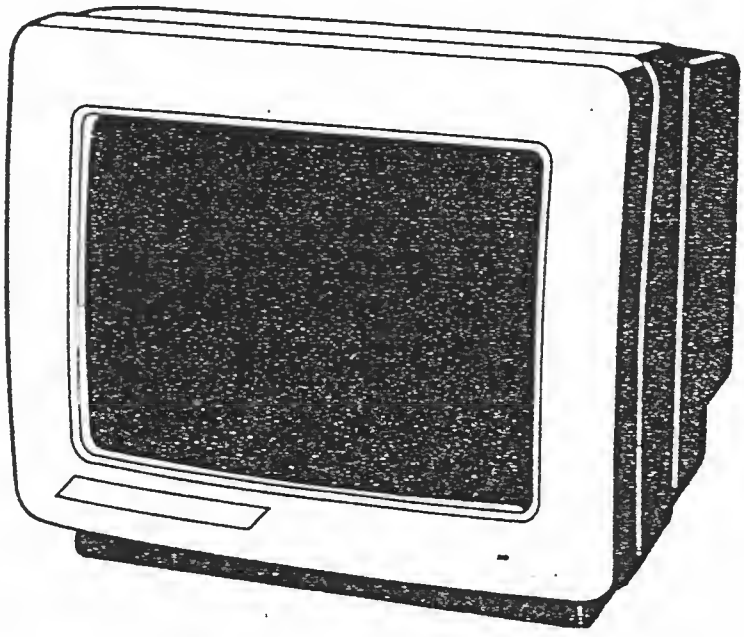
ATARI®

Chassis No.: MT-21

SM124™

HIGH-RESOLUTION MONOCHROME MONITOR



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SERVICE MANUAL

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D-1000 Berlin 47

SAFETY PRECAUTIONS

Operation of the monitor outside of its cabinet or with its back removed involves a shock hazard. Work on these models should only be performed by those who are thoroughly familiar with precautions necessary when working on high voltage equipment.

Exercise care when servicing this chassis with power applied. Many B plus and video input terminals are exposed which, if carelessly contacted, can cause serious shock or result in damage to the chassis. Maintain interconnecting ground lead connections between chassis, picture tube dag and power PWB earth when operating chassis.

Certain HV failures can increase X-ray radiation. The monitor should not be operated with HV levels exceeding the specified rating for their chassis type. The maximum operating HV specified for the chassis used in these receivers is 12 KV + 1 − 2KV at zero beam current with a line voltage of 220V AC. Higher voltage may also increase possibility of failure in HV supply.

It is important to maintain specified values of all components in the horizontal and high voltage circuits and anywhere else in the monitor that could cause a rise in high voltage or operating supply voltages. No changes should be made to the original design of the monitor.

Components shown in the shaded areas on the schematic diagram and/or identified by an S in the replacement parts list should be replaced only with exact Factory recommended replacement parts. The use of unauthorized substitute parts may create a shock, fire, X-radiation, or other hazard.

To determine the presence of high voltage, use an accurate, high impedance, HV meter connected between second anode lead and the CRT dag grounding device. When servicing the High Voltage System, remove static charge by connecting a 10K ohm resistor in series with an insulated wire (such as a test probe) between picture tube dag and 2nd anode lead. (Before AC line cord is disconnected from AC supply).

The picture tube used in this monitor employs integralimplosion protection. Replace with tube of the same type numbe! for continued safety. Do not lift picture tube by the neck. Handle the picture tube only when wearing shatter-proof goggles and after discharging the high voltages completely. Keep others without shatter-proof goggles away.

SAFETY INSPECTION

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

PROTECT YOUR CUSTOMER

1. Inspect all wire harmless assemblies to make certain that the wires are not pinched or that any between hardware is not lodged between the chassis and other metal parts in the monitor.
2. Replace all protective devices such as non-metallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, a check for the presence of leakage current should be made at each exposed metal part having a return path to the chassis (input terminal, cabinet metal, screw heads, knobs and/or shafts, escutcheon, etc.) in the following manner.

   Plug the AC line cord directly into a 220V AC receptacle. (Do not use an Isolation Transformer during these checks.) All checks must be repeated with the AC line cord plug connections reversed. (If necessary, a nonpolarized adapter plug must be used only for the purpose of completing these checks.)

If available, measure current using an accurate leakage current tester. (Use Standard Equipment Item No. 21641.) Any reading of 0.26 A or more is excessive and indicates a potential shock hazard which must be corrected before returning the monitor to the owner.

If a reliable leakage current tester is not available, an alternate method of measurement should be used. Using two clip leads, connect a 1.5K ohm, 10 watt resistor in parallel with a 0.15MF capacitor in series with a known earth ground. Use a VTVM or VOM with 1000 ohms per volts sensitivity, or higher to measure the AC voltage drop across the resistor. Any reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the monitor to the owner.

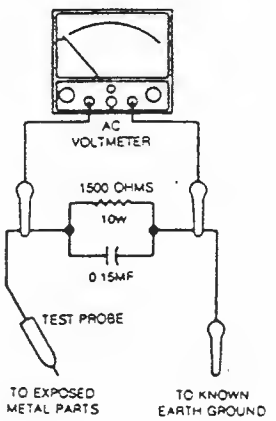


Fig. 1, Voltmeter Hook-up for Safety Check

SPECIFICATIONS

1. CATHODE RAY TUBE
   Type: Non-glare DARK
   Size & Deflection angle: 12", 90°
   Neck diameter: 20 mm
   Phosphor: Paper White

2. INPUT
   Input signal: TTL Signal
   - Video : 1 Vp-p Positive
   - Audio : 1 Vp-p
   - Vertical Drive : 5 ± 1.5 Vp-p Negative
   - Horizontal Drive : 5 ± 1.5 Vp-p Negative

   Power Input : AC 220V 50Hz, 0.3A
   Input Connector : 13 Pin Din Connector

3. SCANNING
   Horizontal frequency : 35.7 KHz
   Horizontal retrace time : 6.3 uS
   Vertical frequency ; 71.2 Hz
   Vertical retrace time : 420 uS

4. VIDEO
   - Display Area (HXV) : 210 mm × 130 mm
   - Amplifier Type : Linear
   - Frequency band width : 32 MHz
   - Horizontal resolution : 1100 lines at center
   - Display character : 80 × 50 characters

5. GEOMETRIC DISTORTION: 2.5% max.

6. LINEARITY
   - Horizontal : 10% max.
   - Vertical: 10% max.

7. EXTERNAL CONTROLS: BRIGHTNESS, CONTRAST, ON/VOLUME.

ADJUSTMENT AND MAINTENANCE

CIRCUIT PROTECTION
Circuit protection is provided by one Mini fuse, on the power pc board. A 1.6 Ampere fuse (F901) is wired into one side of the AC line and provides primary protection to the entire chassis.

1. CENTERING ADJUSTMENT
   CAUTION: The following adjustment points are close to the high voltage yoke terminal. If the raster is not centered in the raster opening, it may be centered by removing the cabinet back and adjusting the centering tabs on the neck of the tube, located at the rear of the deflection yoke. Turn the whole device clockwise or counter-clockwise. To increase the amount of raster shift, move the two tabs which project from the device, farther apart. If the raster is tilted on an angle, it may be straightened by loosening the deflection yoke locking clamp and rotating the deflection yoke.

2. FOCUS
   Adjust the foucs control (VR703) for best overall focus of the test pattern (marked with the symbol "%"). Usually the center and corners of the screen do not focus at the same setting and a compromise must be made.

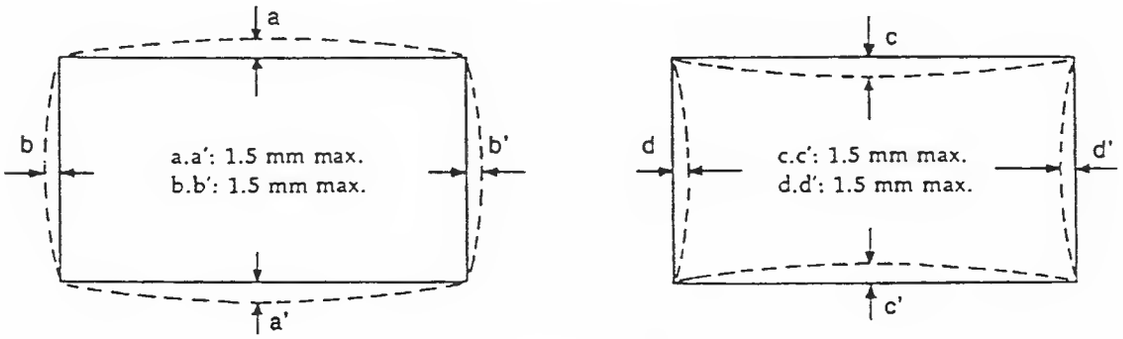
3. BRIGHTNESS
   Adjust subbrightness control (VR701) for visual cut off of the raster when external brightness is turned to maximum.

4. VERTICAL SIZE AND LINEAR ADJUSTMENT
   The vertical size control (VR601) should be adjusted for the picture to fill the screen vertically, the linear control (VR602) should be adjusted for best overall vertical linear. Adjustment of either control will not affect the adjustment of the other.

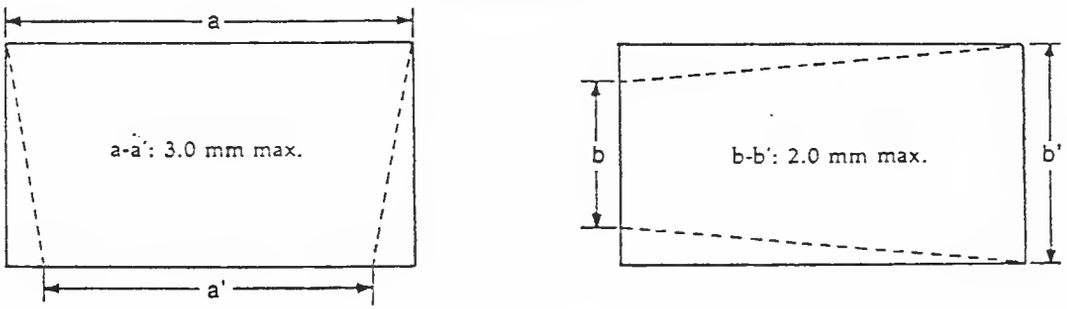
5. HORIZONTAL SIZE AND LINEAR ADJUSTMENT
   The horizontal size control (L703) is on the main PCB, it should be adjusted for the picture to fill the screen horizontally, the linear control (L704) should be adjusted for the best overall horizontal linear adjustment so neither control will affect the adjustment of the other.

6. B^+ ADJUSTMENT
   B^+ adjustment control (VR901) is located on the main PCB and it should be adjusted for the FBT input voltage and other circuit voltage and B^+ adjustment control (VR901) should be set to DC 27V.

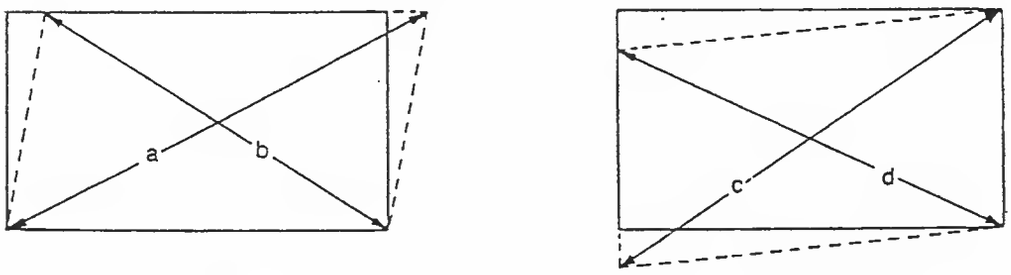
PINCUSHION AND BARRELLING



TRAPEZOID



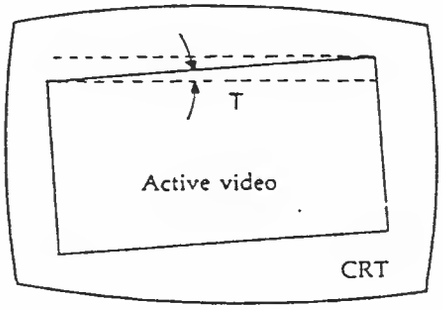
PARALLELOGRAM



a-b: 2.0 mm max.

c-d: 2.0 mm max.

YORK TILT



T = 1° max.

Fig. 2, Geometry Measurements

THEORY OF OPERATION

1. VIDEO AMPLIFIER

The Fig. 3 details the cascade video amplifier. Video amplification is provided by the Q304 and Q305. Q304 and Q305 are connected in a cascade configuration. Q304 operates as a common emitter and Q305 operates in the common base configuration. This minimized the miller effect input capacitance and the defining breakdown parameter for Q304 which becomes BVCBO as opposed to BVCEO.

This enables selection of a higher speed/ower breakdown transistor to be used in the video amplifier.

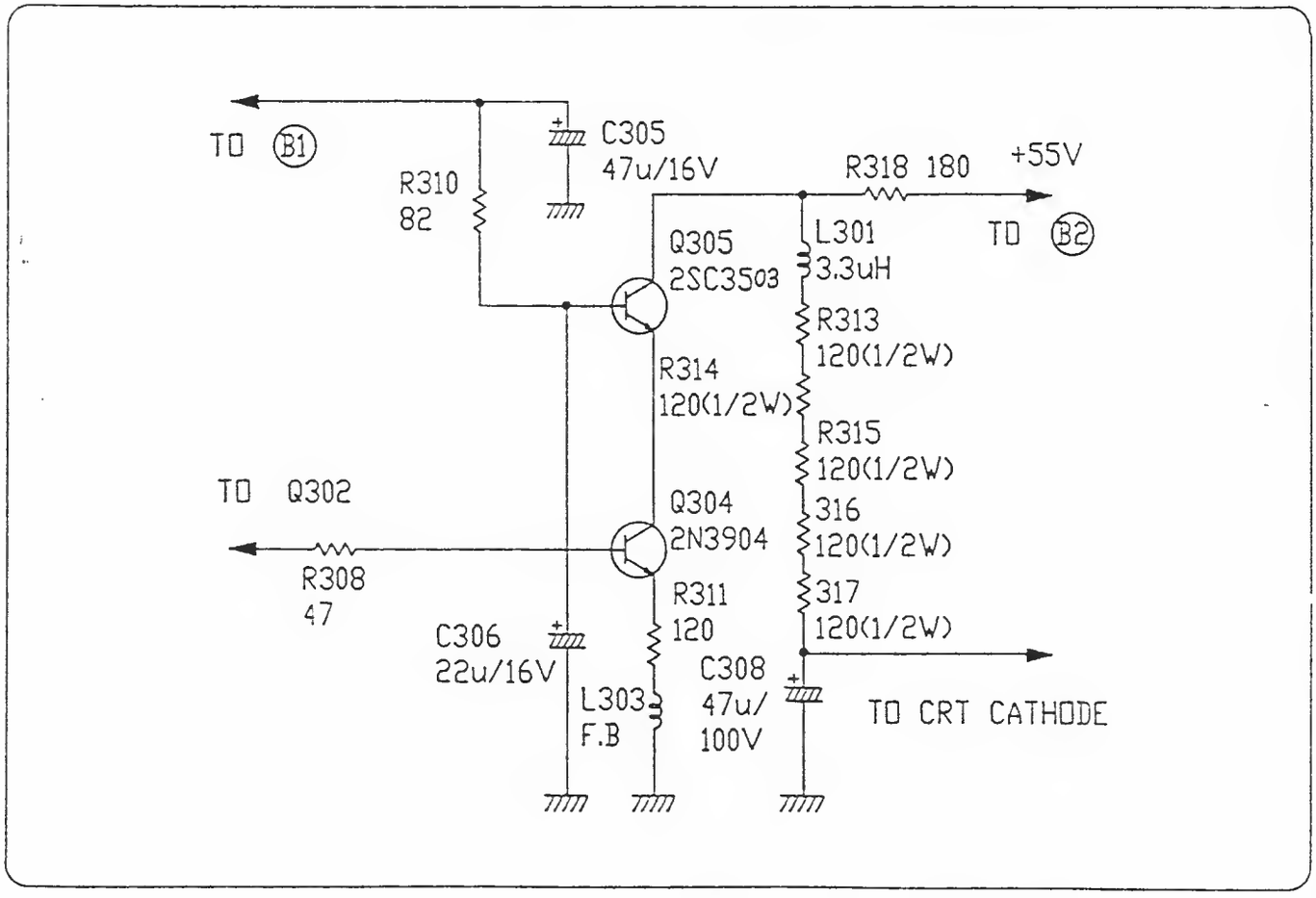
The emitter of Q305 is driven by the collector of Q304 which is a high frequency transistor. Overall voltage gain for the stage is determined by the ratio of R313,314, 315,316, 317 to R311.

2. VERTICAL DEFLECTION

The vertical deflection circuit consists of an IC TDA1170D and the vertical deflection coil of the DY (and associated circuitry). The IC TDA1170D incorporates all the functions for providing the yoke of the MONITOR with the current required for vertical deflection.

The preamplifier is a high input impedance differential type, with inverted input available at pin 1.

The non-inverting input is fixed internally in the circuit at a stabilized voltage of approximately 2.2V. During flyback, the flyback generator produces a voltage equal to approximately double the supply voltage, and this is applied at the yoke by means of the power Amplifier. The oscillator is a threshold type with a high degree of frequency stability. It is synchronized with a circuit which receives either positive or negative sync pulses and ensures complete immunity from noise throughout most of the scanning time.



Fig, 3 Video Amplifier

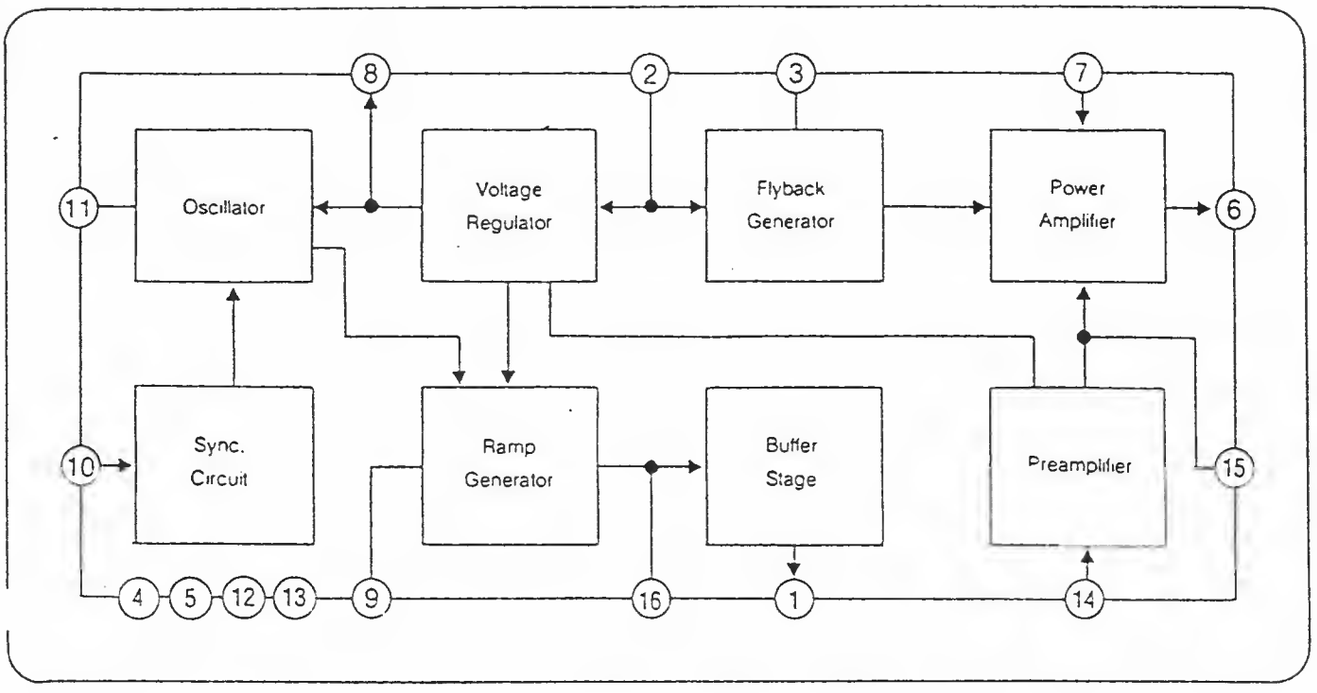


Fig. 4, Block Diagram of the TDA 1170D

3. HORIZONTAL DEFLECTION

Horizontal deflection IC, AN5790 (IC701), oscillates freely on condition that the external voltage source is applied to it. Horizontal-oscillation frequency is made by internal oscillation after H-SYNC has been applied to the pin 1 of horizontal deflection IC, AN5790N (IC701).

Drive pulse of the output pin 8, of H-deflection IC, AN5790N, is applied to the base pin of Q701.

FBT deflects horizontally when the inverted pulse is applied to the base of H-output TR (Q702).

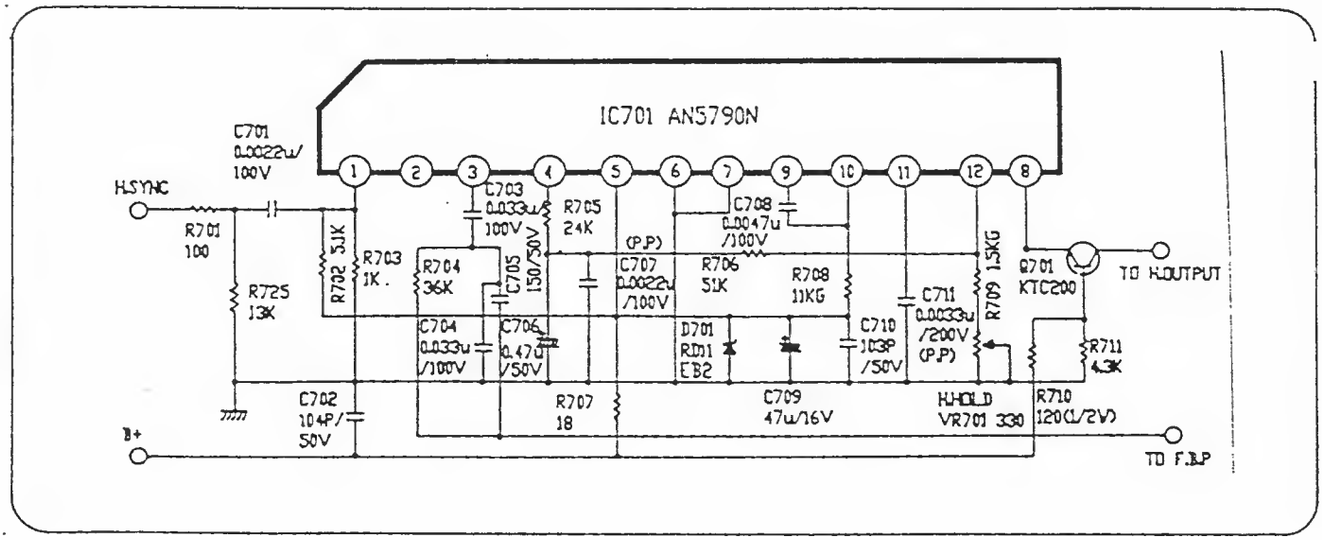


Fig. 5, Horizontal Circuit

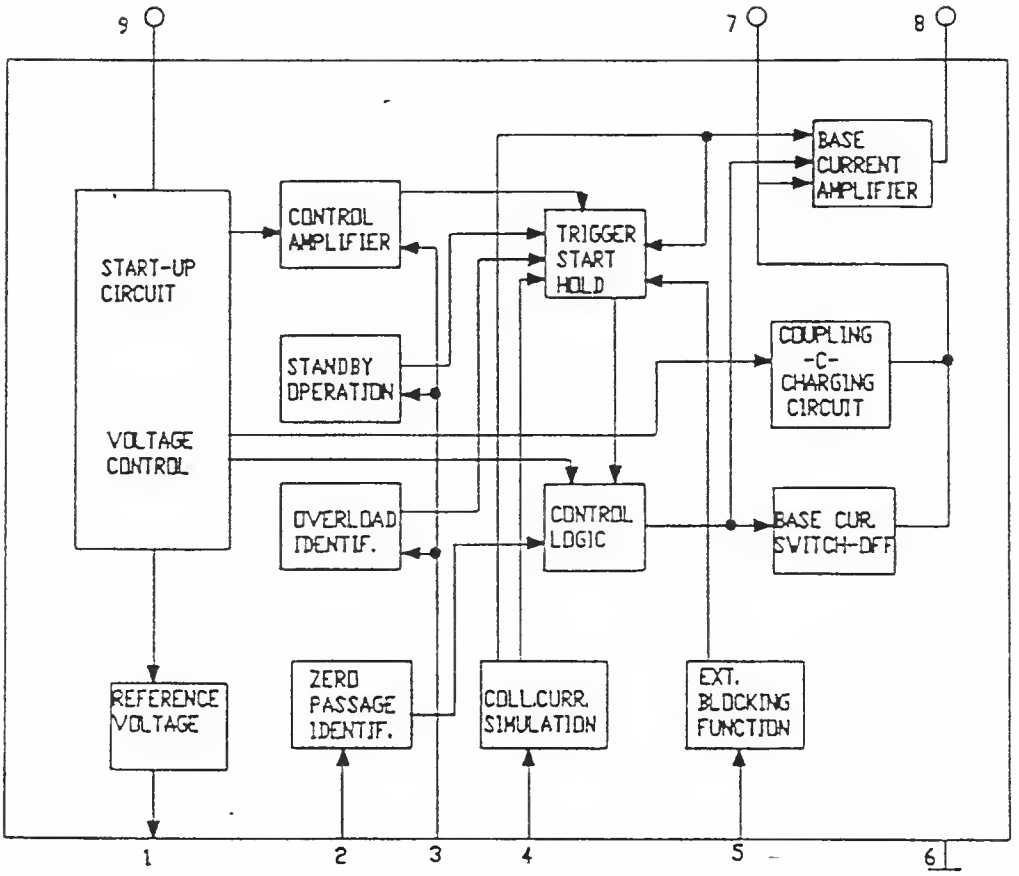


Fig. 6, Block Diagram of the TDA4601

4. POWER SUPPLY

The power supply is a SMPS (switching mode power supply) that consists of switching IC901 (TDA4601), SMPS transformer (T901), and the associated components. The basic theory of the SMPS is the circuit of self oscillation. The primary winding of the SMPS transformer is applied the pulse by operating Q901 Therefore, rectified DC 27V and DC 12V is obtained by D930, D931 in the secondary winding of SMPS transformer T901.

PIN CONFIGURATION

Pin No.	Function
1	Vref output
2	Zero crossing identification
3	Input controlled amplifier, overload amplifier
4	Collector current simulation
5	Connection for additional protective circuit
6	Ground (rigidly connected to substrate mounting plate)
7	DC output for charging the coupling capacitor
8	Pulse output — driving of the switching transistor
9	Supply voltage

POWER SUPPLY DESCRIPTIONS

This SMPS (switching mode power supply) using TDA4601 obtains rectified DC 27V, 12V from AC220V.

Power is supplied in the following procedure:

1) AC220V supplied from the AC Line is rectified by D901.
2) Rectified voltage is supplied to the T901. As to TDA4601. Voltage which is primarily rectified by D901, is supplied to pin 9 of IC901 through R904.
3) At this moment, a pulse is generated at pin 7 of the IC901 which switches Q901 by internal oscillation of IC901.
4) This oscillation causes Q901 to switched, and at the secondary terminal of T901, a voltage proportional to the turn ratio is generated.
5) The generated voltage supplies DC 27V, 12V to the output terminal after the rectified by D930, D931 and filtered by C931, C934 and L931, L933.
6) Between Pins 5 and 6 of T901, a voltage is generated proportional to turn the ratio from voltage generated between Pins 4 and 3.
7) Detecting voltage (pin 6 of IC901) is obtained through D904 by generated voltage.
8) Stable voltage is obtained by changing internal oscillation integer.

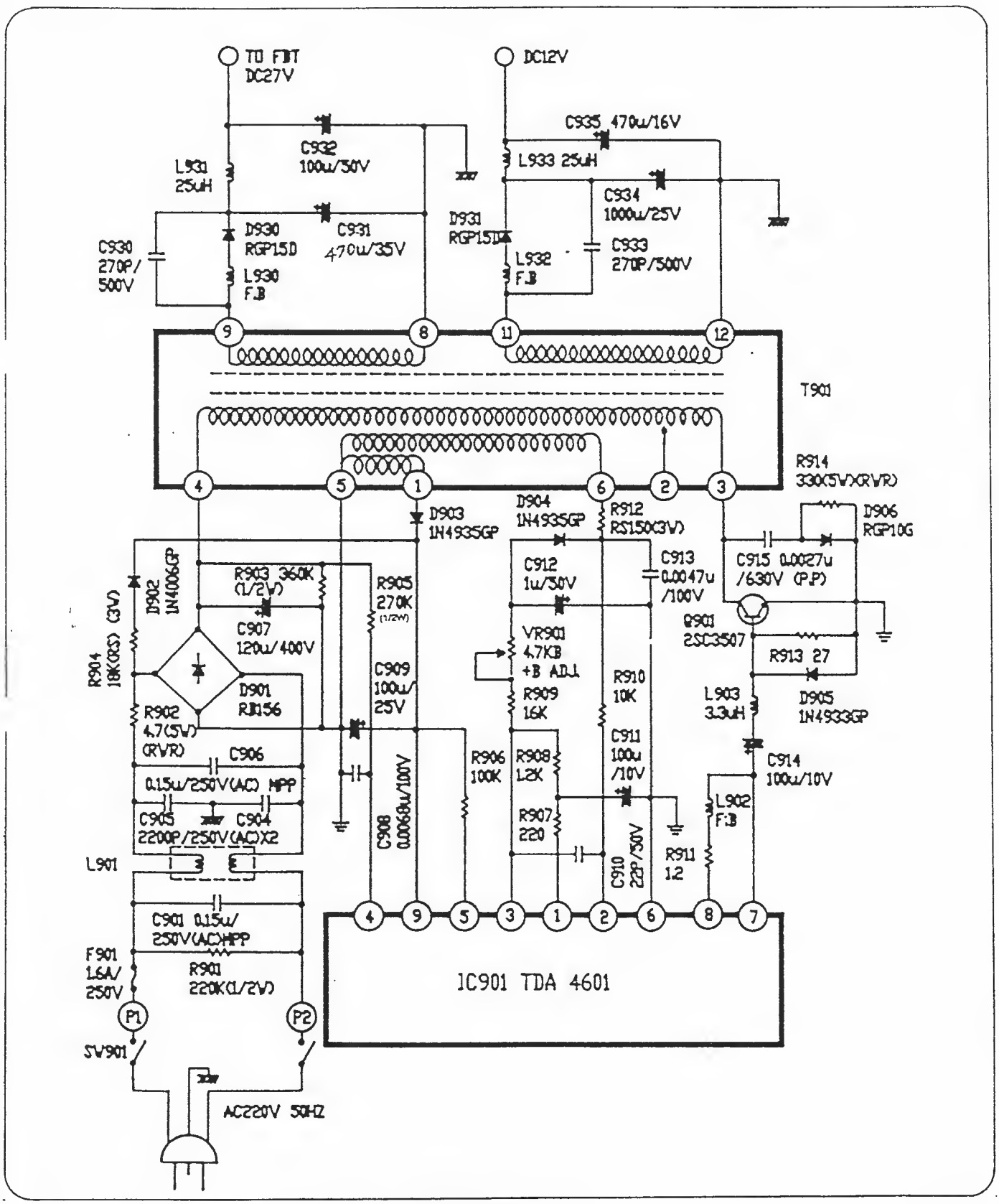
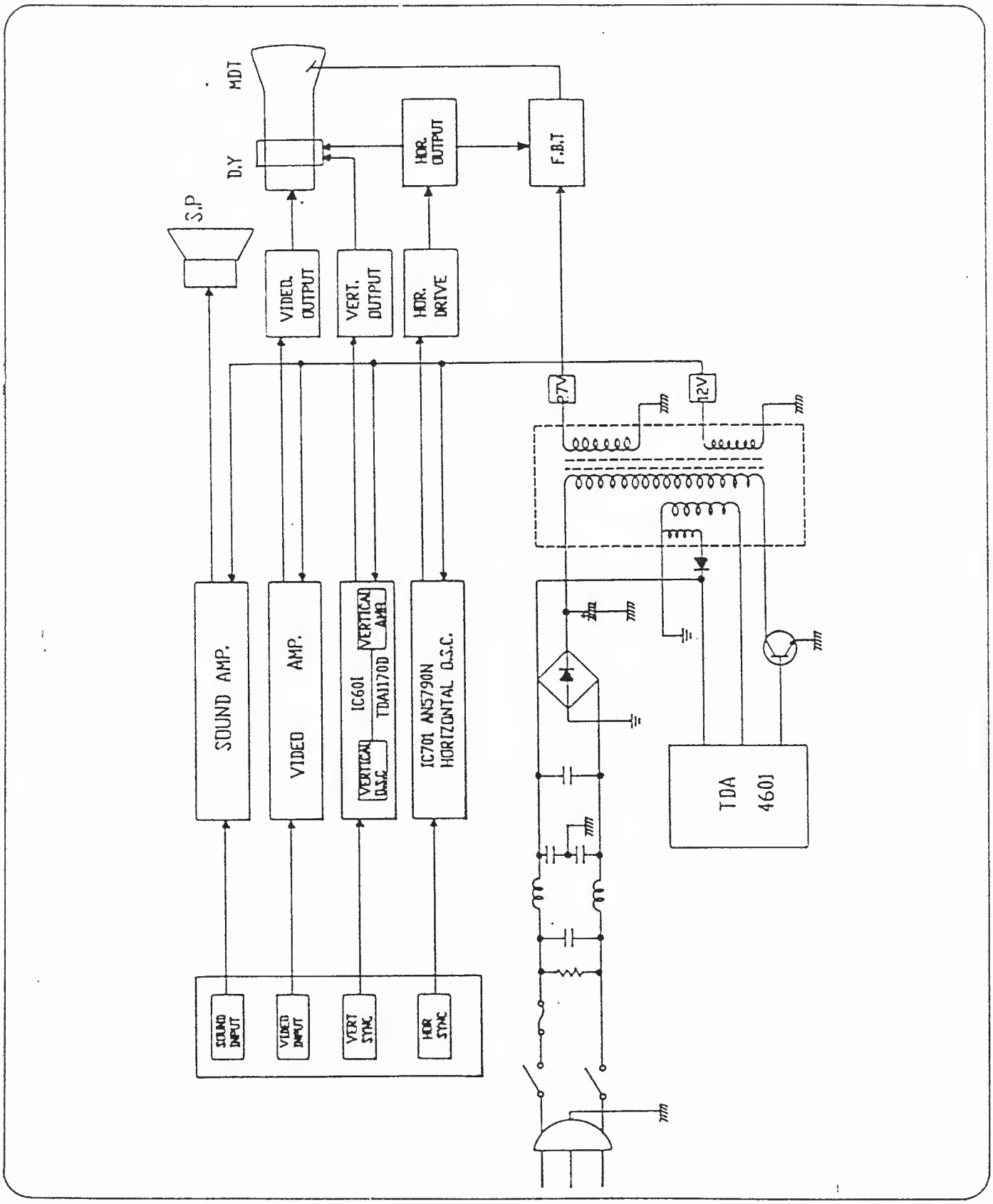
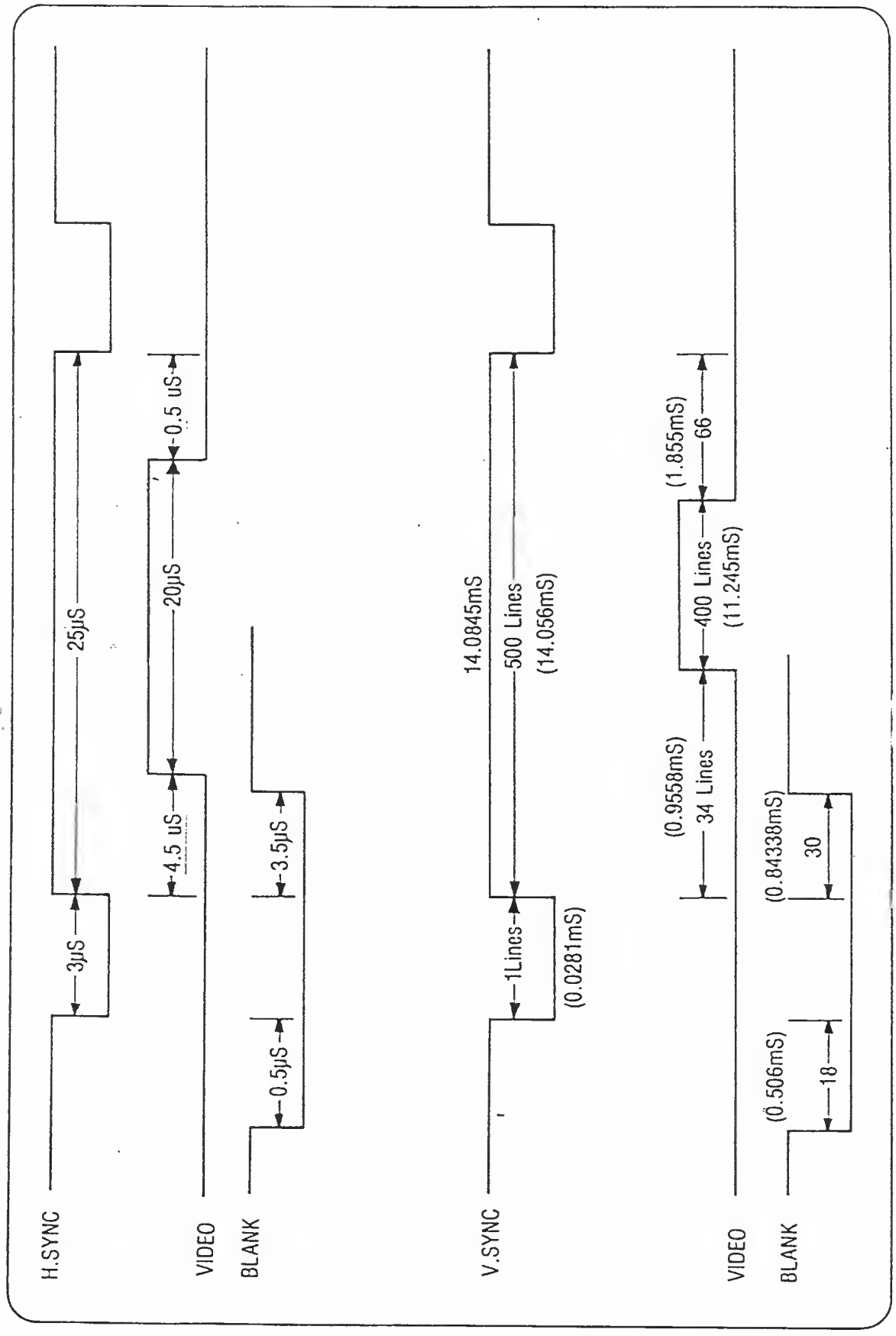


Fig. 7, Power Circuit

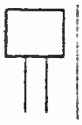
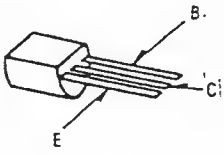
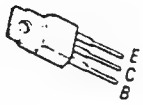
BLOCK DIAGRAM

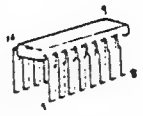
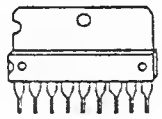
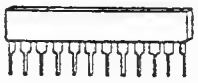
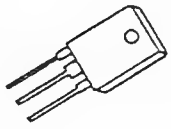
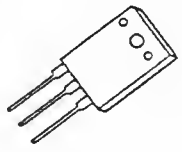


TIMING CHART



TRANSISTOR & IC BASING

REFERENCE NO.	FIGURE	DESCRIPTION
D701		RD11EB2
D704		RGP30G
D601,D702,D703 D705,D706,D708 D906		RGP10D RGP10G
LED		SLP262B
D707		ERG26-20
Q303,Q401 Q402,Q403 Q701		KTC1959 KTA562TM KTC200
Q301,Q302		2N2369
Q702		BU806

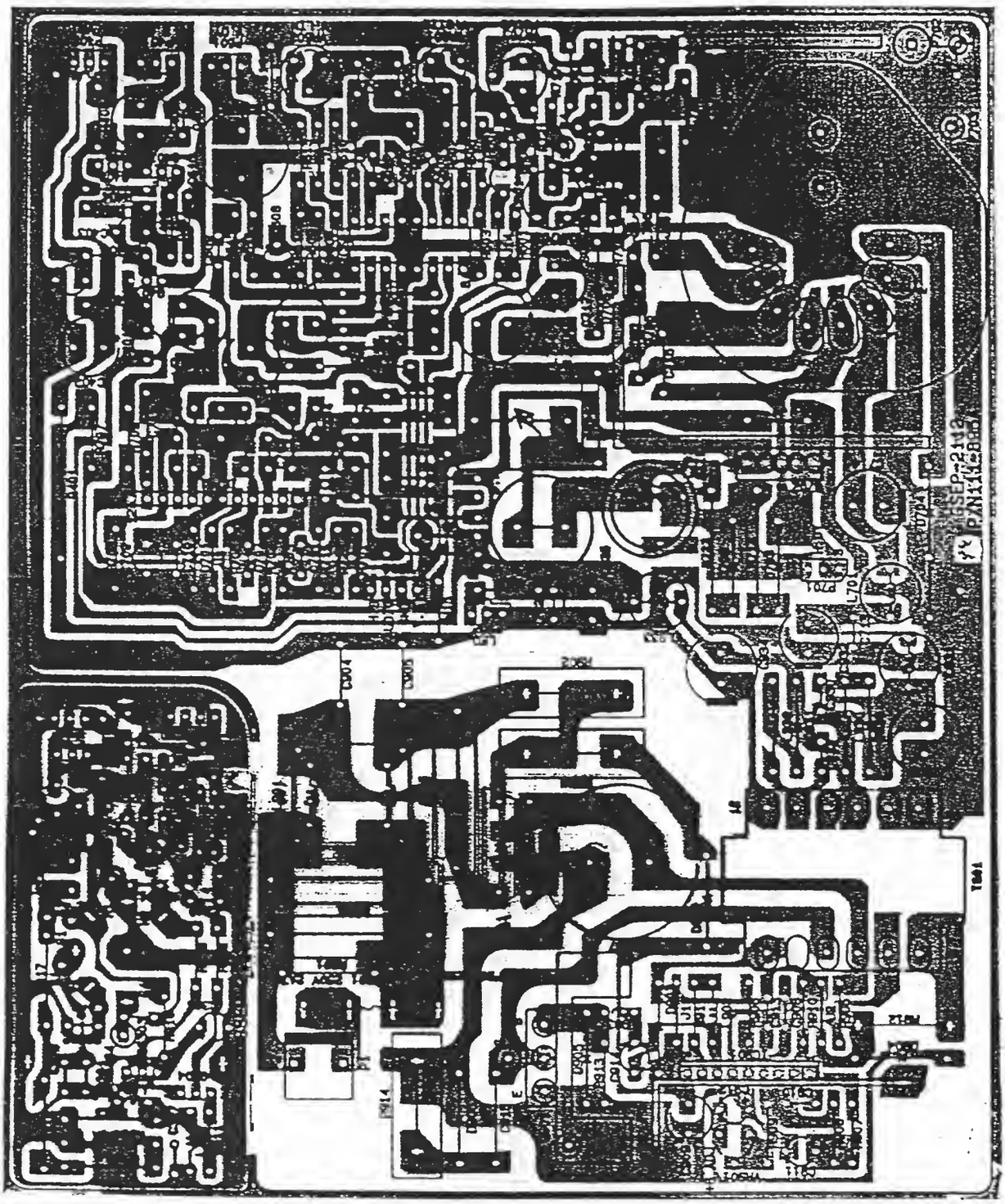
REFERENCE NO.	FIGURE	DESCRIPTION
IC601		TDA1170D
IC901		TDA4601
IC701		AN5790N
D901		RB156
Q304		2N3904
Q305		2SC3503
Q901		2SC3507

VOLTAGE CHART

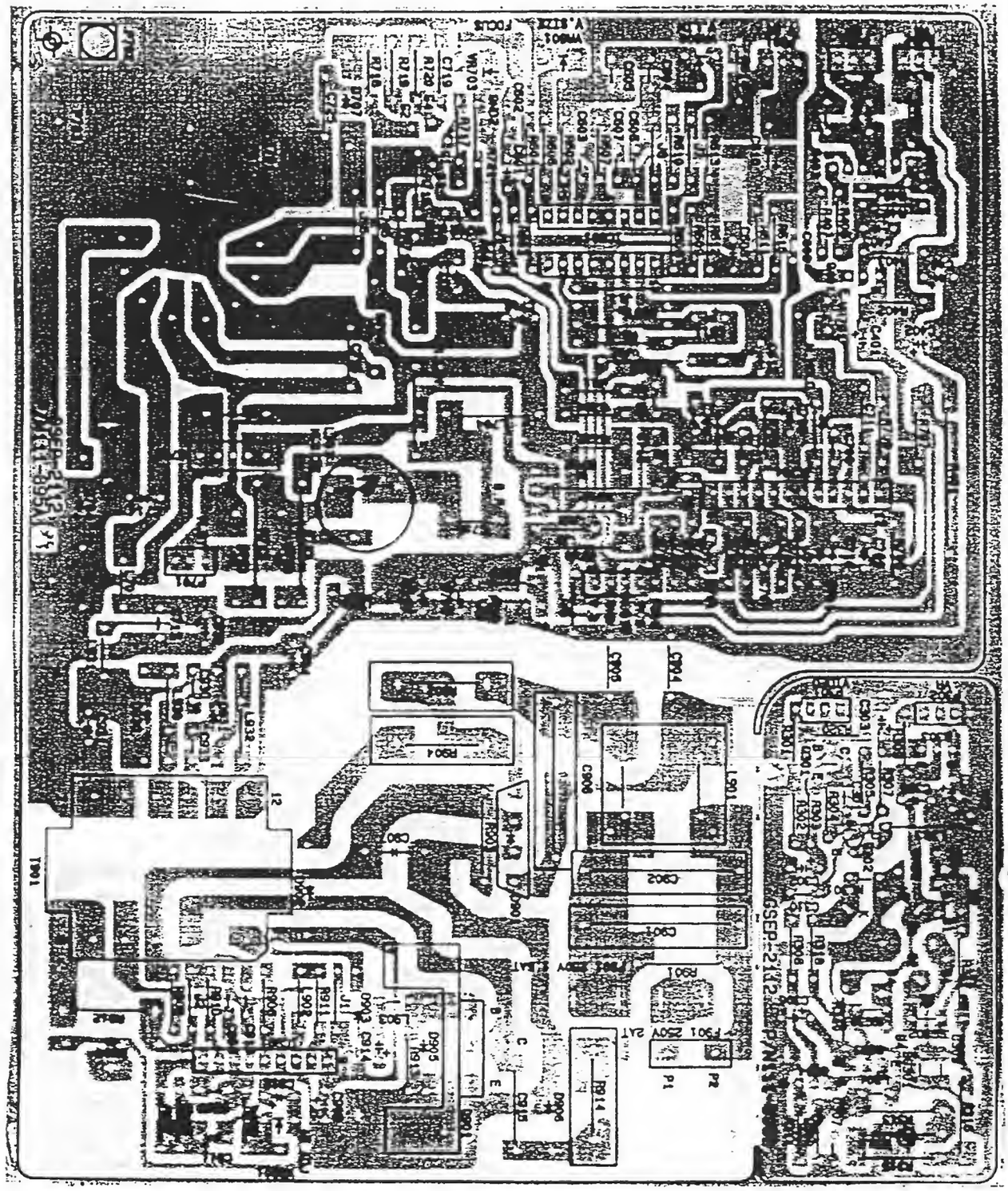
TR NO.	TYPE	FUNCTION	INPUT CONDITION	B	E	C
Q301	2N2369	VIDEO INPUT	NO SIGNAL	0	0	3.8
			1Vp-p VIDEO SIGNAL	0.8	0	3.4
Q302	2N2369	VIDEO AMP	NO SIGNAL	0.8	0	0.1
			1Vp-p VIDEO SIGNAL	0.8	0	7.2
Q303	KTC1959	BRIGHT/CONTRAST ADJUSTMENT	NO SIGNAL	8	7	12
			1Vp-p VIDEO SIGNAL	8	7	12
Q304	2N3904	VIDEO DRIVE	NO SIGNAL	0.3	0	12
			1Vp-p VIDEO SIGNAL	7.2	6.7	13
Q305	2SC3503	VIDEO OUTPUT	NO SIGNAL	12	12	60
			1Vp-p VIDEO SIGNAL	12	13	57
Q701	KTC200	HORIZONTAL DRIVE	NO SIGNAL	6.8	6.85	6.8
			1Vp-p VIDEO SIGNAL	6.8	7	6.8
Q702	BU806	HORIZONTAL OUTPUT	NO SIGNAL	6.4	0	180
			1Vp-p VIDEO SIGNAL	6.4	0	180
Q901	2SC3507	POWER SWITCHING	NO SIGNAL	1.6	0	510
			1Vp-p VIDEO SIGNAL	1.6	0	520
Q401	KTC1959	AUDIO INPUT	NO SIGNAL	0.7	0	0
			1Vp-p VIDEO SIGNAL	0.7	0	0
Q402	KTC1959	AUDIO AMP	NO SIGNAL	6.6	1	12
			1Vp-p VIDEO SIGNAL	6.6	1	12
Q403	KTC562	AUDIO AMP	NO SIGNAL	2.6	6	0
			1Vp-p VIDEO SIGNAL	2.6	6	0

IC NO.	IC TYPE	FUNCTION	PIN NO.	OPERATING CONDITION	VOLT
IC601	TDA1170D	VERTICAL DEFLECTION IC	1	1Vp-p VIDEO SIGNAL	4.8
			2	1Vp-p VIDEO SIGNAL	12.5
			3	1Vp-p VIDEO SIGNAL	14
			4	1Vp-p VIDEO SIGNAL	0
			5	1Vp-p VIDEO SIGNAL	0
			6	1Vp-p VIDEO SIGNAL	26
			7	1Vp-p VIDEO SIGNAL	25
			8	1Vp-p VIDEO SIGNAL	6.7
			9	1Vp-p VIDEO SIGNAL	6.8
			10	1Vp-p VIDEO SIGNAL	0
			11	1Vp-p VIDEO SIGNAL	3.8
			12	1Vp-p VIDEO SIGNAL	0
			13	1Vp-p VIDEO SIGNAL	0
			14	1Vp-p VIDEO SIGNAL	2.1
			15	1Vp-p VIDEO SIGNAL	0.7
IC901	TDA4601	POWER SWITCHING IC	16	1Vp-p VIDEO SIGNAL	3.9
			1	1Vp-p VIDEO SIGNAL	4.3
			2	1Vp-p VIDEO SIGNAL	1.1
			3	1Vp-p VIDEO SIGNAL	2.1
			4	1Vp-p VIDEO SIGNAL	2.1
			5	1Vp-p VIDEO SIGNAL	7.5
			6	1Vp-p VIDEO SIGNAL	0
			7	1Vp-p VIDEO SIGNAL	2.8
			8	1Vp-p VIDEO SIGNAL	3.1
			9	1Vp-p VIDEO SIGNAL	6.7
IC701	AN5790N	HORIZONTAL DEFLECTION IC	1	1Vp-p VIDEO SIGNAL	2.8
			2	1Vp-p VIDEO SIGNAL	1.6
			3	1Vp-p VIDEO SIGNAL	5.6
			4	1Vp-p VIDEO SIGNAL	4.1
			5	1Vp-p VIDEO SIGNAL	11
			6	1Vp-p VIDEO SIGNAL	0
			7	1Vp-p VIDEO SIGNAL	0
			8	1Vp-p VIDEO SIGNAL	6.8
			9	1Vp-p VIDEO SIGNAL	1.7
			10	1Vp-p VIDEO SIGNAL	2
			11	1Vp-p VIDEO SIGNAL	8.4
			12	1Vp-p VIDEO SIGNAL	2.8

COMPONENT OF P.C.B



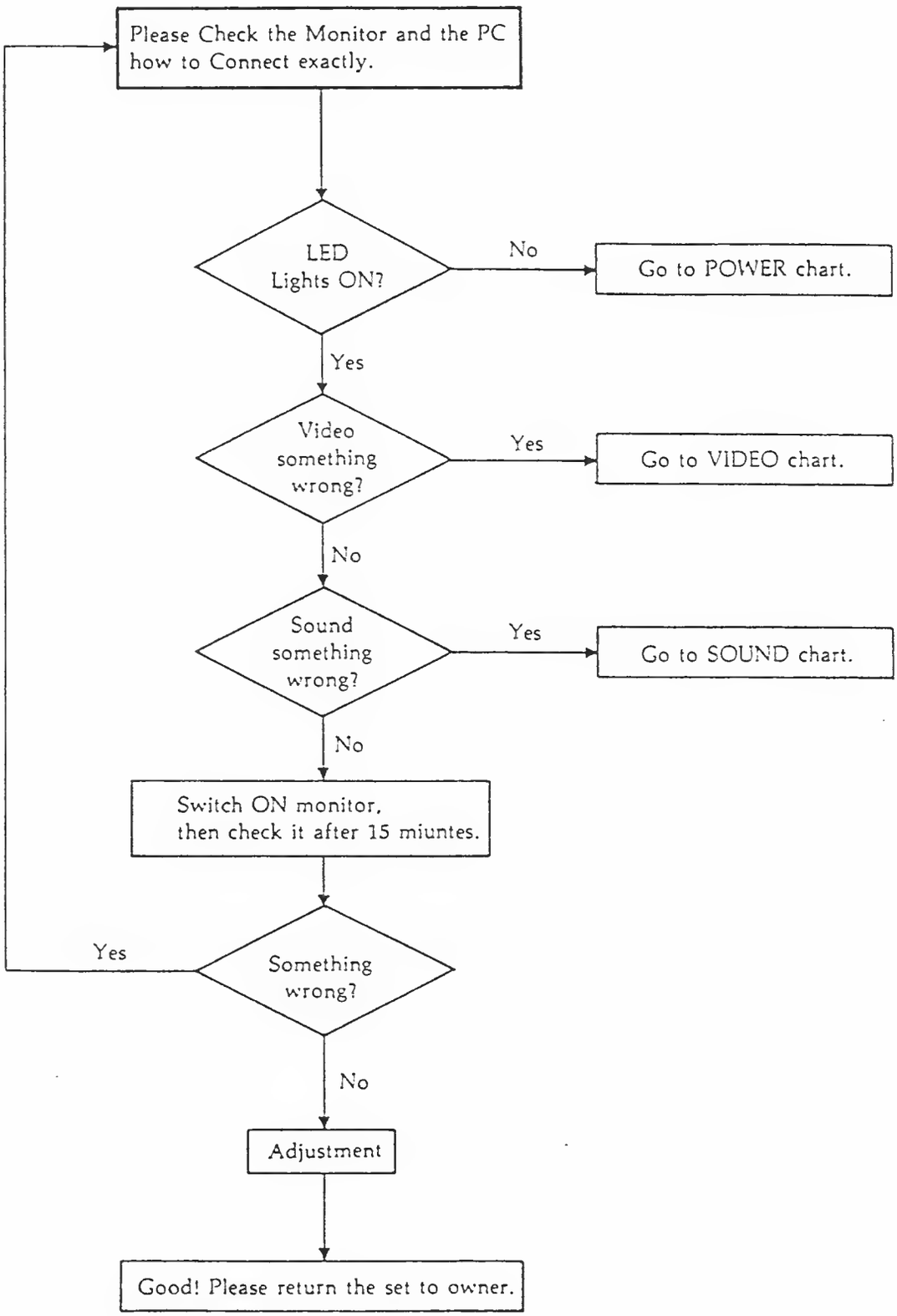
MAIN P.C.B (COMPONENT SIDE)



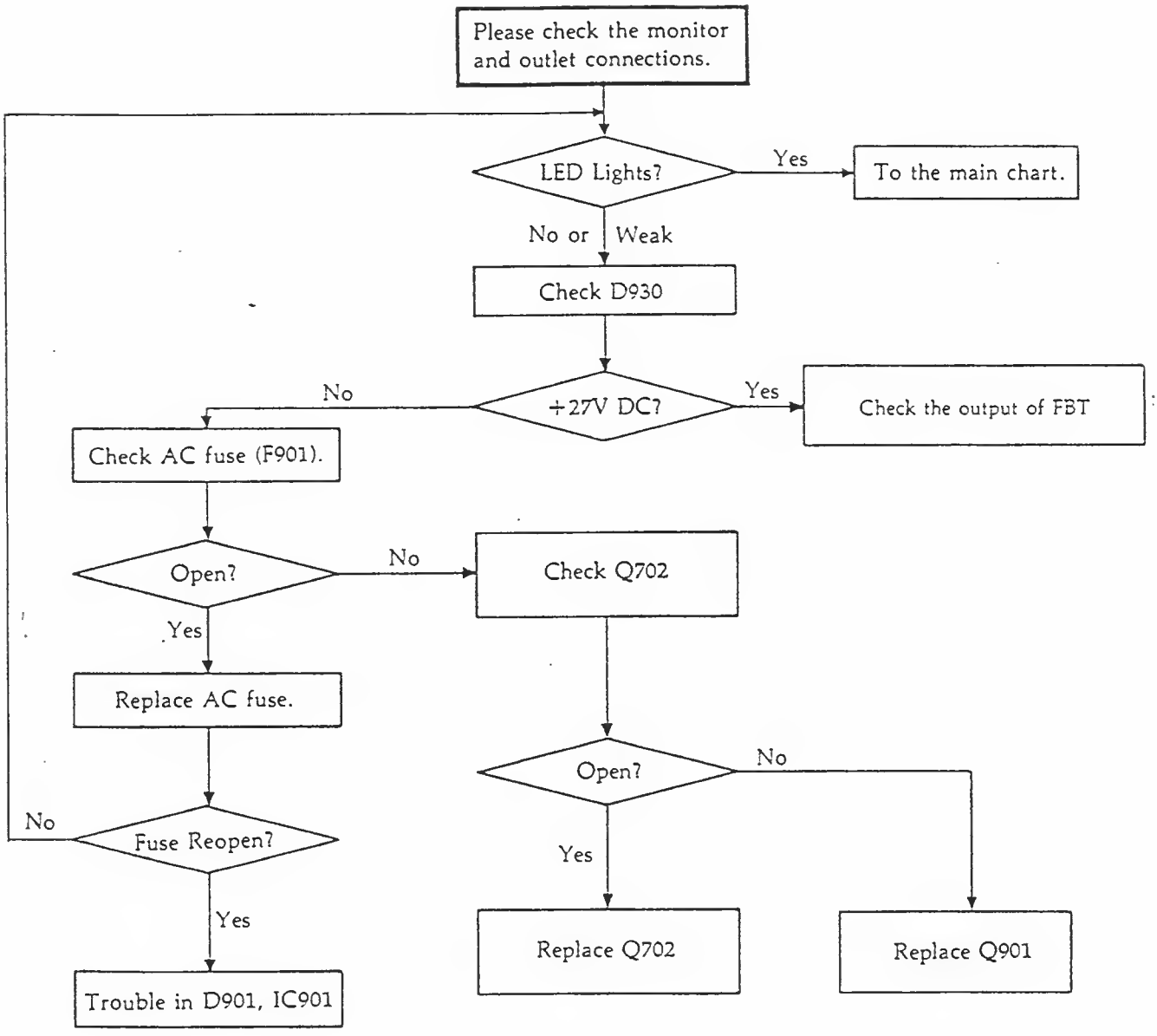
MAIN P.C.B (SOLDER SIDE)

TROUBLESHOOTING CHART

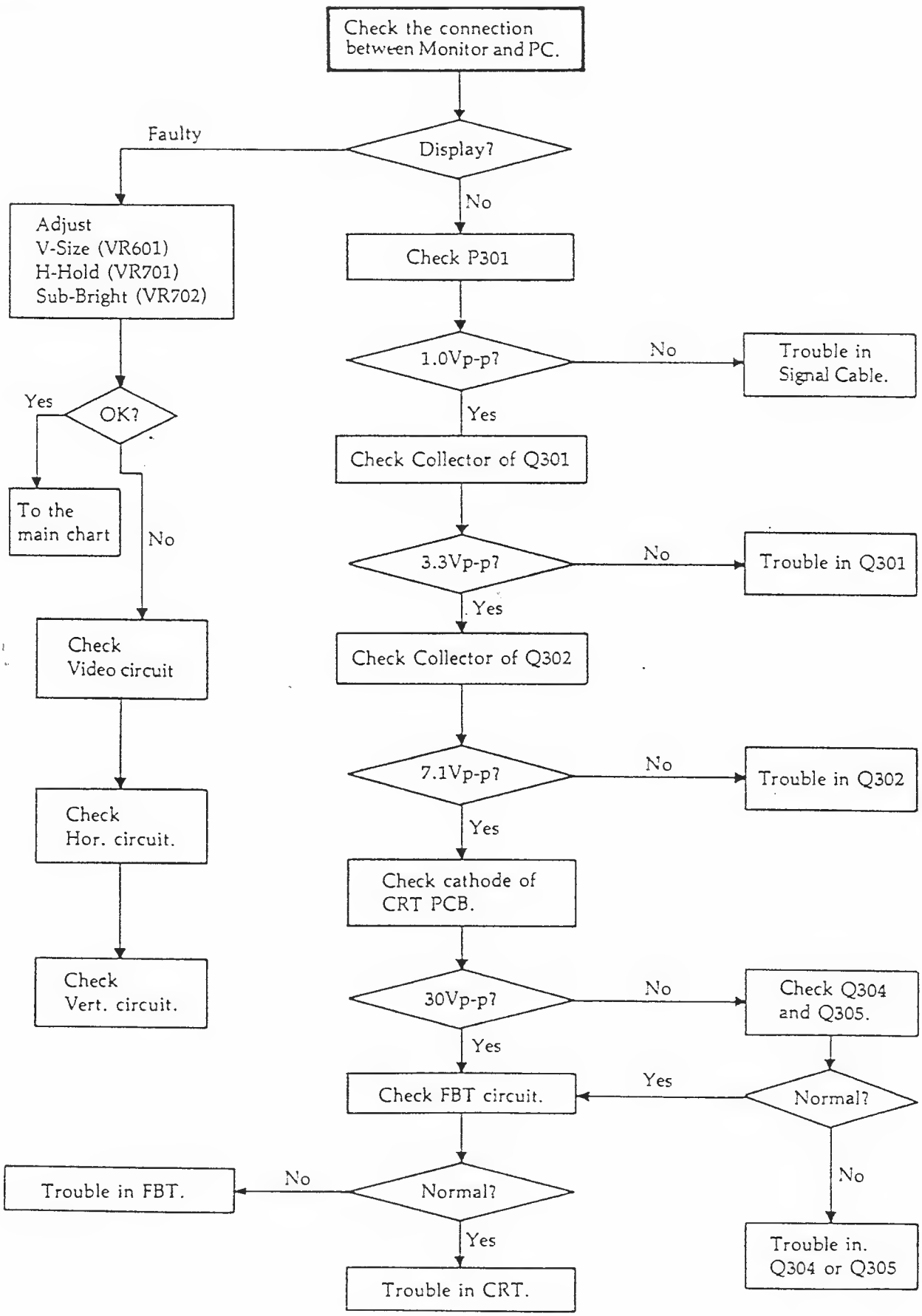
MAIN CHART



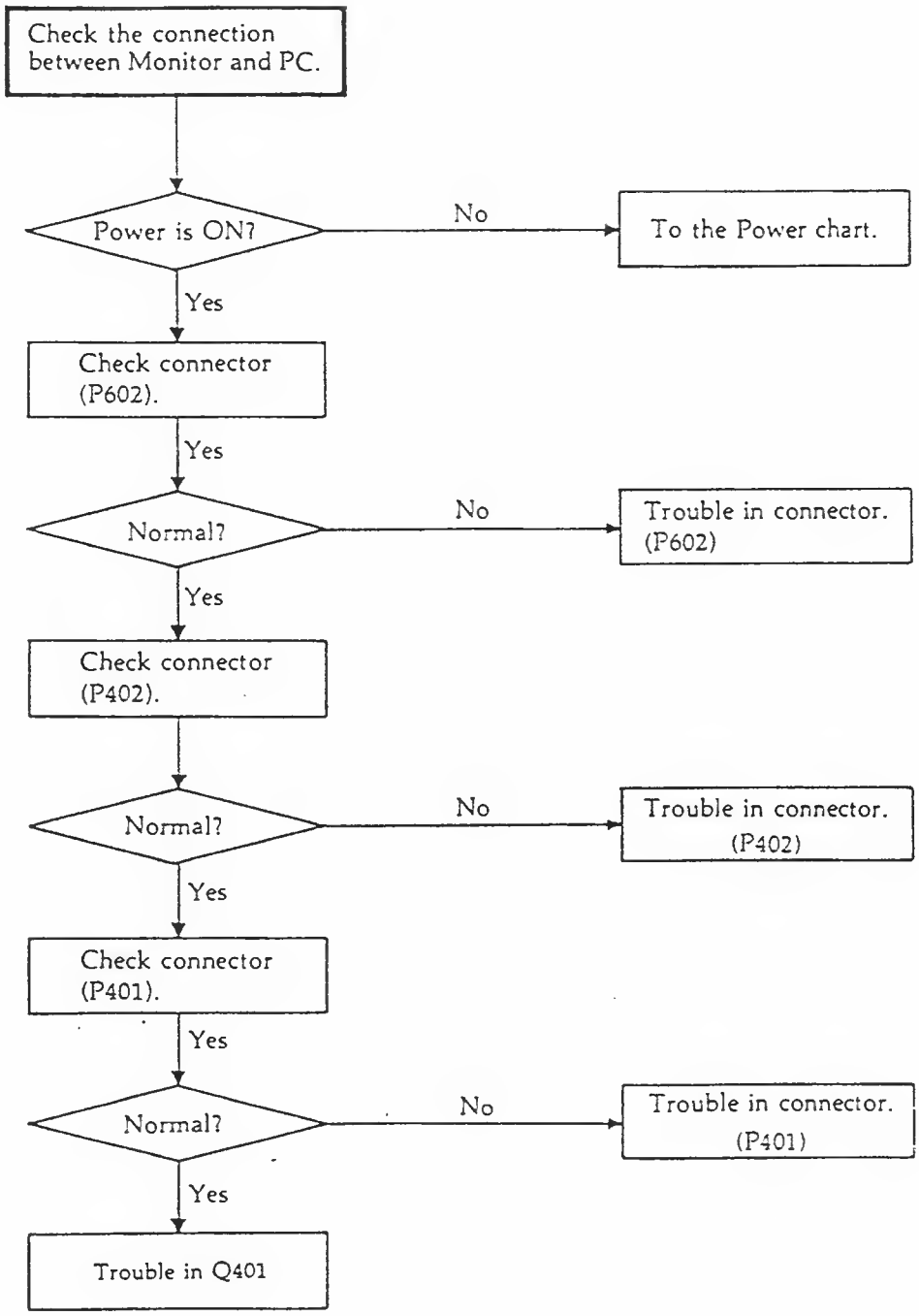
POWER CHART


Please check the monitor and outlet connections.
LED Lights?
Yes
To the main chart.
No or Weak
Check D930
+27V DC?
No
Yes
Check the output of FBT
Check AC fuse (F901).
Open?
No
Check Q702
Yes
Replace AC fuse.
Open?
No
No
Fuse Reopen?
Yes
Yes
Replace Q702
Replace Q901
Trouble in D901, IC901

VIDEO CHART


Check the connection between Monitor and PC.
Display?
Faulty
Adjust
V-Size (VR601)
H-Hold (VR701)
Sub-Bright (VR702)
OK?
Yes
No
To the main chart
Check Video circuit
Check Hor. circuit.
Check Vert. circuit.
Trouble in FBT.
No
Normal?
Yes
Trouble in CRT.
Check P301
1.0Vp-p?
No
Trouble in Signal Cable.
Yes
Check Collector of Q301
3.3Vp-p?
No
Trouble in Q301
Yes
Check Collector of Q302
7.1Vp-p?
No
Trouble in Q302
Yes
Check cathode of CRT PCB.
30Vp-p?
No
Check Q304 and Q305.
Yes
Check FBT circuit.
Yes
Normal?
No
Trouble in. Q304 or Q305

SOUND CHART


Check the connection between Monitor and PC.
Power is ON?
No
To the Power chart.
Yes
Check connector (P602).
Yes
Normal?
No
Trouble in connector. (P602)
Yes
Check connector (P402).
Normal?
No
Trouble in connector. (P402)
Yes
Check connector (P401).
Yes
Normal?
No
Trouble in connector. (P401)
Yes
Trouble in Q401

REPLACEMENT PARTS LIST

CAUTION: Components identified by the ⚠ symbol in the PARTS LIST and on the SCHEMATIC DIAGRAM have special characteristics important to safety.
Do not degrade the safety of the set through improper servicing.

ABBREVIATIONS: Capacitors .... CC: Ceramic (TC), CE: Chemical, CK: Ceramic (Hi-K), BP: Bipolor, CQ: Mylar, PE: Polyester, PP: Polypropylene
Resistors ..... RD: Carbon Film, RS: Metal Oxide Film, SR: Semifix

(All CC and Plastic Capacitors are ±5%, 50 Volts and all resistor, ±5%, 1/8W unless otherwise noted.
S : Recommend Service Parts

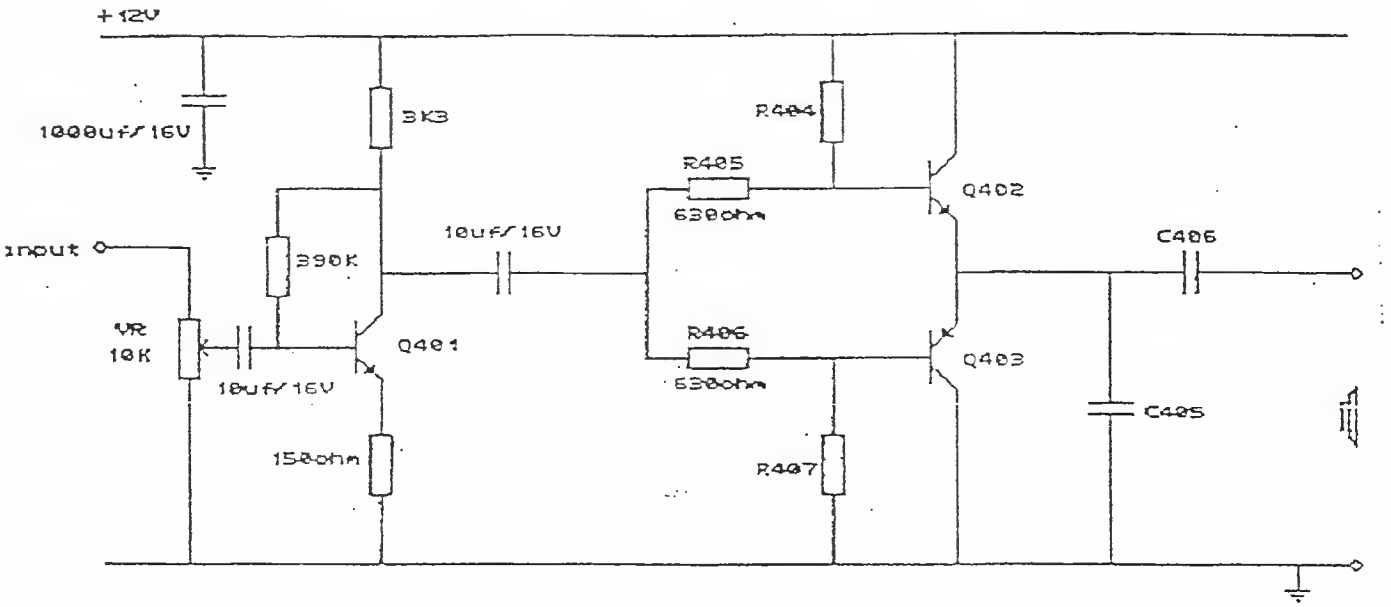
REF. NO	PART NO.	DESCRIPTION	REMARK
		RESISTOR	
R301	01157085	RD, 0.125W, 330 ohm, ±5%	
R302	01157081	RD, 0.125W, 220 ohm, ±5%	
R303	01157083	RD, 0.125W, 270 ohm, ±5%	
R304	01157088	RD, 0.125W, 430 ohm, ±5%	
R305	01157081	RD, 0.125W, 220 ohm, ±5%	
R307	01157075	RD, 0.125W, 120 ohm, ±5%	
R308	01157065	RD, 0.125W, 47 ohm, ±5%	
R309	01157084	RD, 0.125W, 300 ohm, ±5%	
R310	01157071	RD, 0.125W, 82 ohm, ±5%	
R311	01157075	RD, 0.125W, 120 ohm, ±5%	
R313	01154075	RD, 0.5W, 120 ohm, ±5%	
R314	01154075	RD, 0.5W, 120 ohm, ±5%	
R315	01154075	RD, 0.5W, 120 ohm, ±5%	
R316	01154075	RD, 0.5W, 120 ohm, ±5%	
R317	01154075	RD, 0.5W, 120 ohm, ±5%	
R318	01157079	RD, 0.125W, 180 ohm, ±5%	
R320	01157088	RD, 0.125W, 430 ohm, ±5%	
R401	01335073	RD, 2W, 100 ohm, ±5%	
R402	01157121	RD, 0.125W, 10K ohm, ±5%	
R403	01157097	RD, 0.125W, 1K ohm, ±5%	
R404	01157115	RD, 0.125W, 5.6K ohm, ±5%	
R405	01157093	RD, 0.125W, 680 ohm, ±5%	
R406	01157093	RD, 0.125W, 680 ohm, ±5%	
R407	01157115	RD, 0.125W 5.6K ohm, ±5%	
R408	01157087	RD, 0.125W, 390 ohm, ±5%	
R601	01157110	RD, 0.125W, 3.6K ohm, ±5%	
R602	01157083	RD, 0.125W, 270 ohm, ±5%	
R603	01160145	RD, 0.125W, 100K ohm, ±5%	
R604	01160146	RD, 0.125W, 110K ohm, ±5%	
R605	01521025	RD, 1W, 1 ohm, ±5%	
R606	01157157	RD, 0.125W, 330K ohm, ±5%	
R607	01157161	RD, 0.125W, 470K ohm, ±5%	
R608	01157132	RD, 0.125W, 30K ohm, ±5%	
R609	01157129	RD, 0.125W, 22K ohm, ±5%	
R610	01157145	RD, 0.125W, 100K ohm, ±5%	
R611	01157115	RD, 0.125W, 5.6K ohm, ±5%	
R612	01157117	RD, 0.125W, 6.8K ohm, ±5%	
R613	01157115	RD, 0.125W, 5.6K ohm, ±5%	
R614	01157029	RD, 0.125W, 1.5 ohm, ±5%	
R615	01157037	RD, 0.125W, 3.3 ohm, ±5%	
R616	01154083	RD, 0.5W, 270 ohm, ±5%	
R701	01157073	RD, 0.125W, 100 ohm, ±5%	

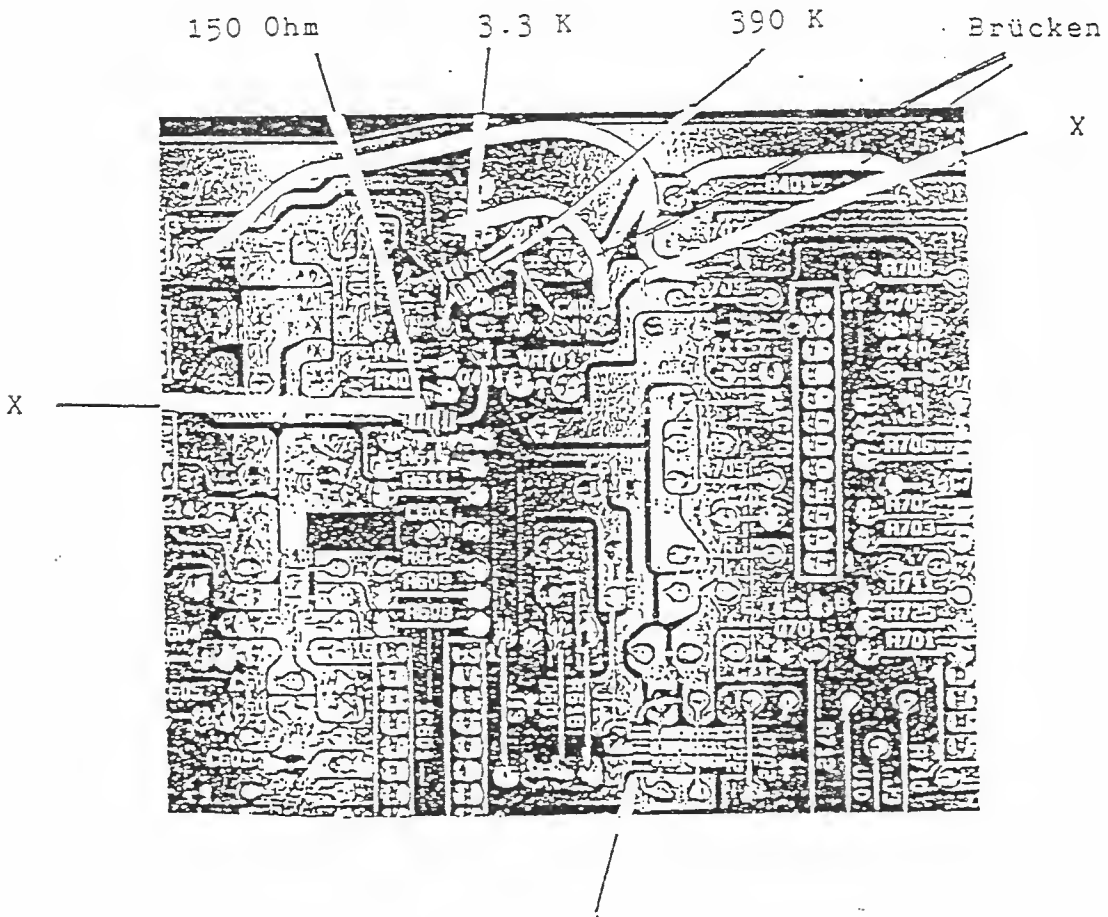
REF. NO	PART NO.	DESCRIPTION	REMARK
R702	01157114	RD, 0.125W, 5.1K ohm, ±5%	
R703	01157097	RD, 0.125W, 1K ohm, ±5%	
R704	01157134	RD, 0.125W, 36K ohm, ±5%	
R705	01157130	RD, 0.125W, 24K ohm, ±5%	
R706	01157138	RD, 0.125W, 51K ohm, ±5%	
R707	01157055	RD, 0.125W, 18 ohm, ±5%	
R708	01160122	RD, 0.125W, 11K ohm, ±5%	
R709	01160101	RD, 0.125W, 1.5K ohm, ±5%	
R710	01154075	RD, 0.5W, 120 ohm, ±5%	
R711	01157112	RD, 0.125W, 4.3K ±5%	
R712	01332075	RD, 1W, 120 ohm, ±5%	
R713	01332095	RD, 1W, 820 ohm, ±5%	
R714	01154095	RD, 0.5W, 820 ohm, ±5%	
R715	01157137	RD, 0.125W, 47K ohm, ±5%	
R716	01157140	RD, 0.125W, 62K ohm, ±5%	
R717	01157133	RD, 0.125W, 33K ohm, ±5%	
R718	01157133	RD, 0.125W, 33K ohm, ±5%	
R719	01157177	RD, 0.125W, 2.2M ohm, ±5%	
R720	01157133	RD, 0.125W, 33K ohm, ±5%	
R721	01157156	RD, 0.125W, 300K ohm, ±5%	
R722	01157061	RD, 0.125W, 33 ohm, ±5%	
R723	01332061	RD, 1W, 33 ohm, ±5%	
R725	01157124	RD, 0.125W, 13K ohm, ±5%	
R901	01154153	RD, 0.5W, 220K ohm, ±5%	
R902	180-142V	RESISTOR CEMENT, 5W, 4.7 ohm, ±5%	
R903	01154158	RD, 0.5W, 360K ohm, ±5%	
R904	180-304U	RESISTOR, METAL OXIDE, 3W, 18K ohm, ±5%	
R905	01154155	RD, 0.5W, 270K ohm, ±5%	
R906	01157145	RD, 0.125W, 100K ohm, ±5%	
R907	01157081	RD, 0.125W, 220 ohm, ±5%	
R908	01157099	RD, 0.125W, 1.2K ohm, ±5%	
R909	01157126	RD, 0.125W, 16K ohm, ±5%	
R910	01157121	RD, 0.125W, 10K ohm, ±5%	
R911	01157027	RD, 0.125W, 1.2 ohm, ±5%	
R912	180-304Q	RESISTOR, METAL OXIDE, 3W, 150 ohm, ±5%	
R913	01157059	RD, 0.125W, 27 ohm, ±5%	
R914	180-165A	RESISTOR, CEMENT, 5W, 330 ohm, ±5%	
R920	01160101	RD, 0.125W, 1.5K ohm, ±2%	

REF. NO	PART NO.	DESCRIPTION	REMARK
		CAPACITOR	
C301	08300132	CC, 68pF/50V	
C302	08110219	CE, 100uF/10V	
C303	08110219	CE, 100uF/10V	
C304	08110217	CE, 47uF/10V	
C305	08110317	CE, 47uF/10V	
C306	08110315	CE, 22uF/16V	
C308	02140617	CE, 47uF/100V	
C309	08201046	CK, 270pF/500V	
C401	08110313	CE, 10uF/16V	
C402	02140325	CE, 1000uF/16V	
C403	08110313	CE, 10uF/16V	
C404	08110317	CE, 47uF/16V	
C405	08200978	CK, 104pF/50V	
C406	02140321	CE, 220uF/16V	
C601	08110501	CE, 0.1uF/50V	
C602	08300146	CC, 270pF/50V	
C603	181-057D	PE, 0.1uF/100V	
C604	181-057D	PE, 0.1uF/100V	
C605	181-057D	PR, 0.1uF/100V	
C606	08300146	CC, 270pF/50V	
C607	08300150	CC, 390pF/50V	
C608	08110313	CE, 10uF/16V	
C609	181-057D	PE, 0.1uF/100V	
C610	02140327	CE, 2200uF/16V	
C611	02140321	CE, 220uF/16V	
C612	02140321	CE, 220uF/16V	
C701	08700323	CO, 0.0022uF/100V	
C702	08200978	CK, 104pF/50V	
C703	08700334	CO, 0.033uF/100V	
C704	08700334	CO, 0.033uF/100V	
C705	08300140	CC, 150pF/50V	
C706	08110505	CE, 0.47uF/50V	
C707	181-143H	PP, 0.0022uF/100V	
C708	02706527	CQ, 0.0047uF/100V	
C709	08110317	CE, 47uF/16V	
C710	08200972	CK, 103pF/50V	
C711	181-059S	PP, 0.0033uF/200V	
C712	08110511	CE, 4.7uF/50V	
C713	08200972	CK, 103pF/50V	
C714	02140522	CE, 330uF/50V	
C715	181-060P	PP, 0.022uF/400V	
C716	181-020J	BP, 2.2uF/50V	
C717	02140617	CE, 47uF/100V	
C718	02140619	CE, 100uF/100V	
⚠ C719	02201472	CK, 0.01uF/1KV	
C725	02201472	CK, 0.01uF/1KV	
C901	181-142A	MPP, 0.15uF/250V	
C904	181-048J	DE, 0.0022uF	
C905	181-048J	DE, 0.0022uF	
C906	181-142A	MPP, 0.15uF/250V	
C907	181-124M	CE, 120uF/400V	
C908	02706529	CQ, 0.0068uF/100V	
C909	02140417	CE, 47uF/25V	
C910	08300120	CC, 22pF/50V	
C911	08110219	CE, 100uF/10V	
C912	08110507	CE, 1uF/50V	
C913	02706527	CQ, 0.0047uF/100V	
C914	08110219	CE, 100uF/10V	
C915	181-061P	PP, 0.0027uF/630V	
C930	08201046	CK, 270pF/500V	
C931	181-254B	CE, 470uF/35V	
C932	02140519	CE, 100uF/50V	
C933	08201046	CK, 270pF/500V	
C934	181-254C	CE, 1000uF/25V	
C935	02140323	CE, 470uF/16V	
		TRANSISTOR AND IC	
Q301	06120244	2N2369	S
Q302	06120244	2N2369	S
Q303	06179460	TR, KTC1959-O (TA)	S
Q304	06150049	2N3904	S
Q305	06179487	TR, 2SC3503	S
Q401	06179460	KTC1959-O (TA)	S
Q402	06179460	KTC1959-O (TA)	S
Q403	06100094	KTA562TM-Q (TA)	S
Q701	06120203	KTC200-Y	S
⚠ Q702	06160011	TR, BU806	S
⚠ Q901	06170031	TR, 2SC3507	S
IC601	06300122	IC, TDA1170D	S
IC701	06300157	AN15790N	S
⚠ IC901	06300323	TDA4601	S
		DIODE	
D601	02600072	RGP10D	S
D701	06200177	RD, 11EB2 TA21R	S
D702	06200072	RGP10D	S
D703	06200072	RGP10D	S
D704	06200293	RGP30G	S
D705	06200072	RGP10D	S
D706	06200072	RGP10D	S
⚠ D707	06200120	DRB26-20	S
D708	06200072	RGP10D	S
LED	06200316	LED, DLG-2513D2	S
⚠ D901	06200222	RB-156 (BRIDGE)	S
D902	06200290	IN4006GP	S
D903	06200292	IN4935GP	S
D904	06200292	IN4935GP	S
D905	06200291	IN4933GP	S
D906	06200266	DIODE, RGP10G, FAST RECOVERY	S
D930	06220017	RGP15D	S
D931	06220017	RGP15D	S
		VARIABLE RESISTOR	
VR601	180-021R	RESISTOR SEMIFIX SR-19R 220KB	
VR602	180-021Q	RESISTOR SEMIFIX SR-19R 100KB	
VR701	180-021M	RESISTOR SEMIFIX SR-19R 330B	
VR702	180-021O	RESISTOR SEMIFIX SR-19R 100KB	
⚠ VR703	180-375B	RESISTOR SEMIFIX H1021A (0.5W)	
VR901	180-098E	RESISTOR SEMIFIX SR-19R 4.7K	
P302	180-324B	RESISTOR VARIABLE	S

REF. NO	PART NO.	DESCRIPTION	REMARK
		MISCELLANEOUS	
L301	04011029	PL3R3KTR	
L302	125-022C	CORE, FERRITE	
L303	125-022B	CORE, FREEITE SM-2CRHW 3.5 × 12 × 1B	
L701	150-166F	COIL, CHOKE 3.3uH 1A	
L703	150-308V	COIL, H. WIDTH	
L704	150-399B	COIL, H. LINEARITY	
L705	125-022C	CORE, FERRITE	
⚠ L901	150-314A	COIL, LINE FILTER, 20MH	
L902	125-022C	CORE, FERRITE	
L903	04011029	PL3R 3K TR	
L930	125-022C	CORE, FERRITE	
L931	150-235F	COIL, CHOKE 25uH 1A	
L932	125-022C	CORE, FERRITE	
L933	150-235F	COIL,CHOKE 25uH 1A	
⚠ T701	154-090A	FBT MBH-2155N, MT-21,35.7KHz	S
⚠ T901	151-284B	TRANS, SMPS	S
P301	366-921B	WAFER IL-G3 (2.5S)	
P302	366-065B	PIN, AMP ULTREX 17268-3	
P401	366-065B	PIN, AMP ULTREX 17268-3	
P402	366-065B	PIN, AMP ULTREX 17268-3	
P601	366-084A	PIN MOLEX 5267-3A	
P602	366-921C	WAFER IL-G4 (2.5S)	
P701	366-084A	PIN MOLEX 5267-3A	
P702	366-009B	PIN PLUG	
P902	366-065B	PIN, AMP ULTREX 17268-3	
P1, P2	366-059A	PIN MOLEX 5096-02C	
F901	131-007T	FUSE, TIME LAG 1.6A/250V	S
DY	153-071A	DY ASSY, MONITOR MH3-1	S
⚠ CRT	112-123F	MDT, 310KAB4K (UL,CSA/VDE)	S
SG301	165-004A	SPARK GAP, AG20PT 152F-L3N	
SG302	165-004A	SPARK GAP, AG20PT 152F-L3N	
SG303	165-004A	SPARK GAP, AG20PT 152F-L3N	
NL301	144-018B	NEON LAMP 95V	
FUSE HOLD	430-122A	FUSE HOLDER	
SOCKET	381-067E	SOCKET, CRT	
SIGNAL CABLE	387-369E	CONNECTOR ASSY, SIGNAL	
POWER CORD	174-121B	CORD ASSY, POWER 6FT GY (VDE)	
CRT EARTH	387-131B	CONNECTOR ASSY, HIUSING	
SPEAKER	120-017B	SPEAKER, CO80A21GB	
CONNECTOR	387-923F	CONNECTOR ASSY, H-DY	
CONNECTOR	387-923G	CONNECTOR ASSY, V-DY	
CONNECTOR	387-923H	CONNECTOR ASSY, AMP (SPEAKER)	
CONNECTOR	387-352T	CONNECTOR ASSY, HOUSING (P1)	
CONNECTOR	387-922D	CONNECTOR ASSY, AMP ULTREX (CONTRAST & BRIGHT VR)	
CONNECTOR	387-923B	CONNECTOR ASSY, AMP VOLUME (SOUND)	
CONNECTOR	387-923J	CONNECTOR ASSY, AMP (LED)	
POWER SWITCH	180-291A	SWITCH EVV-G6LF 20B14	
PWB	111-895A	MAIN PWB MT-21	

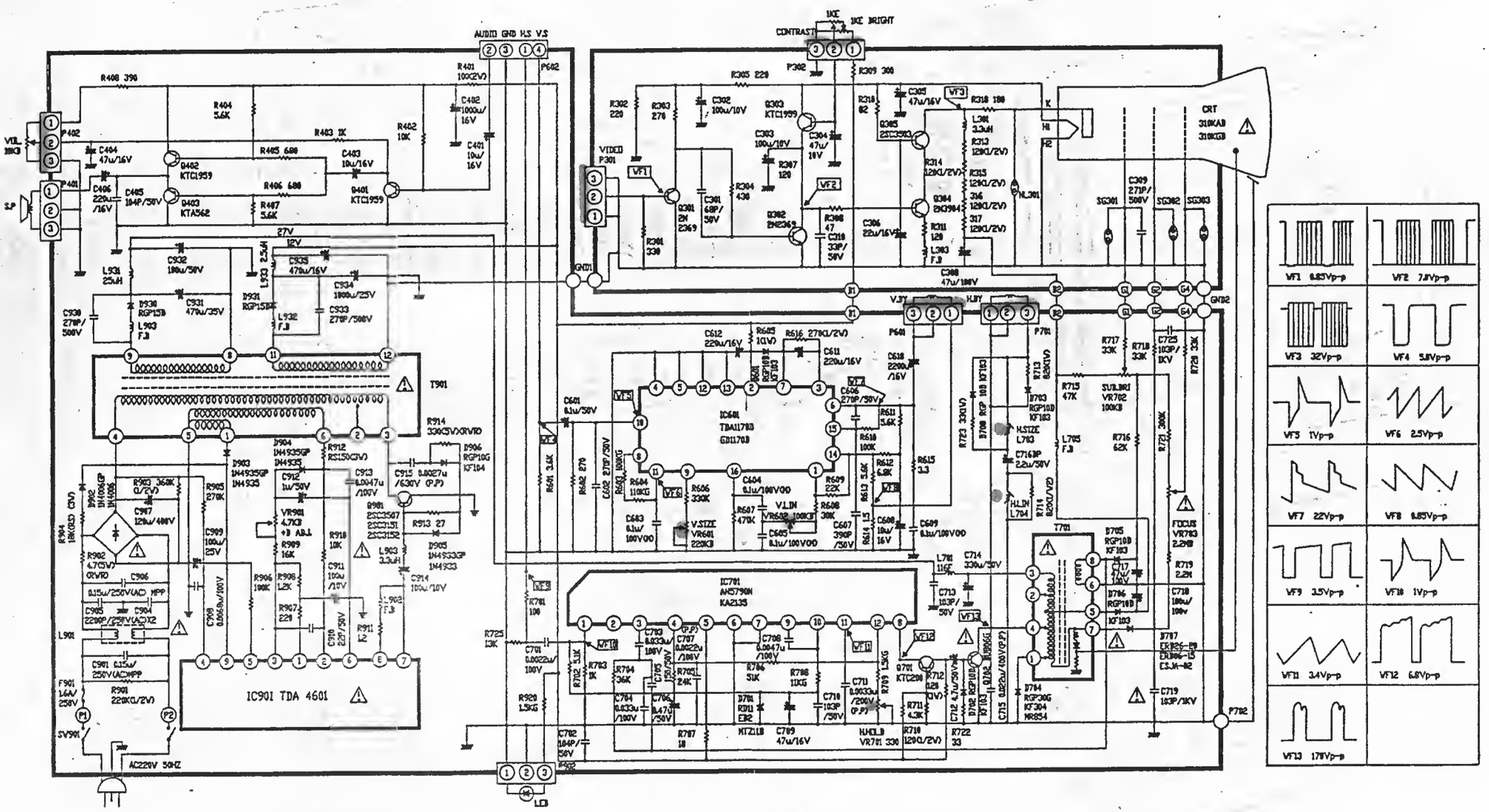
REVISED AUDIO CIRCUIT SH124 MONITOR





X = Leiterbahn unterbrechen

MT-21 SCHEMATIC DIAGRAM



NOTES : 1. RESISTORS ARE SHOWN IN OHMS
K = 1,000 M = 1,000,000
2. CAPACITORS ARE SHOWN IN uF
OTHERWISE NOTED P = u u
3. ALL RESISTORS ARE ± 5 % TOLERANCE
UNLESS OTHER WISE INDICATED.

⚠ REPLACE ALL COMPONENTS MARKED WITH SAFTY SYMBOL WITH IDENTICAL TYPE

IMPORTANT SAFETY NOTICE

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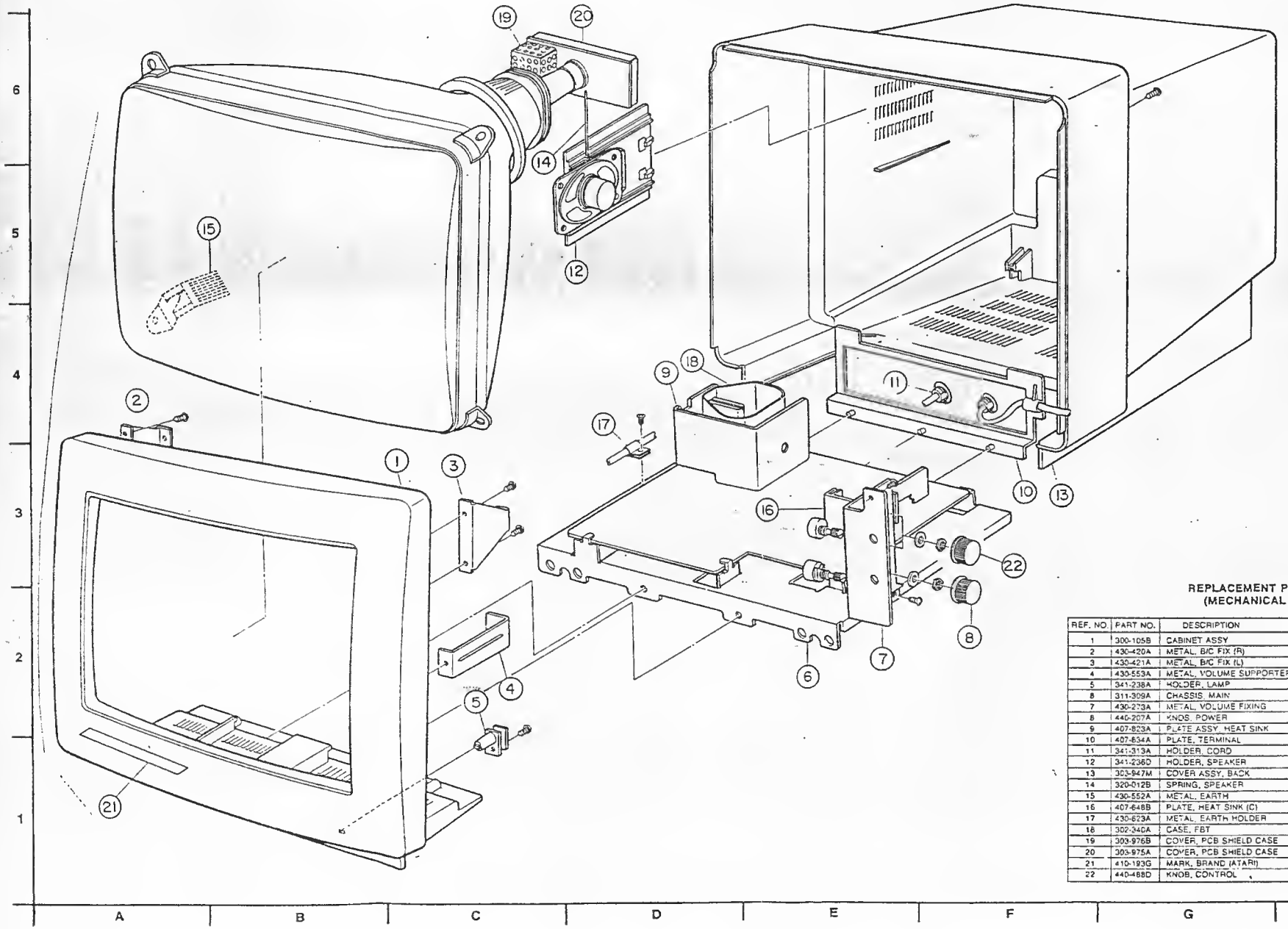
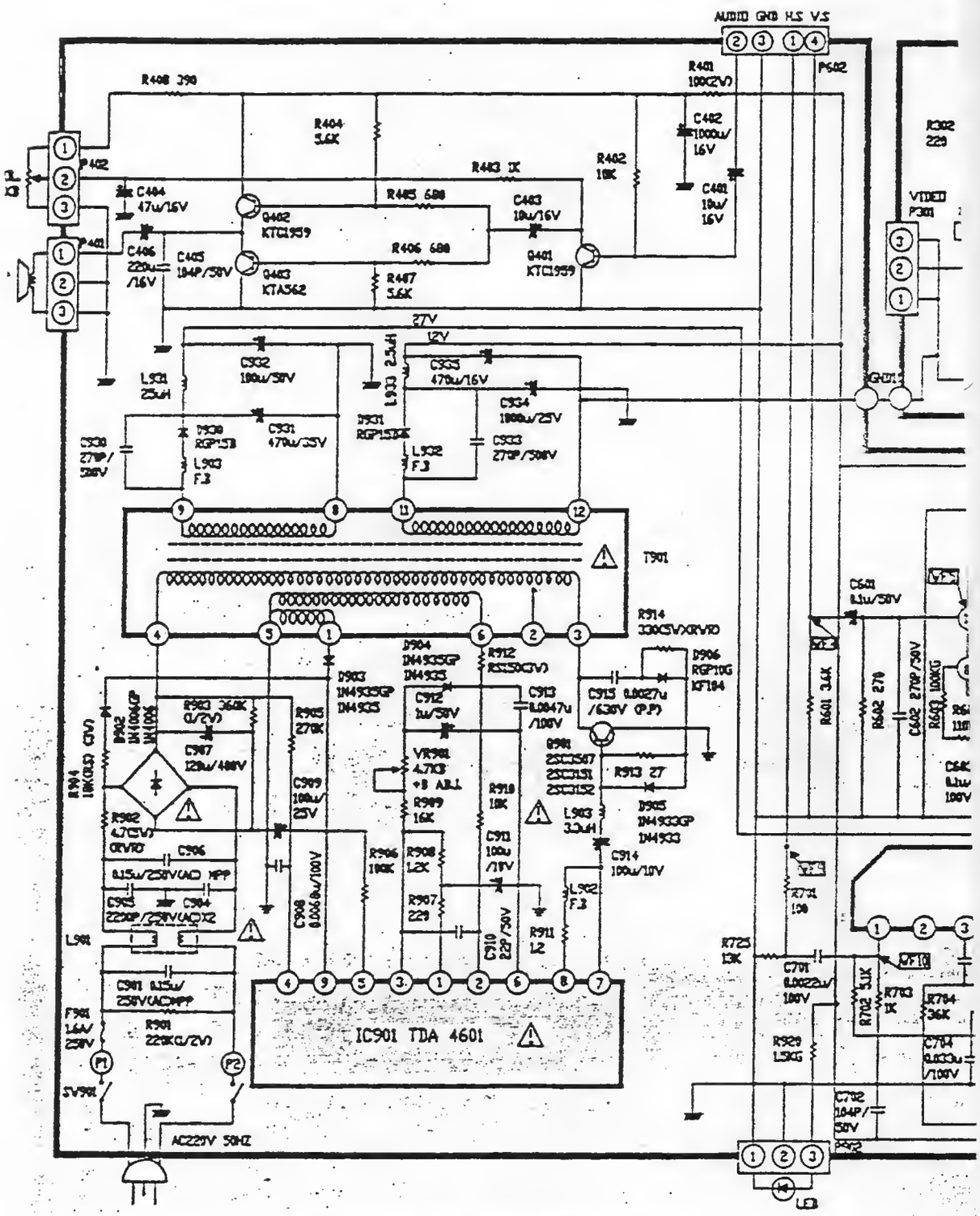
ATARI SM 124
MT-21

EXPLODED VIEW



REPLACEMENT PARTS LIST
(MECHANICAL PARTS)

REF. NO.	PART NO.	DESCRIPTION	MATERIAL	Q'TY	REMARKS
1	300-105B	CABINET ASSY	LUCKY, HIPS 55SH	1	
2	430-420A	METAL, B/C FIX (R)		1	
3	430-421A	METAL, B/C FIX (L)		1	
4	430-553A	METAL, VOLUME SUPPORTER		1	
5	341-238A	HOLDER, LAMP	LUCKY, AF-303	1	
6	311-309A	CHASSIS, MAIN		1	
7	430-273A	METAL, VOLUME FIXING		1	
8	440-207A	KNOB, POWER	LUCKY, 40AF	1	
9	407-823A	PLATE ASSY, HEAT SINK		1	
10	407-834A	PLATE, TERMINAL	LUCKY, AF-303	1	
11	341-313A	HOLDER, CORD	RHONE POULENC, A-218	2	
12	341-236D	HOLDER, SPEAKER	LUCKY, HIPS 55SH	1	
13	303-947M	COVER ASSY, BACK	LUCKY, HIPS 55SH	1	
14	320-012B	SPRING, SPEAKER		1	
15	430-552A	METAL, EARTH		1	
16	407-648B	PLATE, HEAT SINK (C)		1	
17	430-623A	METAL, EARTH HOLDER		1	
18	302-340A	CASE, FBT		1	
19	303-976B	COVER, PCB SHIELD CASE		1	
20	303-975A	COVER, PCB SHIELD CASE		1	
21	410-193G	MARK, BRAND (ATARI)		1	
22	440-488D	KNOB, CONTROL	LUCKY, AF-303S	2	



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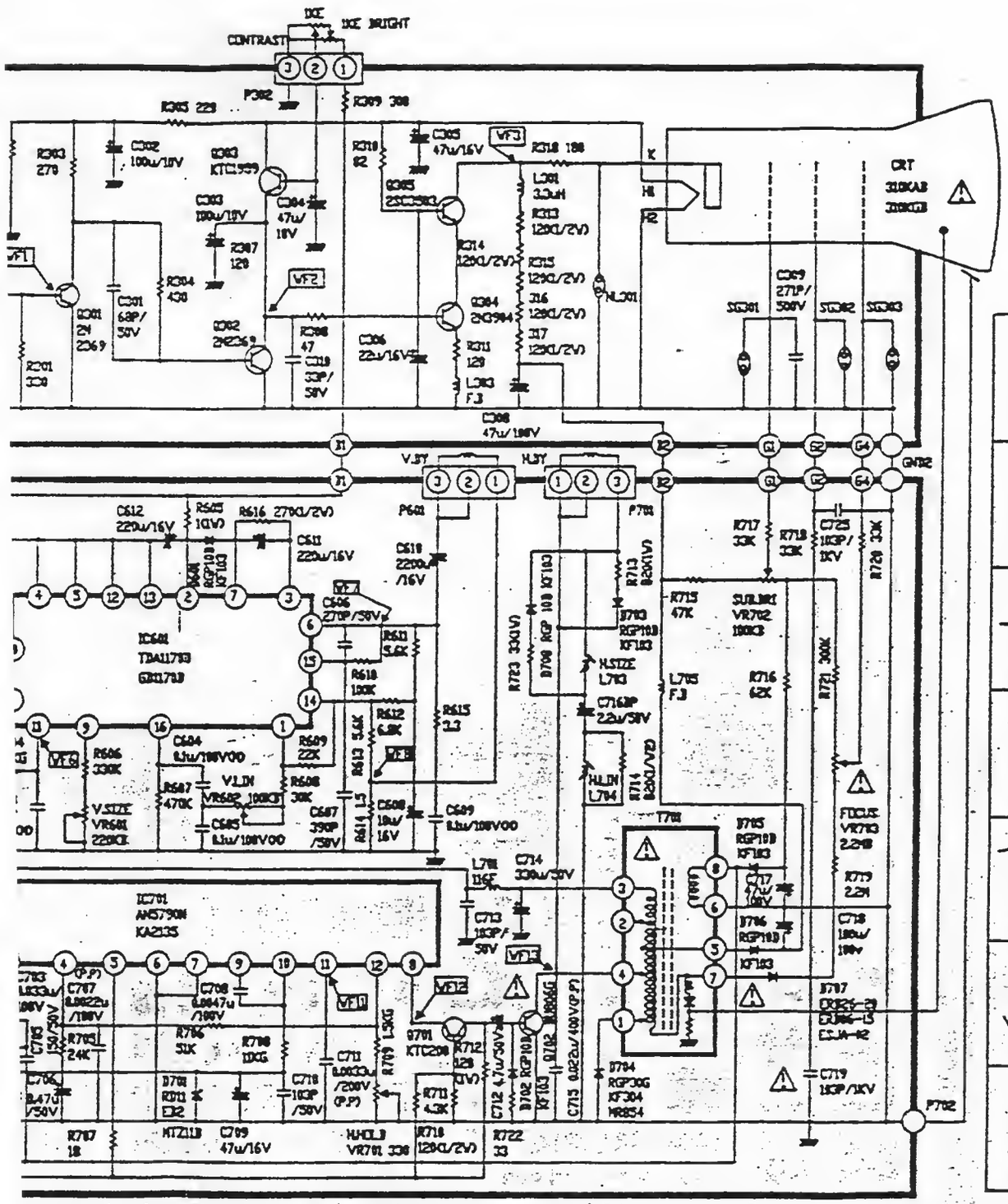
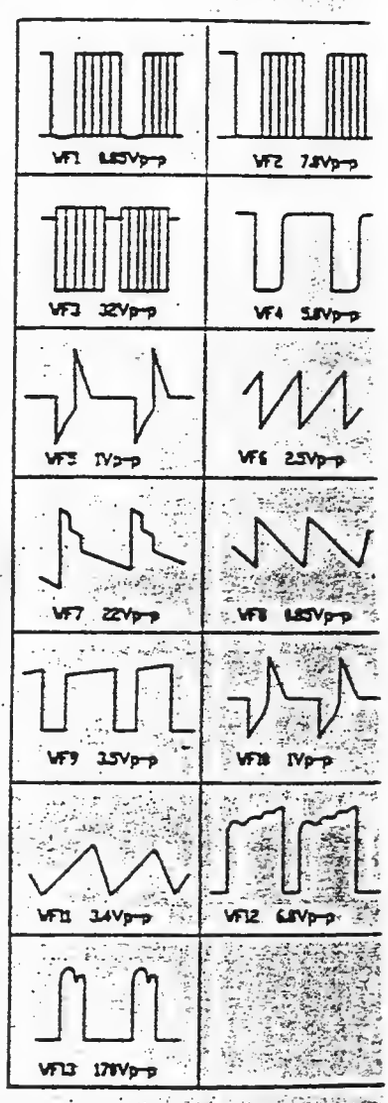
SCHEMATIC DIAGRAM





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