

SPECIFICATIONS

○ Power source.....	AC 115V \pm 15%, 60Hz AC 220V - 240V \pm 10%, 50Hz Not switchable, Completely different design
○ Power consumption.....	35 Watts
○ Input connector.....	RCA phono jack connector
○ Video signal input.....	1Vp-p to 2Vp-p Composite Level
○ Picture tube.....	12" diagonal, 90° deflection 12HBY31N, Phosphor P 31, PLA Available
○ Scanning frequency.....	Horizontal ; 15.75KHz Vertical ; 60Hz
○ Active video period.....	Horizontal ; 44.3 μ s Vertical ; 18.99ms
○ Resolution.....	Horizontal ; 560 dots Vertical ; 216 lines
○ Active display area.....	210(H) \times 160(V)mm
○ Display Character.....	80 characters with 24 lines (7 \times 9 dots)
○ Dimensions.....	380(W) \times 363(V) \times 365(D) mm
○ Weight.....	8.5Kg Approx.

※ NOTE : Specification are subject to change without notice

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SAFETY PRECAUTION

WARNING: Service should not be attempted anyone unfamiliar with the necessary on this unit. The following precautions are necessary during servicing.

1. Some parts such as a picture tube in the unit have special safety-related characteristics for X-RAY radiation protection. For continued safety, the parts replacement should be undertaken referring to item 2 below.
2. Many electrical and mechanical in this unit have special safety-related characteristics for protection against shock hazard, fire hazard and others. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements by shading on the schematic diagram and the parts list. Before replacing any of these components, read the parts list in the manual carefully.
3. When replacing a chassis in the cabinet, always be certain that all the protective devices are installed properly, such as insulating covers, barriers, strain relief, etc.
4. Before replacing the back cover of the set, thoroughly inspect inside the cabinet to see that no stray parts or tools

have been left inside.

5. Before returning to the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as terminal, screwheads, metal overlays, control shafts, etc.

To be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly in to a 220V AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner.

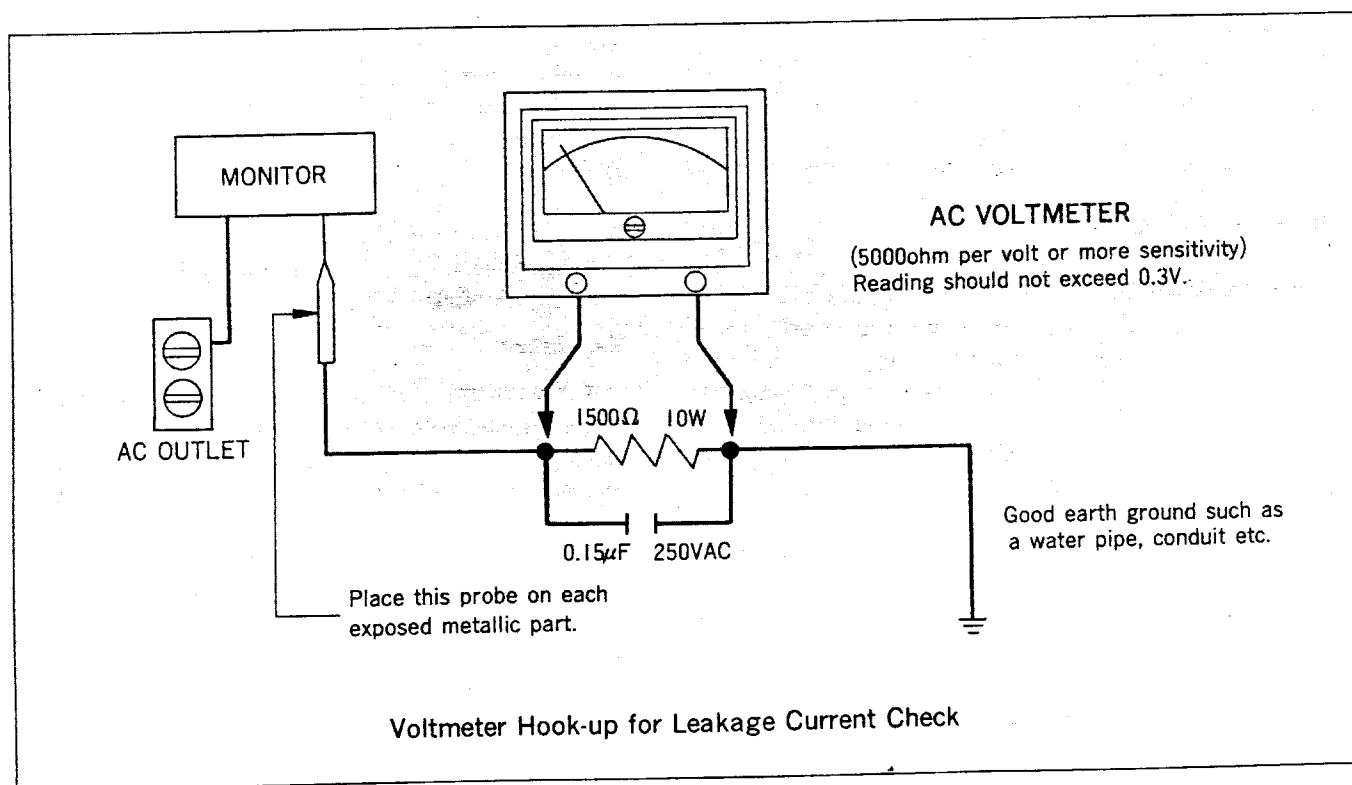
Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15mfd (μF), 250V AC capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time.

Measure the AC voltage across the combination of 1500 ohm resistor and 0.15mfd (μF) capacitor.

Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part.

Voltage measured must not exceed 0.3 volts RMS.

This corresponds to 0.2mA AC any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



GENERAL INFORMATION

1. MONITOR DESCRIPTION

This 12" FLAT (OR ROUND) SCREEN CRT display monitor is operated Composite drive mode input.

2. OPERATING CONTROLS

1) External controls

- Front
Power switch, LED lamp.
- Rear
RCA phono Jack input connector inlet socket for AC power input, H-Shift, Height (V-SIZE), Brightness, Contrast.

2) Service controls (Internal controls)

V-linearity, H-width, H-linearity, Focus, V-Hold, H-Hold, Horiz & vert, Centring Magnet.

3. DISPLAY MONITOR ELECTRICAL CHARACTER

- 1) AC Power Input : 115V \pm 15% 60Hz, 230 \pm 10% 50Hz
Power consumption is 35W under normal viewing condition and uses internal fuse protection.

2) Video

- Input : 1Vp-p to 2Vp-p Sync
Negative RS-170 Compatible
75 ohms internal
Termination Cabinet-Mounted Phone Jack
Connection
- Band Width : 22MHz(-3dB)

3) Horizontal Electrics

- Hold Range : 15.2KHz-16.3KHz
Free Running
- Retrace Time : 9.8 μ s (Includes retrace and delay time)

4) Vertical Electrics

- Hold Range : 47Hz to 63Hz
- Retrace Time : 450 μ s min (Includes retrace and delay time)

- 5) Adjustment size range : 210 \times 160 (mm)
(Horizontal, vertical from 5% over scan to 5% under scan)

4. MECHANICAL SPECIFICATION

Figure-1 shows the mechanical specification for the flat screen CRT display monitor.

5. CRT DISPLAY CHARACTERISTICS

1) Cathode Ray Tube Specification

- Size : 12" diagonal

- Deflection Angle : 90°
- Glass Area : 74 Square inches
- Implosion Protection : Shrinkage band with mounting lug.
- Phosphor : Green (p31), Amber (PLA)
- Display size : 243(H) \times 175(V) (mm)
- Face : Direct etched
- Anode Voltage : 13.0 \pm 1KV

2) Picture Quality

- Resolution : 1100TV line at center, 950TV line at corner at 5 foot-lambert with full "E" character.
- Geometric Distortion : The perimeter of display pattern approaches and ideal rectangle to within \pm 1.5% of the rectangle height.
- Linearity : Character height or width shall be within 10% of that for any adjacent character and within 20% of that for any character on the screen.
- Display Capability : 80 Characters/Row, 24 Rows.

6. ENVIRONMENTAL SPECIFICATION

The monitor is capable of meeting all performance requirement and operate continuously and reliably during and after exposure to any or all of the following environments.

1) Temperature

- Operating : 5°C to +40°C
- Storage : -35°C +50°C

2) Humidity

: 5 to 90 percent
(non condensing)

3) Altitude

- Operating : Up to 10,000 ft
- Non Operating : Up to 50,000 ft

7. X-Radiation

THE FLAT SCREEN CRT display monitor complies with the federal regulation for radiation control as required by the radiation control for health and safety act of 1968 and implemented by title 21 subchapter J of the code of federal regulation.

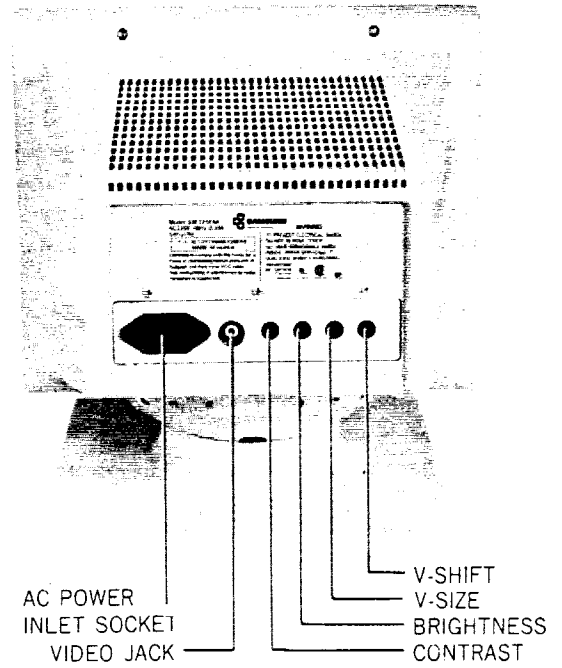
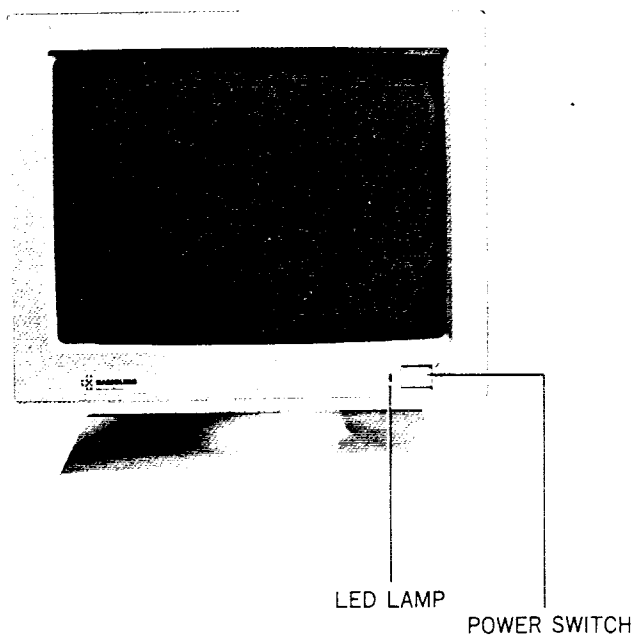
1) Weight

: Approx 8.5kg

2) Others

: All components are capable of meeting UL, CSA, FCC, DHHS, requirement.

CONTROLS AND TERMINAL IDENTIFICATION



MECHANICAL DISASSEMBLIES

CABINET BACK REMOVAL

1. Carefully lay cabinet face down on soft mat.
2. Remove ten(1-10) screws securing the cabinet back and bottom.

CHASSIS REMOVAL

1. First remove cabinet back.
2. Disconnect anode cap, picture tube socket and wire bands. Then slightly loosen the screw securing the deflection yoke.

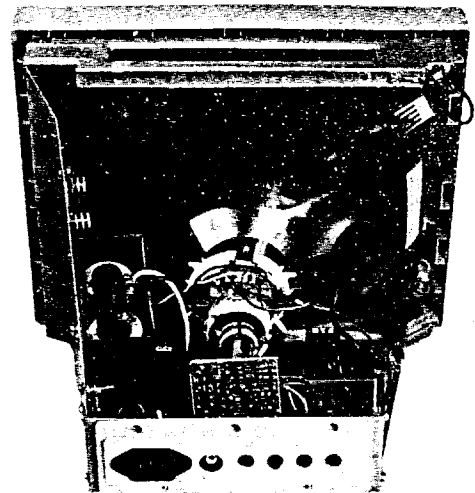
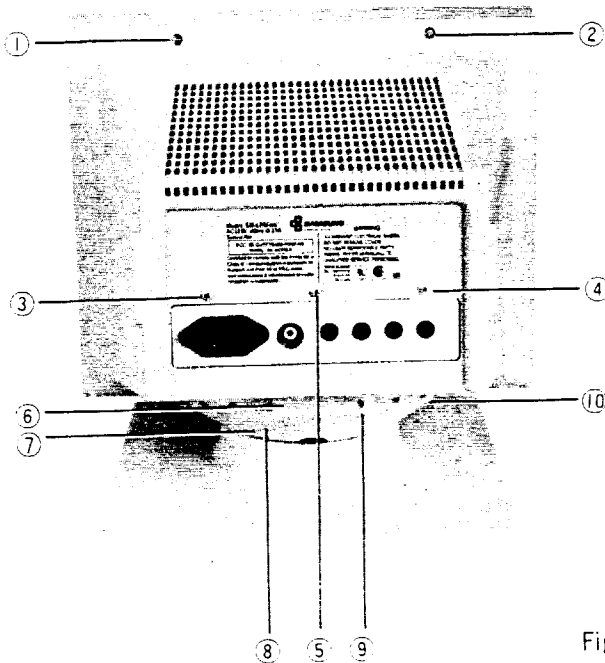


Figure-1

IMPORTANT NOTICE FOR SERVICE PERSONNEL BEFORE SERVICING

PLEASE READ BEFORE ATTEMPTING SERVICE

1. Line voltage must be kept within $\pm 15\%$ of the rated voltage.
2. Do not discharge, arc, or measure high voltage when high voltage lead is connected to CRT. discharge 2nd anode of CRT only after high voltage lead has been disconnected. do not discharge high voltage lead at any time, damage to transistors may result.
3. While the monitor is in operation, do not attempt to connect or disconnect any wires.
4. Disconnect all power before attempting any repairs.
5. When the power is on, do not attempt to short any portion of the circuit.
This shorting may cause damage to the transistors in the monitor.

ADJUSTMENT

Apply power and composite input signal(alphanumeric information) to the data display.

CENTERING

1. Loosen the Deflection Yoke clamp and carefully move the yoke on the neck of the picture tube as far forward as possible.
Rotate the yoke until the top bottom edges of the raster are straight. Tighten the clamp.
2. Center the raster by rotating the centering rings.

FOCUS

Adjust focus control VR503 for providing the best focus.

HORIZONTAL WIDTH

1. Horizontal width coil (L501) to obtain the optimum width for full information.
If the recommended input signal format is used, the width should be (210mm).
2. When character width variation is observed in character of one row, turn the core of the horizontal linearity control (L502) until the character width is uniform.

VERTICAL HEIGHT AND LINEARITY

1. Synchronize the vertical frequency to the information signal by adjusting the vertical hold control VR302.
2. Adjust vertical linearity control VR301 for the best linearity and height control VR303 to obtain the optimum height for full information.
(If the recommended input signal format used, the height should be 160mm).

SERVICE INFORMATION

ADJUSTMENTS

▼ BRIGHTNESS

Normally, the monitor will be used to display alphanumeric or other black and white information moreover, the video polarity is usually white characters on a black background. The brightness control should be adjusted at a point where the while raster is just extinguished the CRT with then be at its cut off point, and a maximum contrast ratio can be obtained when a video signal is applied fully.

▼ VERTICAL ADJUSTMENTS

There is a slight interaction among the vertical frequency height and linearity controls. A change in the height of the picture may affect linearity.

- 1) Set the vertical-hold control VR302, near the mechanical center of its rotation.
- 2) Adjust the vertical linearity control VR301 for best vertical linearity.
- 3) Adjust the vertical height control VR303 for desired height.
- 4) Readjust the vertical hold control VR302 until the picture "locks" on vertical sync.
- 5) Recheck height and linearity, and readjust, if necessary.
- 6) Slight readjustment of vertical hold control, VR302 may be required if the picture "Rolls" up or down after a power off/on sequence.

▼ HORIZONTAL ADJUSTMENTS

Raster width is affected by a combination of the DC power supply, horizontal width coil (L501) and the horizontal linearity coil (L502).

- 1) Horizontal Linearity
When character width variation is observed in characters of one row, turn the core of adjustor (L502) so that character width should become uniform.
- 2) Horizontal Width
Adjust horizontal width by turning the core (L501) of with a plastic hexdrive for the desired width.
- 3) Readjust horizontal linearity and width coil for proper width.
- 4) Observe final horizontal linearity and width, and touch up either adjustment if needed the raster should be properly locked and centered when the horizontal drive

signal adjustment (described in steps 1-4 above) have been completed.

▼ DEFLECTION YOKE ASSEMBLY ADJUSTMENTS

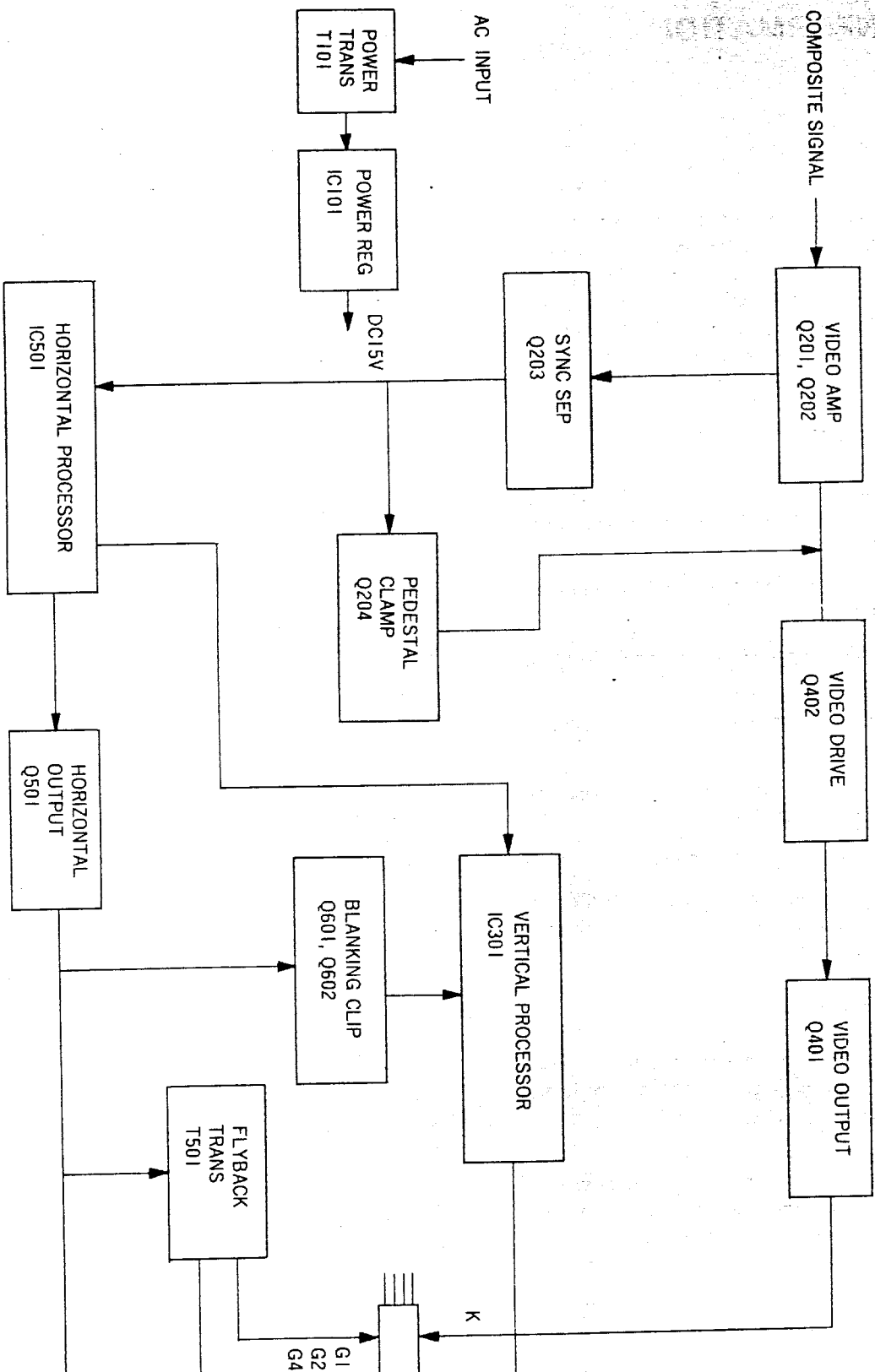
- 1) Raster Centering
If the raster is not properly centered, it may be repositioned by rotating the ring magnets behind the deflection yoke.
The ring magnets should not be used to offset the raster from its nominal center position because it would degrade the resolution of the display if the picture is tilted, rotate the entire yoke.
- 2) Geometric Corrections
The magnets on the yoke assembly shall be polarized so as to provide adjustment of pin-cushion, barreling and other geometric deformities by simply rotating the magnets until the desired display is achieved. readjust if necessary.

▼ FOCUS ADJUSTMENTS

Although the focus control, VR503 dose not have a large effect on focus because of the CRT gun-assembly construction.

If provides some adjustment for maintaining the best overall display focus.

BLOCK DIAGRAM



THEORY OF OPERATION (Circuit Description)

4-1 VIDEO AMP AND DRIVE AND OUTPUT

Video amplifier consists of four stages. Q201 is 1st amplifier, Q202 is 2nd amplifier. Q401 and Q402 are connected in cascode configuration.

Composite signal which applied to Q201 base is developed across collector load. This amplified to driver transistor (Q402) via contrast volume VR201.

Finally, driven signal is applied to CRT cathode through output amplifier (Q401). Q401 and Q402 are cascode configuration.

This minimizes "THE MILLER EFFECT" input capacitance and defining breakdown parameter for Q401 becomes BV_{CBO} as opposed to BV_{CEO} for the common emitter configuration.

4-2 SYNC SEPARATION

This circuit consist of the stage (Q203).

This circuit separate synchronous signal from the composite signal which composed video and synchronous signal.

This separated synchronous signal is supplied to the IC501.

4-3 VERTICAL PROCESS CIRCUIT

Vertical deflection circuit consist of one stage, IC301 which accomplishes all active vertical sync functions.

Vertical input pulses are differentiated by C520 and R301. The sync input performs several function. It strips away any random noise that may be present on the input line and conditions the vertical pulses for processing.

It also converts the input voltage pulses to current control the internal oscillator.

The Oscillator generates non-symmetrical square wave with a short duty cycle at approximately 60Hz. Components VR302, and R312 and C308, determine the frequency. This square wave signal is applied to a ramp generator whose slope and amplitude is determined by VR303, and R311.

The ramp voltage signal is applied to a buffer stages which isolates the ramp generator from the output stages and reduces any loading on the previous stages. Components R303, VR301, V301, C301 and C302, reshape the ramp voltage to make it extremely linear.

The output signal from the buffer stage is applied to a pre-amp stage. For amplification and then to a power ramp stage which driven the vertical deflection coils display via coupling capacitor C305, R304, R305, R306, R302, R309, C307 and C306 Provide AC and DC feedback for the output stage to maintain proper gain and linearity.

4-3 HORIZONTAL OUTPUT AND FLY BACK TRANSFORMER

The horizontal output transistor Q501 is simply a switch is turned on and off at the horizontal scan rate by the driving signal applied to its base.

A sawtooth current through the deflection coil is required to sweep the beam linearly across the CRT screen. This happens when Q501 is turned on and its collector voltage drops to near zero.

And then C516 begins discharging the deflection yoke coil which deflect the beam to the right edge of the CRT.

At that time, Q501 cuts off and C516 causes to supply current to the deflection coil. However, an induced voltage appear across the deflection yoke coil as the magnetic field collapses and an oscillation then occurs the deflection coils and C516.

During the first half cycle of this oscillation the induced voltage is felt across the collector of now cut Q501, C516 and the primary of T501. (F.B.T.)

This voltage is stepped up by T501 and rectified to produce high voltage that is applied to the 2nd anode at the CRT. During the second half cycle of the deflection coil C506 oscillation, the voltage on the collector still cut off Q501 becomes negative

At this time damper diode D504 becomes forward bias and begins conduction.

The DC operating voltage for the CRT with the exception of the heater voltage are all obtained by rectifying and filtering of the horizontal flyback pulse.

D507 and C515 rectify and filter the flyback pulse across Q501 to produce a G2 voltage.

This voltage also feeds to the flyback pulses that rectified and filtered by D505 and C519 to produce voltage which is used as the source voltage for G1 control raster brightness. Also, the CRT anode voltage is developed by T501.

This voltage is typically 13.0KV for 12" normal size.

4-4 PEDESTAL CLAMP CIRCUIT

The pedestal clamp circuit is employed in this character display to stabilize the brightness of the picture.

Q204 is switched by means of the pulse produce by time delayed horizontal signal from the Q203 collector.

The base potential of video exciting transistor Q402 is clamped to the emitter potential of Q204, while Q204 is activated the pedestal level of the video signal applied to the base of Q402 is kept constant.

4-5 BLANKING CLIP

Blanking clip circuit consists of two transistor (Q601, Q602), the vertical signal received from the vertical output stage is

applied to base of Q601 through the R601, C601.

Also, the horizontal blanking signal from the horizontal output stage is applied to base of Q602 VIA the R605 and C605 and C603.

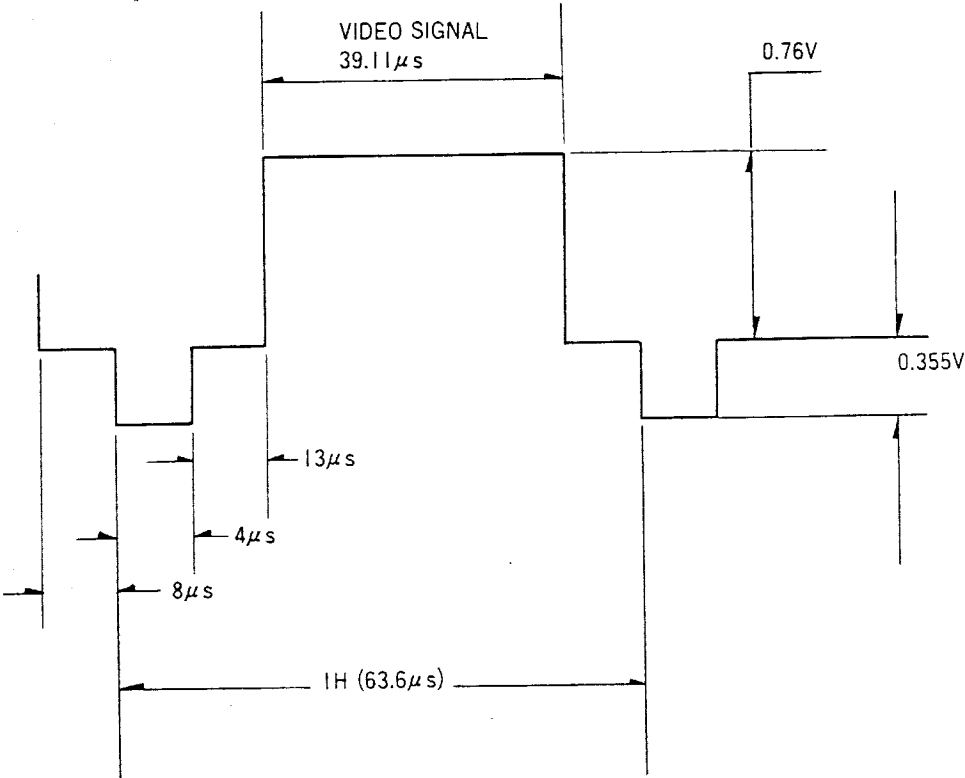
These applied signals are appeared at the collector (Q601, Q602). with phase reverse, amplification and composition.

And than, these signals are applied to brightness grid of CRT through C524.

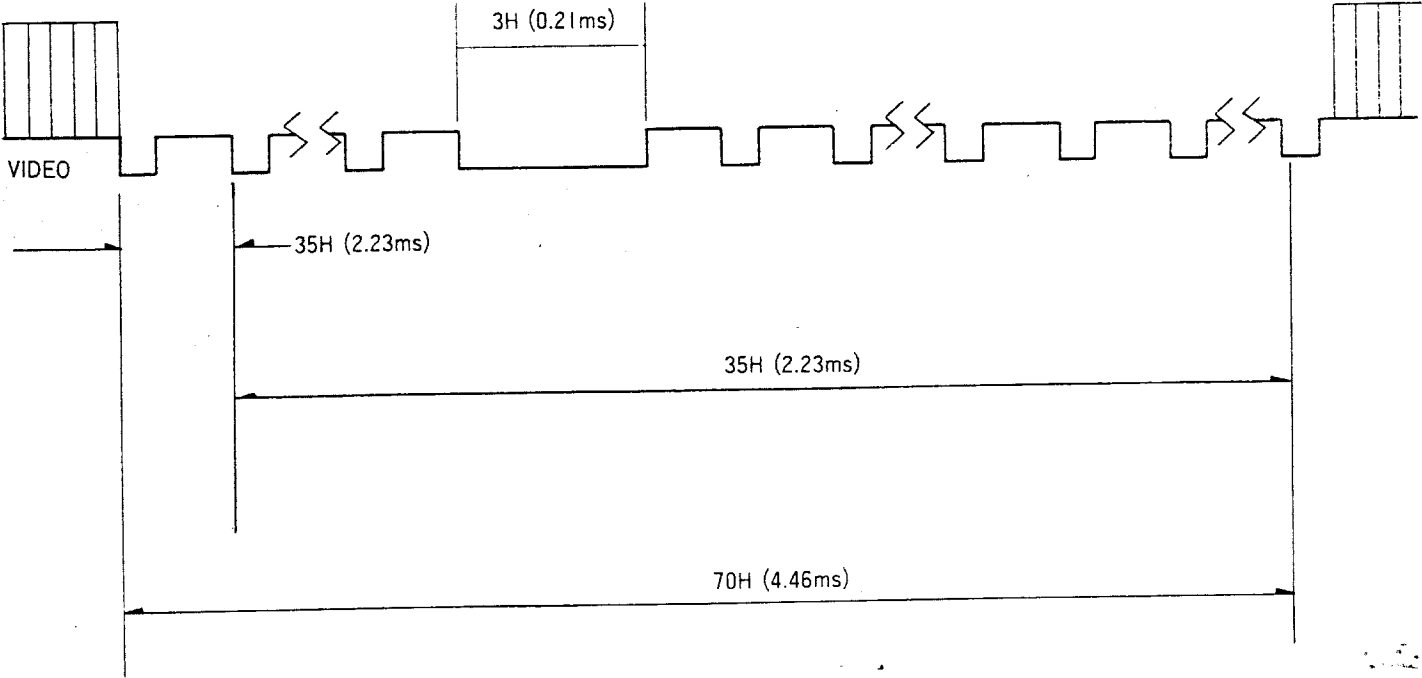
SIGNAL TIMING CHART

(COMPOSITE MODE)

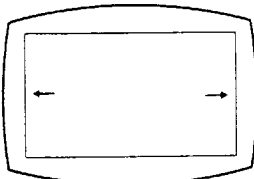
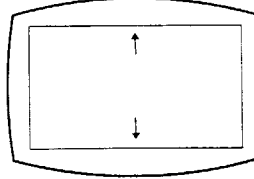
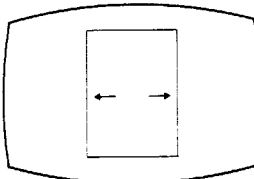
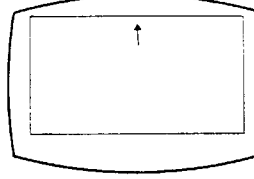
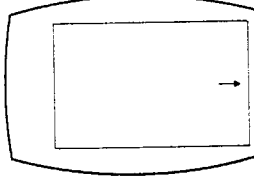
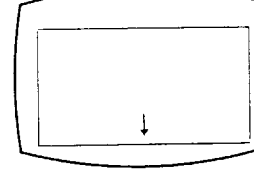
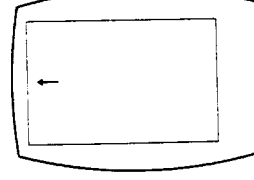
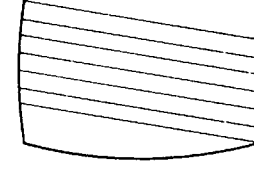
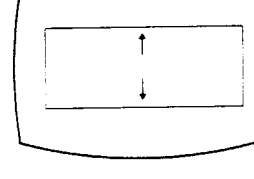
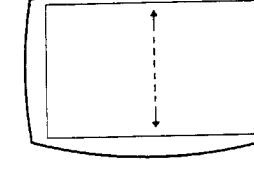
HORIZONTAL
SYNCHRONOUS
INTERVAL



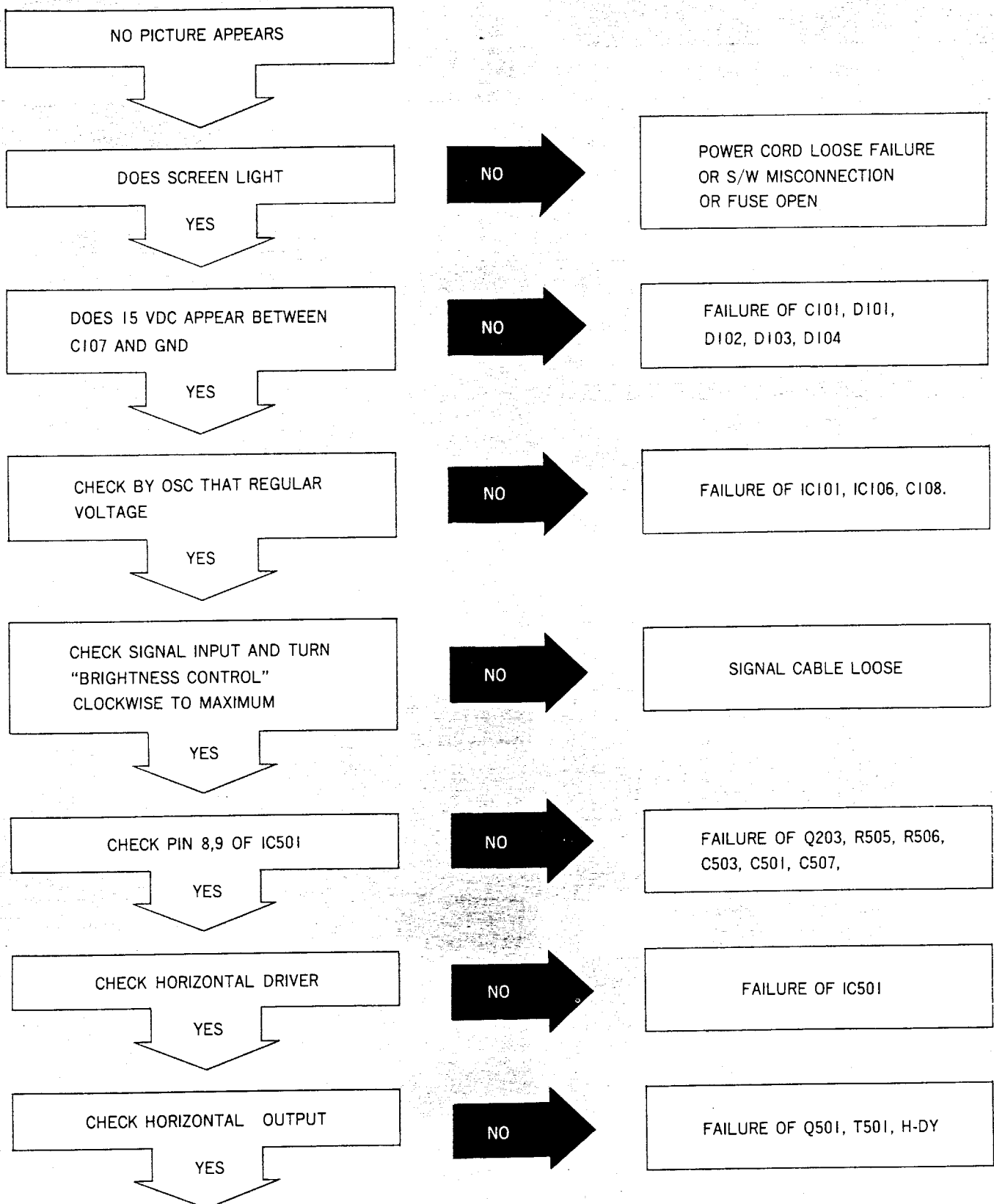
VERTICAL
SYNCHRONOUS
INTERVAL

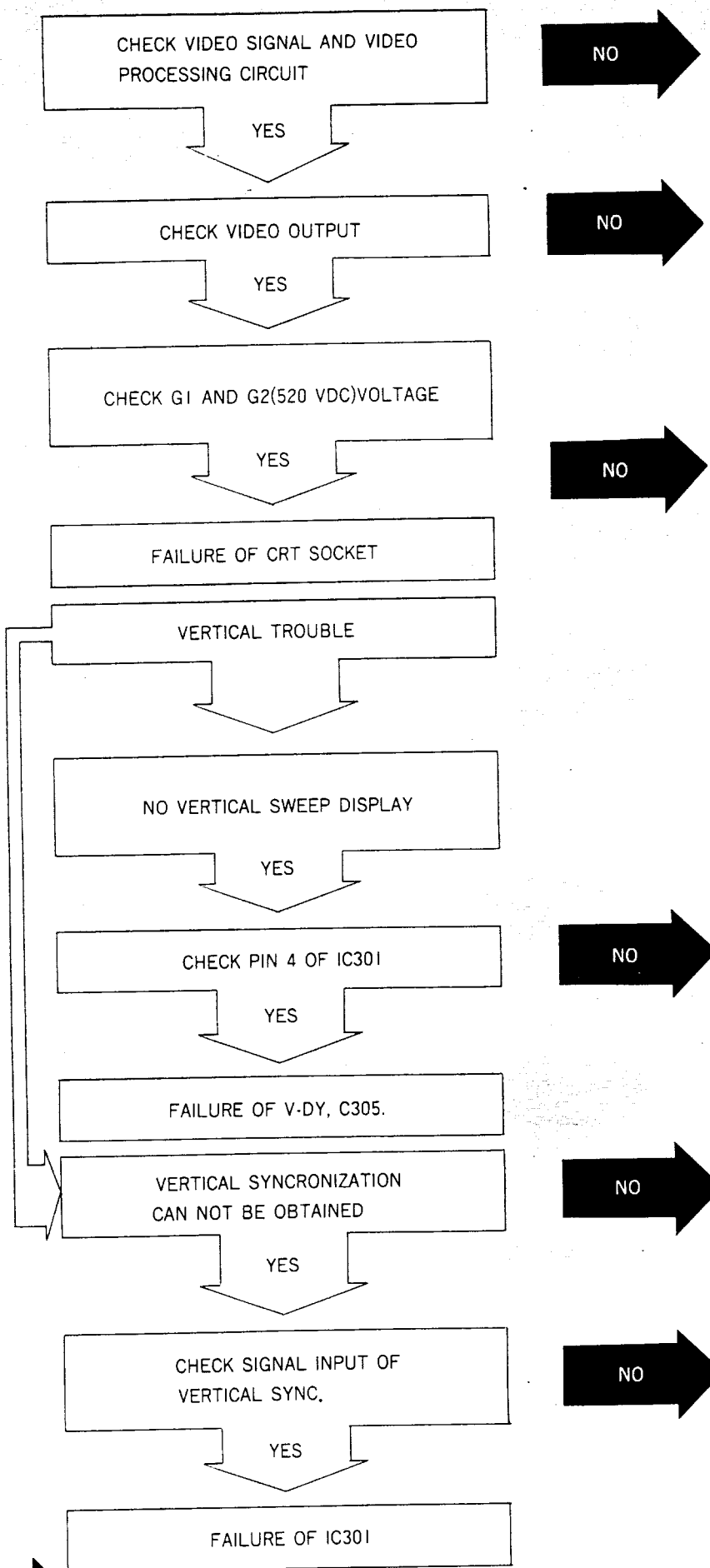


WHEN SIGNALS OTHERS THAN THE RECOMMENDED SIGNAL ARE RECEIVED

PHENOMENON	CAUSE	PHENOMENON	CAUSE
Picture width too wide. 	Data display period is more than $39.11\mu s$	Height of picture too much extended. 	Vertical flyback period is less than 7.8ms
Picture width too narrow. 	Data display period is less than $39.11\mu s$	Picture deviates up ward. 	Picture until that vertical sync signal period is more.
Picture deviates to the right 	Value of front porch is more than $8\mu sec$ or value of back porch is less than $13\mu s$	Picture deviates down ward. 	Picture until that vertical sync signal period is less.
Picture deviates to the left. 	Value of front porch is less than $8\mu s$, or value of back porch is more than $13\mu s$	Picture becomes lateral stripes. 	Horizontal sync. frequency is not set to 15.75KHz
Height of picture too shortened. 	Vertical flyback period is more than 7.6ms	Picture flows vertically (upward and down ward) 	Vertical sync. frequency is not set to 50Hz

TROUBLE SHOOTING INFORMATION CHART





TROUBLE SHOOTING FOR RESPECTIVE SYMPTOMS

▼ NO RASTER

- 1) Turn the internal brightness control clockwise fully :
If raster appears : Good
If raster does not appear : No good to next check item.
 - 2) Is CRT heater on?
It is not on : Check CRT-Heater voltage, power supply circuit and CRT socket for normality.
It is On : Proceed to next check item.
 - 3) Check high voltage by high-voltage voltmeter.
High voltage is not obtained.
Check of flyback transformer T501.
Check the collector pulse of Q501, Check of Pin 2 and ;
din 8 (Input Pin) of IC501, Check of Pin 9 of IC301.
High voltage is obtained : to next check item.
- Check respective CRT electrode voltage for normality with a multi-tester.
-G1 : $-100V \sim +50V$
-G2 : $500V \sim 600V$
-G4 : $-100V \sim 500V$
-K : $40V \sim 50V$

-When voltage of G2 and G4 are not obtained :
Check of D503, D504, D505, D506, D507, VR503, R523, R409, R410, E401, E402 and T501.

-Voltage of G1 is not obtained :
Check of D503, D524, D522, VR504, R524, R407, R525, E404, and T501.

-Voltage of K is not obtained :
Check of D503, D506, C522, C402, E403, R403, R402.

-Voltage of G2, G4 and K are normal :
CRT is faulty, replace CRT.
 - Only one raster line appears in horizontal direction : Check of deflection yoke vertical coil When deflection yoke vertical coil is shorted or opened, deflection yoke is faulty and should be replaced.
 - Only one raster line appears in vertical direction : Check for wire broken in deflection yoke horizontal coil, H-DY, width, lin open, Q501 is failure.
 - Raster is deformed abnormally : Rare shorting of deflection yoke coil, replace deflection yoke.
 - Excessive noise in raster :
Check by measurement that ripples of power supply is less than 50mV p-p when ripples are normal, check to determine whether is any such source that causes alternating magnetic field near the unit.
 - When power is turned off spot remains : Check C521 and CRT for deterioration.
 - Brightness range is abnormal :
Deterioration of C523, or CRT, check of G2 voltage, check of heater voltage.
Check of Q401, Q402 and E401 and C515.
 - Raster size is small and picture is abnormally bright (high voltage is abnormally high) check of C522 or FBT.
 - Vertical synchronization is not achieved.
Check of IC301, VR302.
 - Raster position is deviate to Relative CRT face :
Turn deflection yoke centering magnet so that raster should be positioned at center.
 - Picture or characters do not appear, contrast is unachievable :
-Check of C202, Q201, Q202, VR201, C205, Q401, Q402 and associated components.
-Check of input signal.
-Check of CRT.
 - Picture or characters are displayed but inclined :
-Loosen clamp screw on deflection yoke. rectify the inclination by turning the entire deflection yoke.
 - Fine lines(noise) appear in the picture and characters shiver :
-Check high-voltage portion for leakage.
-Check connectors for complete contact.
-Check FBT for wire breakdown.
 - It takes long for picture to appear (more than 15 seconds) service life of CRT has reached replace CRT.
 - Sync noise not replated with input data appears in picture :
-Check grounding wire for poor contact video grounding for incompleteness input signal for normality and power supply return for incompleteness.

- Picture appear and disappear alternately :
 - Check of input signal.
 - Check of video circuit for poor soldering.
 - Check of CRT socket.
 - Horizontal linearity is not achieved :
 - Check of L501, L502, C512, Q501.
 - Vertical linearity is not achieved :
 - Check of IC301, VR301.
 - Focusing is not achievable :
 - Check of voltage G2 and G4. Readjustment of VR503.
 - Check of high voltage.
 - Check of D507.
- When all above items are normal, CRT is faulty and should be replaced.

VOLTAGE CHART (1)

1. TRANSISTOR

Measured with high impedance
V.T.V.M or circuit tester under
line voltage 120V voltage
reading may vary $\pm 10\%$

TR Lo/No.	TR Type	Function	Operating Condition	Base	Emitter	Collector	Note on Measurement
Q201	C1815	Video Amp Drive	Non signal 1.12Vp-p Signal	3.3V 3.3V	2.66V 2.66V	10.69V 10.69V	V.T.V.M
Q202	A1015	Video Amp Drive	Non signal 1.12Vp-p Signal	10.68V 10.68V	11.35V 11.35V	5.83V 5.84V	"
Q203	A1015	Sync Separation	Non signal 1.12Vp-p Signal	12.20V 14.45V	12.93V 14.85V	9.12V 1.15V	"
Q204	C1815	Pedestal Clamp	Non signal 1.12Vp-p Signal	1.3V -0.9V	0.72V 0.71V	0.74V 1.3V	"
Q401	BF258	Video Output	Non signal 1.12Vp-p Signal	6.85V 6.83V	6.3V 6.3V	47.6V 40V	"
Q402	2N2222A	Video Drive	Non signal 1.12Vp-p Signal	0.73V 1.3V	0.12V 0.67V	6.3V 6.3V	"
Q501	BU806	Horizontal Output	Non signal 1.12Vp-p Signal	-0.21V -0.21V	12mV 11.7mV	20.5V 20.5V	"
Q601	C1815	Blanking Clip	Non signal 1.12Vp-p Signal	-1.9V -1.9V	1.9mV 1.9mV	36.8V 35.6V	"
Q602	C1815	Blanking Clip	Non signal 1.12Vp-p Signal	-2.85V -2.84V	1.8mV 1.9mV	36.7V 35.6V	"

VOLTAGE CHART (2)

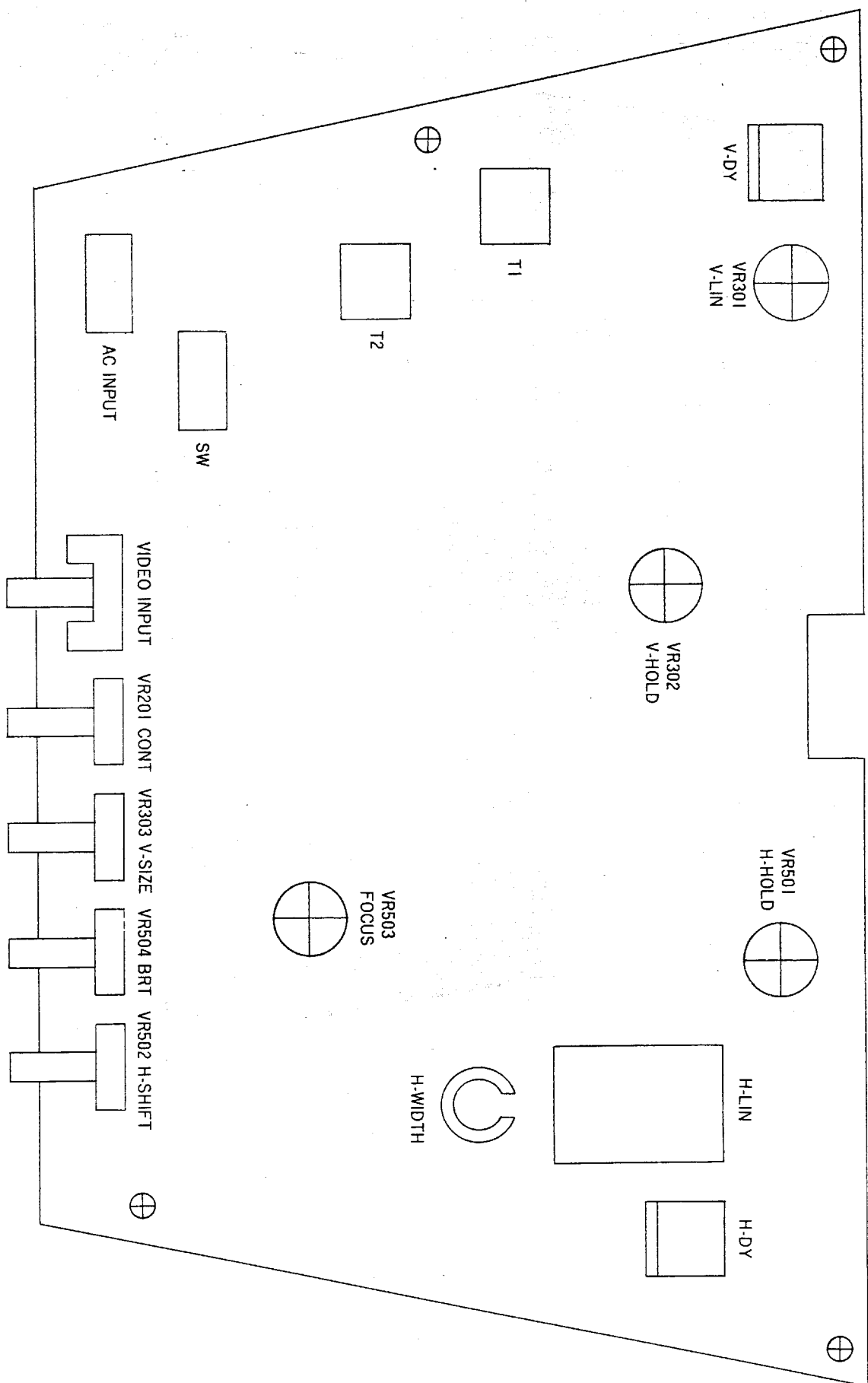
2. IC

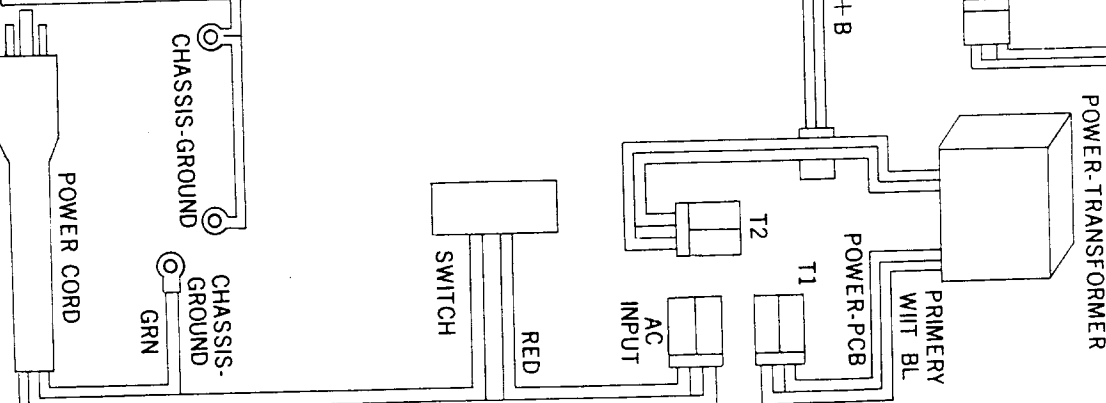
Measured with high impedance
V.T.V.M or circuit tester under
line voltage 120V voltage
reading may vary $\pm 10\%$

Pin No	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC101 L78S15CV VIDEO DRIVE														
No Signal	20.5 V	0 V	15.1 V											
1.12Vp-p Signal	"	"	"											
IC301 TDA 1170N VERTICAL OSC/DRIVER OUTPUT														
No Signal	6.0 V	15.13 V	0.27 V	6.3 V	14.7 V	6.64 V	6.74 V	2.61 V	3.12 V	2.1 V	0.685 V	5.5 V		
1.12Vp-p Signal	5.85 V	15.2 V	0.27 mV	6.4 V	14.7 V	6.65 V	6.75 V	3.73 mV	2.98 V	2.12 V	0.7 V	5.4 V		
IC501 TDA 1180N HORIZONTAL OSC/DRIVER OUTPUT														
No Signal	11.9 V	5.5 V	4.38 mV	11.7 V	8.38 V	1.18 V	1.28 V	1.31 V	1.38 V	11.8 V	7.87 V	2.96 V	2.87 V	6.77 V
1.12Vp-p Signal	11.9 V	5.52 V	4.47 V	11.7 V	8.38 V	1.95 V	1.25 V	0.17 V	0.25 V	0.28 V	7.72 V	2.9 V	2.04 V	6.74 V

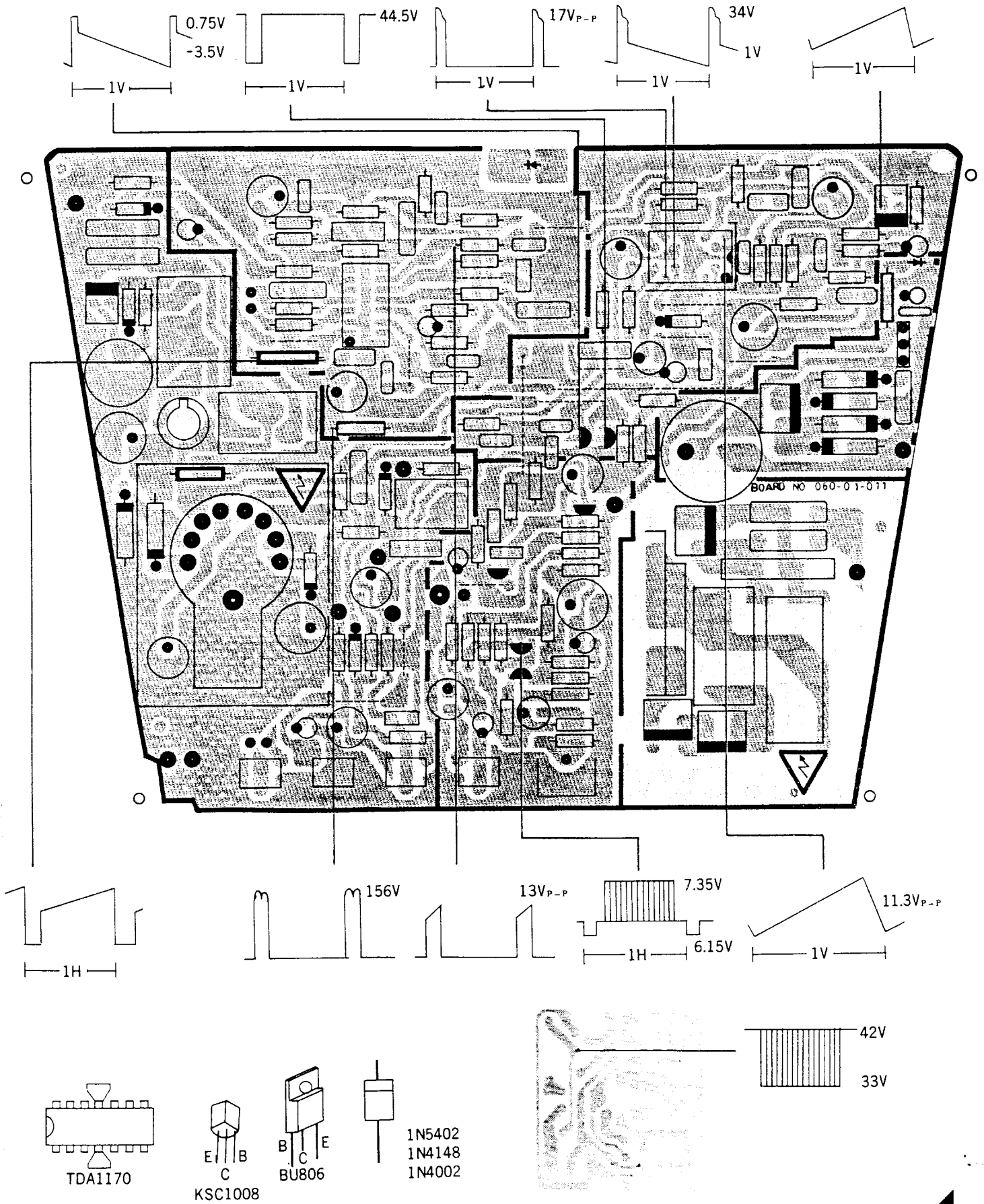
Pin No		15	16
IC501			
No Signal		2.87 V	4.1 mV

ADJUSTOR AND CONNECTOR FOR MAIN PC 8.





PC BOARD ASSEMBLY (SOLDER SIDE)



100



PCB COMPONENT LOCATION

PCB COMPONENT LOCATION

BOARD NO: 060-01-011

AC INPUT

VIDEO IN

VR 301

VR 302

VR 303

VR 304

VR 305

VR 306

VR 307

VR 308

VR 309

VR 310

VR 311

VR 312

VR 313

VR 314

VR 315

VR 316

VR 317

VR 318

VR 319

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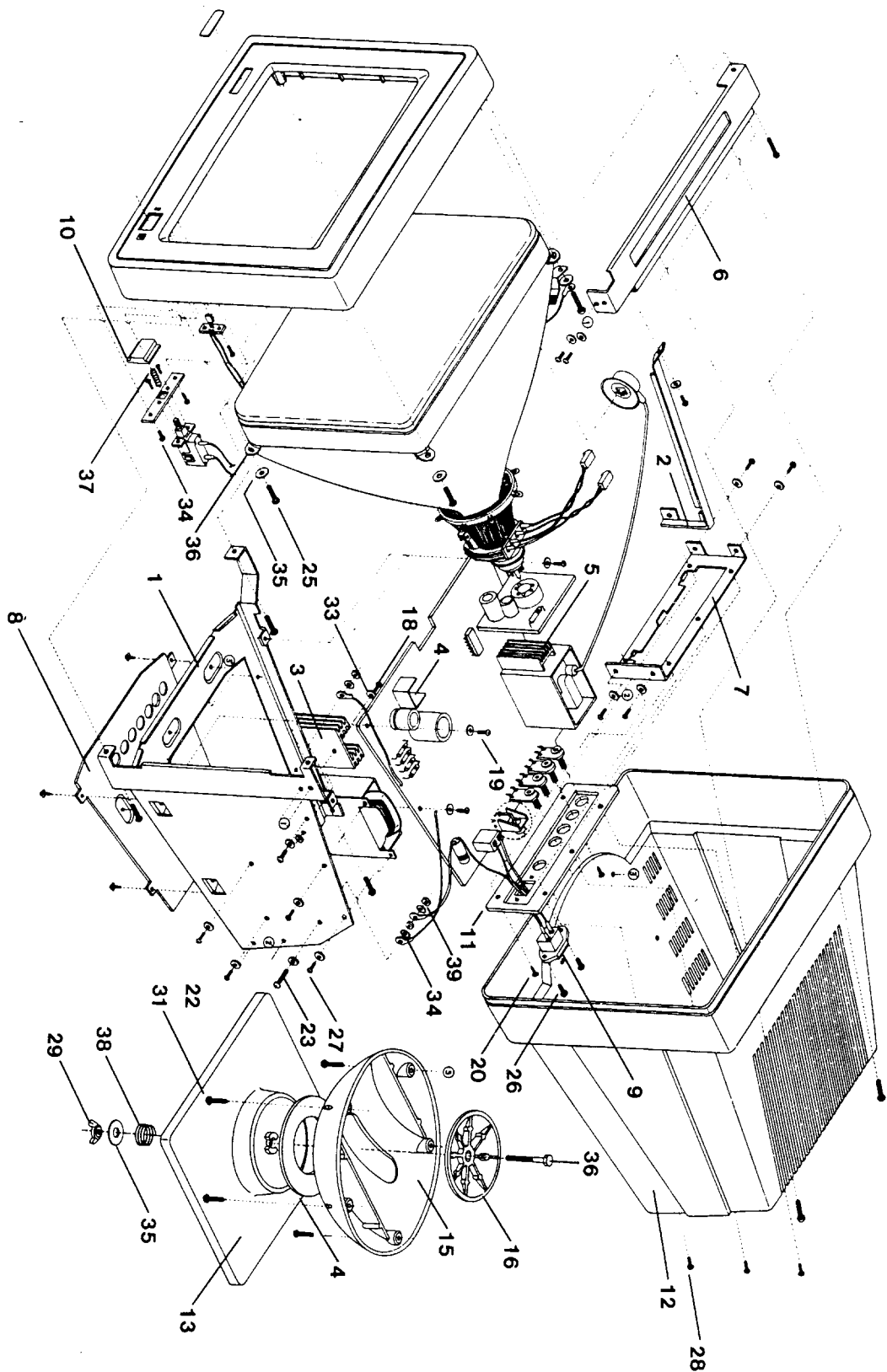
VR 685

VR 686

VR 687

VR 688

VR 68



REFER TO PAGE: 28

REPLACEMENT PARTS LIST

Location No.	Part No.	Description	Remark
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PICTURE TUBE

26-04-012	Picture Tube (Type : 12HBY31N)		
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INTEGRATED CIRCUITS

IC301	20-06-002	TDA 1170N	
IC502	20-06-006	TDA 1180P	

TRANSISTORS

Q201	18-04-006	2SC1815	
Q202	18-05-002	2SA1015	
Q203	18-05-002	2SA1015	
Q204	18-04-006	2SC1815	
Q601	18-04-006	2SC1815	
Q602	18-04-006	2SC1815	

DIODES

D101	19-01-007	Diode, 1N5402	
D102	19-01-007	Diode, 1N5402	
D103	19-01-007	Diode, 1N5402	
D104	19-01-007	Diode, 1N5402	
D301	19-03-012	Diode, 1N4150	
D502	19-01-004	Diode, 1N4004	
D503	19-01-023	Diode, RGP30G	
D504	19-01-023	Diode, RGP30G	
D505	19-01-003	Diode, 1N4003	
D506	19-01-002	Diode, 1N4002	
D507	19-01-022	Diode, GL 818	

CAPACITORS

C101	16-25-005	Capacitor-FXD M-Polyester 0.47uF AC 250V	
Alternate	16-18-004	Capacitor-FXD M-Paper 0.47uF AC 250V	
C102	16-25-006	Capacitor-FXD M-Polyester 0.01uF AC 300V	
Alternate	16-18-003	Capacitor-FXD M-Paper 0.01uF AC 250V	
C103	16-25-010	Capacitor-FXD M-Polypropylene 4700pF AC 300V	
Alternate	16-18-002	Capacitor-FXD M-Paper 4700pF AC 250V	
C104	16-25-010	Capacitor-FXD M-Polypropylene 4700pF AC 300V	
Alternate	16-18-002	Capacitor-FXD M-Paper 4700pF AC 250V	
C105	16-13-016	Capacitor-FXD Mylar 0.22uF 100V	
C106	16-14-011	Capacitor-FXD Mylar 0.01uF 50V	
C107	16-01-028	Capacitor-FXD Electrolytic 3300uF 35V	(115V Only)
Alternate	16-01-030	Capacitor-FXD Electrolytic 6800uF 35V	(115V Only)
C108	16-04-006	Capacitor-FXD Electrolytic 47uF 25V	
C201	16-01-021	Capacitor-FXD Electrolytic 220uF 25V	
C202	16-04-007	Capacitor-FXD Electrolytic 100uF 25V	
C203	16-01-021	Capacitor-FXD Electrolytic 220uF 25V	
C204	16-04-004	Capacitor-FXD Electrolytic 10uF 25V	
C205	16-04-005	Capacitor-FXD Electrolytic 22uF 25V	
C206	16-14-004	Capacitor-FXD Mylar 0.033uF 50V	
C207	16-01-022	Capacitor-FXD Electrolytic 470uF 25V	
C208	16-11-003	Capacitor-FXD Ceramic 330pF 50V	
C209	16-04-004	Capacitor-FXD Electrolytic 10uF 25V	
C301	16-14-008	Capacitor-FXD Mylar 0.1uF 100V	
C302	16-14-008	Capacitor-FXD Mylar 0.1uF 100V	
C303	16-14-001	Capacitor-FXD Mylar 0.0015uF 50V	
C304	16-11-002	Capacitor-FXD Ceramic 100pF 50V	
C305	16-01-011	Capacitor-FXD Electrolytic 1000uF 16V	
C306	16-14-008	Capacitor-FXD Mylar 0.1uF 100V	
C307	16-04-004	Capacitor-FXD Electrolytic 10uF 25V	
C308	16-13-015	Capacitor-FXD Mylar 0.15uF 100V	
C309	16-04-007	Capacitor-FXD Electrolytic 100uF 25V	
C501	16-13-016	Capacitor-FXD Mylar 0.22uF 100V	
C502	16-13-016	Capacitor-FXD Mylar 0.22uF 100V	
C504	16-14-008	Capacitor-FXD Mylar 0.1uF 100V	
C505	16-04-007	Capacitor-FXD Electrolytic 100uF 25V	
C506	16-14-011	Capacitor-FXD Mylar 0.01uF 50V	
C507	16-14-002	Capacitor-FXD Mylar 0.0039uF 50V	
C508	16-14-011	Capacitor-FXD Mylar 0.01uF 50V	
C509	16-04-003	Capacitor-FXD Electrolytic 4.7uF 25V	
C510	16-13-017	Capacitor-FXD Mylar 0.47uF 100V	
C511	16-04-003	Capacitor-FXD Electrolytic 4.7uF 25V	

C512	16-09-004
C513	16-01-011
C514	16-04-007
C515	16-15-010
C516	16-15-025
C518	16-15-008
C519	16-01-038
C520	16-14-001
C521	16-04-002
C522	16-01-033
C523	16-14-008
C524	16-13-016
C525	16-14-008
C526	16-14-008
C601	16-04-001
C602	16-14-006
C603	16-14-006
C604	16-11-002
C605	16-11-001

Capacitor-FXD	N-Polar 3.9uF 25V
Capacitor-FXD	Electrolytic 1000uF 16V
Capacitor-FXD	Electrolytic 100uF 25V
Capacitor-FXD	Polypropylene 0.047uF 630V
Capacitor-FXD	Polypropylene 0.039uF 400V
Capacitor-FXD	Polypropylene 0.01uF 630V
Capacitor-FXD	Electrolytic 10uF 160V
Capacitor-FXD	Mylar 0.0015uF 50V
Capacitor-FXD	Electrolytic 3.3uF 50V
Capacitor-FXD	Electrolytic 220uF 50V
Capacitor-FXD	Mylar 0.1uF 100V
Capacitor-FXD	Mylar 0.22uF 100V
Capacitor-FXD	Mylar 0.1uF 100V
Capacitor-FXD	Mylar 0.1uF 100V
Capacitor-FXD	Electrolytic 1uF 50V
Capacitor-FXD	Mylar 0.0056uF 100V
Capacitor-FXD	Mylar 0.0056uF 100V
Capacitor-FXD	Ceramic 100pF 50V
Capacitor-FXD	Ceramic 47pF 50V

RESISTORS

R101	14-06-102
R201	14-04-121
R202	14-04-101
R203	14-04-681
R204	14-04-153
R205	14-04-101
R206	14-04-562
R207	14-04-750
R208	14-04-331
R209	14-04-221
R211	14-04-224
R212	14-04-300
R213	14-04-221
R214	14-04-102
R215	14-04-274
R216	14-04-103
R217	14-04-302
R218	14-04-151
R301	14-04-393
R302	14-04-474
R303	14-04-824
R304	14-04-104
R305	14-04-104
R306	14-04-563
R307	14-04-563
R308	14-04-033
R309	14-04-018
R310	14-04-392
R311	14-04-124
R312	14-04-124
R501	14-09-270
R502	14-10-101
R503	14-04-103
R504	14-04-155
R505	14-04-103
R506	14-04-122
R507	14-04-223
R508	14-04-123
R509	14-04-823
R511	14-04-104
R512	14-04-122
R513	14-04-824
R514	14-04-332
R515	14-06-753
R516	14-04-562
R517	14-04-330
R518	14-06-102
R519	14-09-005
R520	14-04-103
R521	14-06-101
R522	14-04-154
R523	14-04-102
R524	14-04-393
R525	14-06-682
R526	14-04-563
R527	14-04-224
R528	14-04-225
R601	14-04-222
R602	14-04-103
R603	14-04-104
R604	14-04-103
R605	14-04-563

Resistor-FXD	Carbon 1KΩ	1/2W 5%
Resistor-FXD	Carbon 120Ω	1/4W 5%
Resistor-FXD	Carbon 100Ω	1/4W 5%
Resistor-FXD	Carbon 680Ω	1/4W 5%
Resistor-FXD	Carbon 15KΩ	1/4W 5%
Resistor-FXD	Carbon 100Ω	1/4W 5%
Resistor-FXD	Carbon 5.6KΩ	1/4W 5%
Resistor-FXD	Carbon 75Ω	1/4W 5%
Resistor-FXD	Carbon 330Ω	1/4W 5%
Resistor-FXD	Carbon 220Ω	1/4W 5%
Resistor-FXD	Carbon 220KΩ	1/4W 5%
Resistor-FXD	Carbon 30Ω	1/4W 5%
Resistor-FXD	Carbon 220Ω	1/4W 5%
Resistor-FXD	Carbon 1KΩ	1/4W 5%
Resistor-FXD	Carbon 270KΩ	1/4W 5%
Resistor-FXD	Carbon 10KΩ	1/4W 5%
Resistor-FXD	Carbon 3KΩ	1/4W 5%
Resistor-FXD	Carbon 150Ω	1/4W 5%
Resistor-FXD	Carbon 39KΩ	1/4W 5%
Resistor-FXD	Carbon 470KΩ	1/4W 5%
Resistor-FXD	Carbon 820KΩ	1/4W 5%
Resistor-FXD	Carbon 100KΩ	1/4W 5%
Resistor-FXD	Carbon 100KΩ	1/4W 5%
Resistor-FXD	Carbon 56KΩ	1/4W 5%
Resistor-FXD	Carbon 56KΩ	1/4W 5%
Resistor-FXD	Carbon 3.3Ω	1/4W 5%
Resistor-FXD	Carbon 1.8Ω	1/4W 5%
Resistor-FXD	Carbon 3.9KΩ	1/4W 5%
Resistor-FXD	Carbon 120KΩ	1/4W 5%
Resistor-FXD	Carbon 120KΩ	1/4W 5%
Resistor-FXD	Metal Oxide 27Ω	1W 5%
Resistor-FXD	Metal Oxide 100Ω	2W 5%
Resistor-FXD	Carbon 10KΩ	1/4W 5%
Resistor-FXD	Carbon 1.5MΩ	1/4W 5%
Resistor-FXD	Carbon 10KΩ	1/4W 5%
Resistor-FXD	Carbon 1.2KΩ	1/4W 5%
Resistor-FXD	Carbon 22KΩ	1/4W 5%
Resistor-FXD	Carbon 12KΩ	1/4W 5%
Resistor-FXD	Carbon 82KΩ	1/4W 5%
Resistor-FXD	Carbon 100KΩ	1/4W 5%
Resistor-FXD	Carbon 1.2KΩ	1/4W 5%
Resistor-FXD	Carbon 820KΩ	1/4W 5%
Resistor-FXD	Carbon 3.3KΩ	1/4W 5%
Resistor-FXD	Carbon 75KΩ	1/2W 5%
Resistor-FXD	Carbon 5.6KΩ	1/4W 5%
Resistor-FXD	Carbon 33Ω	1/4W 5%
Resistor-FXD	Carbon 1KΩ	1/2W 5%
Resistor-FXD	Metal Oxide 0.5Ω	1W 5%
Resistor-FXD	Carbon 10KΩ	1/4W 5%
Resistor-FXD	Carbon 100Ω	1/2W 5%
Resistor-FXD	Carbon 150KΩ	1/4W 5%
Resistor-FXD	Carbon 1KΩ	1/4W 5%
Resistor-FXD	Carbon 39KΩ	1/4W 5%
Resistor-FXD	Carbon 6.8KΩ	1/2W 5%
Resistor-FXD	Carbon 56KΩ	1/4W 5%
Resistor-FXD	Carbon 220KΩ	1/4W 5%
Resistor-FXD	Carbon 2.2MΩ	1/4W 5%
Resistor-FXD	Carbon 2.2KΩ	1/4W 5%
Resistor-FXD	Carbon 10KΩ	1/4W 5%
Resistor-FXD	Carbon 100KΩ	1/4W 5%
Resistor-FXD	Carbon 10KΩ	1/4W 5%
Resistor-FXD	Carbon 56KΩ	1/4W 5%

CONTROLS

VR201	15-03-008	H-Trimer W/Shaft 500Ω B 0.2W 25%
VR301	15-05-008	V-Trimer W/Shaft 220KΩ B 0.15W 25%
VR302	15-05-007	V-Trimer W/Shaft 100KΩ B 0.15W 25%
VR303	15-03-003	H-Trimer W/Shaft 100KΩ B 0.2W 25%
VR501	15-05-005	V-Trimer W/Shaft 22KΩ B 0.15W 25%
VR502	15-03-010	H-Trimer W/Shaft 200KΩ B 0.2W 25%
VR503	15-05-010	V-Trimer W/Shaft 2.2MΩ B 0.15W 25%
VR504	15-03-003	H-Trimer W/Shaft 100KΩ B 0.2W 25%

COILS

L501	17-04-019	Coil Horizontal Width 20~55uH
L502	17-05-015	Coil Horizontal Linearity 11~55uH
L/F101	17-08-004	Coil Line Filter 15.5uH 120mm

FLYBACK TRANSFORMER & DEFELECTION YOKE

T501	17-03-017	Deflection Yoke DMK-1294PL
	17-02-019	Flyback Transformer FMC-1245 OL

TRANSFORMERS & FUSE & FUSE CLIP

17-01-023	Power Transformer 451-01-018 (115V Only)
17-01-024	Power Transformer 451-01-019 (230V Only)

AC CORDS & TERMINARS & WIRINGS

21-07-004	Power Cord SVT 3/18 AWG 6FT Black (115V Only)
21-07-005	Power Cord SVT 3/18 AWG 6FT Black (230V Only)
10-11-001	HDR, Lock, 3.96, 2P Black (V-DY Base)
10-11-002	HDR, Lock, 3.96, 2P White (H-DY Base)
10-11-005	HDR, Lock, 7.92, 2P White (4pcs) (S/W, Power Base)
21-05-022	Wire, Connector Housing, 3P 108mm (IC101 Connector)
21-02-005	Wire, Bus, Spa 0.6 52mm (13pcs)
21-06-058	Wire, Ring Terminal, 125mm (Chassis GND)
21-06-035	Wire, Ring Terminal, 272mm (ARC GND)
21-06-036	Wire, Ring Terminal, 118mm (L/F GMD)
22-04-032	LED PCB
19-06-008	LED (SLB-25MG)
21-02-038	Wire Manut, Strended AWM1015 240mm Red (Led Wire)
21-02-040	Wire Manut, Strended AWM1015 240mm Black (Led Wire)
21-02-035	Wire Manut, Solide AWM1015 30mm
21-02-036	Wire Manut, Solide AWM1015 48mm
21-02-037	Wire Manut, Strended AWM1007 175mm, Red (H-Shift)
21-02-039	Wire Manut, Strended AWM1007 175mm, Black (H-Shift)

SWITCH ASS'Y

00-04-009	Ass'y Power S/W
23-02-010	Switch Power (SDL-1P)
21-05-013	Wire Connector Housing 3.96, 2P (318mm)
06-21-017	Plate Switch

BU 806 ASS'Y

00-06-013	BU 806 Ass'y
18-07-013	BU 806 TR NPN
06-25-006	Heat Sink for BU806. 23.2×13.8×50
24-42-001	Washer Gear Outside 3.2×6.5×0.45W
24-01-003	M-SCR Pan Head M3×8W

INLET SOCKET ASS'Y

00-09-007	Ass'y AC Recept
10-08-003	Socket AC Receptacle 3505
21-05-014	Wire Connector Housing, 3.96, 2P (N,W,BL 50mm)
12-21-03	Tube, Shrinkable 5φ

MISCELLANEOUS

22-04-031	P.C Board Blank (FR-1)
10-08-005	Phone Jack (BRKT Type H: 15m/m)
10-07-004	Fastener 93mm
13-15-092	Label, Product FST. (115V Only)
13-15-093	Label, Product FST. (230V Only)

07-21-002	Magnet Square, Ferrite 10 Gauss etc.
13-11-047	C/P Box,
13-13-019	Styroform, Left
13-13-020	Styroform, Right
13-17-003	Vinyl Bag
13-16-015	Manual
06-26-003	Logo

MECHANICAL PARTS

06-20-007	Chassis Bottom	1
06-20-032	Chassis Brace Support	2
06-25-023	Heat Sink, Regulator 50×14×60	3
06-25-011	Heat Sink, IC TDA1170 21.3×23.0×0.3	4
06-22-019	BRKT Attachment	5
06-21-014	Plate Back	6
06-24-006	Shield Bottom	7
10-05-055	Back Plate 1380C	8
10-05-051	Knob S/W 1380C	9
10-05-053	Rear Cover 1380C	10
10-05-052	Stand 1380C	11
10-05-049	Stand/Part	12
10-05-054	Neck 1380C	13
10-05-048	Neck/Part	14
24-01-003	M-Screw Pan Head M3×8W	15
24-26-037	M-Screw Pan Head W/Washer C M3×8W	16
24-26-001	M-Screw C/S Head M3×8W	17
24-26-007	T-Screw Pan Head M3×5W	18
24-01-010	M-Screw Pan Head M4×15W	19
24-26-039	M-Screw Pan Head W/Washer C M4×10W	20
24-04-005	P-Screw Pan Head #6×10W	21
24-04-014	P-Screw Pan Head #8×15W	22
24-26-012	P-Screw C/S Head #4×12 Black	23
24-26-019	T-Screw Hex Head W/Washer M4×8W	24
24-26-025	M-Screw Hex Head M3×10 Ivory	25
24-33-002	Nut Butterfly M5×0.8P W	26
24-03-006	M-Screw Hex Head M5×40W	27
24-26-027	M-Screw Pan Head Cone Type M4×13.5W	28
24-42-001	Washer Gear Out Side 3.2×6.5×0.45W	29
24-42-007	Washer Gear Out Side 4.8×9.5×0.5W	30
24-41-017	Washer Flat 5.3×16×1.2W	31
10-09-007	Rubber Washer 14×5×2	32
24-45-001	Spring Compression 9×21×0.5Y	33
24-45-002	Spring Compression 23×17×25Y	34
24-31-005	Nut Hex M4×0.7P W	35

CRT SOCKET ASS'Y

10-08-016	Socket CRT 20φ 6 Pin
22-04-022	P.C Board FR-1, Socket 1.5t

TRANSISTORS

Q401	18-02-003	BF 258NPN
Q402	18-03-001	2N2222A

WIREING

H	21-01-005	Wire Stranded AWM1007 175mm Yellow
K	21-01-003	Wire Stranded AWM1007 160mm Red
GND	21-01-014	Wire Stranded AWM1015 175mm Black
G1	21-01-002	Wire Stranded AWM1007 160mm Brown
G2	21-01-007	Wire Stranded AWM1007 165mm Blue
G4	21-01-008	Wire Stranded AWM1007 165mm Violet
V1,E2	21-01-037	Coaxial Cable AWM1365 165mm Black

CAPACITORS

C401	16-11-002	Capacitor-FXD. Ceramic 100pF 50V
C402	16-01-033	Capacitor-FXD. Electrolytic 220uF 50V
C403	16-04-007	Capacitor-FXD. Electrolytic 100uF 25V

RESISTORS

R401	14-04-823	Resistor-FXD. Carbon 83KΩ 1/4W 5%
R402	14-10-821	Resistor-FXD. Metal Oxide 820Ω 2W 5%
R403	14-04-101	Resistor-FXD. Carbon 100Ω 1/4W 5%
R404	14-04-680	Resistor-FXD. Carbon 68Ω 1/4W 5%
R405	14-04-122	Resistor-FXD. Carbon 1.2KΩ 1/4W 5%
R406	14-04-102	Resistor-FXD. Carbon 1KΩ 1/4W 5%

R407	14-04-102	Resistor-FXD. Carbon 1K Ω 1/4W 5%
R408	14-09-390	Resistor-FXD. Metal Oxide 39 Ω 1W 5%
R409	14-04-563	Resistor-FXD. Carbon 56K Ω 1/4W 5%
R410	14-04-563	Resistor-FXD. Carbon 56K Ω 1/4W 5%
R411	14-04-104	Resistor-FXD Carbon 100K Ω 1/4W 5%
R412	14-04-820	Resistor-FXD Carbon 82 Ω 1/4W 5%

LAMP & SPARK-GAPS

E401	16-24-003	Spark-Gap 1KV -15%/+50%
E402	16-24-003	Spark-Gap 1KV -15%/+50%
E403	16-24-004	Neon Lamp 100V
E404	16-24-003	Spark-Gap 1KV -15%/+50%