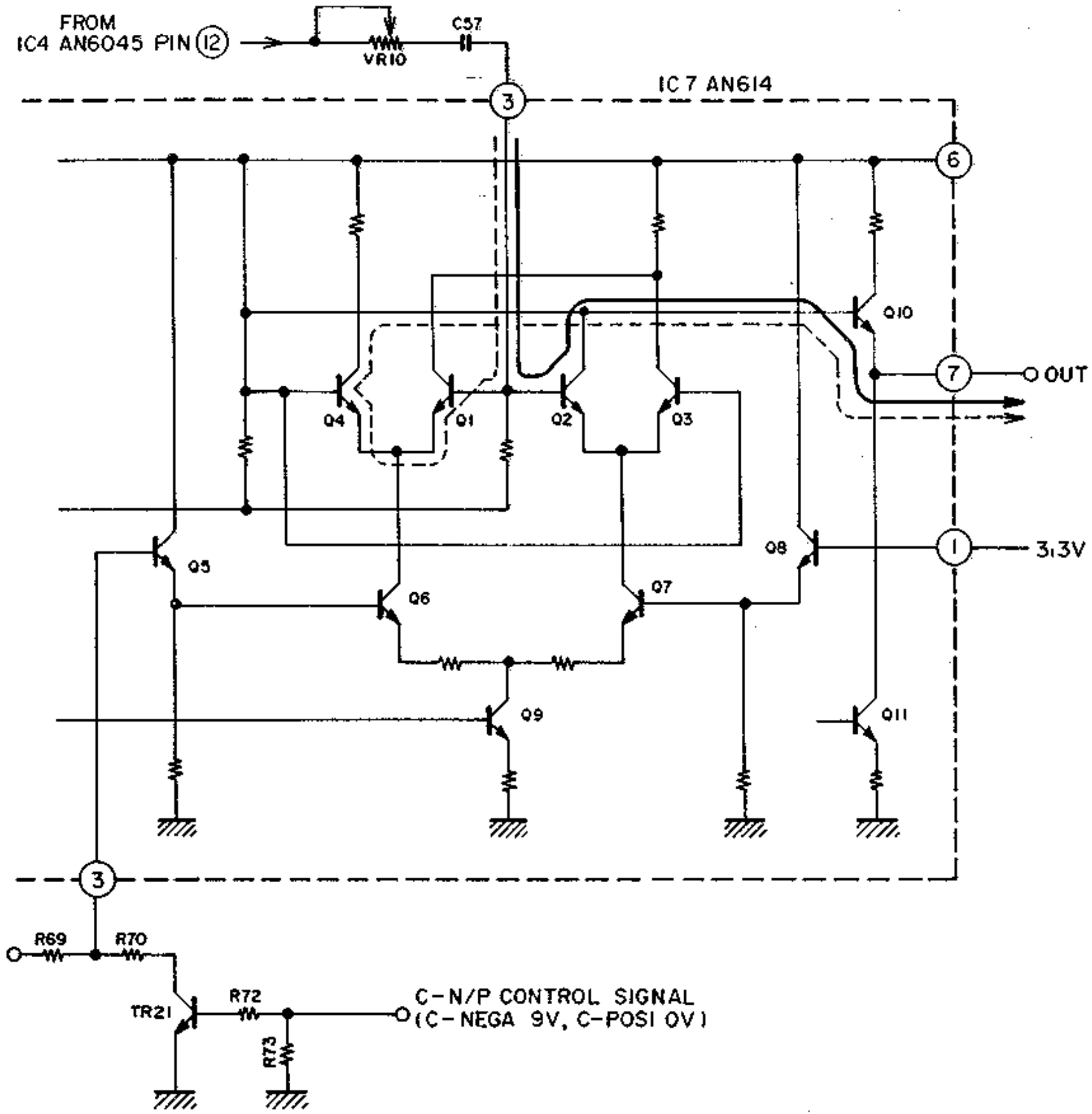


Fig. 5-26 Chroma Negative/Positive Reversal Circuit

The chroma signal that has been modulated with the subcarrier (PAL = 4.433619 MHz ; NTSC = 3.57954 MHz) in the balanced modulator (BM) within IC4 (AN6045) is then supplied to the input pin ③ of the chroma negative/positive reversal circuit (IC7 AN614).
Whether the phase of the chroma signal which is made available at pin ⑦ of IC7 is to be reversed or not is determined by the negative/positive control signal from the panel PCB which is at either "H" or "L".
Suppose that the Normal/Reverse switch on the panel PCB is set to "COLOR NEGATIVE" position. The C-N/P control terminal goes to "H" and TR 21 is activated, which in turn causes pin ③ of IC7 to go to "L". Thus, Q5 within IC7 is turned off, Q6 is also turned off and as a result Q1 and Q4 are deactivated.
On the other hand, 3.3V is routed to pin ① of IC7 and therefore Q8 and Q7 within IC7 are both turned on, activating Q2 and Q3. The chroma signal supplied through pin ③ of IC7 has its phase reversed 180° by Q2 and then is passed through the emitter-follower circuit of Q10 before being made available at pin ⑦ of IC7.
In contrast, when the Normal Reverse switch on the panel PCB is set to "COLOR NORMAL" position, the C-N/P control terminal goes to "L", causing TR21 to be turned off. As a result, pin ③ of IC7 goes to "H".
Thus, Q5 and Q6 are both turned on and Q9's collector potential is increased, turning Q7 off.
As a result Q1 and Q4 alone are activated, and the chroma signal from pin ③ of IC7 is passed through the emitter-follower circuit of Q1, the common base circuit of Q4, and then the emitter-follower circuit of Q10. From here the chroma signal is made available at pin ⑦ of IC7 without its phase being reversed.

2-4-7 Aperture Correction Circuit

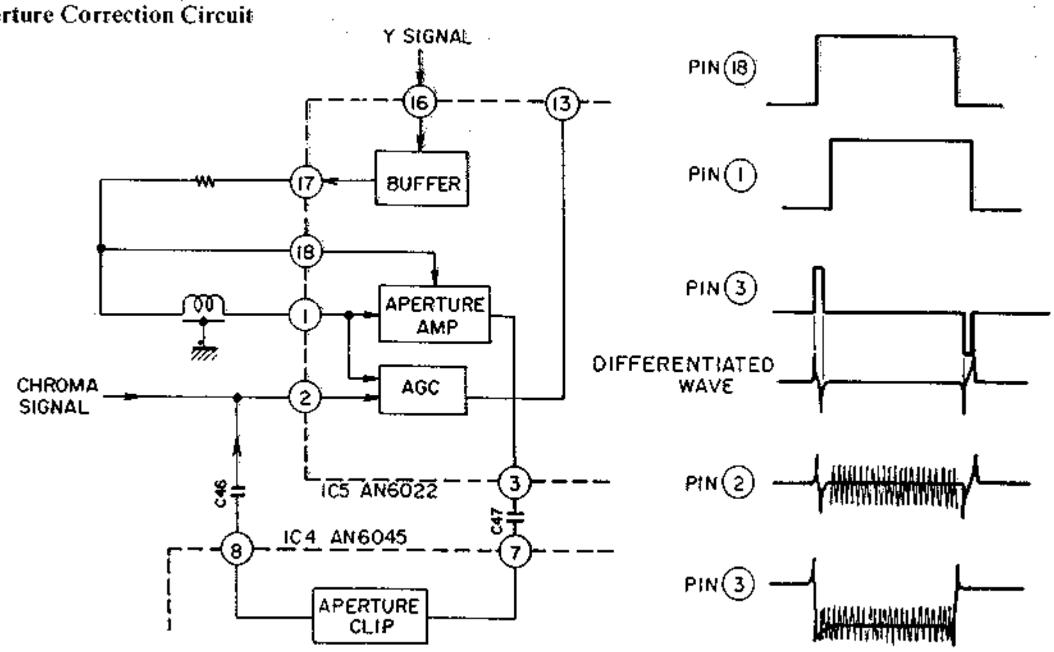


Fig. 5-27

The spot formed by the scanning electron beam in the image pick-up tube must be finite in size, resulting in a reduced picture resolution of high frequency components. This is referred to as aperture distortion. The aperture correction circuit is employed to correct this aperture distortion.

With VC-X2, the delay line is unterminated on the load side so the signal is reflected back through the delay line from this end. The circuit shown in Figure 5-24 is used as a contour correction circuit. The contour correction signal generated by the amount of delay between pin ⑱ and pin ① of IC5 (AN6022) is differentiated. The result is then passed through the base clip circuit in IC4 (AN60450). After being mixed with the chroma signal, it is supplied to the AGC amplifier, where it is mixed with the Y-signal. The inverted signal is then made available at pin ⑬ of IC5.

2-4-8 Automatic Gain Control (AGC) Circuit

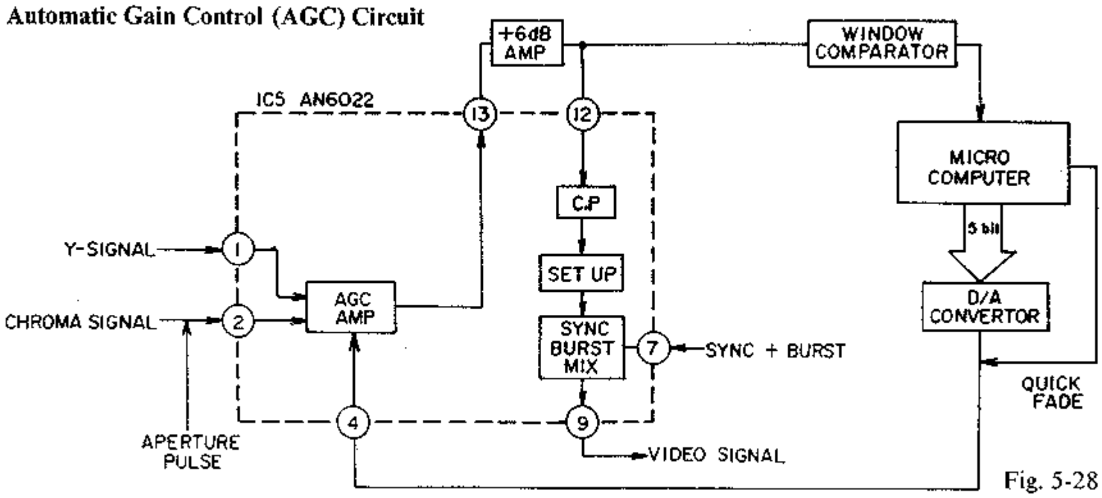


Fig. 5-28

The AGC is intended to operate on TV signals after SYNC and COLOR BURST have been removed. Therefore, SYNC and color burst signals are added in the last stage after the AGC.

Figure 5-25 shows the block diagram of the AGC circuit. If pin ⑬ and pin ⑫ of IC5 AN6022 were connected together directly, a standard output would be made available at "AGC Full Gain". In view of this a + 6 dB amplifier (TR14 and TR15) is connected between these pins so that the AGC amplifier operates at −6 dB during NORMAL operation and the output level is increased by +6 dB in low-illumination conditions. For this reason, AGC is applied to the video signal obtained from the point where it is amplified by +6 dB.

In addition, the video signal entering through pin ⑫ is clamped and then passed through the set-up circuit. It is subsequently mixed with SYNC and COLOR BURST signals before being sent out from pin 9 as a standard TV signal.

2-4-9 Synchronizing (SYNC) Signal Generation Circuit

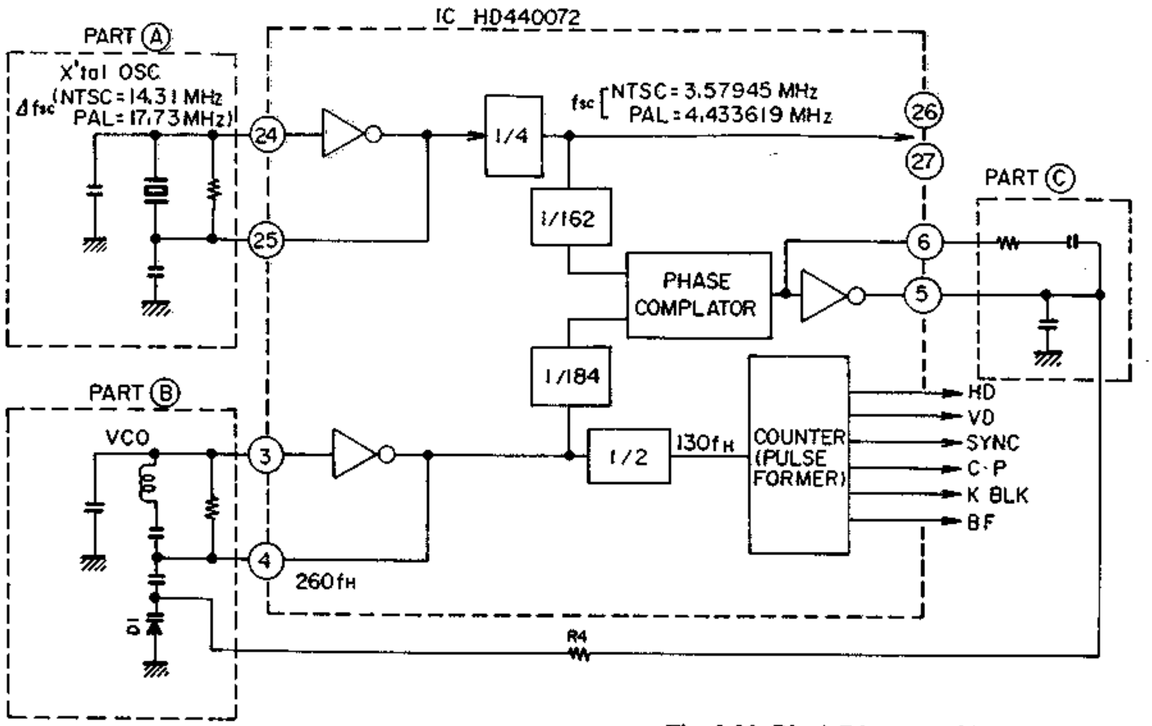


Fig. 5-29 Block Diagram of Sync Signal Generation

The purpose of this circuit to generate composite synchronizing signals to be mixed with the video signal as well as a variety of pulses to be supplied to various circuits.
The IC HD440072 is a one-chip IC used to generate synchronizing signals. Figure 5-26 shows the block diagram of the IC.
The portion A represents a crystal oscillator using a C-MOS inverter,. which oscillates at 14.31000 MHz (NTSC) or a C-MOS inverter, which oscillates at 17.73000 MHz (PAL) which is four times the color subcarrier frequency. This frequency is divided by a factor of 4 to provide the color subcarrier. It is further divided by a factor of 162 and then this resultant output signal is subjected to phase comparison with the output which is the result of dividing the frequency of the VCO (voltage conrolled oscillator) in portion B by a factor of 184.
The DC component of the phase comparator which is selected by a low pan filter in portion Ⓒ is used to control the VCO in portion Ⓑ. This arrangement forms a PLL (phase locked loop) circuit.
Through the action of the PLL, the VCO frequency becomes 260 times the horizontal line frequency of 15.750 kHz (NTSC) or 15.625 kHz (PAL). This frequency is further divided by two and then applied as a clock pulse to the pulse forming counter, which generates horizontal drive (HD), vertical drive (VD) and synchronizing pulses required by the video circuitly.

2-4-10 Vertical Color Error Correction Circuit

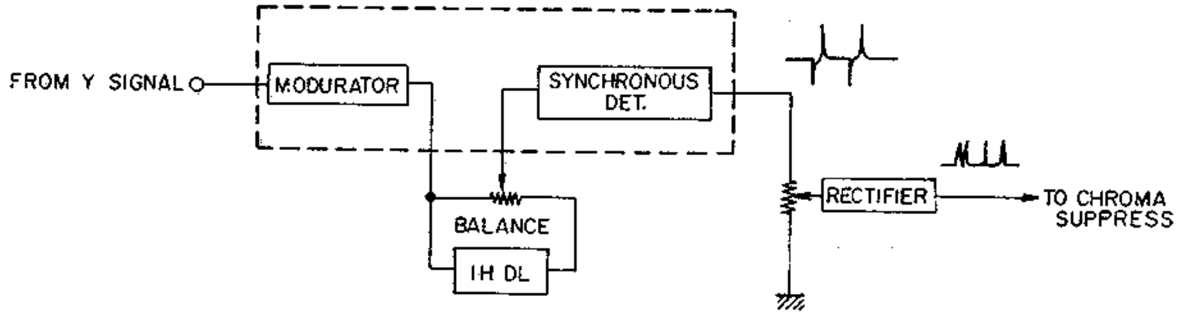


Fig. 5-30 Vertical Color Error Correction Circuit

As described earlier, the image pick-up tube of this camera is the single carrier frequency separation type which uses vertical correlation during demodulation. This means that the red and blue signals are produced using a 1H delay in accordance with the description of section 2.4.
The possibility exists that a false chroma signal will be generated if proper vertical correlation cannot be established. This error condition is corrected by suppressing the chroma signal where an error occurred.

2-4-11 Power Zoom

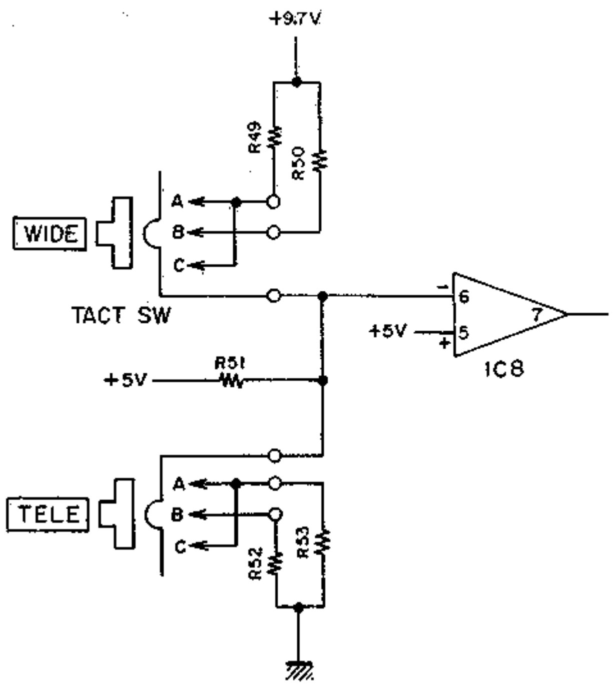


Fig. 5-31

The power zoom circuit is driven by IC8.
Depressing the contact switch slightly causes Common, A and C to be connected (first step).
Further depression of the switch causes all of Common, A, B and C to be brought into contact (Second step).
Thus, in the first step with the Wide Switch, voltage EW_1 which is obtained by dividing 4.7V by R95 and R94 is applied to IC8 6. When the switch is further depressed, voltage EW_2 which is obtained by dividing 4.7V by R95//R96 and R94 is applied.
Since $EW_1 < EW_2$, output voltage in the second step is lower than that in the first step, making zooming possible in the second step.

2-4-12 Auto Iris Control Circuit

The output signal available at pin ⑨ of IC6 is integrated by R28 and C11. The iris motor driven by IC5 is provided with a drive coil and a governor coil. The motor acceleration is detected by the governor coil and then supplied to pin ⑥ of IC5 to control speed of the iris motor.
Further, since a force is always applied, which tries to close the iris, there is always a balance current flowing through the drive coil to control the aperture. Therefore, when the power switch is turned off, the iris is automatically closed, thereby protecting the Saticon from incident light when not in use.

2-5 High Voltage & Deflection (H & D) Circuit

2-5-1 Horizontal Deflection (HD) Circuit

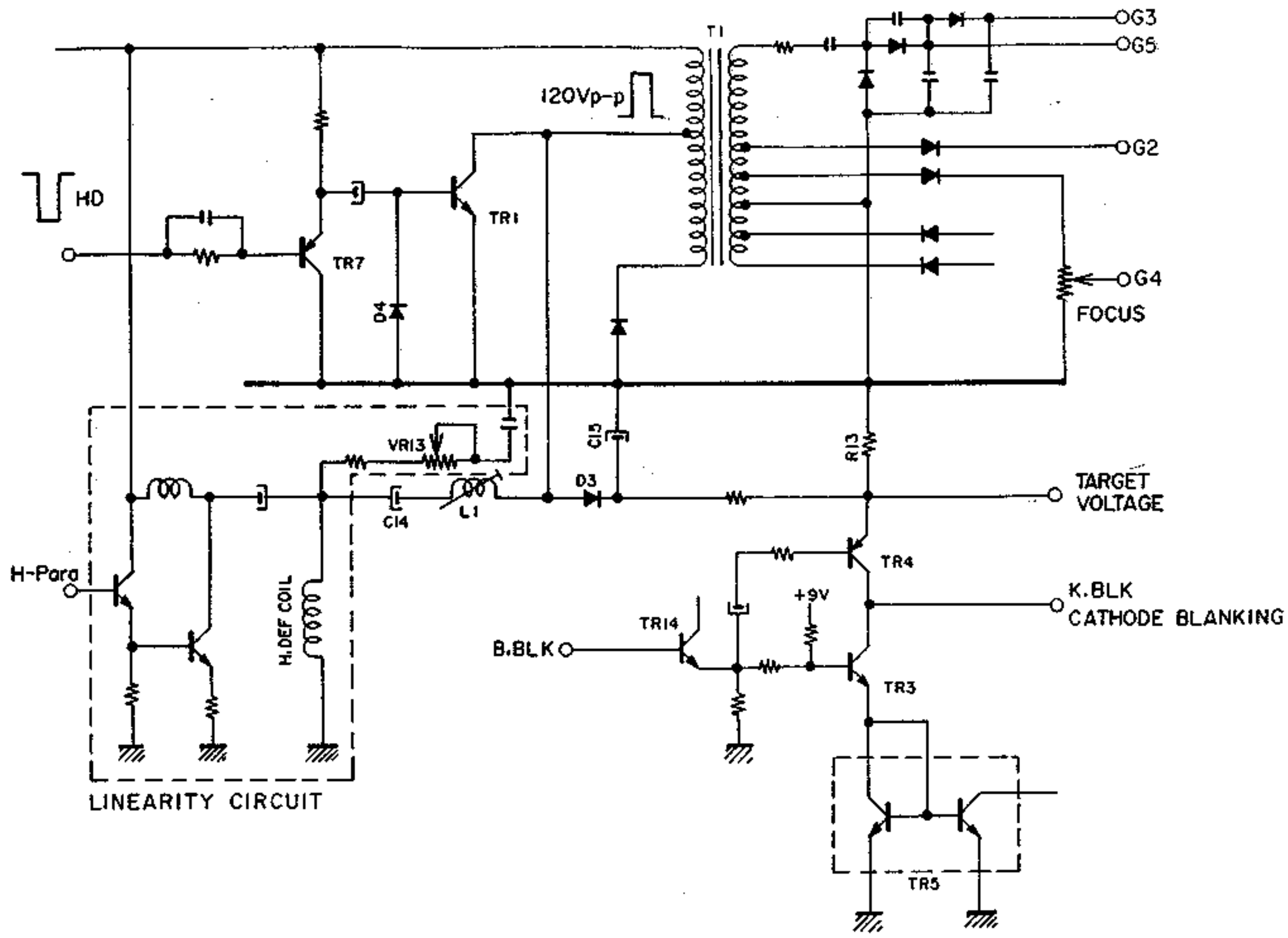


Fig. 5-32 Horizontal Deflection Circuit

The purpose of this circuit is to provide horizontal deflection of the electron beam in the Saticon tube and to generate appropriate voltages for each electrode.

In Figure 5-29, the horizontal deflection transistor TR1 is driven by an HD pulse, which creates a flyback pulse of about 120 Vpp and 10 μs in width at its collector. This pulse is supplied to a horizontal deflection coil via horizontal scan width and linearity adjustment control circuits.

The flyback pulse is rectified for use as the saticon's cathode blanking power source and target voltage. In addition, the flyback pulse also is boosted by transformer T1 and then rectified by diodes. DC is obtained by smoothing and is supplied to the relevant electrodes.

VI. ADJUSTMENT

1. REQUIRED JIGS FOR ADJUSTMENT

1) Linearity Checker Circuit

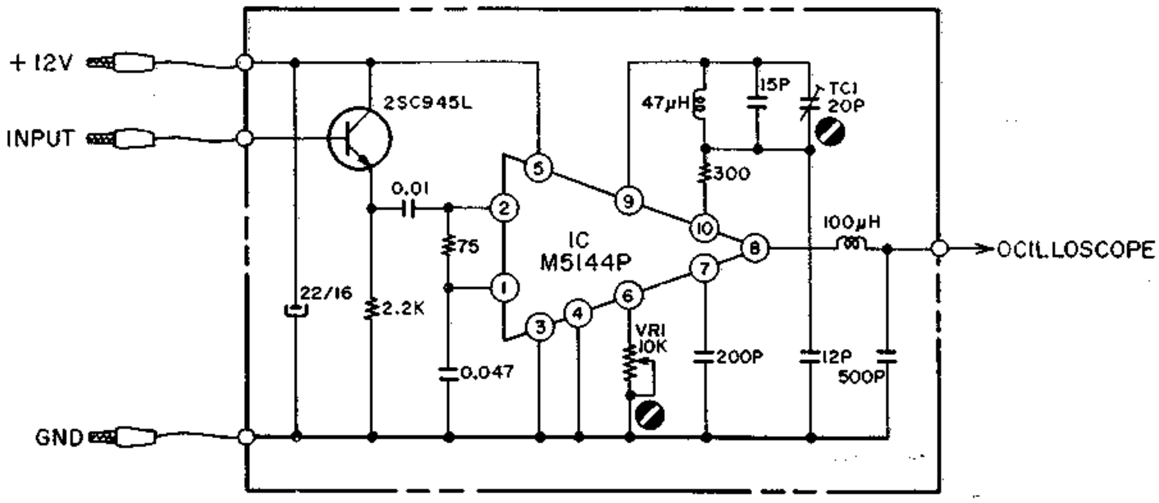


Fig. 6-1

It is necessary to build a linearity checker circuit which is required in adjustment step 11. Note that the major parts and their numbers are as follows:

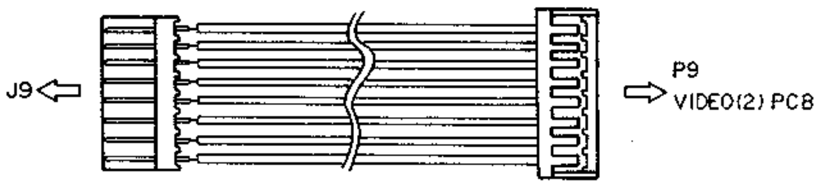
Parts No.	Description
EI-704201	IC M5144P
ET-632204	TR 2SC945L K, P, Q
EC-700214	Trimmer/C. MCV50D1H200YZ VC-65

Method of Adjusting TC1 and VR1

Supply a sine wave of 43 MHz to INPUT and adjust TC1 so that the waveform on the oscilloscope is at 5.5V (center). Then, adjust VR1 so that a difference of ± 1V can be obtained with 4.3 MHz ± 100 kHz.

2) Extension Cords

Extension Cable 8P (VC-X2) Parts No. AJ-751233



Extension Cable 4P (VC-X2) Parts No. AJ-751234

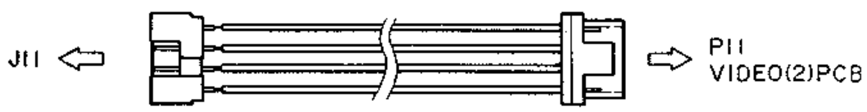


Fig. 6-2

VI. ADJUSTMENT

1. REQUIRED JIGS FOR ADJUSTMENT

1) Linearity Checker Circuit

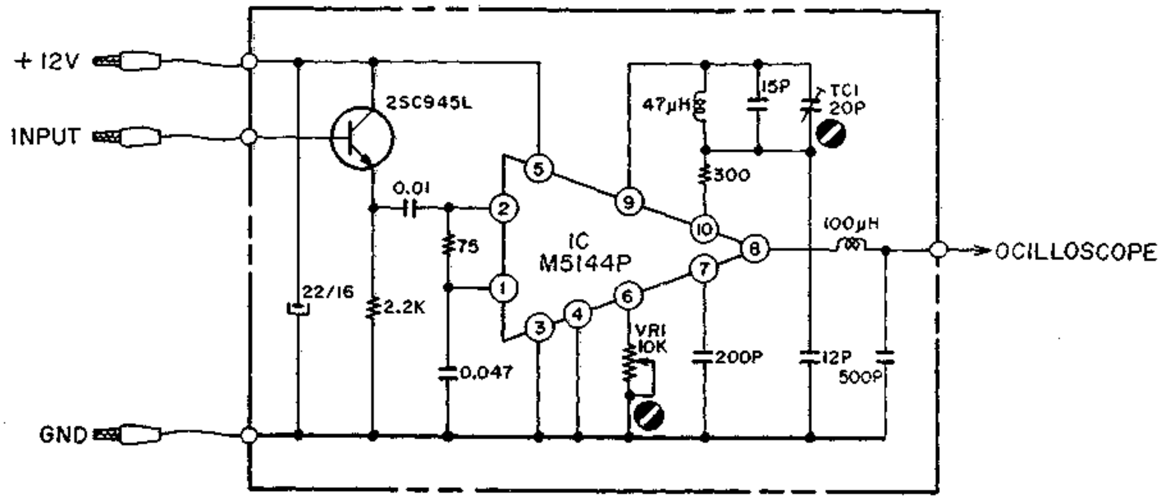


Fig. 6-1

It is necessary to build a linearity checker circuit which is required in adjustment step 11. Note that the major parts and their numbers are as follows:

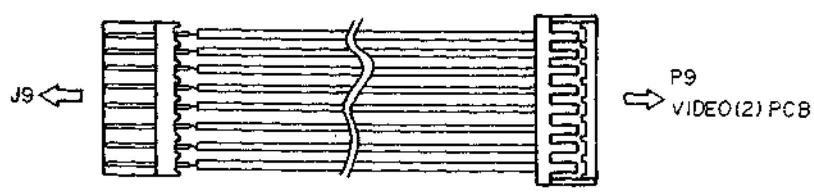
Parts No.	Description
EI-704201	IC M5144P
ET-632204	TR 2SC945L K, P, Q
EC-700214	Trimmer/C. MCV50D1H200YZ VC-65

Method of Adjusting TC1 and VR1

Supply a sine wave of 43 MHz to INPUT and adjust TC1 so that the waveform on the oscilloscope is at 5.5V (center). Then, adjust VR1 so that a difference of ± 1V can be obtained with 4.3 MHz ± 100 kHz.

2) Extension Cords

Extension Cable 8P (VC-X2) Parts No. AJ-751233



Extension Cable 4P (VC-X2) Parts No. AJ-751234

Fig. 6-2

3) Resistance for heaters

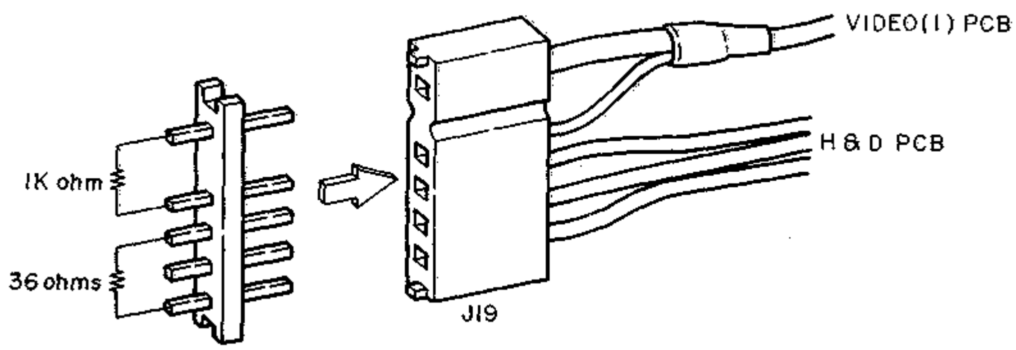


Fig. 6-3

Since the heaters for the Saticon and EVF's CRT are connected in series, if adjustment is made with the EVF BLK removed, a resistance of 36 ohms must be installed as illustrated above.
Note that a resistance of 1 kohm serves as a video circuit's output impedance.

4) Light Box (3,200 K°)

Note:
When make an adjustment with 5,100°K Light Box, please put the Lens Filter W10 to the VC-X2 Lens.

2. LOCATION OF POTENTIOMETERS AND TEST POINTS

1) H & D PCB

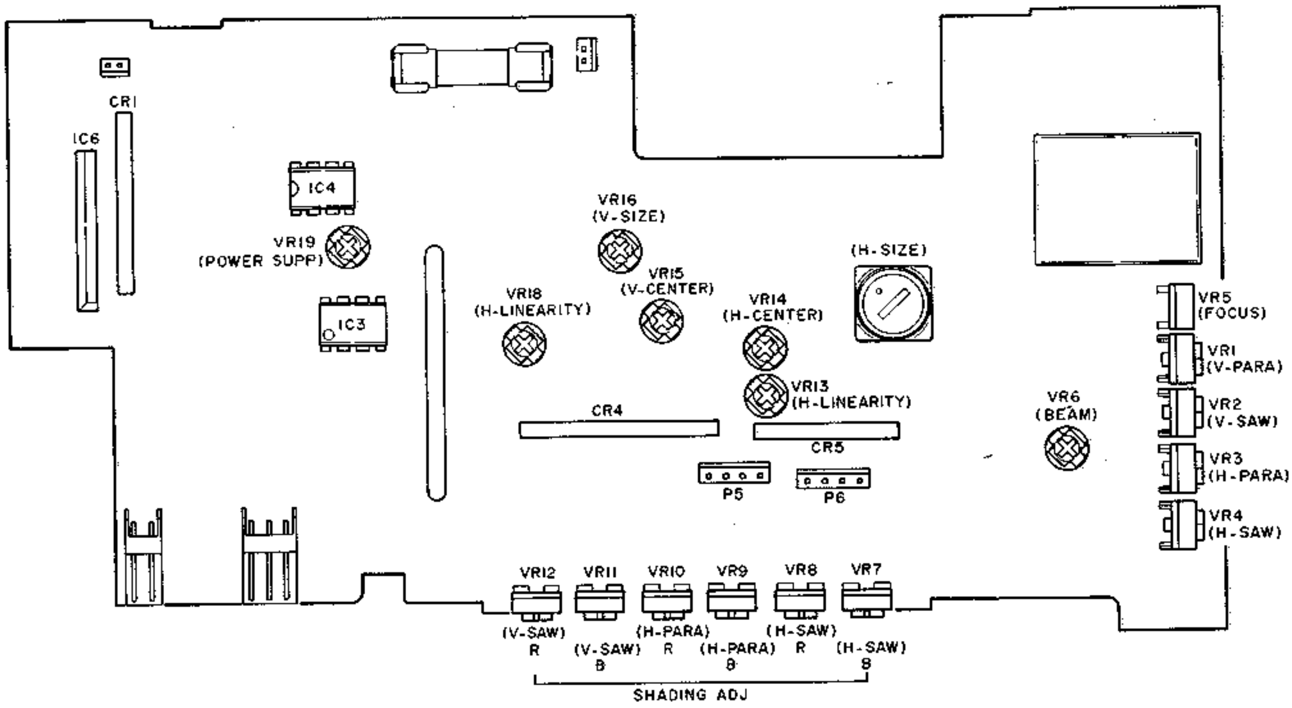


Fig. 6-4 H & D PCB Adjustment Points

2) VIDEO (1) PCB

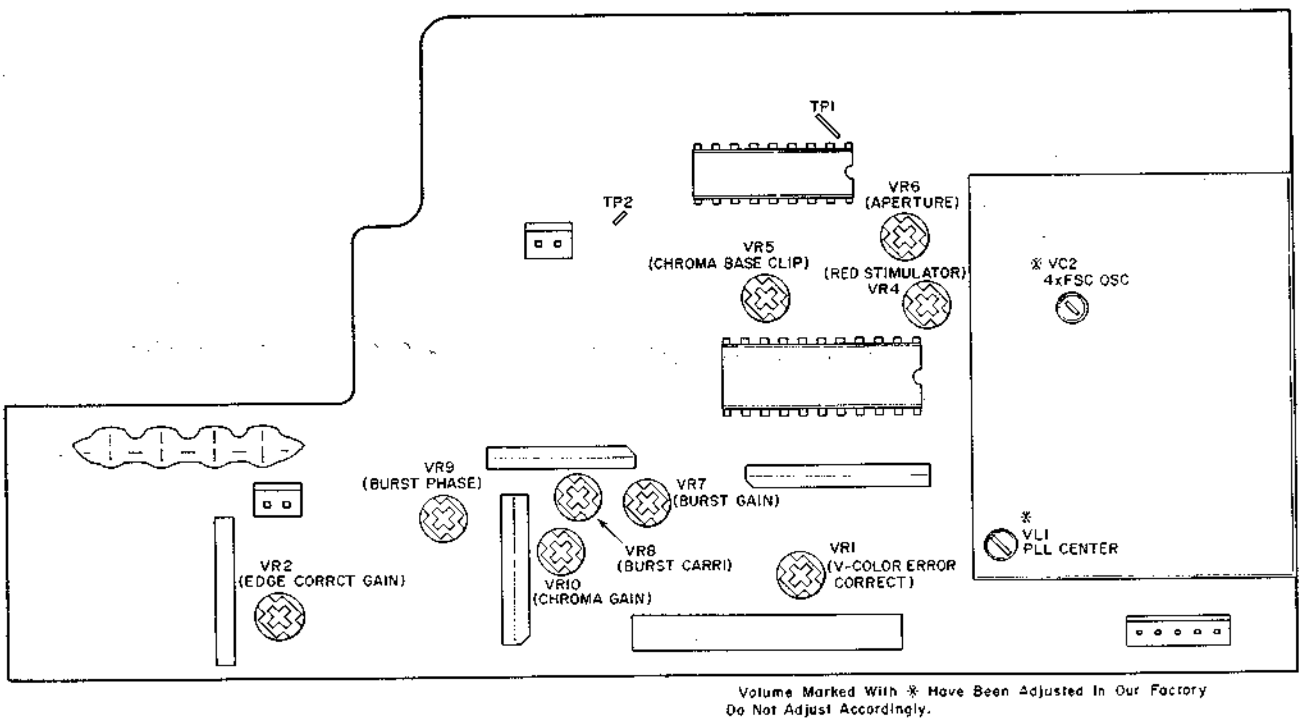


Fig. 6-5 Video (1) PCB Adjustment Points

3) VIDEO (2) PCB

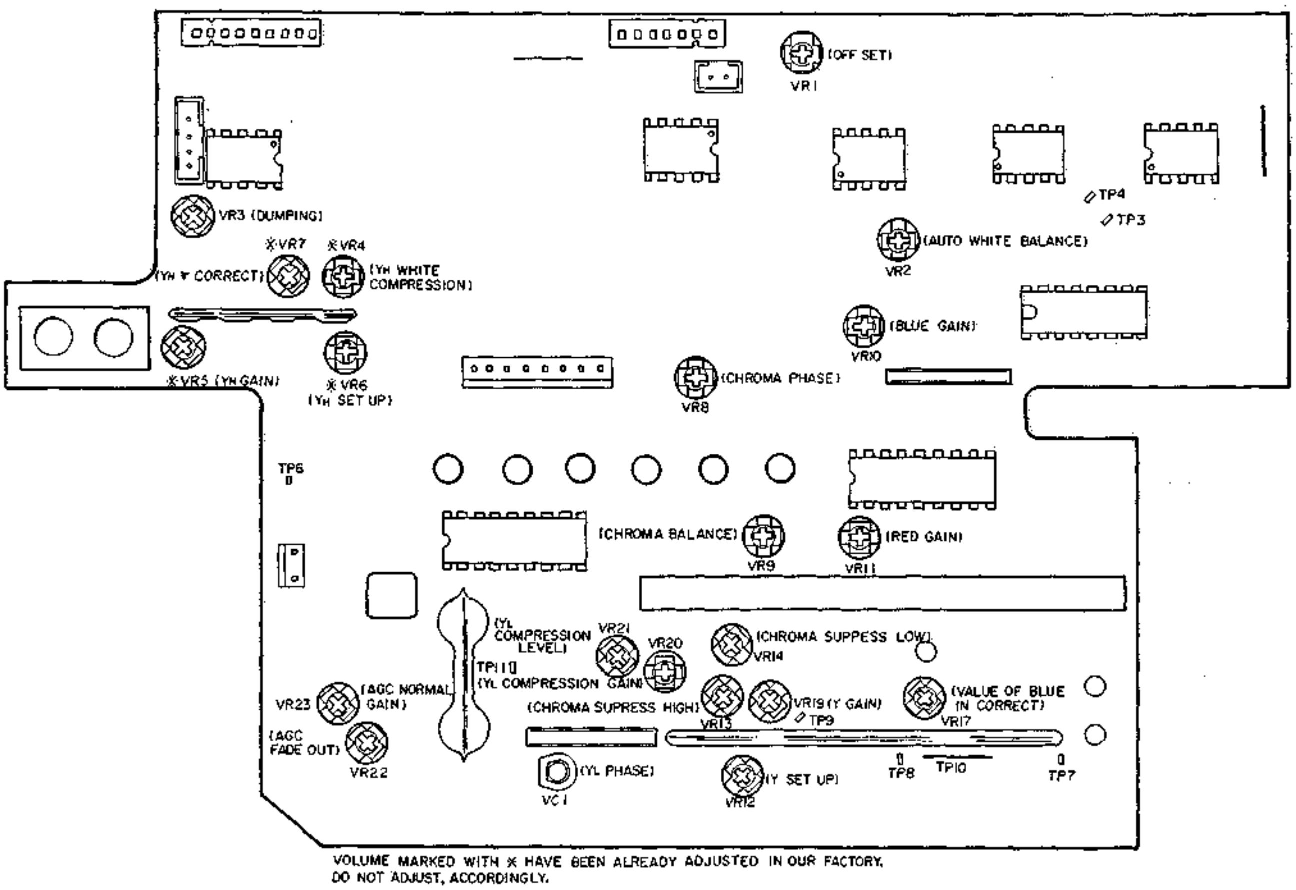


Fig. 6-6 Video (2) PCB Adjustment Points

4) PANEL PCB

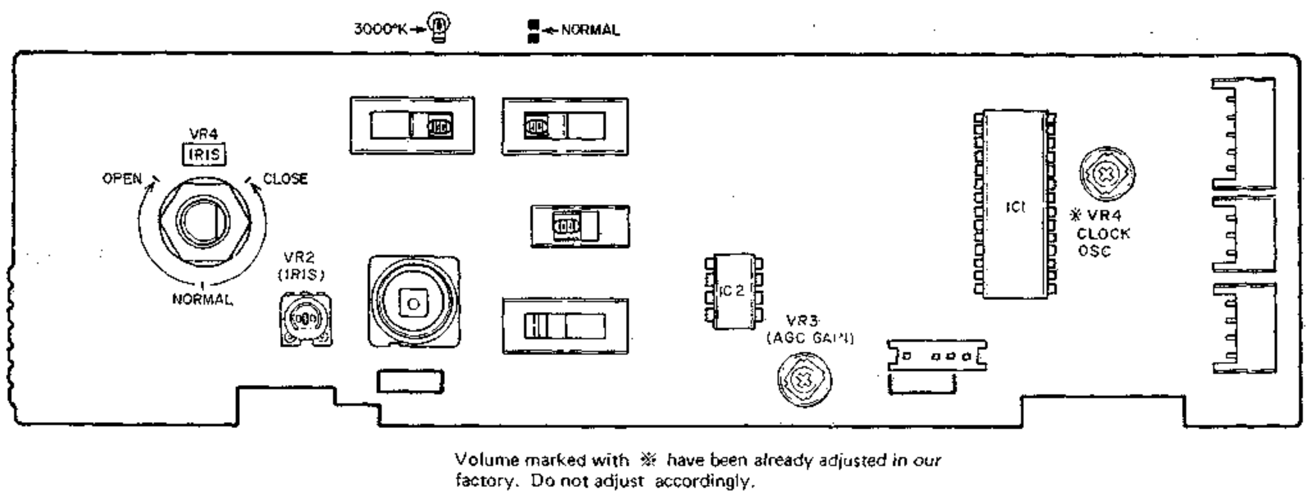


Fig. 6-7 Panel PCB Adjustment Points

5) MECHANICAL ADJUSTMENT POINTS

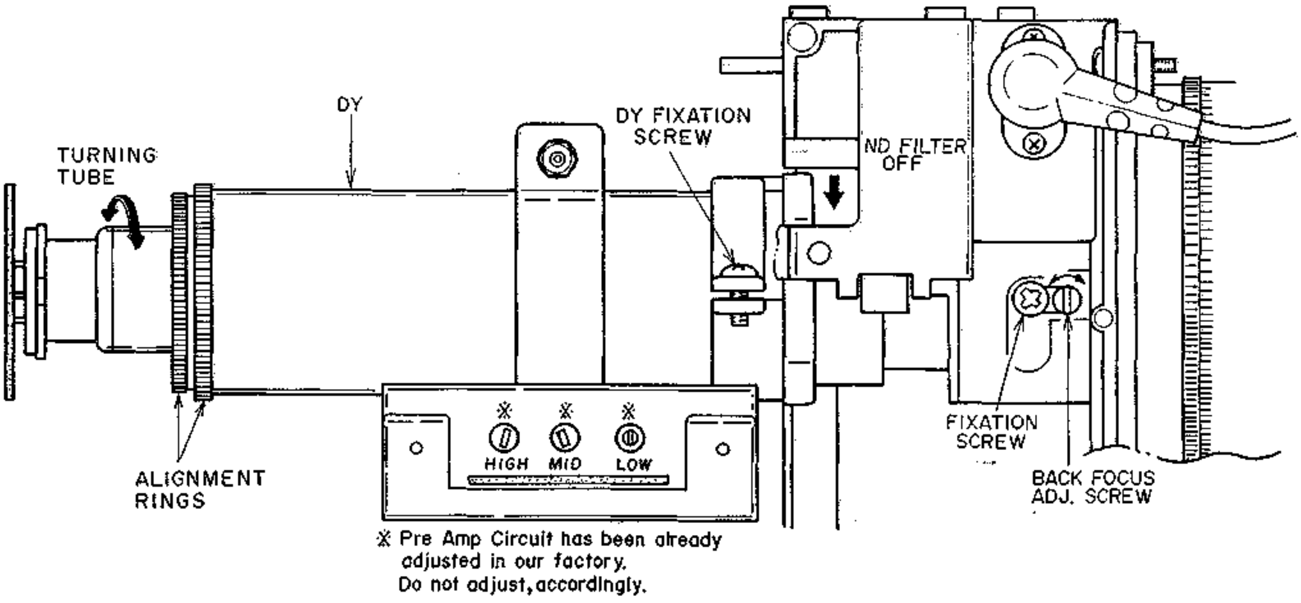


Fig. 6-8 Mechanical Adjustment Points (Right Side)

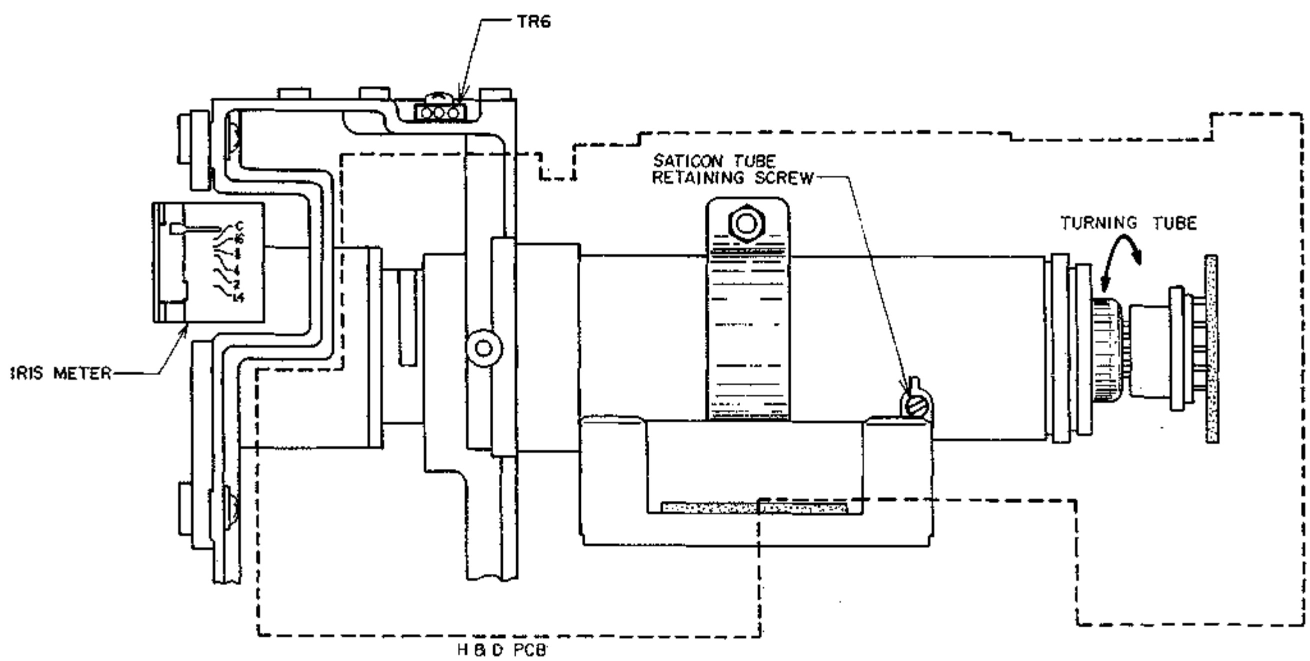
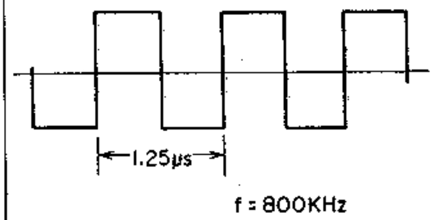
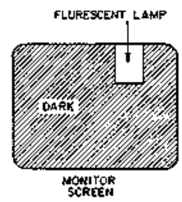
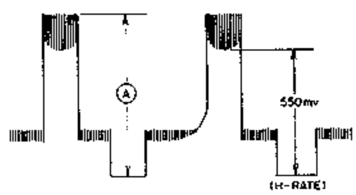
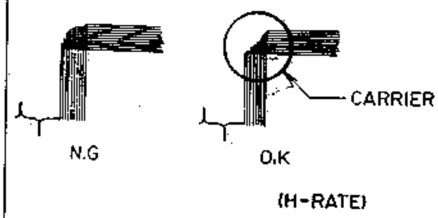
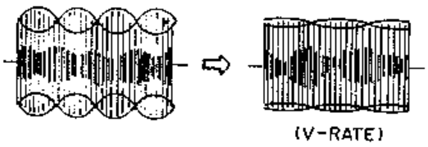
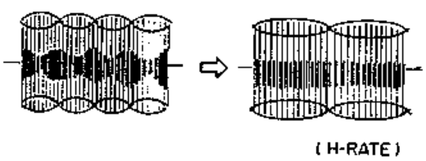
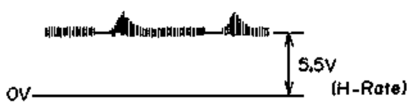
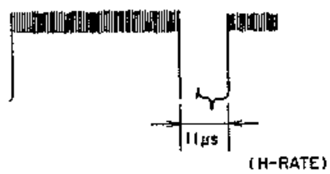
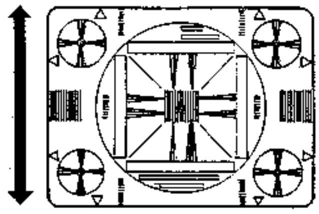
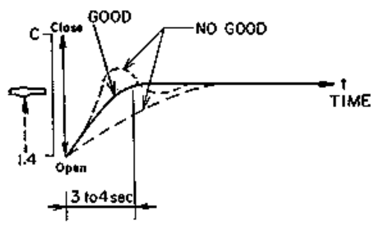


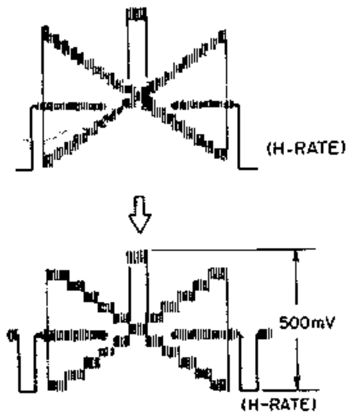
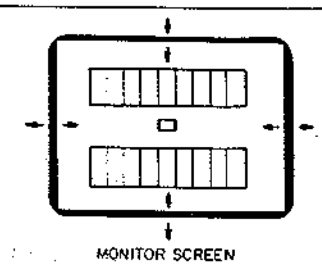
Fig. 6-9 Mechanical Adjustment Points (Left Side)

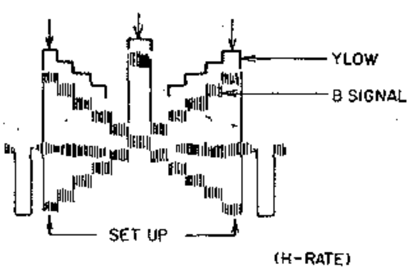
Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
1	Setting					Set each switch to proper position IRIS CLICK (NORMAL) NEGA/POSI SWITCH NORMAL WHITE BALANCE SWITCH (3000°K) AUTO-FOCUS SWITCH MANUAL ND FILTER OFF VTR SELECTOR SWITCH 3
2	DC Power Supply			Power TR TR6 (Collector) Refer to the Fig. 6-9)	VR19 (DC Power supply) H & D PCB	Connect DC Digital Voltmeter between TR6 (Collector) and GND. Adjust VR19 so that the Digital Voltmeter Readings 9.00V.
3	Clock osc frequency check			IC2 Pin ⑤ panel PCB	VR4 (clock osc) panel PCB	 1. Connect an oscilloscope between pin ⑤ of IC2 (MP4523) and GND. 2. Adjust VR4 so that the waveform becomes as shown above.
4	Beam	Fluorescent lamp or Bright object	Open	TP6	VR6 (Beam) H & D PCB	  Adjust VR6 so that saturation level of the output waveform is 550 mV. * If level A is more than 709 mV, adjustment of above is set to 500 mV.
5	Checking for dirt	White	Open	Monitor screen		Upon replacement of the saticon tube, make certain that there is no adhering dirt or dust.
6	Target voltage			Connector P5 pin 3 (target out pin) of the H & D PCB	Confirmation	Connect digital voltmeter between connector (P5 pin ③) of the H & D PCB and GND, confirm the Digital Voltmeter Readings is within 50V ±3V.

Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
7	Turning tube	White		TP6 Video (2) PCB IC6 Pin 3 Video (2) PCB	Saticon tube (Loosen retaining screw VR16 (V-size) H & D PCB Saticon tube	 1. Turn the tube so that the carrier waveform minimum, as shown above. [V-rate]  2. Adjust VR16 (V-size) so that the Beat is minimum. [H-rate]  3. Turn the tube again so that the Beat is minimum.
8	Horizontal adjustment	Resolution		Monitor screen	Deflection coil	1. Loosen retaining screw of the Deflection coil and turn the Deflection coil so that the picture is made level. 2. After this tighten the retaining screw.
9	FOCUS	White	5.6	TP6 Video 2 PCB	VR5 (Focus) H & D PCB	 Adjust so that the modulated wave in the waveform becomes maximum.

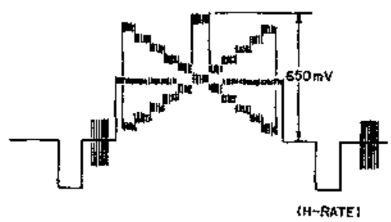
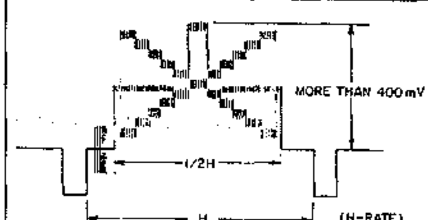
Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
10	Back focus			Monitor screen	Back focus adjustment screw	1. Set the Focus ring to " ∞ ", Zoom to WIDE, and then shoot a distant object. 2. Loosen the fixation screw and adjust Focus by means of the adjusting screw. 3. Zoom to TELE and Focus by means of the Focus ring. 4. Zoom ONCE again to WIDE and adjust to get the right Focus by means of the adjusting screw. 5. Repeat the above step 1 through 4 until the object focused upon zooming to WIDE is found to be still in focus upon zooming to TELE. After this tighten the fixation screw.
11	H deflection	White		Connect linearity checker input to TP6 (Video (2) PCB) and its output to oscilloscope.	L1 (H-size) VR13 VR18 (H-linearity) H & D PCB	  Obtain an average output of 5.5V by means of L1, adjust VR13, and VR18 alternately to flatten the waveform. Repeat the adjustment until the satisfactory results are obtained.
12	H center	White		TP6	VR14 (H-center) H & D PCB	 Adjust VR14 so that the rising edge of the video signal is 11 μs from the start of the blanking period.

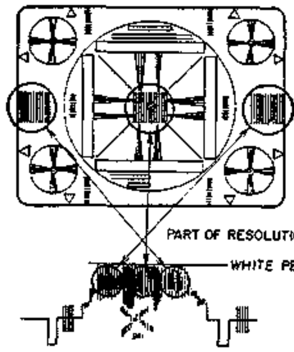
Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
13	V deflection	Resolution		Monitor screen	VR16 (V-size) H & D PCB	 1. Zoom up so that the right-hand wedges for H-direction are as near to the edge of the monitor screen as possible. Note that the left-hand wedges must be hidden by the black mask. 2. Adjust by means of VR16 so that the wedges for V-direction are as near to the edges of the monitor screen as possible.
14	V center	Resolution		Monitor screen	VR15 (V-center) H & D PCB	Zoom to TELE and adjust the camera direction so that the center of the pattern is at the center of the monitor screen. Zoom to WIDE and adjust VR15 so that the center of the pattern coincides with the center of the monitor screen.
15	Beam				Readjust step 3	
16			Click (Normal position)	TP6 Video 2 PCB	VR2 (Iris set) panel PCB	 1. Set the IRIS to click position and adjust VR2 so that the white peak (Center) stands at 150 mV.
			Open		VR3 (Damping) Video 2 PCB	 2. Turn VR3 counterclockwise from parts side all the way and set IRIS to open, pick-up Gray scale interrupt light with hand. (Iris Open), and the EXPOSE to light. At this time adjust VR3 so that the IRIS METER moved like figure in above.
			Click (Normal position)			3. Set the IRIS to click position again, and check level 1 (150 mV at center peak).

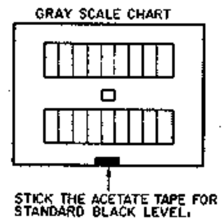
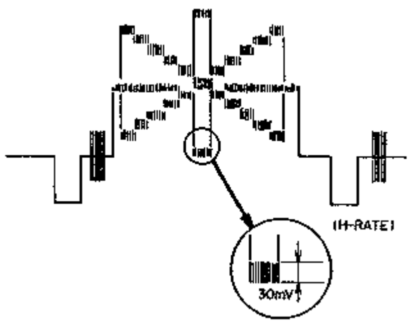
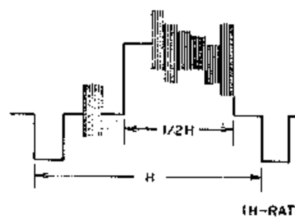
Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
17	B signal	Gray scale	Click (Normal position)	TP8	VR8 (Phase) VR9 (Balance) VR10 (B-gain) Video (2) PCB	 1. Adjust VR8 and VR9 alternately so that a satisfactory staircase waveform is obtained. 2. Adjust VR10 so that the shite peak (Center) stand at 500 mV.
18	R signal	Gray scale	Click (Normal position)	TP7	VR11 (R-gain) Video (2) PCB	 1. Confirm a satisfactory staircase waveform is obtaind. 2. Adjust VR11 so that the white peak (Center) stands at 500 mV.
19	Alignment	Gray scale		Monitor screen	Alignment ring	 1. Adjust the alignment ring so that the black portions along the edges of lthe monitor screen do not move vertically/horizontally when VR5 (focus) is adjusted on the pannel PCB.

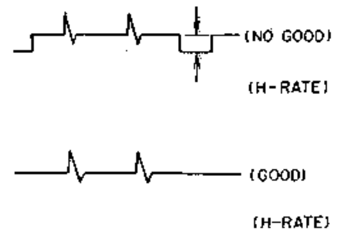
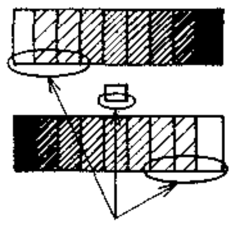
Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
20	Dynamic focus	White	F5.6	Monitor screen	 VR5 (Focus) VR3 (H-para) VR4 (H-saw) VR2 (V-saw) VR1 (V-para) H & D PCB	* Set all of the shading adjustments VR7 through VR12 (H & D PCB) at the center. 1. Adjust VR5 to reduce the green portion in the picture so that a "magenta" picture can be obtained. 2. Adjust VR3 to correct the color on either side and near the center. 3. Adjust VR4 to correct the color in horizontal direction. 4. Adjust VR2 to correct the color in vertical direction. 5. Adjust VR1 to correct the color near the center and in vertical direction. **Example:** Turn VR5 until unevenness in color in the circumference is minimized. During the adjustment, the center portion of the picture will become greenish, which must be controlled by means of VR3.
21	B signal	Readjust step 16				
22	R signal	Readjust step 17				
23	Y-low	Gray scale	Click (Normal position) Open	TP10 TP8 (B signal) TP10 (Y_L-signal) Video (2) PCB	VR19 (Y_L-gain) Video (2) PCB VR20 (Y_L-WHT) compression gain) VR21 (Y_L-WHT) compression level) Video (2) PCB	 1. Set IRIS to click (Normal) position and adjust VR19 so that the white peak (Center) stand at 500 mV.  2. Set IRIS to open, and compare with TP8 (B-signal) waveform, and turn VR20 and VR21 until waveform is flattened similar to TP8 (B-signal) waveform. Note: "Phase shift" will result if done excessively.

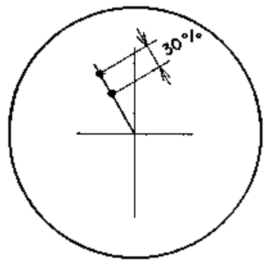
Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
			Click (Normal position)		VR12 (Set-up) Video (2) PCB	3. Set IRIS to click (Normal) position, and adjust VR12 so that the rising curve obtained is identical to the one with TP8 (B-signal).
24	Shading	Gray scale	Click (Normal position)	TP10 (YL-signal) TP8 (B-signal) Video (2) PCB	 VR10 (B-gain) Video (2) PCB VR9 (H-para) VR7 (H-saw) V11 (V-saw) H & D PCB VR11 (R-gain) Video (2) PCB VR10 (H-para) VR8 (H-saw) VR12 (V-saw) H & D PCB	1. Adjust VR10, VR9, VR7 and VR11 so that TP10 (YL signal) and TP8 (B-Signal) are same. VR10 → Total size of the waveform. VR9 → Linearity of the staircase waveform. VR7 → Incline of left and right. VR11 → Incline of left and right at V rate. 2. Adjust the follwing VRs so that the TP10 (YL-signal) waveform becomes identical to the TP7 (R-signal) waveform. VR11 → Total size of the waveform. VR10 → Linearity of the staircase waveform. VR8 → Incline of left and right. VR12 → Incline of left and right at V rate. After finishing above adjustments, pick-up white pattern, and check color phase irregularity. If it is found, take step again.
25	H center				Readjust step 13	
26	YH white compression				VR4 (YH-WHT compression) Video (2) PCB	* Do not tamper with this adjustment (VR4), since it is factory adjusted by a PCB tester. If it is tampered with, turn it completely counterclockwise because it is originally set to almost maximum position.

Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
27	White balance	Gray scale		TP2 Video (1) PCB	VR10 (B-gain) VR11 (R-gain) VR12 (YL-set up) VC1 (YL-phase) Video (2) PCB	1. Adjust VR10 and VR11 so that the modulated carrier wave is minimized.  Upper side: adjust by means of VR10 and VR11. Lower side: Fine-adjust by means of VR12. 2. Adjust VC1 while wathcing screen so that smear from white to black (fall) and from black to white (rise) will be minimized.
28	AGC	Gray scale		TP2 Video (1) PCB	VR3 (AGC gain) Panel PCB VR22 (AGC fade out) Video (2) PCB	 1. Turn IRIS slightly toward OPEN from "Click" position, and adjust VR23 so that the video output signal is available at 650 mV. 2. Reset IRIS to "Click" position and adjust VR3 so that the video output signal is 650 mV. 3. Set tha fade-out switch to ON to cause the picture to disappear on the monitor screen, and then adjust VR22 so that 7.0V is made available at pin 4 of IC5 (AN-6022).
29	Y-Sensitivity check	Grat scale	Click (Normal position)	TP2		 1. Set IRIS to "Click" position. 2. Adjust the field angle so that the waveform of the video output is as shown above. 3. Set the ND filter to ON position. 4. Verify that the center white peak level is 400 mV or more. 5. If less than 400 mV, re-adjust or change the Saticon tube.

Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
30	Aperture	Resolution chart	Click	TP2	VR6 (Aperture) Video (1) PCB	1. Set IRIS to "Click" position. 2. Adjust the field angle so that "full-size" can be obtained with respect to V-size. Try to attain the best in-focus condition. 3. Watching the TP2 (video ouput) waveform, adjust VR6 so that the peak of the modulated wave corresponding to a resolution of 200 lines coincides with the white peak. 
31	Chroma supress	Gray scale		TP2	VR13 (Hi-clip) Video (2) PCB VR5 (Chroma base clip) (Hi-clip)	1. Turn VR5 all the way clockwise. 2. Set IRIS so that the video output is 800 mV, and adjust VR13 so that a little of the white peak (Center, B point) is cliped. 3. Further, shoot an ordinary picture and verify that colors are all reproduced properly.
32	Chroma phase	Color bar		TP2	VR9 (Burst phase) Video (1) PCB VR17 (B-correct) Video (2) PCB	1. Connect the vector scope between video output (TP2) and GND. 2. Adjust VR9 and VR17 so that the chroma phase is in correct position.

Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
33	Chroma gain	Color bar	Click	TP2	VR10 (Chroma gain) Video (1) PCB	1. Set IRIS to "Click" position. 2. Adjust the field angle so that "Full Size" can be obtained. 3. Adjust VR10 so that a yellow vector is within the ⊕ mark on a vector scope. 4. Then, verify that the subcarrier waveform is not saturated at all hues on an oscilloscope.
34	Chroma low supress	Gray scale	Clip (Normal position)	TP2 Video (1) PCB	VR5 (Base clip) Video (1) PCB VR14 (Chroma supress low) Video (2) PCB	  1. Set IRIS to "Click" position. 2. Turn VR5 (chrom base clip) clockwise to "OFF" 3. Adjust VR14 so that the carrier component on the reference black level is made available at 30 mV p-p. * If less than 30 mV p-p, slight clipping is required.  4. Adjust the fields as illustrated above. 5. Set the ND filter to ON position. 6. Verify that the colors B and G do not disappear completely. Note: If B and G have disappeared, check Y-sensitivity, etc. once again, and readjust or change the Saticon tube.

Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
35	Vertical color error correction	Gray scale		FL-1 "hot" side Video (1) PCB	VR1 (V-color error correct) VR2 (Edge correct gain) Video (1) PCB	 1. Confirm the correction signal is balanced as shown above.  2. Adjust VR2 so that colored shades are no more present in the straight portions. 3. Shoot an ordinary scene and verify that the picture is free from an edge error (color missing in particular). ***Note:** When a return is made to the previous step after completion of the adjustment, be sure to set VR2 to OFF (the top to GND).
36	Burst	Gray scale		TP2 Video (1) PCB	VR7 (Brust gain) VR8 (Burst carri balance)	 1. Adjust VR17 so that the Burst level is 0.3V p-p, as shown above.  2. Adjust VR8 so that the Carrire leak is minimum as shown above.

Step	Adjustment Item	Pattern	Iris	Test Point	Adjustment Point	Result & Remarks
37	Red stimulator	Color bar		TP2 Video (1) PCB	VR4 (Red stimulator) Video (1) PCB	 1. Connect a vector scope between video output (TP2) and GND. 2. Set white balance selector S.W. to (5500°K) position and put on the lens filter W12. 3. Watching the vector scope, adjust VR4 so that red level is increased 130%.
38	Assembling					
39	White balance	1. Perform Step 26 (check or readjust). 2. Other associated checking.				

Note:
The follwing adjustments are made at the factory using a printed circuit board tester.
If readjustment becomes necessary or VRs, etc. are turned inadvertently, then necessary adjustments should be made as follows:

1. Video (1) PCB VC2 (4 × fsc)
Adjust VC2 so that the subcarrier at pin ③ or ⑤ of IC2 (TC4049BP) is :
3.57945 MHz ± 50 Hz (NTSC Model), or
4.433619 MHz ± 50 Hz (PAL Model).

VL1 (PLL Center)
Adjust VL1 so that 3.5V is made available at pin ⑤ of IC1 (HD440072).

VR5 (Chroma Base Clip)
Turn VR5 all the way counterclockwise (as viewed from the parts side) and set there.

2. Video (2) PCB
VR1 (Off Set)
VR2 (AW Balance)
Darken AW sensor, measure TP4 with digital voltmeter, and take the measured value as "X", then measure TP3 with digital voltmeter, and adjust VR1 to "X" + 10 mV. Then bring the sensor close to light box, put lens filter C2 on, and adjust VR2 until the voltages on TP3 and TP4 agree.

VR4 (Y_H White Compression)
Turn VR4 completely clockwise (as viewed from the parts side) and set there.

VR5 (Y_H Gain)
Turn VR5 all the way counterclockwise (as viewed from the parts side) and set there.

VR7 (Y_N γ)
Turn VR7 completely clockwise (as viewed from the parts side) and set there.

3. Pre-Amp PCB
1) VC2
Shoot the APL 20 percent pattern and connect an oscilloscope to the TP6.
Adjust VC2 so that the carrier which part of falling down (White to Black) is flat.

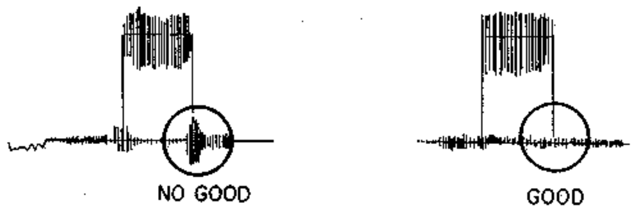


Fig. 6-10

2) VC1
Shoot the APL 20 percent pattern and connect an oscilloscope to the TP6. Adjust VC1 so that the component of Low frequency which part of falling down (White to Black) is flat.

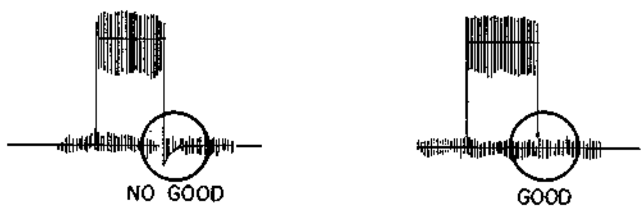


Fig. 6-11

3) VR1
Shoot the Resolution pattern and watching the monitor screen. Adjust VR1 so that the Resolution 200 lines are clear, and then adjust white Balance (step 27)

3. ADJUSTING THE EVF BLOCK

To adjust the EVF Block, it is necessary to connect it to the camera body that has been thoroughly adjusted.

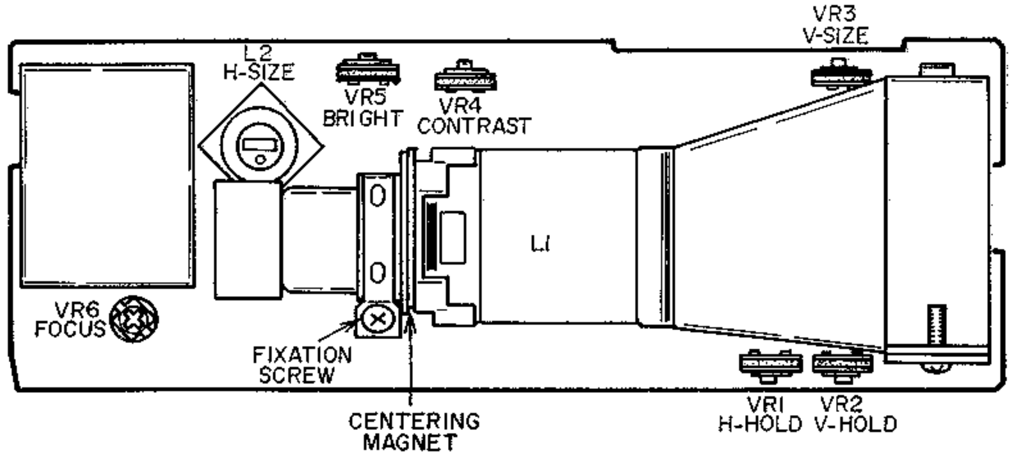
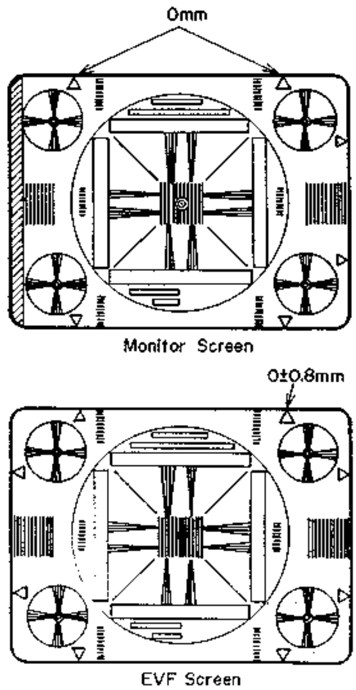
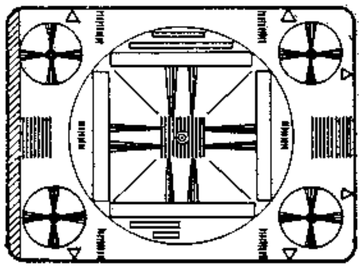
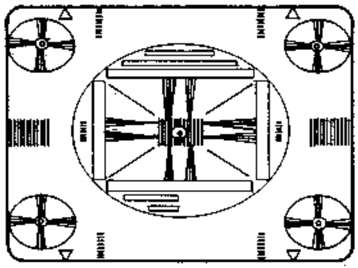
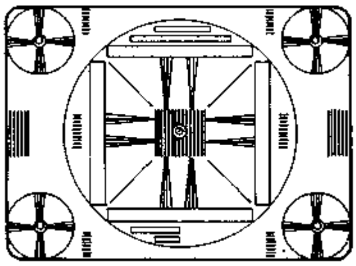
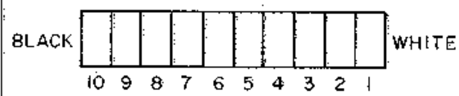


Fig. 6-12 EVF Block

Step	Adjustment Item	Pattern	Test Point	Adjustment Point	Result & Remarks
1	H-Hold	Resolution	EVF screen	VR1 (H-hold)	Fix at point at which the picture synchronizes into one picture.
2	V-Hold	Resolution	EVF screen	VR2 (V-hold)	Fix at position at which the picture is stationary.
3	CRT yoke	Resolution	Monitor screen EVF screen	L1 (DY)	 Set the camera so that the wedges found in the upper and lower portions of the pattern align with the boundary of the monitor screen. Then, turn the zoom ring to bring the wedges onto the boundary of the EVF screen, at which time the deflecting yoke must be adjusted so that a picture slope of 0 ± 0.8 mm is obtained.

Step	Adjustment Item	Pattern	Test Point	Adjustment Point	Result & Remarks
4	H deflection size & V deflection Size	Resolution	Monitor screen & EVF screen	L2 (H-size) VR3 (V-size)	 (a)Monitor Screen  (b) EVF Screen  (c)EVF Screen 1. Set the camera so that the wedges under each side of the pattern align with the boundary of the monitor screen. 2. It is also necessary to make the following adjustment so that 85% ± 5% of the resolution pattern is displayed on the EVF screen. 3. Adjust L2 (H-deflection size) so that the pattern displayed is as shown in (b) above. 4. Adjust VR3 (V-deflection size) so that the circles within the resolution pattern are free of distortions. 5. Verify that the picture displayed on the EVF screen is 85% ± 5% of the picture displayed on the monitor screen.

Step	Adjustment Item	Pattern	Test Point	Adjustment Point	Result & Remarks
5	Contrast	Gray scale	EVF screen	VR4	 Adjust VR4 so that No. 9 and No. 10 of gray scale chart attached to the resolution pattern can be distinguished.
6	Brightness	Gray scale	EVF screen	VRS	Adjust VR5 to such a brightness that facilitates focusing.
7	Focus	Resolution	EVF screen	VR6	Adjust VR6 so that the highest resolution can be obtained: Verify that the resolution obtained is at least 330 lines (Horizontal) by 270 lines (Vertical).
8	Centering	Resolution	Monitor screen & EVF screen	Centering magnet	Adjust centering magnet so that the center of the resolution pattern reflected on monitor screen comes to the center of screen.

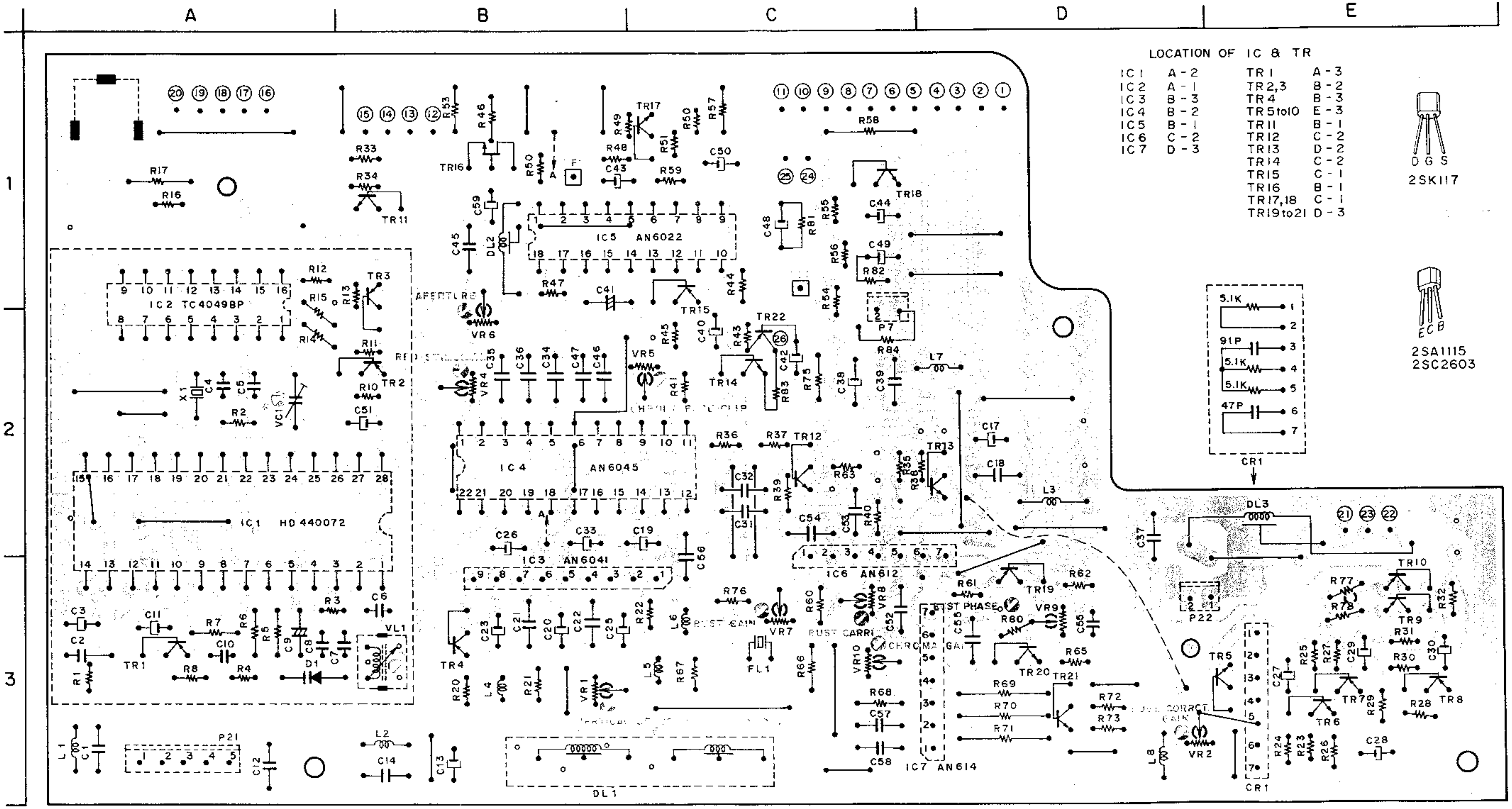
VII. CLASSIFICATION OF VARIOUS P.C BOARDS

1. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

P.C Board Title		P.C Board Number
Video (1)	P.C Board	V3004A501A
Video (2)	P.C Board	V3004A501B
Pre Amp	P.C Board	V3004A501C
AW	P.C Board	V3004A501D
H & D	P.C Board	V3004B502A
Socket	P.C Board	V3004B502B
Panel	P.C Board	V3004C5030
Fade	P.C Board	V3004D504A
Rec	P.C Board	V3004D504B
EVF	P.C Board	V3003C5040

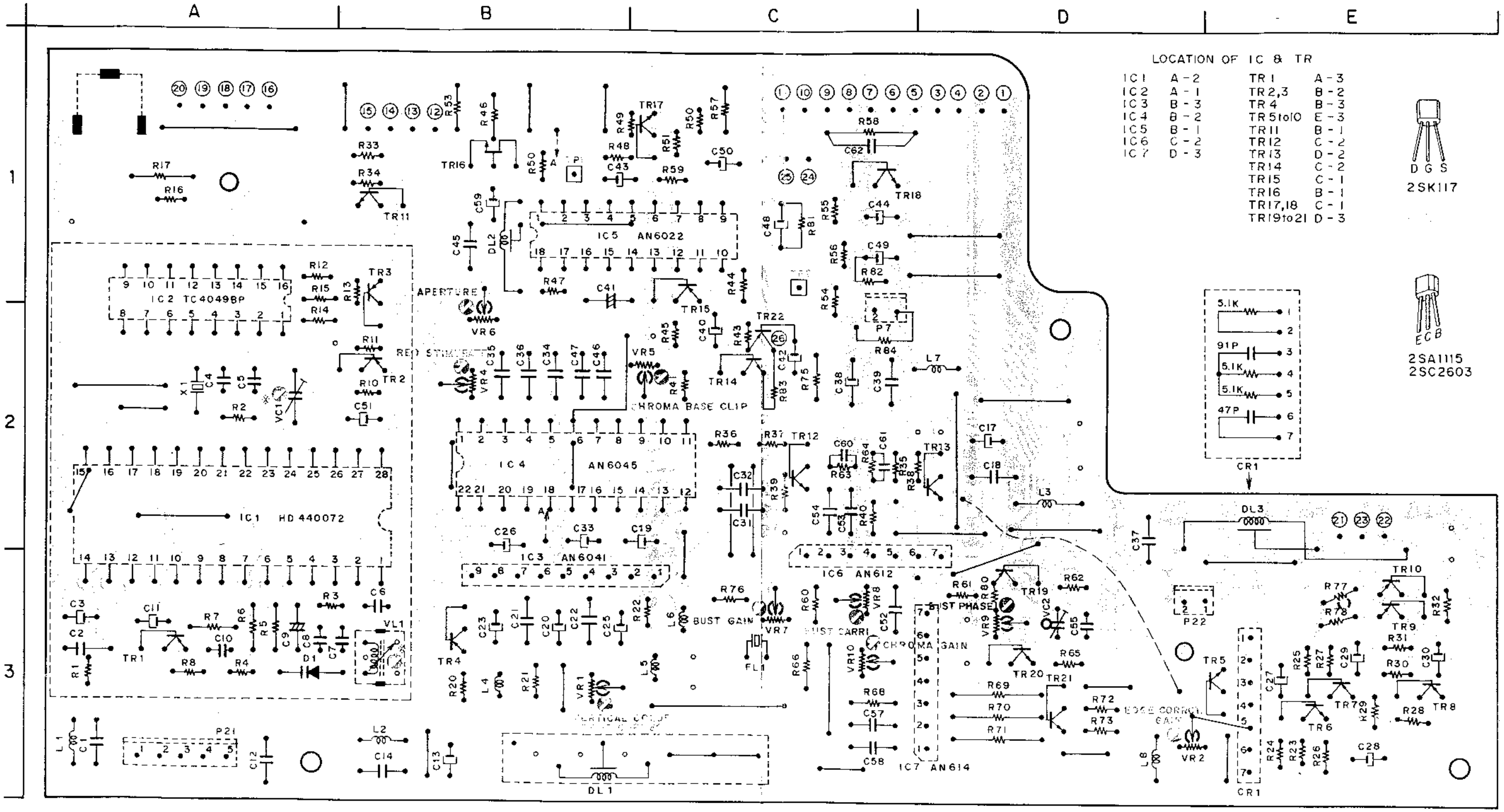
2. COMPOSITION OF VARIOUS P.C BOARDS

1) VIDEO (1) P.C BOARD V3004A501A (VC-X2E)



TR1 to 4, TR7 to 10, 15, 19 ------ 2SA1115 (E, F)
TR5, 6, 11 to 14, 17, 18, 20, 21 ------ 2SC2603 (E, F)
TR16 ------ 2SK117 (GR, BL)

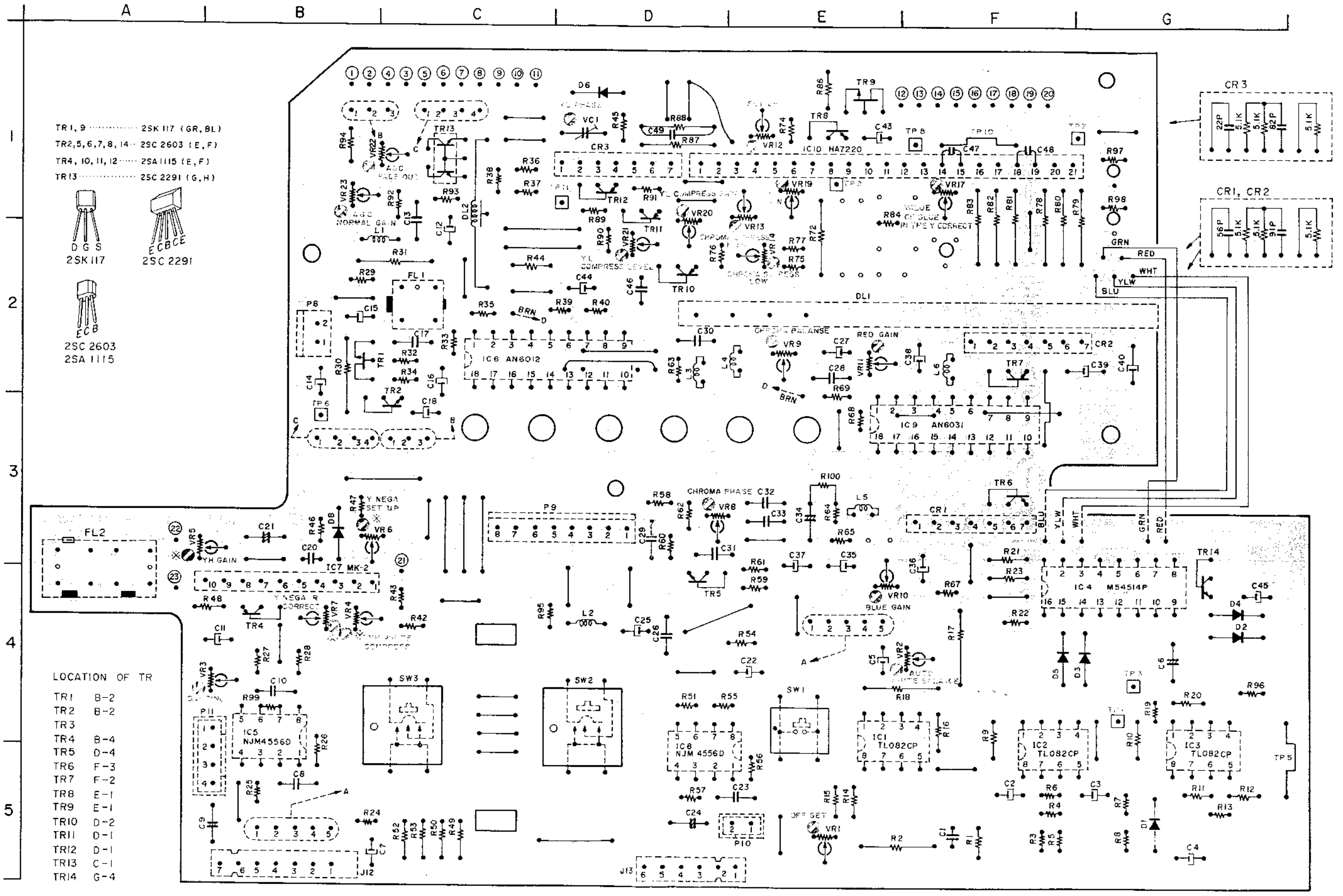
2) VIDEO (1) P.C BOARD V3004A501A (VC-X2U)



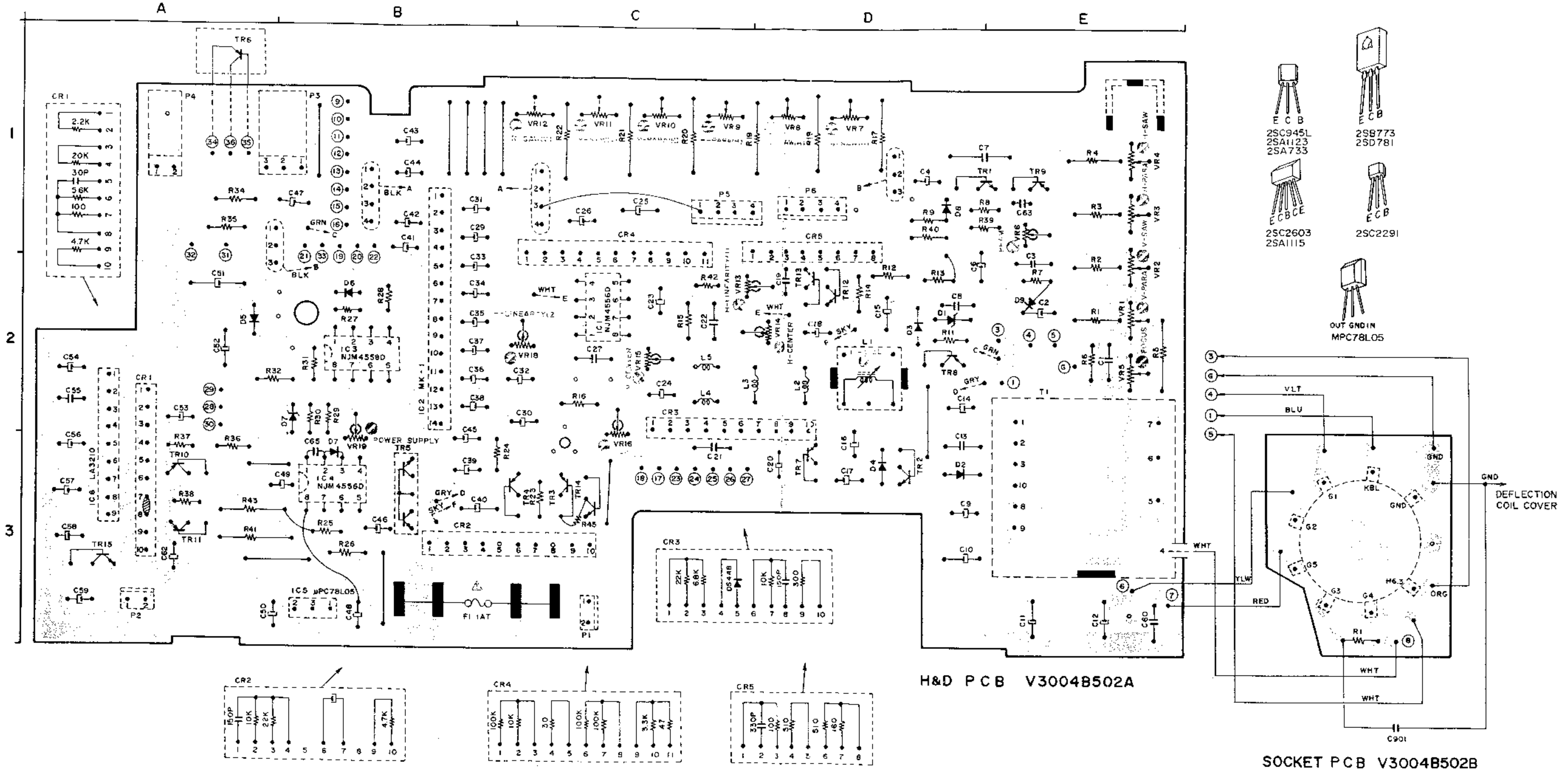
TR1 to 4, TR7 to 10, 15, 19 ------ 2SA1115 (E,F)
TR5,6,11 to 14,17,18,20,21 ------ 2SC2603 (E,F)
TR16 ------ 2SK117 (GR,BL)

… HAVE BEEN ALREA… … FACTORY. DO NOT ADJUST, ACCORDINGLY.

3) VIDEO (2) P.C BOARD V3004A501B



4) HIGH VOLTAGE & DEFLECTION (H & D) P.C BOARD V3004B502A AND SOCKET P.C BOARD V3004B502B

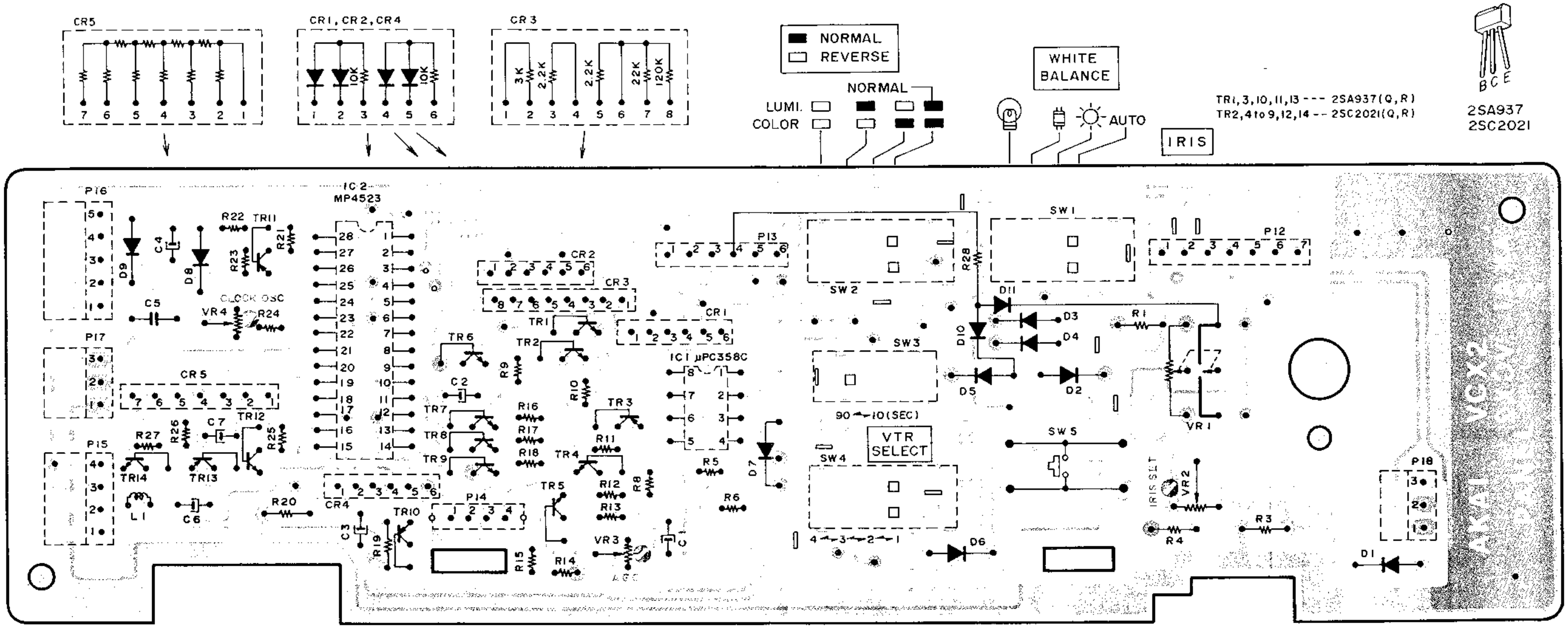


LOCATION OF TR

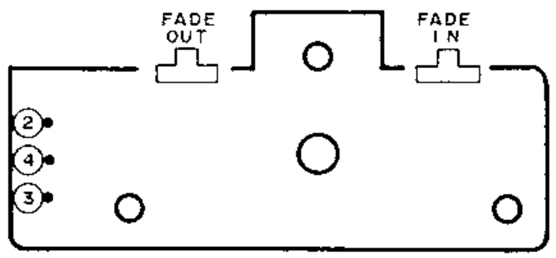
TR 1	D - 1	TR 9	E - 1
TR 2	3 - D	TR 10	3 - A
TR 3	3 - C	TR 11	3 - A
TR 4	3 - C	TR 12	2 - D
TR 5	3 - B	TR 13	2 - D
TR 6	1 - A	TR 14	3 - C
TR 7	3 - D	TR 15	3 - A
TR 8	2 - D		

TR 1, 12, 13, 14, 15 ---------- 2SC2603 (E,F)
TR 2 ---------- 2SD781
TR 3 ---------- 2SC945L (PQR)
TR 4 ---------- 2SA1123 (RS)
TR 5 ---------- 2SC2291 (F,G,H)
TR 6 ---------- 2SB772 (E,P)
TR 7, 8 ---------- 2SA733 (P,Q)
TR 9, 10, 11 ---------- 2SA1115 (E,F)

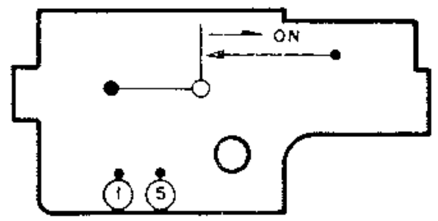
5) PANEL P.C BOARD V3004C5030, FADE P.C BOARD V3004D504A, REC P.C BOARD V3004D504B AND AW P.C BOARD V3004A501D



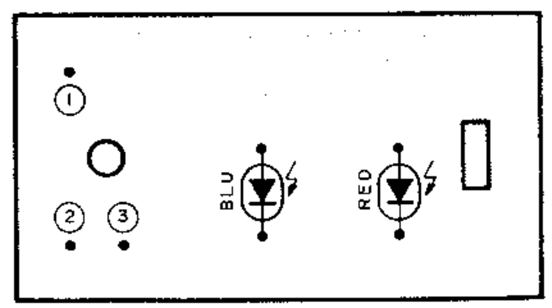
PANEL P.CB V3004C5030



FADE PC BOARD V3004D504A

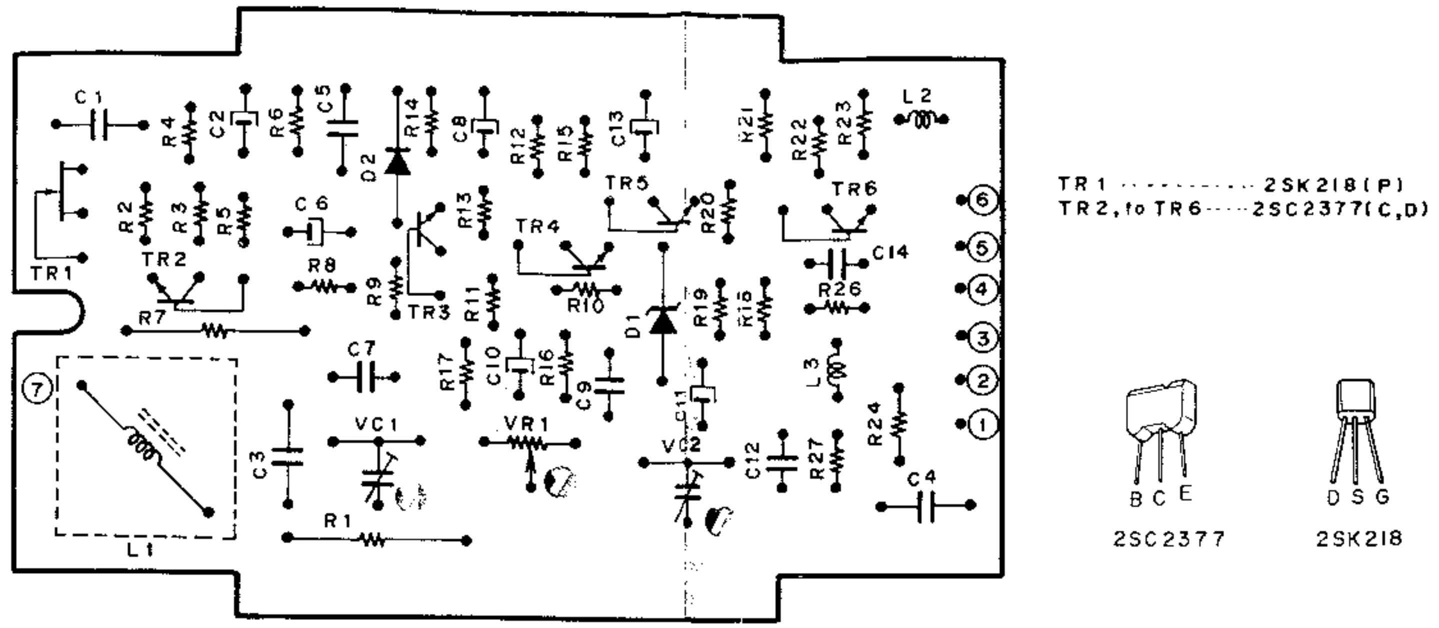


REC PC BOARD V3004D504B

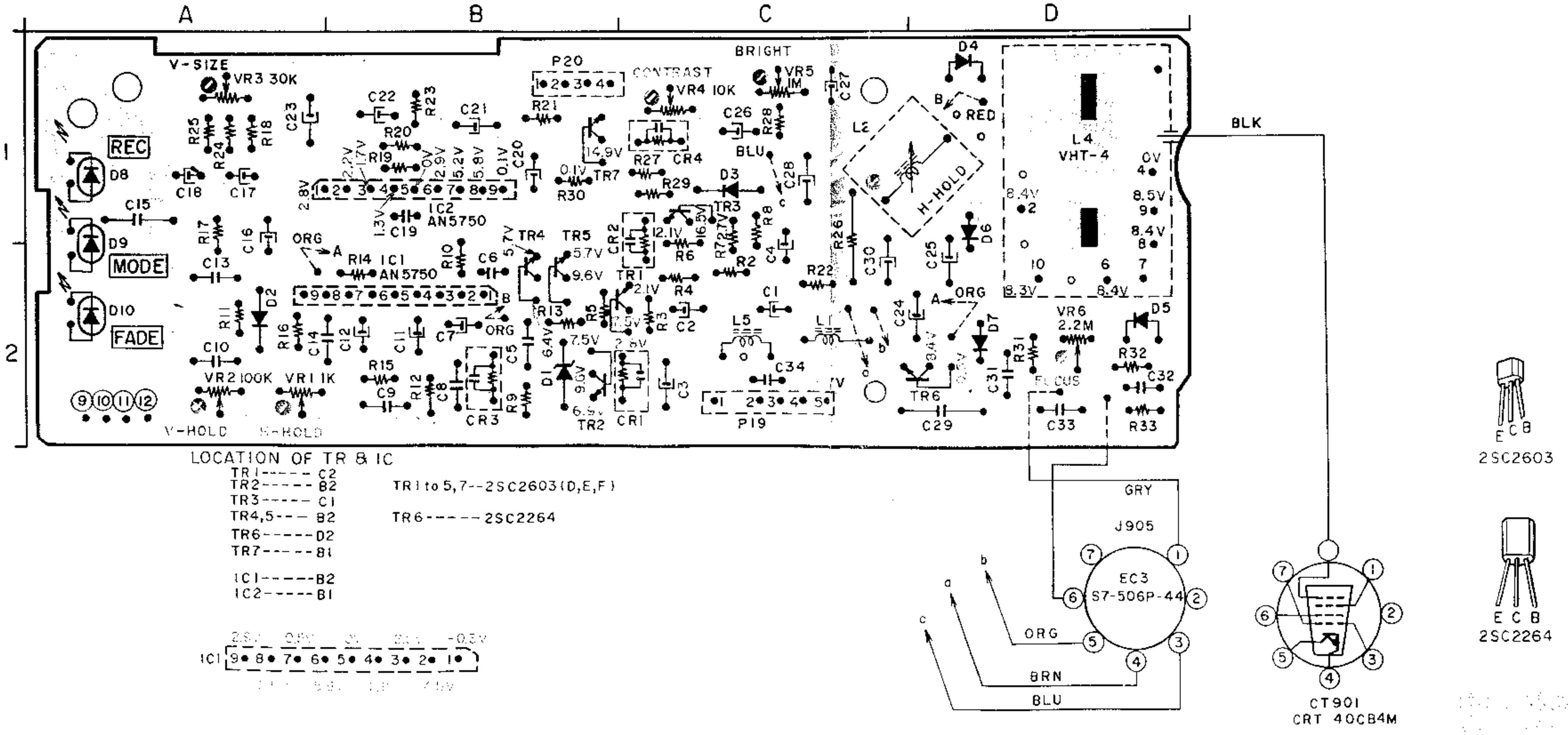


AW PC BOARD V3004A501D

6) PRE AMP P.C BOARD V3004A501C



7) EVF P.C BOARD V3003C5040



MEMO

MEMO

SECTION 2

PARTS LIST

TABLE OF CONTENTS

Please refer to COMMON LIST FOR SERVICE PARTS, for Resistor and Capacitor which are not listed in this parts list.

ATTENTION

1. When placing an order for parts, be sure to list the parts no. model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Parts List may be partially changed, please use this parts list for all future reference.

HOW TO USE THIS PARTS LIST

1. This Parts List shows the parts that are considered necessary for repairs. Other parts, such as resistors and capacitors, are shown in the "Common List for Service Parts". Select and order such parts from the "Common List for Service Parts".
2. The Recommended Spare Parts shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not be supplied in principle.
4. How to read list

a) Mechanism Block

2. HEAD BASE BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1x	BH-T2023A320A	HEAD BASE BLOCK GX-F66R
2-2	HP-H2206A010A	HEAD R/P PR4-8FU C
2-3	ZS-477876	PAN20x03STL CMT
2-4	ZS-536488	BID20x08STL CMT
2-5	ZG-402895	CS ANGLE ADJUST SPRING

- SP (Service Parts) Classification
- A small "x" indicates the inability to show that particular part in the Photo or Illustration.
- This number corresponds with the individual parts index number in that figure
- This number corresponds with the Figure Number

b) P.C Board Block

6. SYS. CON. P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
6-1	BA-T2034A070A	PC SYS CON BLK GX-F44R
6-IC1	EI-324536	IC HD14049BP
6-IC2	EI-336801	IC MB8841-564M
6-IC3	EI-331661	IC SN7405N
6-IC4	EI-336725	IC M54527P
6-TR1to4	ET-200985	TR 2SC2603 F,G
6-TR5to28	ET-554657	TR 2SA733A P,Q
6-D1	ED-318292	D SILICON H 1S2473T-77 T26
6-D2to4	ED-308952	D GERMA V 1K34A-LR F07
6-D5to10	ED-318292	D SILICON H 1S2473T-77 T26
6-X1	EI-318384	OSC X'TAL NC-18C 3.579545MHZ

- SP (Service Parts) Classification
- This reference numbers corresponds with symbol numbers of Schematic Diagrams.

5. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List. It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index.

WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT

⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SURETE POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

REF. NO.	PARTS NO.	DESCRIPTION
1	BM-307613	⚠ MOTOR T16056-M0827Y
2	EC-332222	C S-FIX H TZ03R300E 5.2-30
3	EC-307634	C S-FIX V ECV-1ZW10×60
4	ED-201967	D LED LN26RP RED
5	ED-201968	D LED LN36BP GRN
6	ED-201969	D LED LN46YP ORG
7	ED-300143	D PHOTO BS-500B
8	ED-301911	D SILICON H DS448
9	ED-200212	D SILICON H DS448F×2 F07
10	ED-522472	D SILICON HF-1Z 200/0.6A
11	ED-309859	D SILICON RH-1S 600/0.2A
12	ED-523618	D SILICON SF-1-8 800/0.2A
13	ED-306732	D SILICON S5277D 200/1.0A
14	ED-200468	D SILICON V DS448-VB6
15	ED-307645	D VARACTOR 1S2688
16	ED-310025	D ZENER H HZ6L A2
17	ED-307752	D ZENER H HZ6L B2
18	ED-307690	D ZENER H HZ7L A1
19	EF-318608	⚠ FUSE GGS A 250V 1A (C, A) (F1)
20	EF-309387	⚠ FUSE TSC A 250V 1A (J)(F1)
21	EF-623103	FUSE SEMKO T 250V 1A (VC-X2E) (F1)
22	EI-341521	DL DL102151D-326
23	EI-341524	DL DL102401D-325
24	EI-341522	DL DL102701D-327
25	EI-341623	DL EFD-MN645A13A (VC-X2E)
26	EI-341523	DL EFD-MN645K15E (VC-X2U)
27	EI-341512	DL EFD-PN645B85B (VC-X2U)
28	EI-341595	DL MS-19P (VC-X2E)
29	EI-201970	IC AN5750
30	EI-201972	IC AN5760
31	EI-341525	IC AN6012
32	EI-341513	IC AN6022
33	EI-341528	IC AN6031
34	EI-341516	IC AN6041
35	EI-341514	IC AN6045
36	EI-300128	IC AN612
37	EI-300141	IC AN614
38	EI-300130	IC HD440072
39	EI-341501	IC LA3210
40	EI-341527	IC MA7220
41	EI-341500	IC MK-1
42	EI-341526	IC MK-2
43	EI-341536	IC MP4523
44	EI-341529	IC M5414P
45	EI-307644	IC NJM4556D
46	EI-213390	IC NJM4558D
47	EI-305456	IC TC4049BP
48	EI-324255	IC TL082CP
49	EI-311392	IC UPC358C
50	EI-310031	IC UPC78L05
51	EI-300840	OSC X'TAL HC-18/U 14.31818 OMHz (VC-X2U)
52	EI-341511	OSC X'TAL HC-18/U 17.734475MHz (VC-X2E)
53	EJ-341598	DIN J TCS0819-0601 L 8P
54	EJ-307693	PHONE J 2P HSJ0289-050 2.5
55	EJ-464995	PHONE J 2P SJ296-1-15 3.5
56	EJ-341601	PLUG CONNECTOR D8-102N-100 8P
57	EJ-311393	SOCKET CRT SPECIAL-7P S7-506P-44
58	EJ-311395	SOCKET VIDICON MT-7P S8-612J-02 P
59	EO-301630	⚠ COIL CA. TV FLYBACK VHT-4
60	EO-341502	⚠ COIL CA. TV HIGH VOLT HVT-7
61	EO-311396	⚠ COIL DEF VIDICON ELY-15V101A
62	EO-341622	⚠ COIL DEF VIDICON XVC-557N
63	EO-307409	⚠ COIL CA. TV LINEARITY CANS-4668Z
64	EO-201965	COIL CA. TV LINEARITY LCH-10
65	ER-326169	⚠ R FUSE ERD2FC F10 1/4W 22R0G
66	ER-318235	CR COMP EXR-P100K-474C
67	ER-309996	CR COMP EXR-P101K-103C
68	ER-309982	CR COMP EXR-P221K-102C
69	ER-341519	CR COMP 10-0056
70	ER-338309	CR COMP 10-0062
71	ER-338560	CR COMP 10-0068
72	ER-300068	FILTER CE TPS3.58MA 3.580MHz (VC-X2U)
73	ER-338339	FILTER CE TPS4.43 MA 4.430 MHz (VC-X2E)
74	ER-341518	FILTER LC BP 221FCCS-2219 4.3 MHz
75	ER-341517	FILTER LC LP 236LVS-1635
76	ER-341533	R COMP RGSD10A0306
77	ER-341535	R COMP 1D-0005
78	ER-338584	R THERMO H 3900PPM 1/4W 271J
79	ER-337745	R THRMO H 2700PPM 1/4W 103J
80	ER-341534	RD COMP 3D-0007
81	ES-341532	SW SLIDE MSS-P-1-2 01-2
82	ES-307659	SW SLIDE MSS-P-2-4
83	ES-341531	SW SLIDE MSS-P-2-4 02-4
84	ES-300122	SW TACT EVQ-QBR08K
85	ES-332277	SW TACT EVQ-QJ104K
86	ES-307404	SW TACT KHC10014
87	ET-321016	TR FET 2SK117 GR, BL
88	ET-307630	TR FET 2SK218 P
89	ET-200558	TR 2SA1115 E, F
90	ET-341603	TR 2SA1123 R, S
91	ET-554657	TR 2SA733A P, Q
92	ET-328436	TR 2SA937 Q, R
93	ET-330427	TR 2SB772 E, P
94	ET-328435	TR 2SC2021 R, S
95	ET-305468	TR 2SC2264
96	ET-338594	TR 2SC2291 F, G, H
97	ET-338595	TR 2SC2291 F, G, H
98	ET-330526	TR 2SC2377 C, D
99	ET-200480	TR 2SC2603 D, E, F
100	ET-200505	TR 2SC2603 E, F
101	ET-515733	TR 2SC945L P, Q, R
102	ET-307571	TR 2SD781
103	EU-307635	⚠ CRT 40CB4M
104	EU-341599	⚠ IMAGE-T SATICON H4100 (VC-X2E)
105	EU-341600	⚠ IMAGE-T SATICON H4103 (VC-X2U)
106	EV-338074	R S-FIX H EVNB3AAOO 3P 302
107	EV-338583	R S-FIX H H0621A 3P 0.30W 101
108	EV-307623	R S-FIX H H0621A 3P 0.30W 102
109	EV-341561	R S-FIX H H0621A 3P 0.30W 105
110	EV-307629	R S-FIX H H0621A 3P 0.30W 223
111	EV-307655	R S-FIX H H0621A 3P 0.30W 225
112	EV-307652	R S-FIX H H0621A 3P 0.30W 474
113	EV-332404	R S-FIX H H0651A 3P 0.05W 101
114	EV-307653	R S-FIX H H0651A 3P 0.05W 102
115	EV-307621	R S-FIX H H0651A 3P 0.05W 103
116	EV-341560	R S-FIX H H0651A 3P 0.05W 105
117	EV-332319	R S-FIX H H0651A 3P 0.05W 221
118	EV-307620	R S-FIX H H0651A 3P 0.05W 222
119	EV-307709	R S-FIX H H0651A 3P 0.05W 223
120	EV-332321	R S-FIX H H0651A 3P 0.05W 331
121	EV-307706	R S-FIX H H0651A 3P 0.05W 471
122	EV-307694	R S-FIX H H0651A 3P 0.05W 472
123	EV-336770	R S-FIX H H0651A 3P 0.05W 473
124	EV-338360	R S-FIX V EVM-31G 3P 0.30W 504
125	EV-338359	R S-FIX V EVN-31C 3P 102
126	EV-338358	R S-FIX V EVN-31C 3P 103
127	EV-338388	R S-FIX V RVS0707H 3P 0.33W 103
128	EV-522404	R S-FIX V V8K1-1 3P 102
129	EV-475470	R S-FIX V V8K1-1 3P 103
130	EV-522663	R S-FIX V V8K1-1 3P 104
131	EV-522652	R S-FIX V V8K1-1 3P 105
132	EV-464264	R S-FIX V V8K1-1 3P 503

When ordering parts, please quote Parts Number, Description and Model Number.

REF. NO.	PARTS NO.	DESCRIPTION
133	EV-201964	VR ROTARY 16W10S0A B102
134	EW-341593	CORD VC-X2 CAMERA CABLE
135	VC-B341619	LENS J6×11 – 141G AF-2 PART
136	VC-307615	MIC EMU-4628A 2.00K

1. VIDEO P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
1-1	BA-V3004A170A	PC VIDEO (1) BLK VC-X2E
1-2	BA-V3004A170B	PC VIDEO (1) BLK VC-X2U
	VIDEO (1) P.C BOARD	
1-IC1	EI-300130	IC HD440072
1-IC2	EI-305456	IC TC4049BP
1-IC3	ET-341516	IC AN6041
1-IC4	EI-341514	IC AN6045
1-IC5	EI-341513	IC AN6022
1-IC6	EI-300128	IC AN612
1-IC7	EI-300141	IC AN614
1-TR1 to 4	ET-200558	TR 2SA1115 E,F
1-TR5,6	ET-200505	TR 2SC2603 E,F
1-TR7 to 10	ET-200558	TR 2SA1115 E,F
1-TR11 to 14	ET-200505	TR 2SC2603 E,F
1-TR15	ET-200558	TR 2SA1115 E,F
1-TR16	ET-321016	TR FET 2SK117 GR, BL
1-TR17, 18	ET-200505	TR 2SC2603 E,F
1-TR19	ET-200558	TR 2SA1115 E,F
1-TR20, 21	ET-200505	TR 2SC2603 E,F
1-TR22	ET-200558	TR 2SA1115 E,F
1-D1	ED-307645	D VARACTOR 1S2688
1-VC1, 2	EC-332222	C S-FIX H TZ03R300E 5.2 – 30
1-VR1, 2	EV-307620	R S-FIX H H0651A 3P 0.05W 222
1-VR4	EV-307694	R S-FIX H H0651A 3P 0.05W 472
1-VR5	EV-332404	R S-FIX H H0651A 3P 0.05W 101
1-VR6	EV-307621	R S-FIX H H0651A 3P 0.05W 103
1-VR7	EV-336770	R S-FIX H H0651A 3P 0.05W 473
1-VR8	EV-307621	R S-FIX H H0651A 3P 0.05W 103
1-VR9	EV-338583	R S-FIX H H0621A 3P 0.30W 101
1-VR10	EV-307621	R S-FIX H H0651A 3P 0.05W 103
1-L1, 2	EO-330252	COIL FIX 1 EL0606SKI 100μH K
1-L3	EO-322395	COIL FIX 1 EL0810SKI 100μH K
1-L4	EO-341579	COIL FIX 1 L-5 8.2μH J (VC-X2E)
1-L4	EO-341586	COIL FIX 1 L-5 15μH J (VC-X2U)
1-L5	EO-341579	COIL FIX 1 L-5 8.2μH J (VC-X2E)
1-L5	EO-341586	COIL FIX 1 L-5 15μH J (VC-X2U)
1-L6	EO-357287	COIL FIX 1 FL05H 100μH K (VC-X2E)
1-L6	EO-241380	COIL FIX 1 FL05H 120μH K (VC-X2U)
1-L7, 8	EO-330252	COIL FIX 1 EL0606SKI 100μH K
1-VL1	EO-341542	COIL VARI 1 L215 VXN1243Z 35μH
1-CR1	ER-341519	CR COMP 10-0056
1-FL1	ER-338339	FILTER CE TPS4.43MA 4.430 MHz (VC-X2E)
1-FL1	ER-300068	FILTER CE TPS3.58MA 3.580 MHz (VC-X2U)
1-X1	EI-341511	OSC X'TAL HC-18/U 17.734 475 MHz (VC-X2E)
1-X1	EI-300840	OSC X'TAL HC-18/U 14.318 180 MHz (VC-X2U)
1-DL1	EI-341595	DL MS-19P (VC-X2E)
1-DL1	EI-341512	DL EFD-PN645B85B (VC-X2U)
1-DL2	EI-341521	DL DL102151D-326
1-DL3	EI-341522	DL DL102701D-327
1-R69	ER-330304	R MF H F10 1/4W 1102F
1-R70	ER-341617	R MF H F10 1/4W 3001F
1-R71	ER-341616	R MF H F10 1/4W 3900F

REF. NO.	PARTS NO.	DESCRIPTION
1-R80	ER-338584	R THERMO H 3900PPM 1/4W 271J
1-C9	EC-338596	C EC V NP 100M 16DC
1-C41	EC-300193	C EC V F05 NP SM 100M 16DC
	VIDEO (2) P.C BOARD	
1-IC1, 2	EI-324255	IC TL082CP
1-IC3	EI-311392	IC UPC358C
1-IC4	EI-341529	IC M5414P
1-IC5	EI-307644	IC NJM4556D
1-IC6	EI-341525	IC AN6012
1-IC7	EI-341526	IC MK-2
1-IC8	EI-307644	IC NJM4556D
1-IC9	EI-341528	IC AN6031
1-IC10	EI-341527	IC MA7220
1-TR1	ET-321016	TR FET 2SK117 GR, BL
1-TR2	ET-200505	TR 2SC2603 E, F
1-TR4	ET-200558	TR 2SA1115 E, F
1-TR5 to 8	ET-200505	TR 2SC2603 E, F
1-TR9	ET-321016	TR FET 2SK117 GR, BL
1-TR10 to 12	ET-200558	TR 2SA1115 E, F
1-TR13	ET-338594	TR 2SC2291 F, G, H
1-TR14	ET-200505	TR 2SC2603 E, F
1-D1 to 6	ED-200212	D SILICON H DS448F×2 F07
1-D8	ED-200212	D SILICON H DS448F×2 F07
1-SW1, 2	ES-300122	SW TACT EVQ-QBR08K
1-SW3	ES-332277	SW TACT EVQ-QJ104K
1-VR1	EV-307620	R S-FIX H H0651A 3P 0.05W 222
1-VR2	EV-307652	R S-FIX H H0621A 3P 0.30W 474
1-VR3	EV-307621	R FIX H H0651A 3P 0.05W 103
1-VR4	EV-332319	R S-FIX H H0651A 3P 0.05W 221
1-VR5	EV-307653	R S-FIX H H0651A 3P 0.05W 102
1-VR6, 7	EV-307621	R S-FIX H H0651A 3P 0.05W 103
1-VR8	EV-307623	R S-FIX H H0621A 3P 0.30W 102
1-VR9	EV-332321	R S-FIX H H0651A 3P 0.05W 331
1-VR10, 11	EV-307620	R S-FIX H H0651A 3P 0.05W 222
1-VR12	EV-307706	R S-FIX H H0651A 3P 0.05W 471
1-VR13	EV-307653	R S-FIX H H0651A 3P 0.05W 102
1-VR14	EV-307706	R S-FIX H H0651A 3P 0.05W 471
1-VR17	EV-307621	R S-FIX H H0651A 3P 0.05W 103
1-VR19, 20	EV-307620	R S-FIX H H0651A 3P 0.05W 222
1-VR21	EV-307653	R S-FIX H H0651A 3P 0.05W 102
1-VR22	EV-307709	R S-FIX H H0651A 3P 0.05W 223
1-VR23	EV-307620	R S-FIX H H0651A 3P 0.05W 222
1-L1, 2	EO-330252	COIL FIX 1 EL0606SKI 100μH K
1-L3, 4	EO-341579	COIL FIX 1 L-5 8.2μH J
1-L5, 6	EO-485278	COIL FIX 1 FL05H 220μH K
1-FL1	ER-341518	FILTER LC BP 221FCCS-2219 4.30 MHz
1-FL2	ER-341517	FILTER LC LP 236LVS-1635
1-CR1, 2	ER-338560	CR COMP 10-0068
1-CR3	ER-338309	CR COMP 10-0062
1-DL1	EI-341524	DL DL102401D-325
1-DL2	EI-341623	DL EFD-MN645A13A (VC-X2E)
1-DL	EI-341523	DL EFD-MN645K15E (VC-X2U)
1-VC1	EC-332222	C S-FIX H TZ03R300E 5.2-30
1-R2	ER-341550	R MF H F10 1/4W 1004F
1-R18	ER-341551	R MF H F10 1/4W 1003F
1-R30	ER-330304	R MF H F10 1/4W 1102F
1-R31	ER-341612	R MF H F10 1/4W 6200F
1-R40	ER-337745	R THERMO H 2700PPM 1/4W 103J
1-R78	ER-341609	R MF H F10 1/4W 3901F
1-R79	ER-338078	R MF H F10 1/4W 3601F
1-R80	ER-341608	R MF H F10 1/4W 2401F
1-R81	ER-341609	R MF H F10 1/4W 3901F
1-R82	ER-341617	R MF H F10 1/4W 3001F
1-R83	ER-341552	R MF H F10 1/4W 1001F
1-R87	ER-341577	R MF H F10 1/4W 7501F
1-R88	ER-338079	R MF H F10 1/4W 4301F
1-C6	EC-300193	C EC V F05 NP SM 100M 16DC
1-C9	EC-300193	C EC V F05 NP SM 100M 16DC
1-C21	EC-307684	C EC V F05 NP SM R47M 50DC
1-C24	EC-307793	C EC V F05 NP SM 220M 10DC
1-C34	EC-300193	C EC V F05 NP SM 100M 16DC
1-C50	EC-304431	C TT V D 220M 6.3DC

REF. NO.	PARTS NO.	DESCRIPTION
	PRE AMP P.C BOARD	
1-TR-1	ET-307630	TR FET 2SK218 P
1-TR2 to 6	ET-330526	TR 2SC2377 C, D
1-D1	ED-307690	D ZENER H HZ7L A1
1-D2	ED-301911	D SILICON H DS448
1-VC1, 2	EC-307634	C S-FIX V ECV-1ZW10×60
1-VR1	EV-338359	R S-FIX V EVN31C 3P 102
1-L1	EO-341539	COIL CA, TV PARCIVAL OR-12.3-6H
1-L2	EO-357287	COIL FIX 1 FL05H 100μH K
1-L3	EO-341587	COIL FIX L-5 56μH J
1-C7	EC-452665	C MC V FM 200J 500DC
1-C9	EC-307711	C PP V APS 102J 100DC
1-C12	EC-427948	C MC V FM 100J 500DC
1-C13	EC-337674	C TT V D 100M 16.0DC
	AW P.C BOARD	
1-PH1	ED-300143	D PHOTO BS-500B

2. H & D P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1	BA-V3004A180A	PC H&D BLK VC-X2E
	H & D P.C BOARD	
2-IC1	EI-307644	IC NJM4556D
2-IC2	EI-341500	IC MK-1
2-IC3	EI-213390	IC NJM4558D
2-IC4	EI-307789	IC NJM4560D
2-IC5	EI-310031	IC UPC78L05
2-IC6	EI-341501	IC LA3210
2-TR1	ET-200505	TR 2SC2603 E, F
2-TR2	ET-307571	TR 2SD781
2-TR3	ET-515733	TR2SC945L P, Q, R
2-TR4	ET-341603	TR 2SA1123 R, S
2-TR5	ET-338595	TR 2SC2291 F, G, H
2-TR6	ET-330427	TR 2SB772 E, P
2-TR7, 8	ET-554657	TR 2SA733A P, Q
2-TR9 to 11	ET-200558	TR 2SA1115 E, F
2-TR12 to 15	ET-200505	TR 2SC2603 E, F
2-D1	ED-307752	D ZENER H HZ6L B2
2-D2	ED-522472	D SILICON HF-1Z 200/0.6A
2-D3	ED-306732	D SILICON S5277D 200/1.0A
2-D4 to 6	ED-200468	D SILICON V DS448-VB6
2-D7	ED-310025	D ZENER H HZ6L A2
2-D8 to 10	ED-301911	D SILICON H DS448
2-J903	EJ-464995	PHONE J 2P SJ296-1-15 3.5
2-VR1 to 4	EV-338358	R S-FIX V EVN31C 3P 103
2-VR5	EV-338360	R S-FIX V EVM-31G 3P 0.30W 504
2-VR6	EV-341560	R S-FIX H H0651A 3P 0.05W 105
2-VR7 to 12	EV-338388	R S-FIX V RVS0707H 3P 0.33W 103
2-VR13	EV-307653	R S-FIX H H0651 3P 0.05W 102
2-VR14	EV-307694	R S-FIX H H0651A 3P 0.05W 472
2-VR15	EV-307621	R S-FIX H H0651A 3P 0.05W 103
2-VR16	EV-341561	R S-FIX H H0621A 3P 0.03W 105
2-VR18	EV-307621	R S-FIX H H0651A 3P 0.05W 103
2-VR19	EV-307629	R S-FIX H H0621A 3P 0.03W 223
2-L1	EO-307409	COIL CA TV LINEARITY CANS-4668Z
2-L2, 3	EO-341558	COIL FIX 1 RC875-473J47MH J
2-L4, 5	EO-357287	COIL FIX 1 FL05H 100μH K
2-T1	EO-341502	⚠ COIL CA, TV HIGH VOLT HVT-7
2-CR1	ER-341503	CR COMP 10-0057
2-CR2	ER-337765	CR COMP 10-0067
2-CR3	ER-341505	CR COMP 14-0025
2-CR4	ER-341506	R COMP 02-0092
2-CR5	ER-341507	CR COMP 10-0054
2-R5	ER-341652	R MF H F10 1/4W 1504F
2-R12	ER-341674	R MF V 1/4W 4703F
2-R13	ER-341673	R MF V 1/4W 3303F
2-R16	ER-338589	R MF V 1/4W 5103F
2-R25	ER-309811	R MF V 1/4W 7501F
2-R26	ER-338590	R MF V 1/4W 1802F
2-R29 to 31	ER-341650	R MF V 1/4W 3922F
2-R32	ER-309815	R MF V 1/4W 1202F
2-R34	ER-326169	⚠ R FUSE ERD 2FC 1/4W 22ROG
2-C1	EC-307724	C CE V E 472P 500DC
2-C2	EC-341559	C EC V F05 SL 2R2 160DC
2-C10	EC-201440	C EC V F05 FL 1R0 160DC
2-C11	EC-231568	C EC V R5A 1R0 350DC
2-C12	EC-307407	C EC V UHU1R0 450DC
2-C13	EC-307778	C PP V ECQ-P 4701G 100DC
2-C15	EC-201440	C EC V F05 SL 1R0 160DC
2-C60	EC-307650	C CE V E 222z 1000DC
	SOCKET P.C BOARD	
2-J906	EJ-311395	SOCKET VIDICON MT-7P S8-612J-02 P

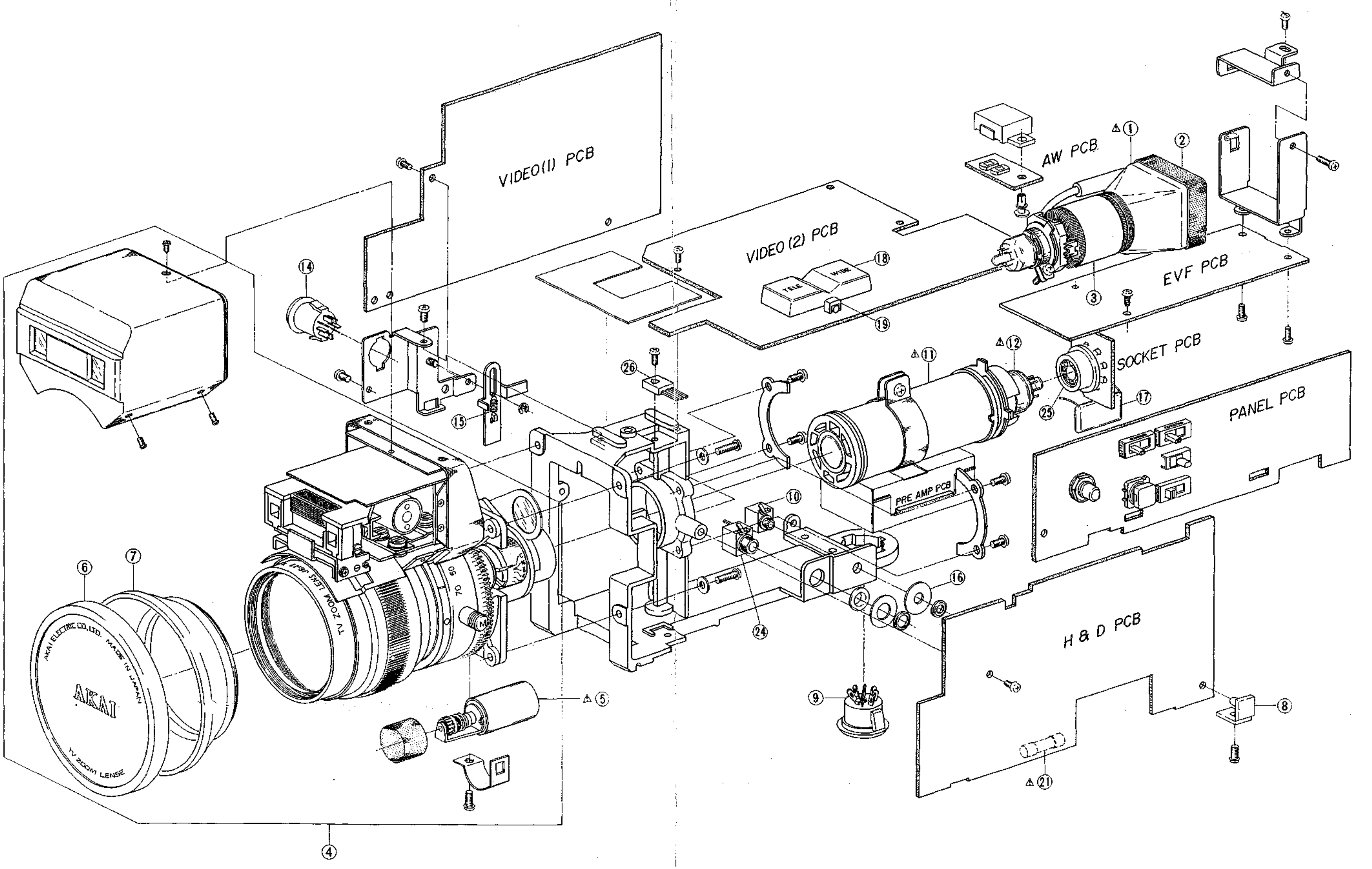
3. PANEL P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
3-1	BA-V3004A070A	PC PANEL BLK VC-X2E
3-IC1	EI-311392	IC UPC358C
3-IC2	EI-341536	IC MP4523
3-TR1	ET-328436	TR 2 SA937 Q, R
3-TR2	ET-328435	TR 2SC2021 R, S
3-TR3	ET-328436	TR 2SA937 Q, R
3-TR4 to 9	ET-328435	TR 2SC2021 R, S
3-TR10, 11	ET-328436	TR 2SA937 Q, R
3-TR12	ET-328435	TR 2SC2021 R, S
3-TR13	ET-328436	TR-2SA937 Q, R
3-TR14	ET-328435	TR 2SC2021 R, S
3-D1 to 9	ED-200212	D SILICON H DS448F×2 F07
3-D10, 11	ED-301911	D SILICON H DS448
3-SW1, 2	ES-307659	SW SLIDE MSS-P-2-4
3-SW3	ES-341532	SW SLIDE MSS-P-1-2 01-2
3-SW4	ES-341531	SW SLIDE MSS-P-2-4 02-4
3-SW5	ES-307404	SW TACT KHC10014
3-VR1	EV-201964	VR ROTARY 16W10S0A B102
3-VR2	EV-338074	R S-FIX H EVNB3AAOO 3P 302
3-VR3	EV-307621	R S-FIX H H0651A 3P 0.05W 103
3-VR4	EV-307709	R S-FIX H H0651A 3P 0.05W 223
3-L1	EO-574187	COIL FIX 1 FL05H 100 μH M
3-CR1, 2	ER-341534	RD COMP 3D-0007
3-CR3	ER-341535	R COMP 1D-0005
3-CR4	ER-341534	RD COMP 3D-0007
3-CR5	ER-341533	R COMP RGSD10A0306

4. EVF P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
4-1	BA-V3004A140A	PC EVF BLK VC-X2E
4-2	BA-V3004A140B	PC EVF BLK VC-X2U
4-IC1	EI-201970	IC AN5750
4-IC2	EI-201972	IC AN5760
4-TR1 to 5	ET-200480	TR 2SC2603 D, E, F
4-TR6	ET-305468	TR 2SC2264
4-TR7	ET-200480	TR 2SC2603D, E, F
4-D1	ED-307690	D ZENER H HZ7L A1
4-D2, 3	ED-200212	D SILICON H DS448F×2 F07
4-D4 to 6	ED-309859	D SILICON RH-1S 600/0.2A
4-D7	ED-523618	D SILICON SF-1-8 800/0.2A
4-D8	ED-201967	D LED LN26RP RED
4-D9	ED-201968	D LED LN36BP GRN
4-D10	ED-201969	D LED LN46YP ORG
4-J905	EJ-311393	SOCKET CRT SPECIAL-7P S7-506P-44
4-VR1	EV-522404	R S-FIX V V8K1-1 3P 102
4-VR2	EV-522663	R S-FIX V V8K1-1 3P 104
4-VR3	EV-464264	R S-FIX V V8K1-1 3P 503
4-VR4	EV-475470	R S-FIX V V8K1-1 3P 103
4-VR5	EV-522652	R S-FIX V V8K1-1 3P 105
4-VR6	EV-307655	R S-FIX H H0621A 3P 0.30W 225
4-L1	EO-322395	COIL FIX 1 EL0810SKI 100 μH K
4-L2	EO-201965	COIL CA. TV LINEARITY LCH-10
4-L4	EO-301630	⚠ COIL CA. TV FLYBACK VHT-4
4-L5	EO-341573	COIL FIX 1 EL0810SKI 33μH J (VC-X2E)
4-L5	EO-321699	COIL FIX 1 EL0810SKI 47μH J (VC-X2U)
4-CR1, 2	ER-309982	CR COMP EXR-P221K-102C
4-CR3	ER-309996	CR COMP EXR-P101K-103C
4-CR4	ER-318235	CR COMP EXR-P100K-474C
4-R26	ER-333347	R CB H SNP FS RDS 1/4W 3R9J
4-C17	EC-307773	C TT V DA 2R2K 10DC
4-C18	EC-307772	C TT V D 4R7K 6.3DC
4-C29	EC-307725	C PP V ECQ-P 103J 100DC
4-C31	EC-307722	C CE V E 472Z 1000DC
4-C32	EC-243617	C MY V AMS 272J 200DC
4-C33	EC-307650	C CE V E 222Z 1000DC

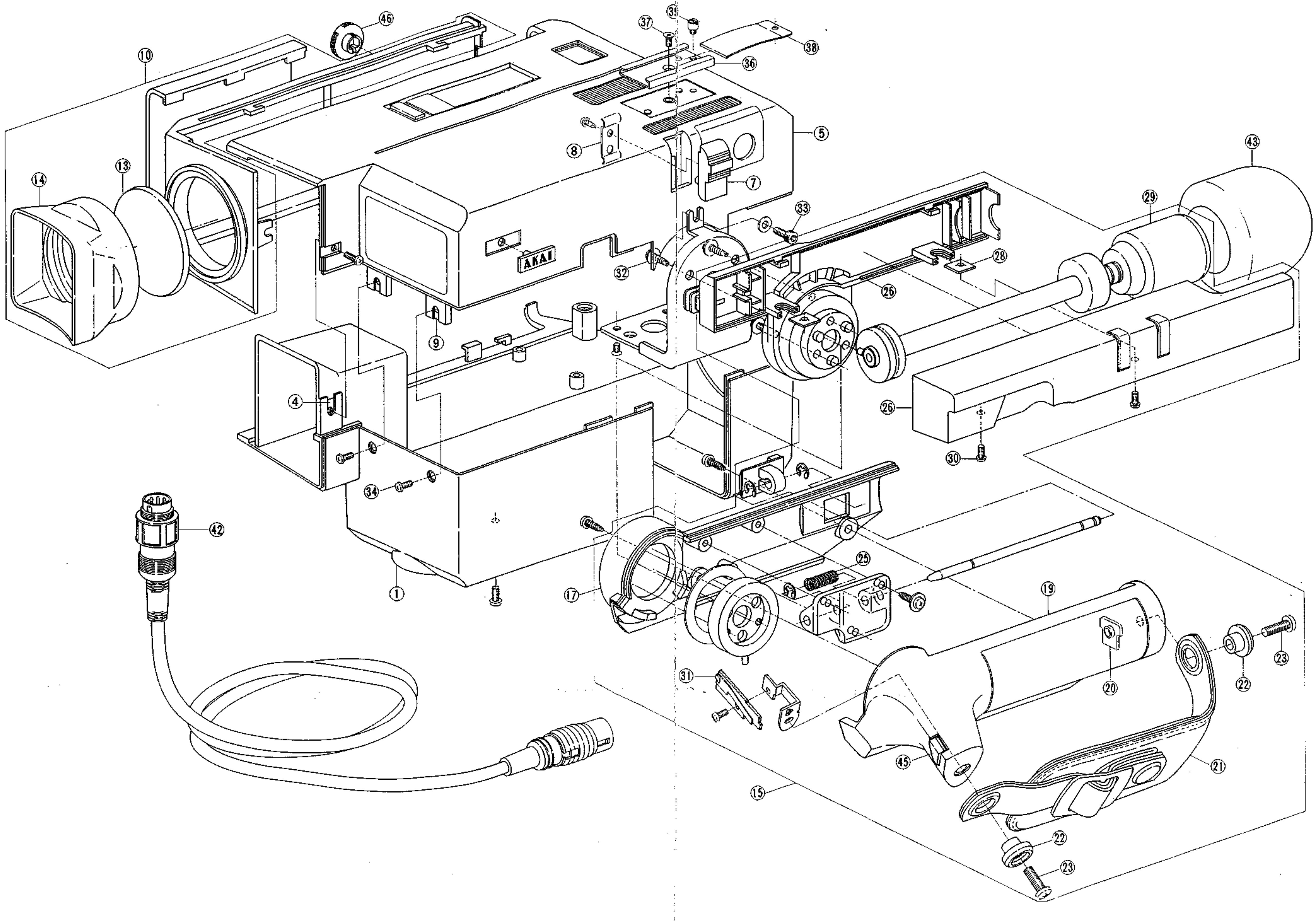
ASSEMBLY BLOCK



5. ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
	EVF BLOCK	
5-1	EU-307635	⚠ CRT 40CB4M
5-2	VC-307875	CUSHION RING
5-3	EO-311396	⚠ COIL DEF VIDICON ELY-15V 101A
	CHASSIS CAMERA BLOCK	
5-4	VC-B341619	LENS J6×11-14 IG AF-2 PART
5-5	BM-307613	⚠ MOTOR T16056-M0827Y
5-6	VC-780010	HOOD CAP B12-2013-K101
5-7	VC-780011	HOOD LES B12-2013-K101
5-8	VC-307663	HINGE TYPE (B) NO312
	CAMERA CONNECTOR BLOCK	
5-9	EJ-341598	DIN J TCS0819-0601 L 8P (J901)
5-10	EJ-307693	PHONE J 2P HSJ0289-050 2.5 (J904)
	IMAGE-TUBE BLOCK	
5-11	EO-341622	⚠ COIL DEF VIDICON XVC-557N
5-12	EU-341600	⚠ IMAGE-T SATICON H4103 (VC-X2U)
5-13x	EU-341599	⚠ IMAGE-T SATICON H4100 (VC-X2E)
	HOLDER ND BLOCK	
5-14	EJ-341601	PLUG CONNECTOR D8-102N 100 8P
5-15	ZG-312944	SP-T1-3.2/0.29-12-5 T1-060
	ASSEMBLY BLOCK	
5-16	EJ-328679A	PW JACK(1)
5-17	EC-307649	C MMY V ECQ-E 682M 1600DC
5-18	SK-307883	KNOB ZOOM
5-19	SK-307878	HOLDER KNOB ZOOM
5-20x	ZW-260370	RV NYL34×055 BL
5-21	EF-309387	⚠ FUSE TSC A 250V 1A (VC-X2 (C, A)) (F1)
5-22x	EF-318608	⚠ FUSE GGS A 250V 1A (VC-X2 (J)) (F1)
5-23x	EF-623103	⚠ FUSE SEMKO T 250V 1A (VC-X2E) (F1)
5-24	EJ-464995	PHONE J 2P SJ296-1-15 3.5 (J903)
5-25	EJ-311393	SOCKET CRT SPECIAL-7P S7-506P-44 (J904)
5-26	ET-330427	TR 2SB772 E, P

FINAL ASSEMBLY BLOCK



6. FINAL ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
	CASE CAMERA (A) BLOCK	
6-1	SP-342012D	CASE CAMERA (A-2) VC-X2U (VC-X2U (C))
6-2x	SP-342012B	CASE CAMERA (A) VC-X2U (VC-X2U (J))
6-3x	SP-342012	CASE CAMERA (A) VC-X2E
6-4	ZW-307859	NUT (A)
	CASE CAMERA (B) BLOCK	
6-5	BD-V3004A150A	CASE CAMERA (B) BLK VC-X2E (VC-X2E, VC-X2 (C, A))
6-6x	BD-V3004A150B	CASE CAMERA (B) BLK VC-X2U (J)
6-7	SK-307884	KNOB ND
6-8	ZG-307871	SP PLATE ND
6-9	ZW-307859	NUT (A)
	CASE CAMERA (C) BLOCK	
6-10	BD-V3004A160C	CASE CAMERA (C) BLK VC-X2U (C)
6-11x	BD-V3004A160B	CASE CAMERA (C) BLK VC-X2U (J)
6-12x	BD-V3004A160A	CASE CAMERA (C) BLK VC-X2E
6-13	VC-307661	LENS EYE
6-14	VC-307938	HOOD EYECAP
	CASE GRIP BLOCK	
6-15	BD-V3004A080A	CASE GRIP BLK VC-X2E (VC-X2E, VC-X2U (C))
6-16x	BD-V3004A080C	CASE GRIP BLK VC-X2U (J)
6-17	SP-307900	CASE GRIP (A)
6-18	SK-307886	KNOB LOCK
6-19	SP-307902	CASE GRIP (B)
6-20	ZW-307872	NUT (B)
6-21	VC-307942	GRIP BAND
6-22	VC-307887	COLLAR GRIP BAND
6-23	ZS-558090	BID40×14STL BNI
6-24	ZS-311098	T2PAN30×10STL BNI
6-25	ZG-313193	SP C-4.5/0.6-20.0 C-040
6-26	BD-V3004A090A	CASE MIC BLK VC-X2E (VC-X2E, VC-X20 (C))
6-27x	BD-V3004A090C	CASE MIC BLK VC-X2U (J)
6-28	ZW-307859	NUT (A)
6-29	VC-307615	MIC EMU-4628A 2.00K
6-30	ZS-307944	PAN26×05STL BNI
6-31	ZG-307876	SP PLATE REC
	FINAL ASSEMBLY BLOCK	
6-32	ZS-309374	CTS26×08STL BNI
6-33	ZS-429862	N6B30×080STL CMT
6-34	ZS-593908	PAN30×06STL NI3 (VC-X2E, VC-X2U (C, A))
6-35x	ZS-355522	PAN30×06STL BNI (VC-X2U (J))
6-36	VC-307863	ACCS SHOE
6-37	ZS-609546	CTS26×08STL NI3
6-38	ZG-307864	SP PLATE ACCS SHOE
6-39	ZS-307865	SCREW ACCS SHOE
6-40x	ZS-410231	PAN26×05STL NI3
6-41x	ZS-307944	PAN26×05STL BNI
6-42	EW-341593	CORD VC-X2 CAMERA CABLE
6-43	VC-311418	MIC WIND SCREEN (LARGE)
6-44x	VC-337648	SHOULDER STRAP SS-2 (VC-X2E)
6-45	SK-307885	KNOB REC
6-46	SK-307882	KNOB IRIS

INDEX

PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.
ZS-355522	6-35x						
ZS-410231	6-40x						
ZS-429862	6-33						
ZS-558090	6-23						
ZS-593908	6-34						
ZS-609546	6-37						
ZW-260370	5-20x						
ZW-307859	6-4						
ZW-307859	6-9						
ZW-307859	6-28						
ZW-307872	6-20						

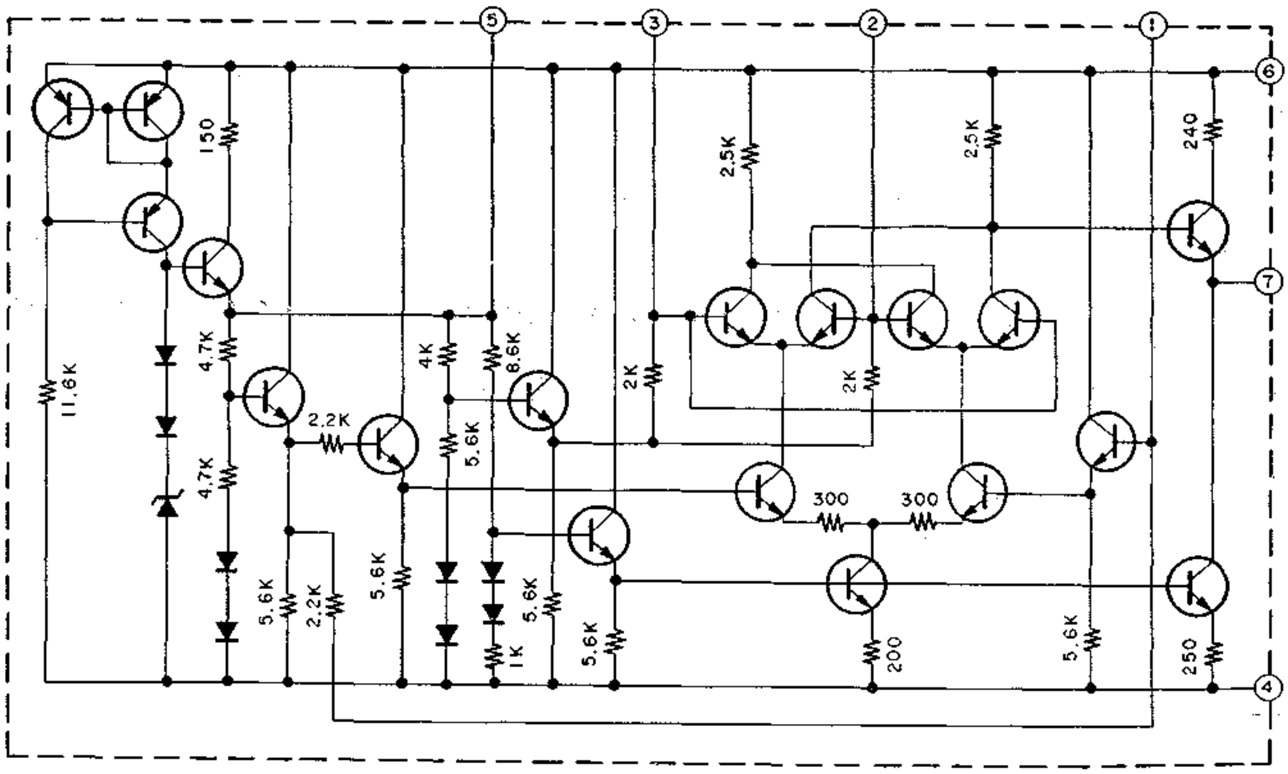
SECTION 3

SCHEMATIC DIAGRAM

TABLE OF CONTENTS

SCHEMATIC DIAGRAM OF IC's

AN612



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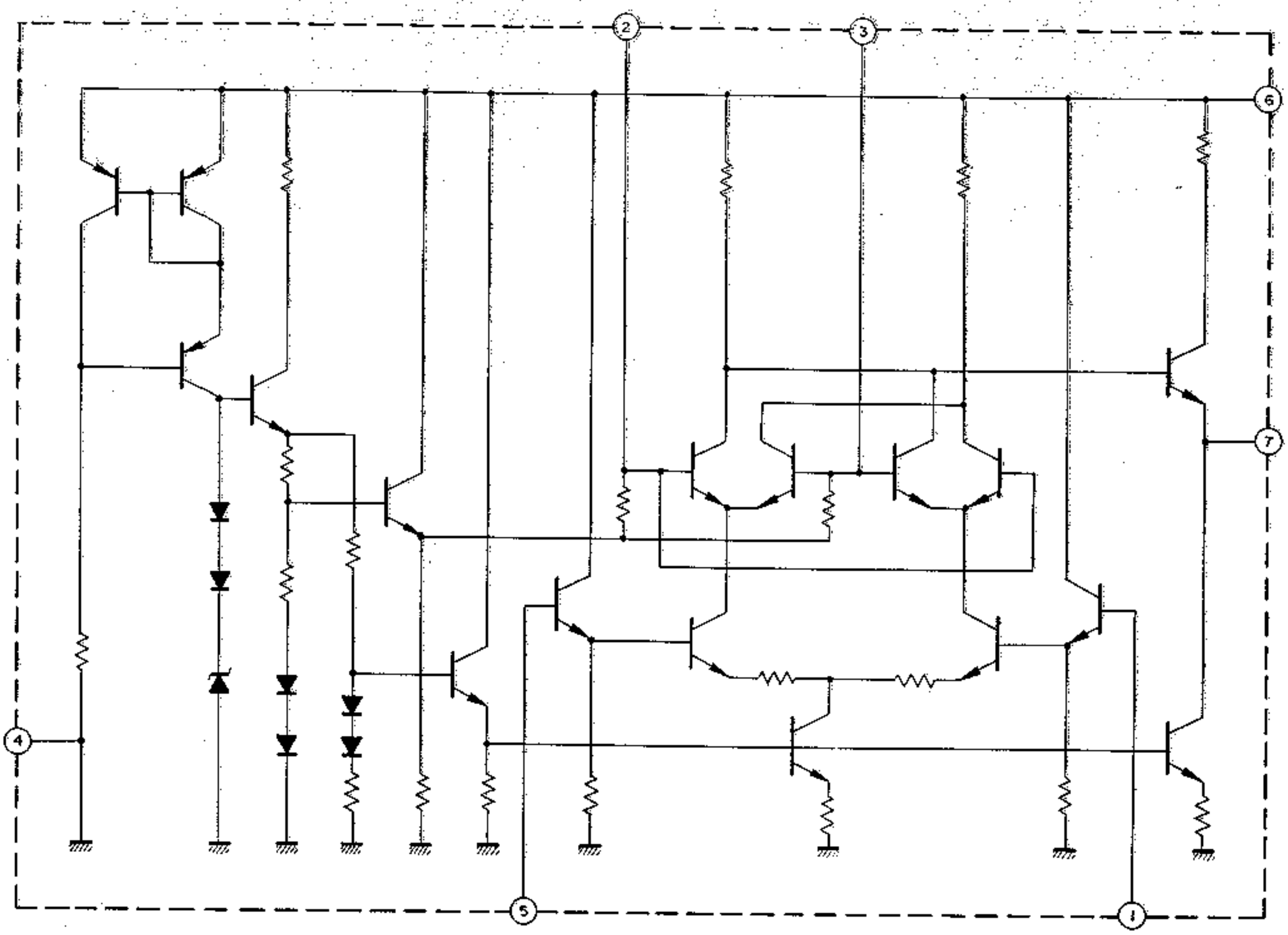

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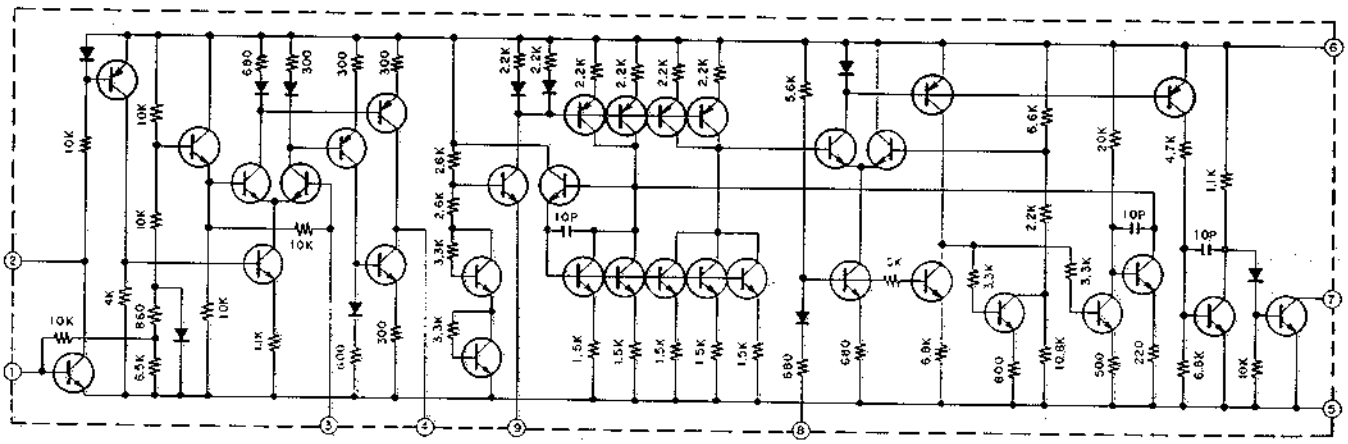

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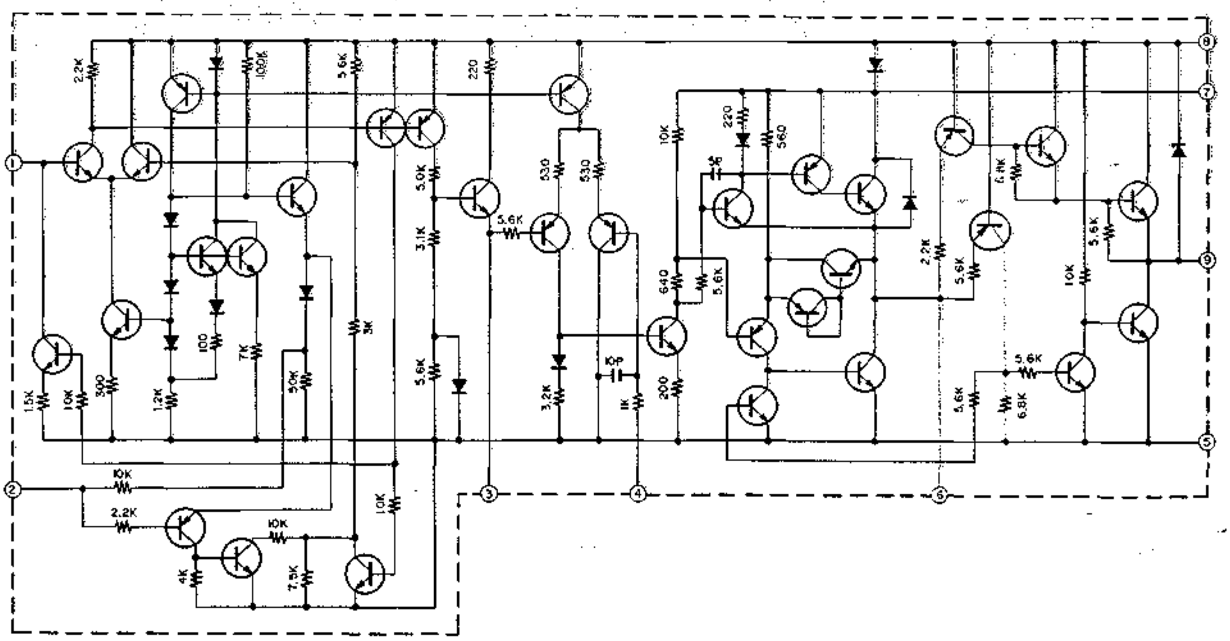

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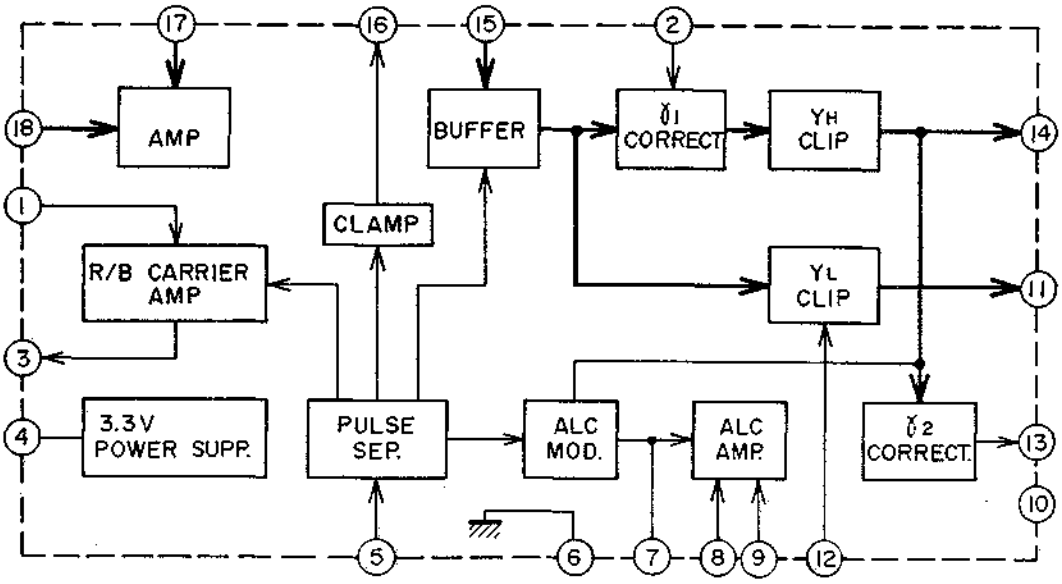

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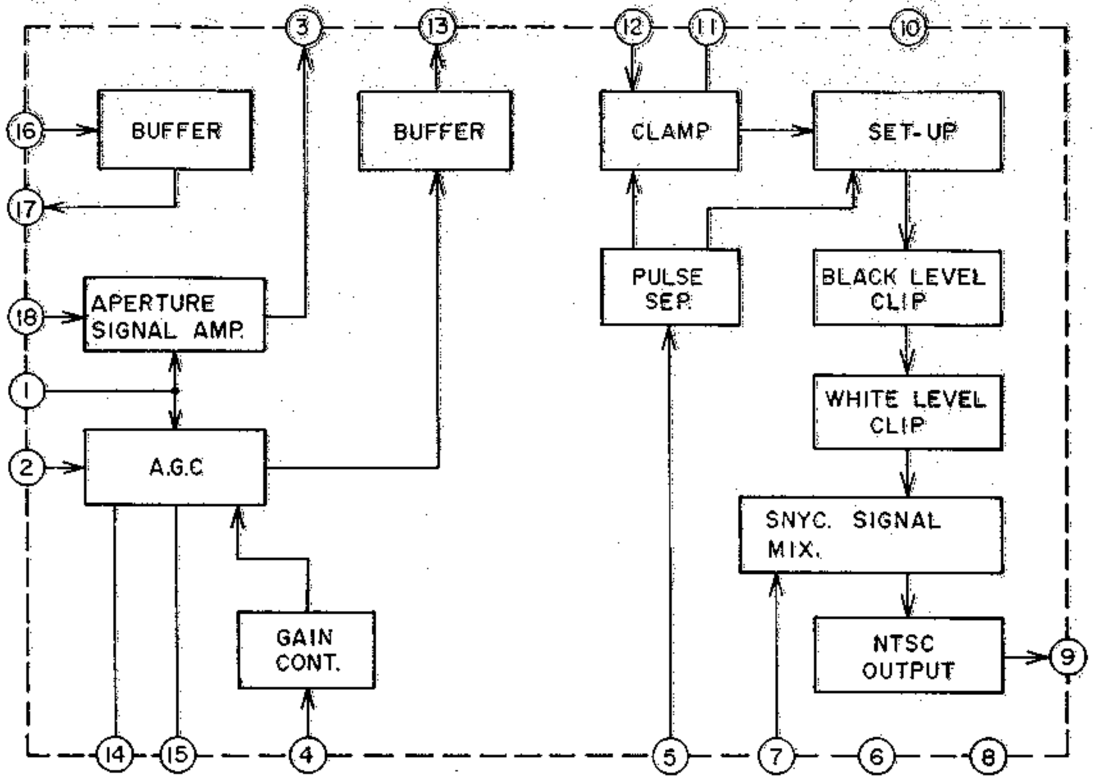

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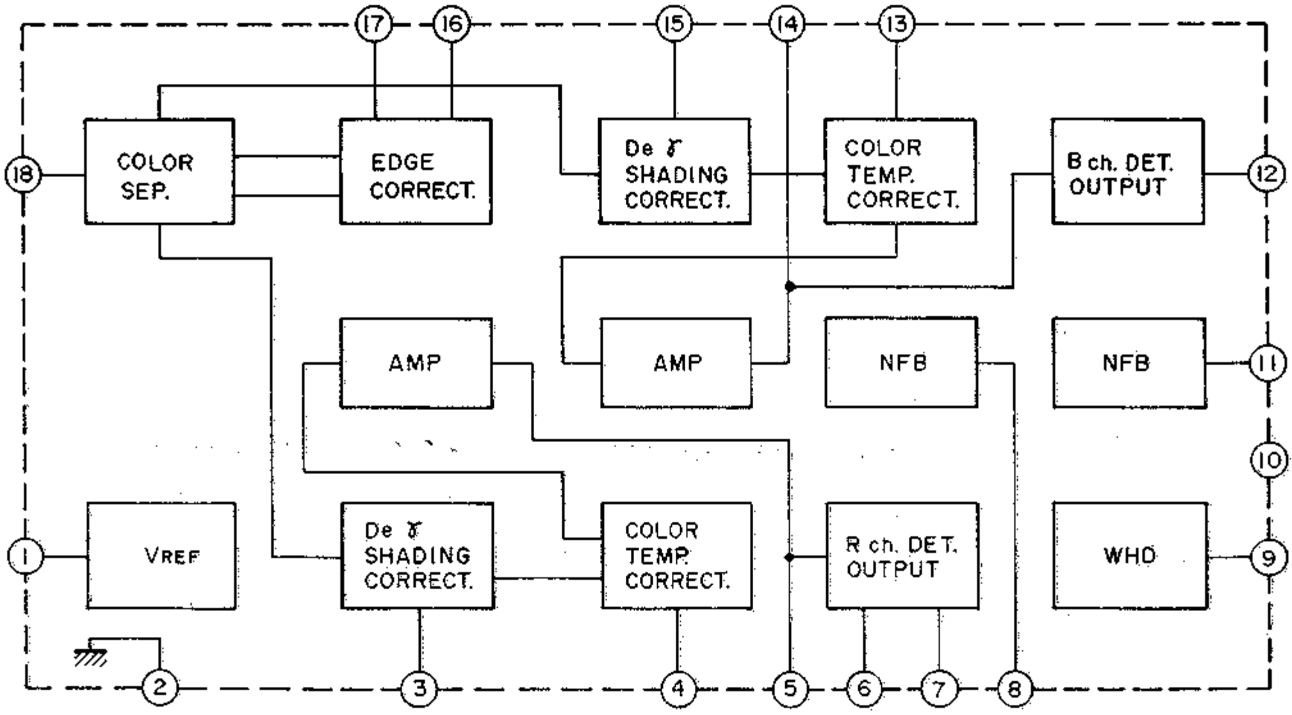

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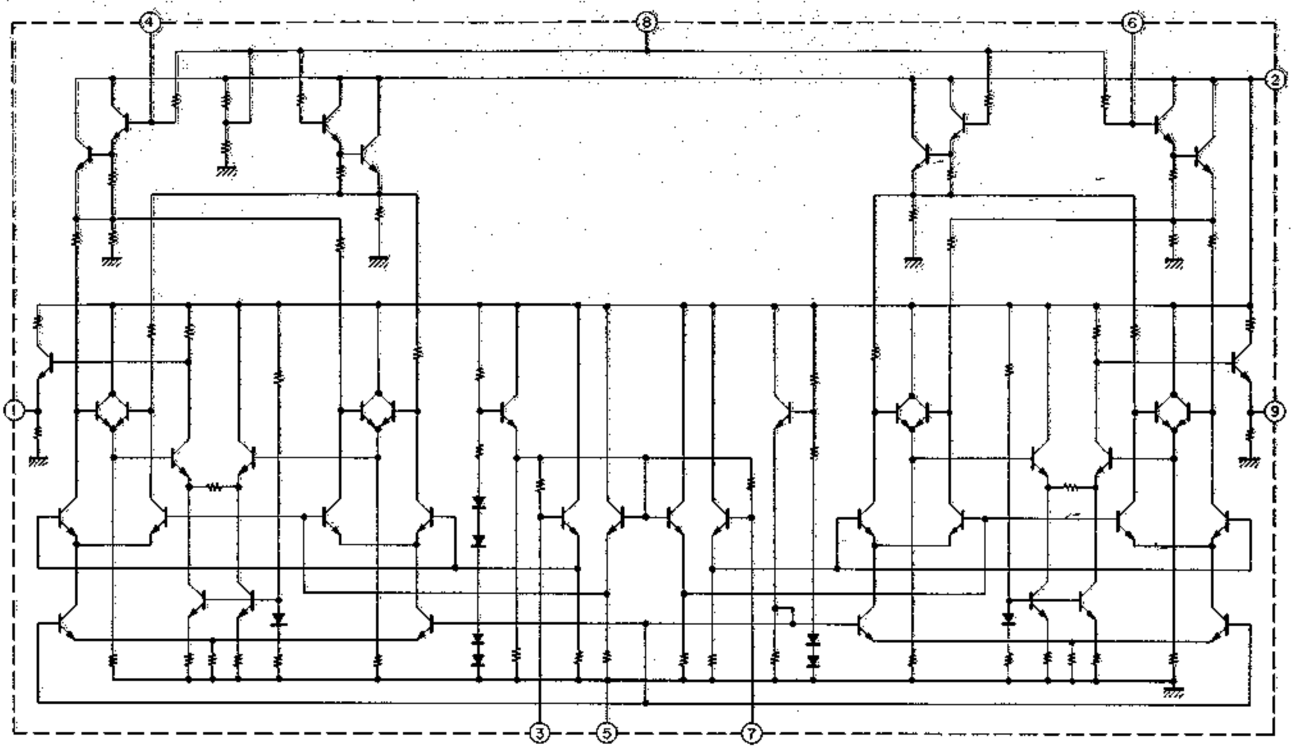

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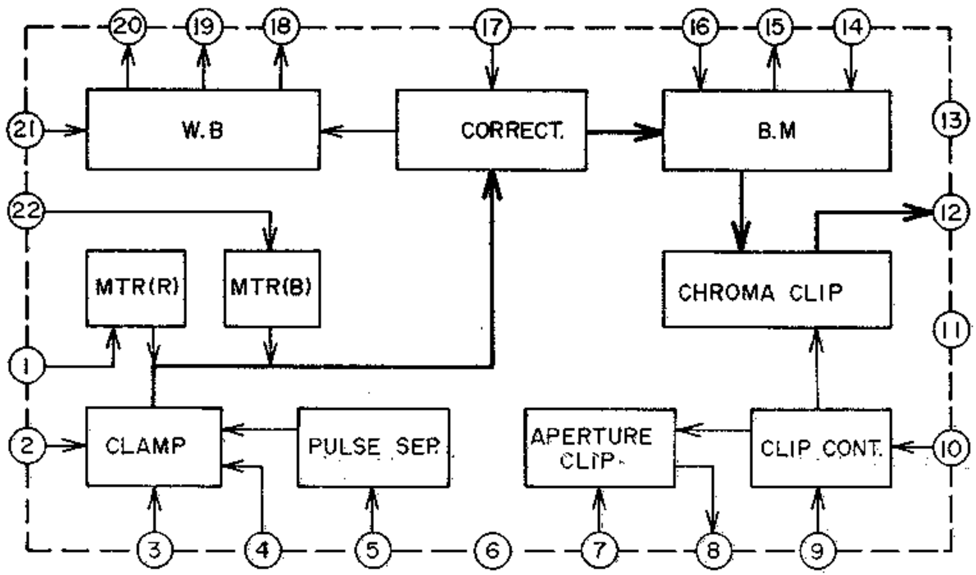
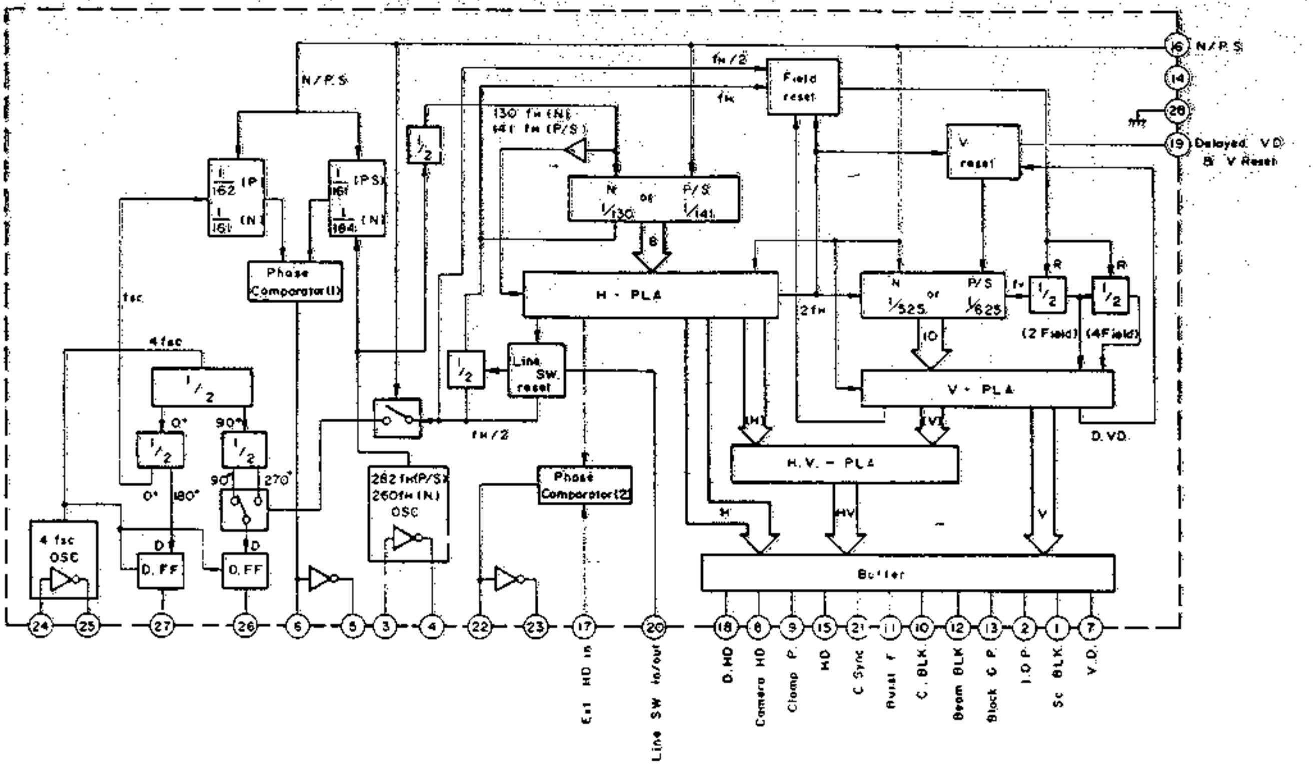
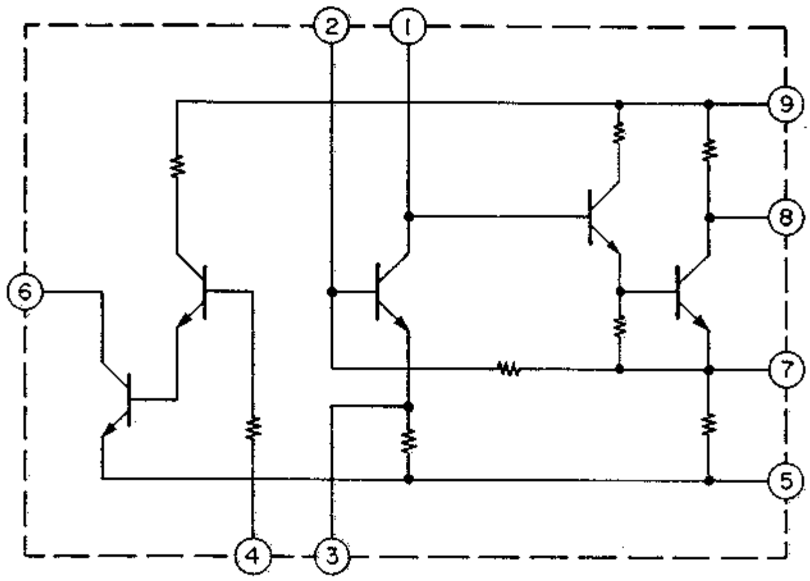


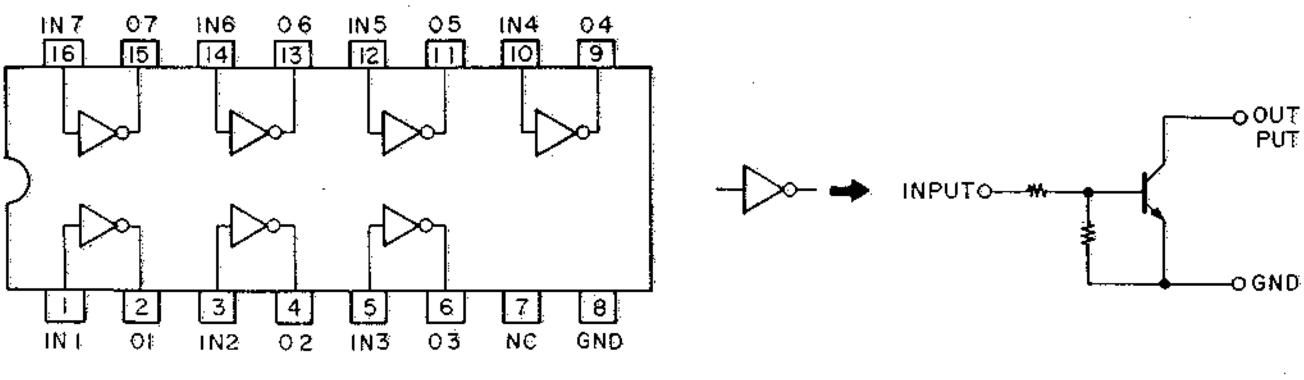
HD440072



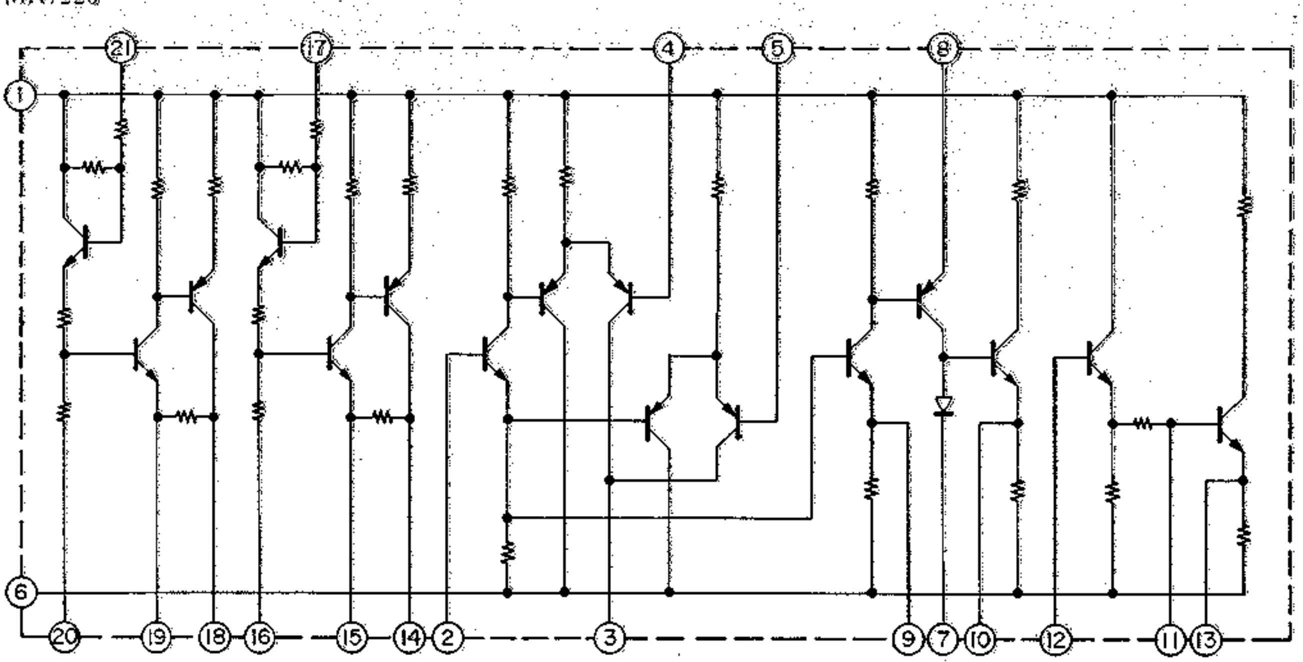
LA3210



M54514P



MA7220



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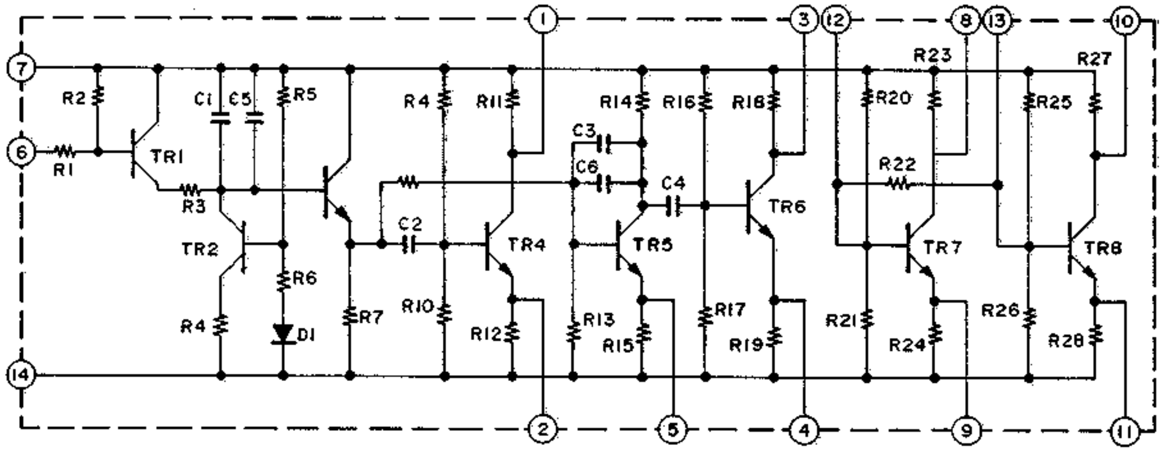

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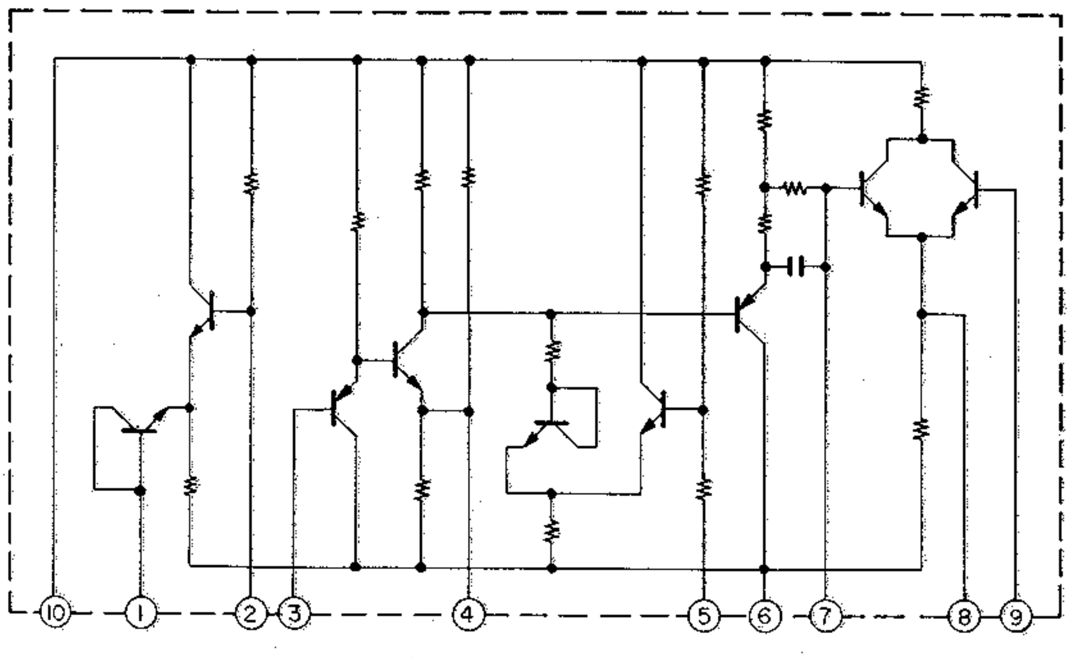
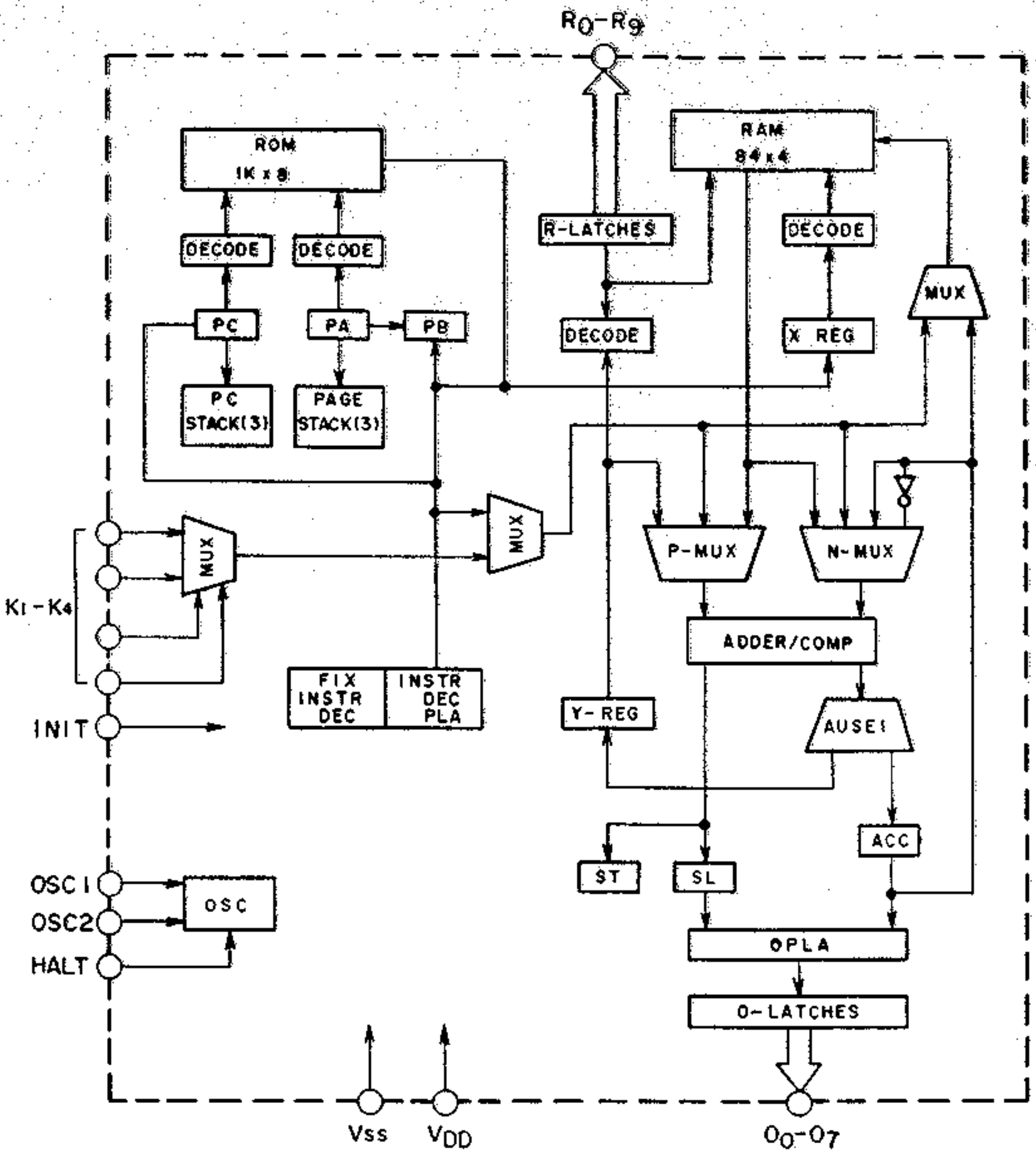
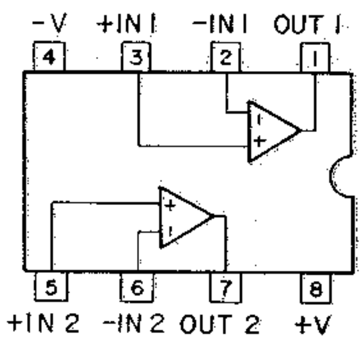
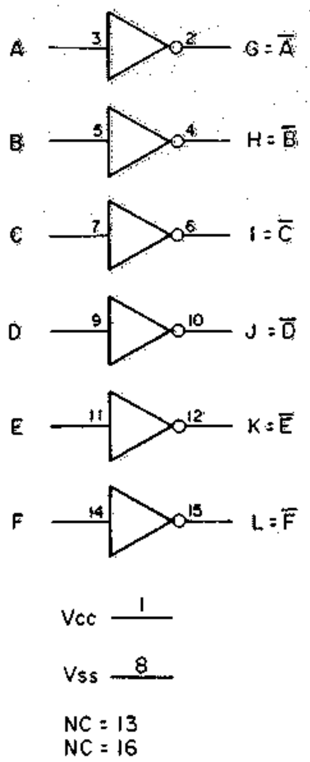


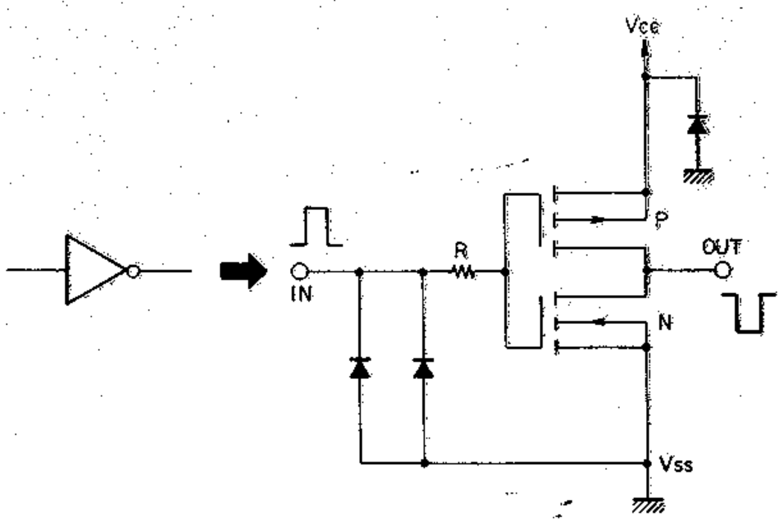


NJM4556D/NJM4558D/TL082/MPC082CP

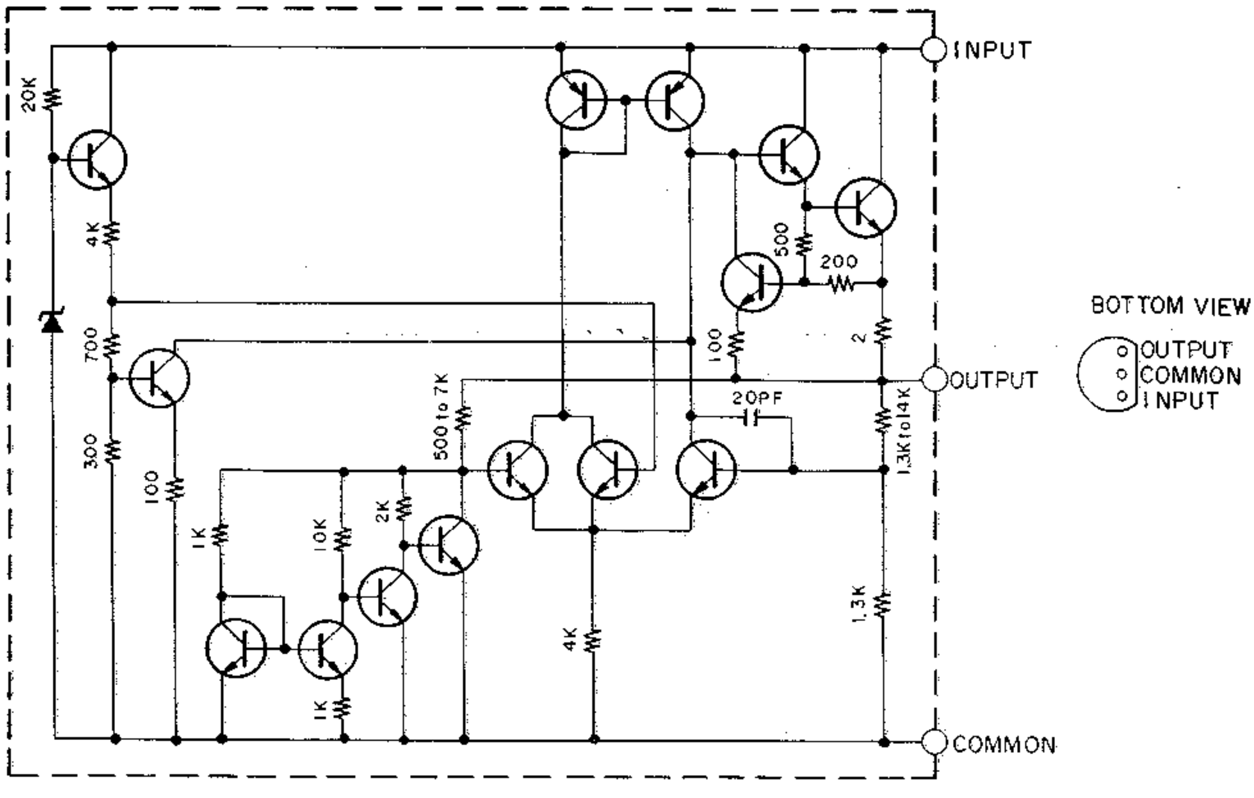


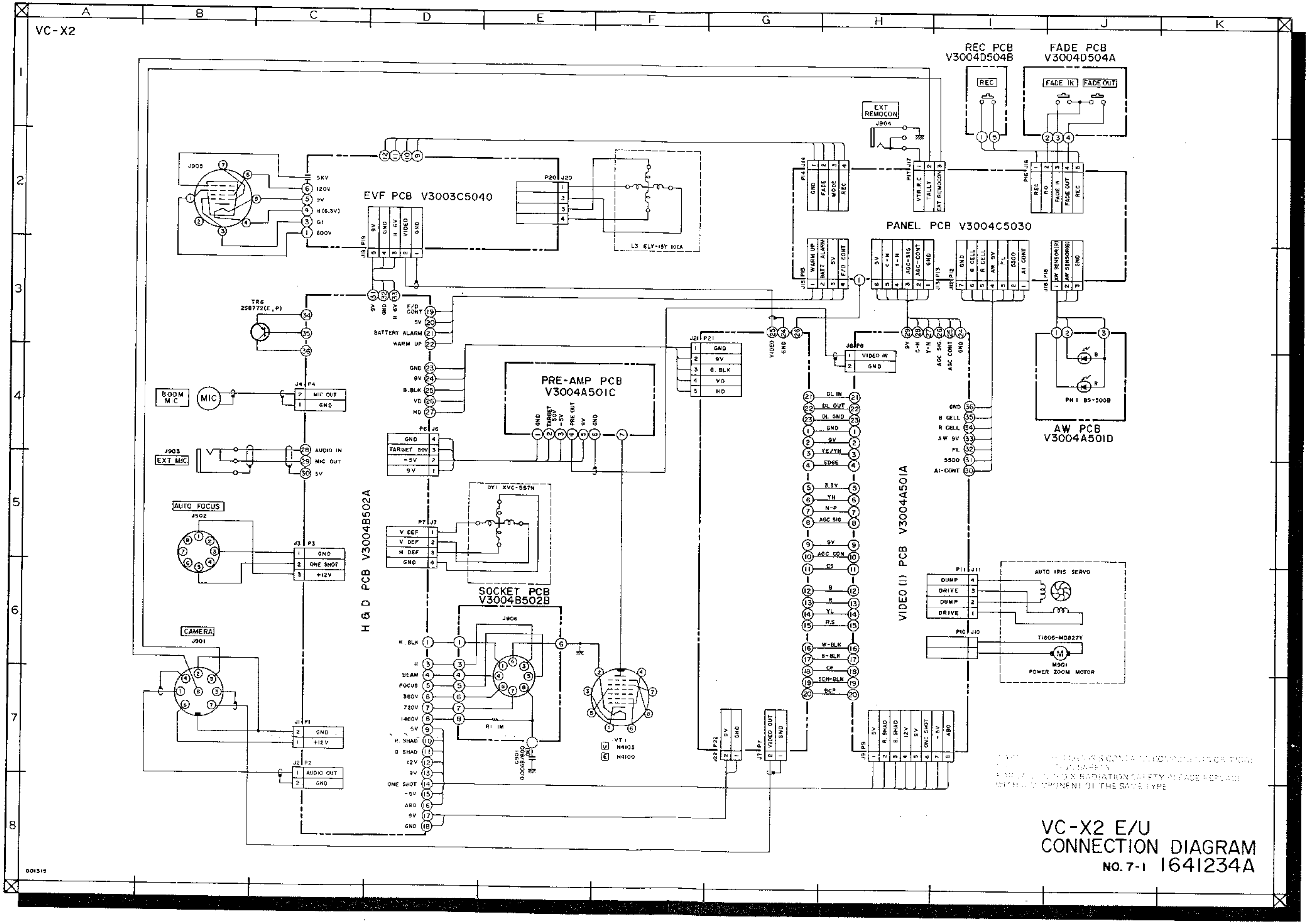
TC4049BP MC14049 MPD4049 HD14049



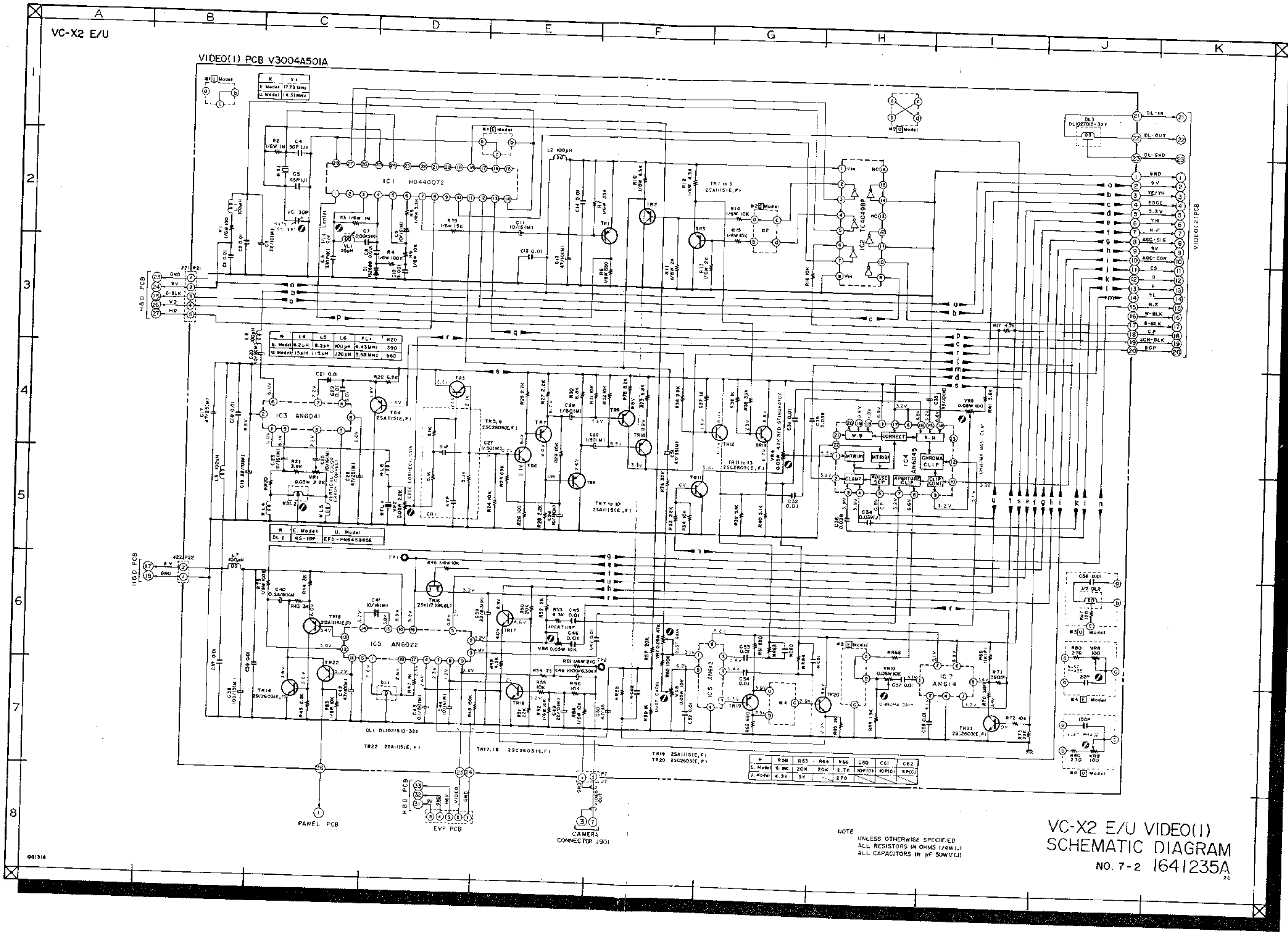


MPC78L05

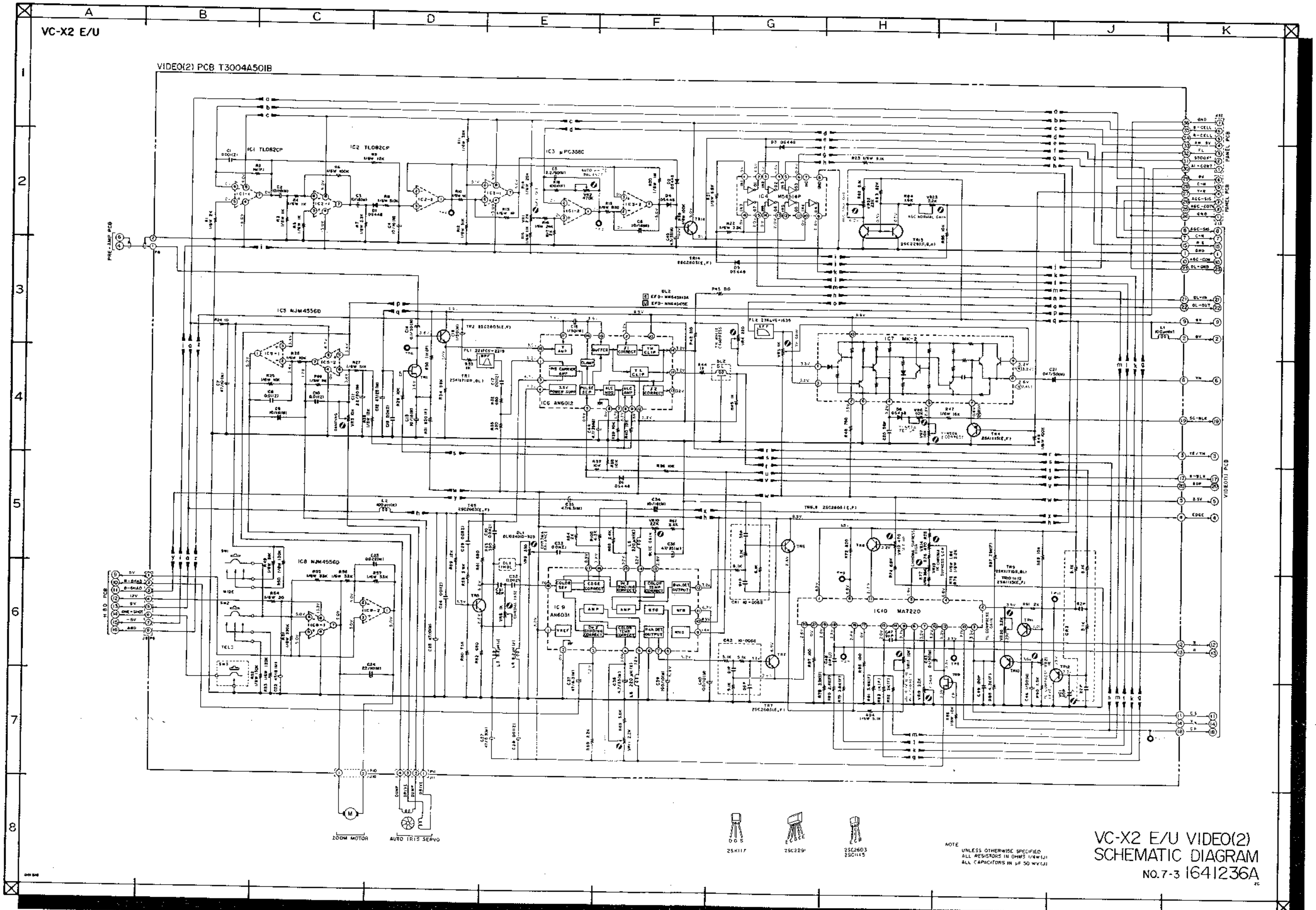


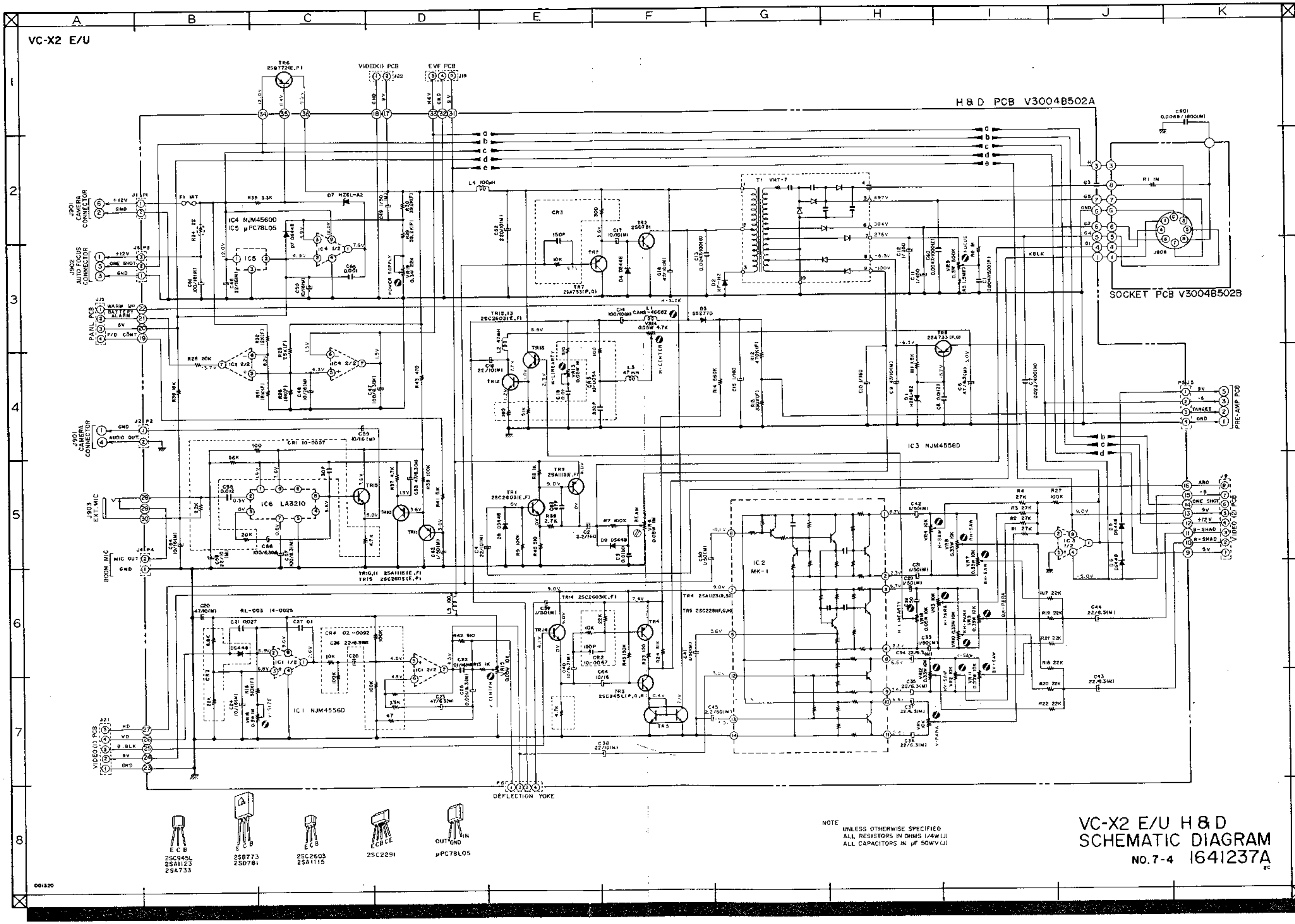


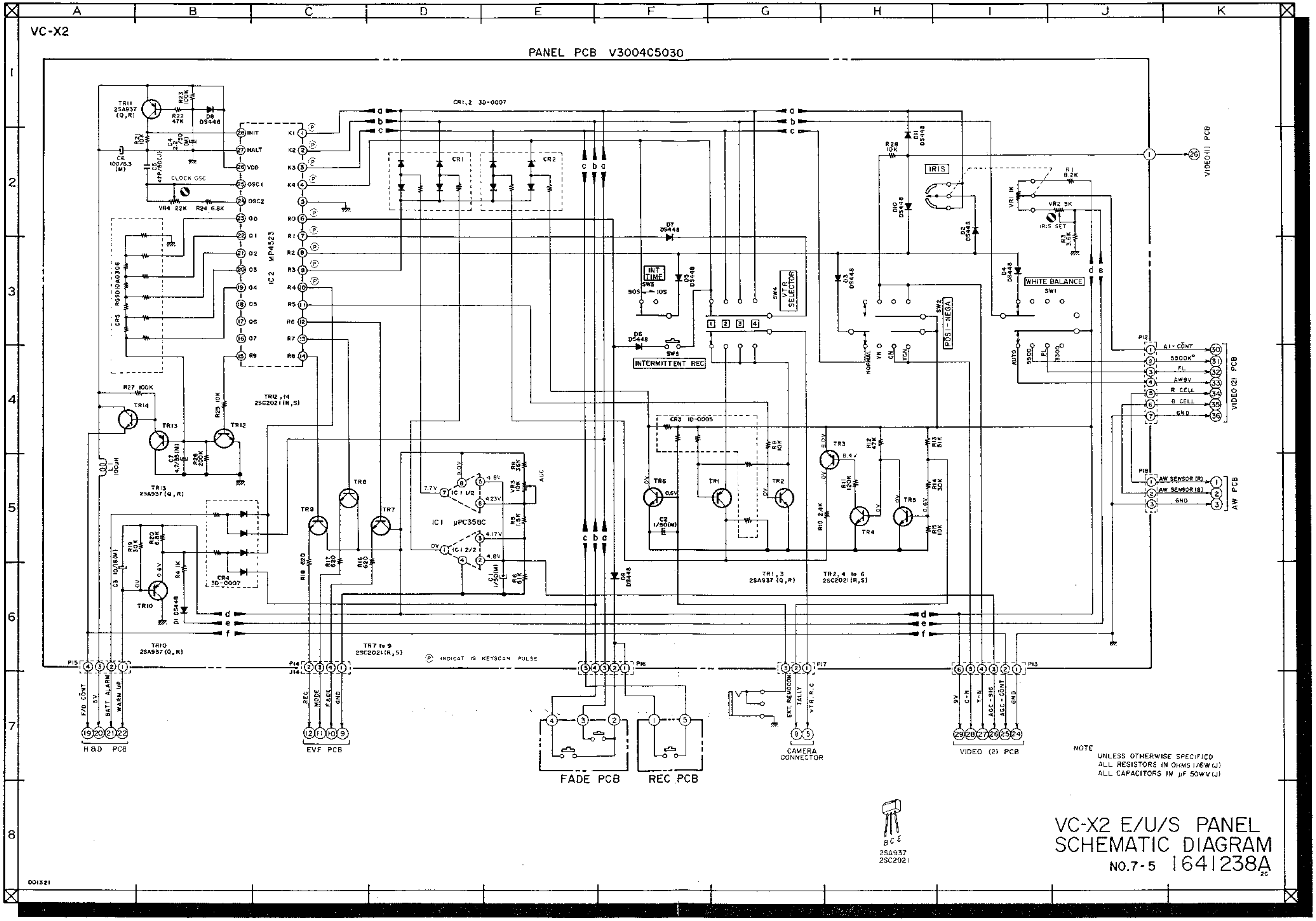
VC-X2
REC PCB
V3004D504B
FADE PCB
V3004D504A
EXT REMOCON
J904
EVF PCB V3003C5040
J905
L3 ELY-15Y 101A
PANEL PCB V3004C5030
TR6
2SB772(E,P)
BOOM MIC
MIC
J903
EXT MIC
AUTO FOCUS
J502
PRE-AMP PCB
V3004A501C
DY1 XVC-557N
SOCKET PCB
V3004B502B
J906
H & D PCB V3004B502A
CAMERA
J901
VIDEO (I) PCB V3004A501A
AW PCB
V3004A501D
AUTO IRIS SERVO
M901
POWER ZOOM MOTOR
VC-X2 E/U
CONNECTION DIAGRAM
NO. 7-1 1641234A
001315



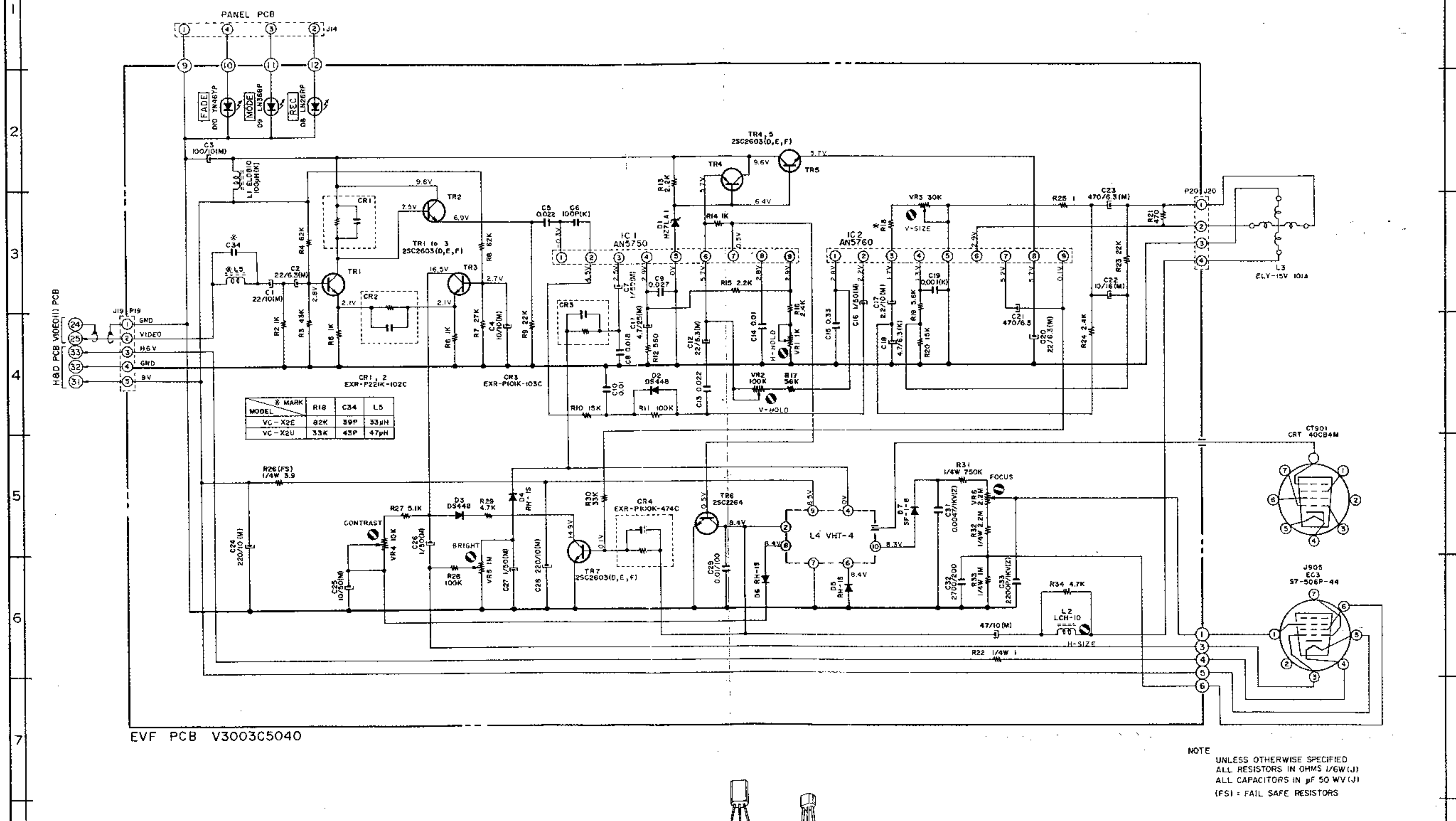
VC-X2 E/U
VIDEO(1) PCB V3004A501A
IC1 HD44007Z
IC3 AN6041
IC5 AN6022
IC6 AN612
IC7 AN614
IC4 AN6045
IC2 TC4049BP
H&D PCB
VIDEO(2)PCB
PANEL PCB
EVF PCB
CAMERA CONNECTOR J901
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W(J)
ALL CAPACITORS IN μF 50WV(J)
VC-X2 E/U VIDEO(1)
SCHEMATIC DIAGRAM
NO. 7-2 1641235A


VC-X2 E/U
VIDEO(2) PCB T3004A501B
IC1 TL082CP
IC2 TL082CP
IC5 NJM4556D
IC6 AN6012
IC8 NJM4556D
IC9 AN6031
IC10 MA7220
ZOOM MOTOR
AUTO IRIS SERVO
PRE-AMP PCB
PANEL PCB
VIDEO(1) PCB
2SK117
2SC2291
2SC2603
2SC1115
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W (J)
ALL CAPACITORS IN µF 50 WV (J)
VC-X2 E/U VIDEO(2)
SCHEMATIC DIAGRAM
NO.7-3 1641236A


VC-X2 E/U
H&D PCB V3004B502A
SOCKET PCB V3004B502B
J901 CAMERA CONNECTOR
J902 AUTO FOCUS CONNECTOR
PANEL PCB
J903 EXT. MIC
BOOM MIC
VIDEO(1) PCB
EVF PCB
PRE-AMP PCB
VIDEO (2) PCB
DEFLECTION YOKE
IC1 NJM4556D
IC2 MK-1
IC3 NJM4558D
IC4 NJM4558D
IC5 μPC78L05
IC6 LA3210
2SC945L 2SA1123 2SA733
2SB773 2SD781
2SC2603 2SA1115
2SC2291
μPC78L05
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W(J)
ALL CAPACITORS IN μF 50WV(J)
VC-X2 E/U H&D
SCHEMATIC DIAGRAM
NO.7-4 1641237A


VC-X2
PANEL PCB V3004C5030
IC2 MP4523
IC1 μPC358C
INTERMITTENT REC
VTR SELECTOR
POSI - NEGA
WHITE BALANCE
IRIS
INT TIME
H&D PCB
EVF PCB
FADE PCB
REC PCB
CAMERA CONNECTOR
VIDEO (2) PCB
VIDEO (1) PCB
AW PCB
(P) INDICAT IS KEYSCAN PULSE
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/6W (J)
ALL CAPACITORS IN μF 50WV (J)
2SA937
2SC2021
VC-X2 E/U/S PANEL
SCHEMATIC DIAGRAM
NO.7-5 1641238A

VC-X2



※ MARK / MODEL	R18	C34	L5
VC-X2E	82K	39P	33μH
VC-X2U	33K	43P	47μH

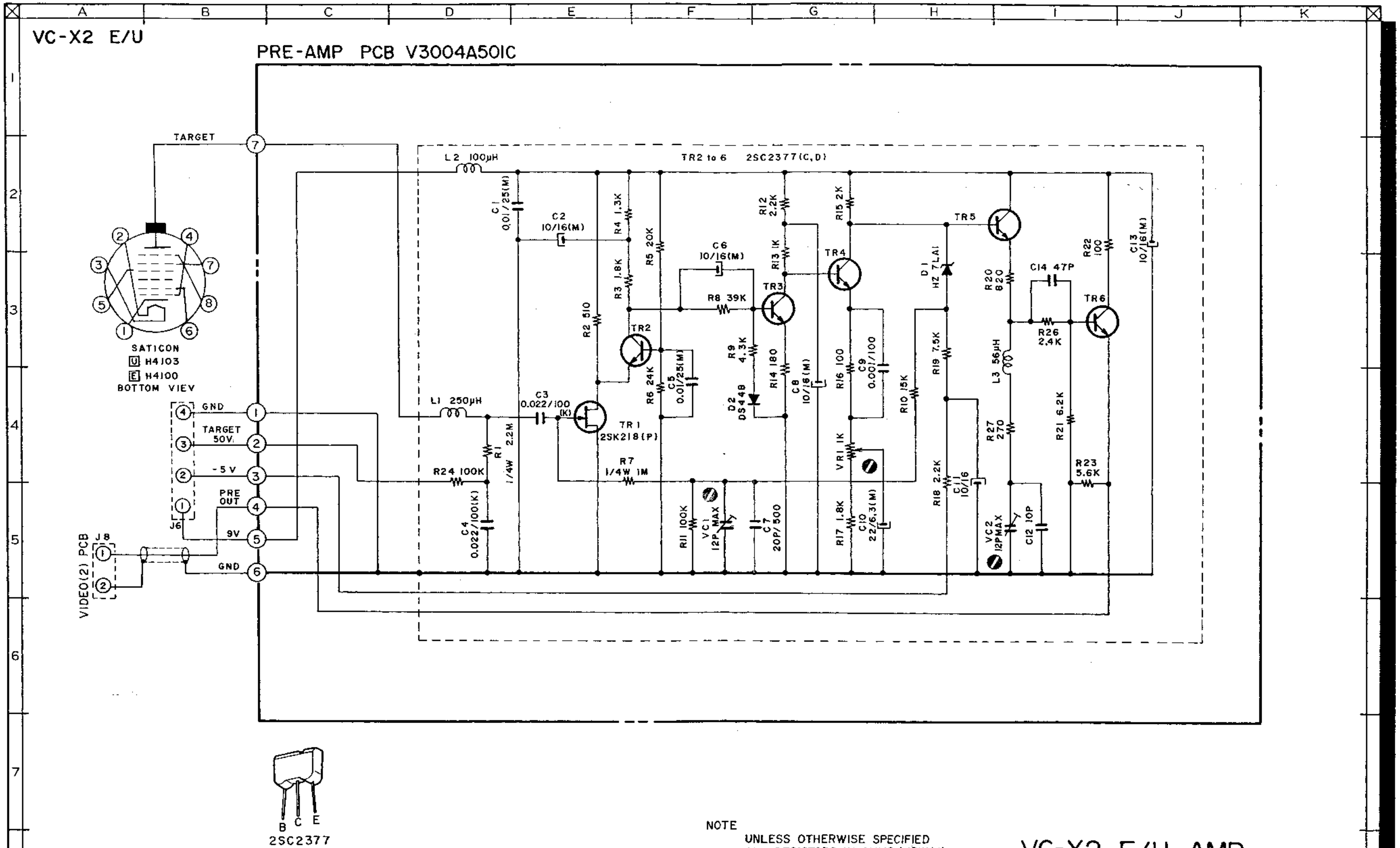
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/6W (J)
ALL CAPACITORS IN pF 50 WV (J)
(FS) : FAIL SAFE RESISTORS

WARNING: THIS CHASSIS CONTAINS COMPONENTS CRITICAL FOR X-RADIATION SAFETY.
FOR CONTINUED X-RADIATION SAFETY PLEASE REPLACE WITH A COMPONENT OF THE SAME TYPE.

VC-X2 E/U/S EVF SCHEMATIC DIAGRAM

NO.7-6 1641239A

001322



NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/6W(J)
ALL CAPACITORS IN μF 50 WV(J)

VC-X2 E/U AMP SCHEMATIC DIAGRAM

NO. 7-7 1641240A

2C