

IBM  
MODEL 5154001

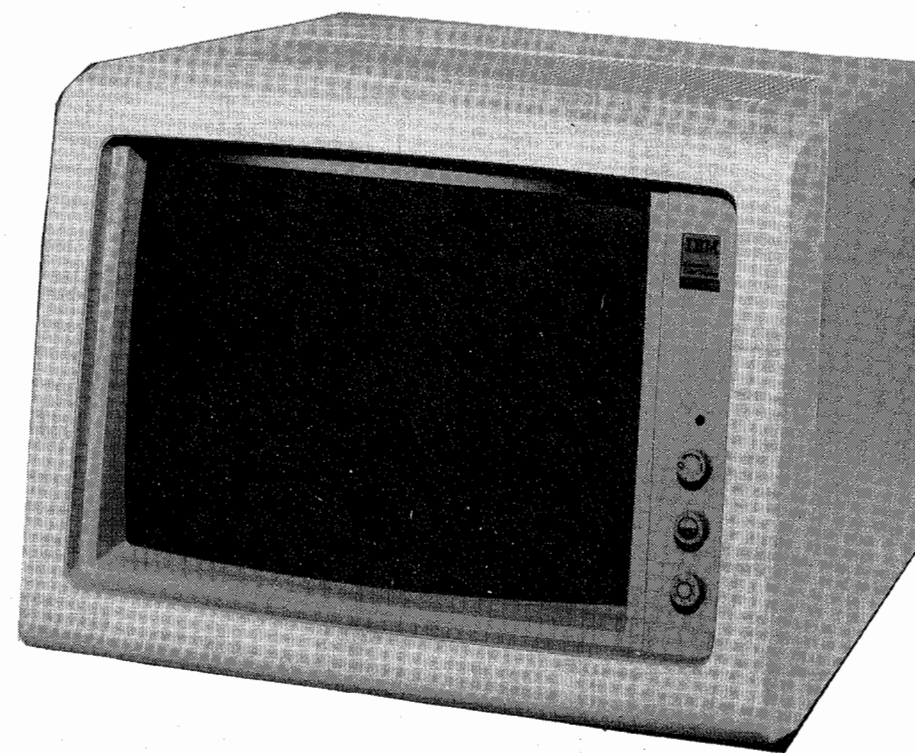
SET 2567 FOLDER 2

**SAMS**

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**SAFETY PRECAUTIONS**

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**SAMS** Howard W. Sams & Co.

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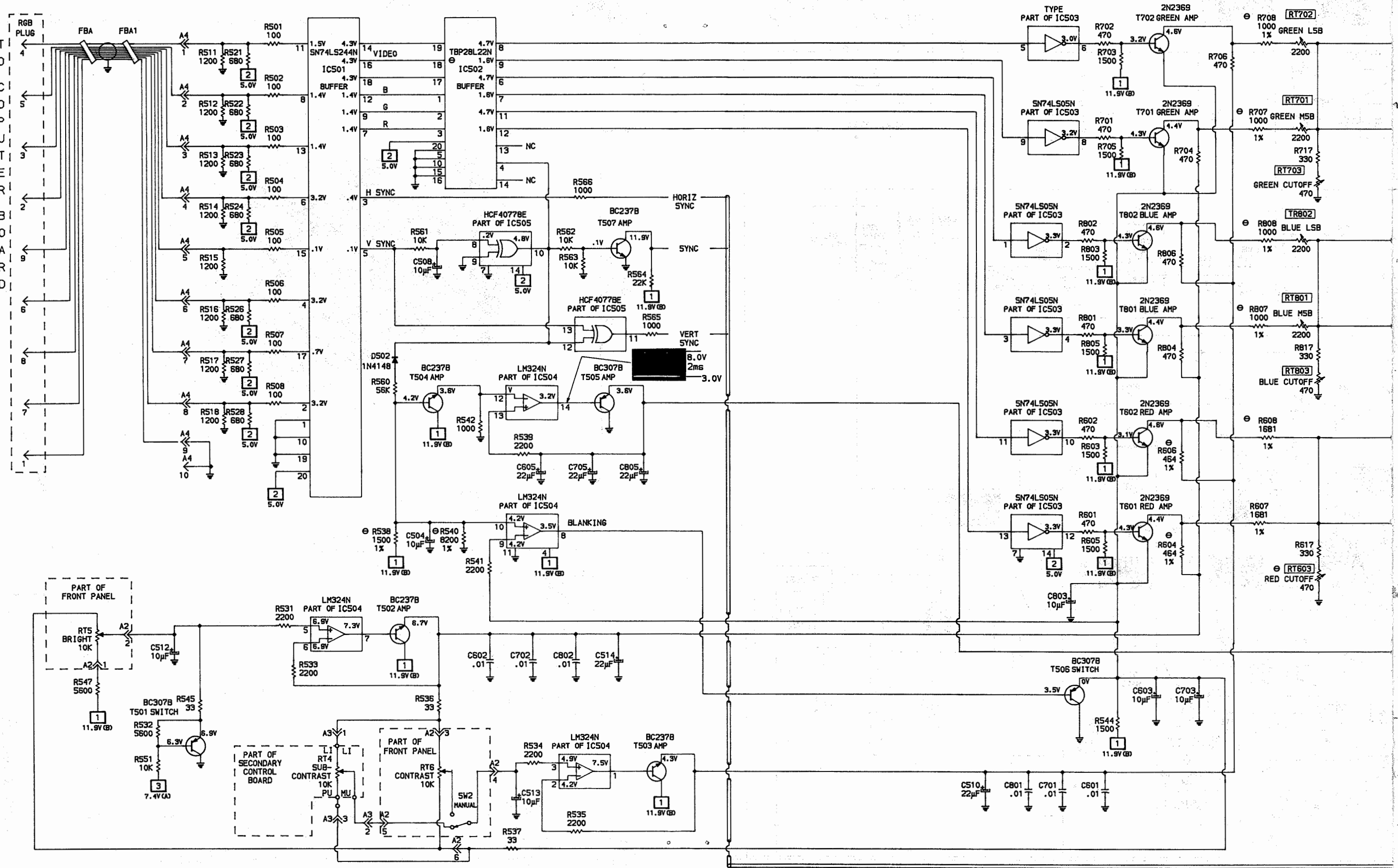
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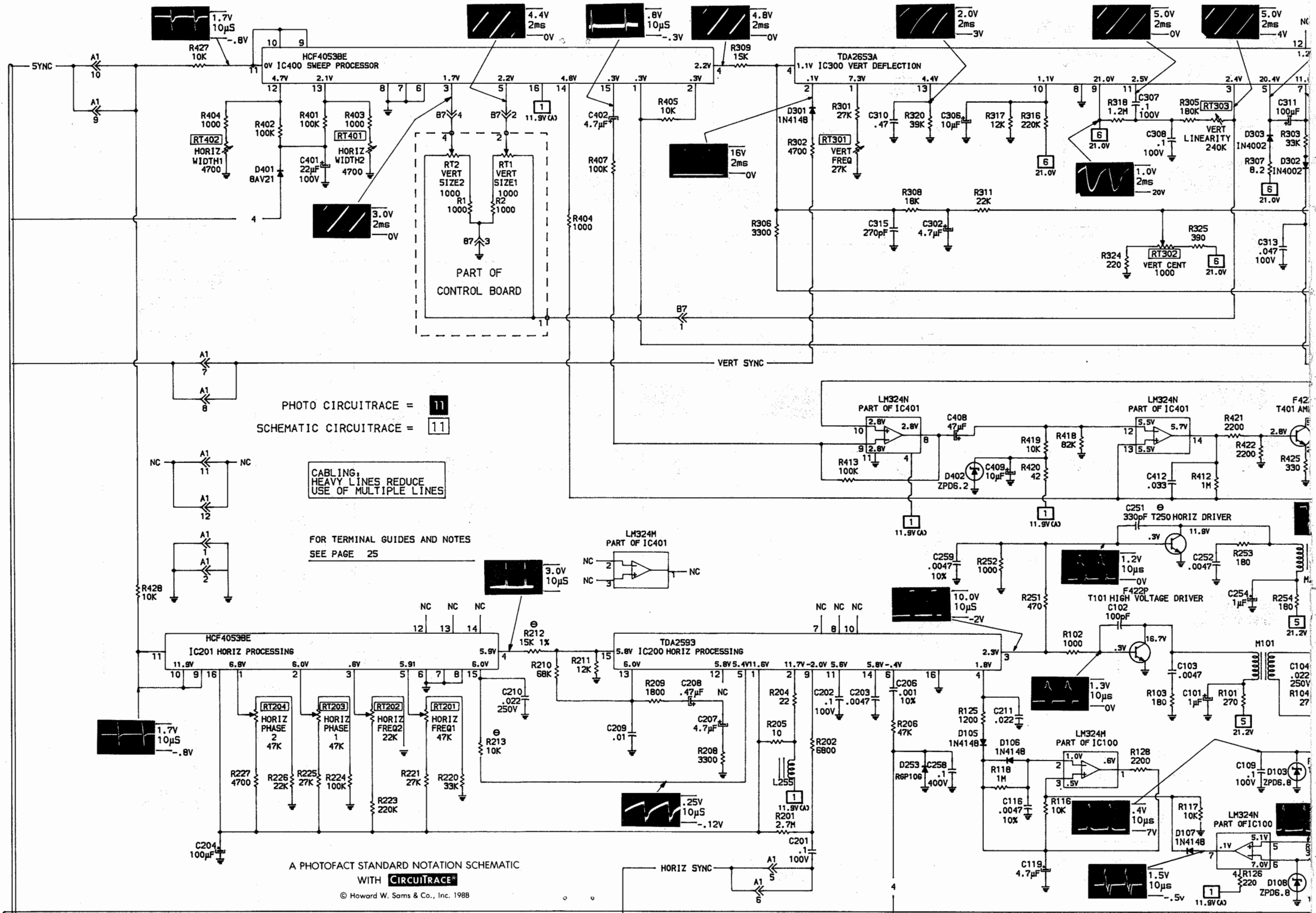
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TO COMPUTER BOARD





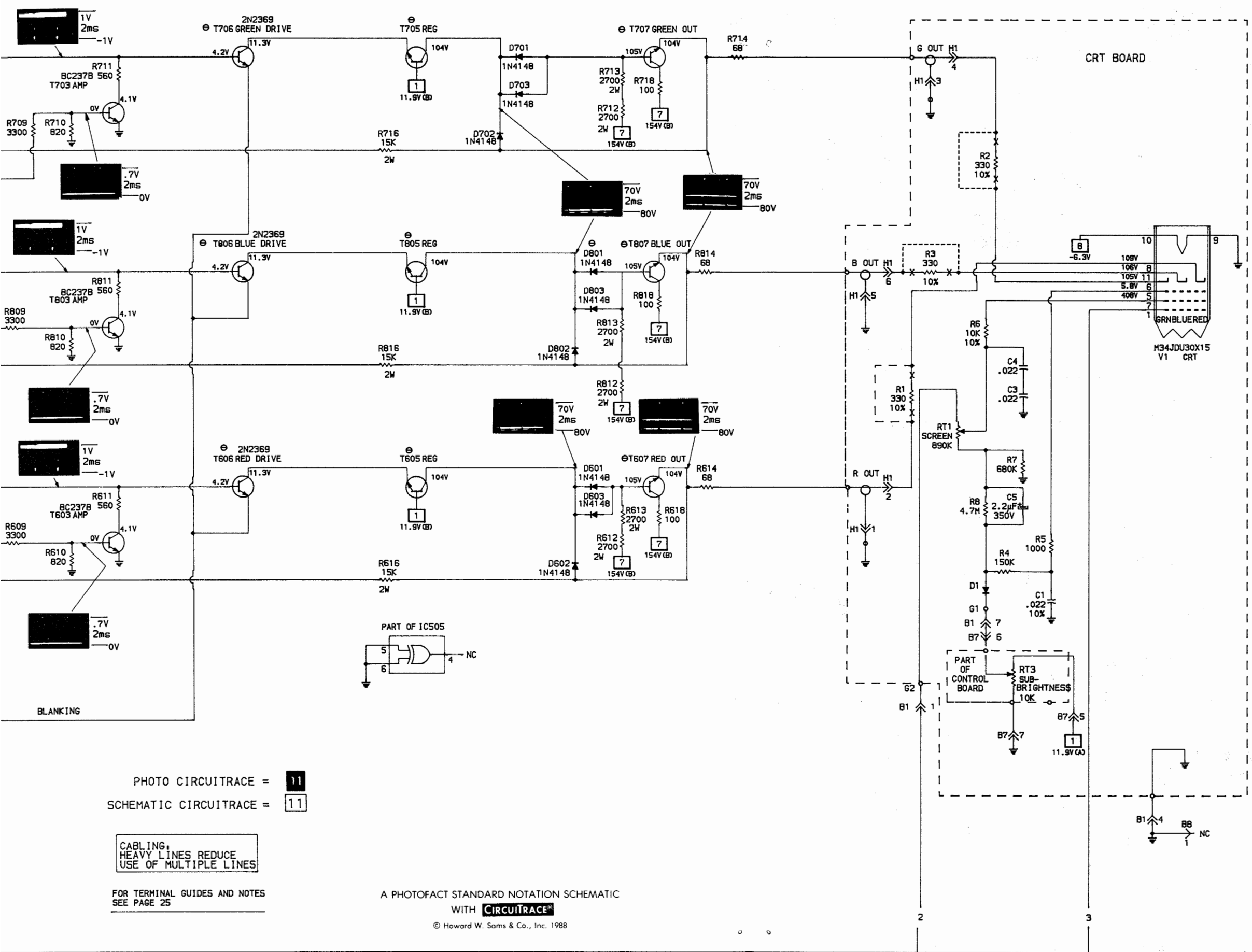


PHOTO CIRCUITRACE = **11**  
 SCHEMATIC CIRCUITRACE = **11**

CABLING,  
 HEAVY LINES REDUCE  
 USE OF MULTIPLE LINES

FOR TERMINAL GUIDES AND NOTES  
 SEE PAGE 25

A PHOTOFACIT STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**  
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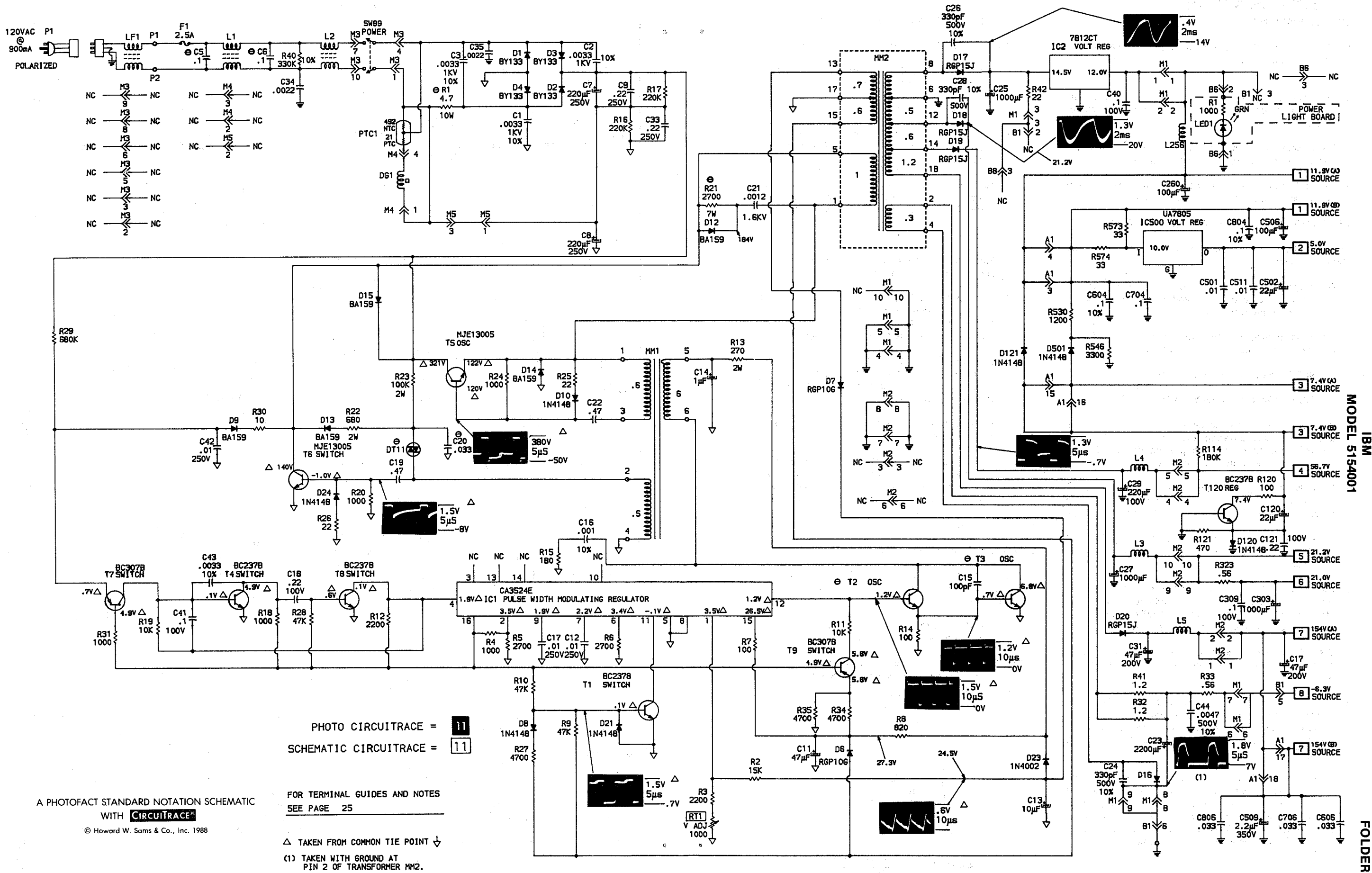


PHOTO CIRCUITRACE = **11**  
 SCHEMATIC CIRCUITRACE = **11**

FOR TERMINAL GUIDES AND NOTES  
 SEE PAGE 25

△ TAKEN FROM COMMON TIE POINT ↓

(1) TAKEN WITH GROUND AT  
 PIN 2 OF TRANSFORMER MM2.

A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**  
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## SAFETY PRECAUTIONS

### SERVICE WARNING

Service work should be performed only by qualified service technicians who are familiar with safety checks and guide lines.

1. For continued safety, no modification of any circuit should be attempted unless recommended by manufacturer.
2. Disconnect power source before replacing parts as some parts may be electrostatic sensitive.
3. Use an isolation transformer between the line cord and power receptacle, when servicing chassis.

### SERVICING HIGH VOLTAGE AND PICTURE TUBE

When servicing the High Voltage circuits, extreme caution should be used.

1. Discharge static High Voltage by connecting a 10 kohms resistor in series with a test lead between chassis and anode lead of picture tube.
2. Wear shatter-proof eye protection (goggles) when handling the picture tube in case of implosion.
3. DO NOT lift picture tube by the neck.

### X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Service personnel should be aware of the procedures and instructions covering x-ray radiation. The only potential source of x-ray in present day solid state receivers and monitors is the picture tube.

1. It is only when High Voltage is excessive that x-ray radiation is capable of being emitted from shell of picture tube. Be sure the High Voltage is set at specified level.
2. An accurate High Voltage meter should be available at all times. Meter calibration should be checked periodically.
3. High Voltage should be kept at rated value - NO HIGHER. Higher voltages may cause x-ray radiation or failure of other associated components. DO NOT depend on protection circuit to keep voltages at rated value.
4. Every time a chassis is serviced, High Voltage should be checked at various brightness levels to be sure it is regulating properly.
5. While troubleshooting a set with excessive High Voltage, avoid being close to picture tube. DO NOT operate longer than it is necessary to locate the cause of excessive High Voltage. Use a variable AC transformer to regulate voltage.
6. Many components, electrical and mechanical, in present chassis have safety related characteristics which are not evident with visual inspection. When these components are known, they are identified with a # on the schematic and in the parts list. When replacing these components, for SAFETY, use only an equivalent replacement part.

### SAFETY CHECKS-FIRE AND SHOCK HAZARD

#### Cold Leakage Checks (Sets with isolated ground.)

1. Unplug the AC cord and connect a jumper across the two prongs on the plug.
2. Turn on power switch.
3. Measure the resistance, with an Ohm meter, between the jumpered AC plug and any exposed metal cabinet parts on the set such as: antenna screw heads, control shafts, handle brackets. Exposed metal parts that have a return path should measure between 200 kohms and 5 megohm. Parts without a return path must measure infinity.

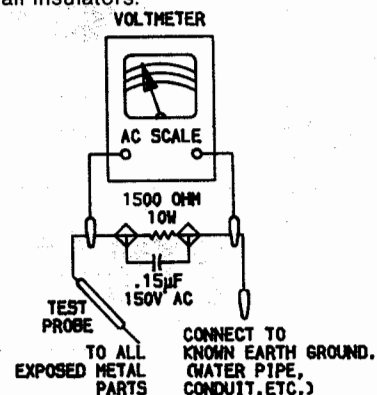
#### Leakage Current Hot Check

1. Plug the AC cord directly into AC outlet. DO NOT use an isolation transformer.
2. Connect a 1500 Ohm 10 watt resistor, in parallel with a .15 $\mu$ F 150V AC capacitor, between any exposed metal parts on the set and a good earth ground such as a water pipe. (See Figure below.)
3. Using an AC volt meter, with 1000 Ohms per volt or more sensitivity, measure the voltage across the resistor. Check each exposed part and measure voltage at each point.
4. Reverse the AC plug and repeat voltage measurement at each point.
5. The voltage at any point should not exceed .75 volts RMS. This corresponds to .5 milliamps AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected.

### GENERAL GUIDE LINES

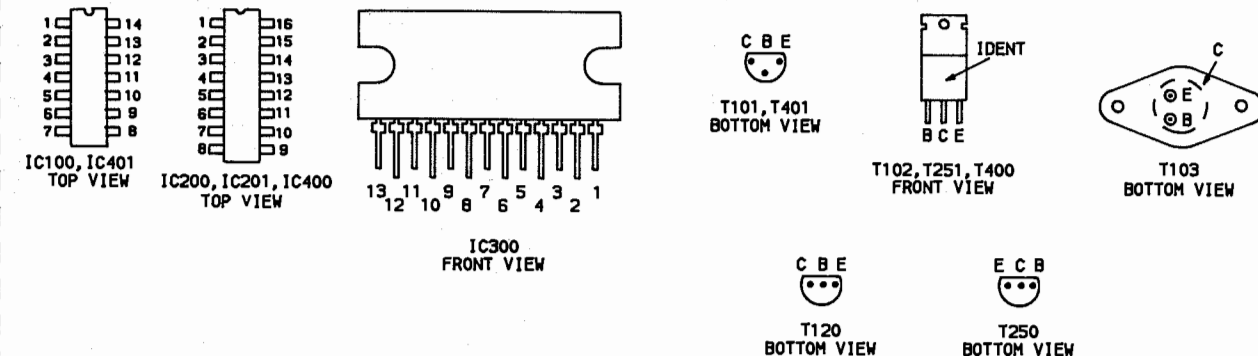
A final SAFETY check before returning the set to customer.

1. Check area repaired for poorly soldered or de-soldered connections. Check entire circuit board surface for solder splashes.
2. Check interboard wiring for pinched wires or wires contacting any high-wattage resistors.
3. Check that all control knobs, shields, covers, grounds and mounting hardware have been replaced. Be sure to replace all insulators.

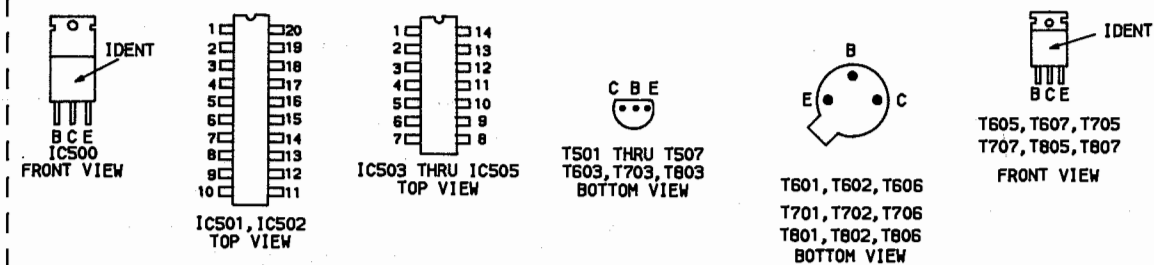


## TERMINAL GUIDES

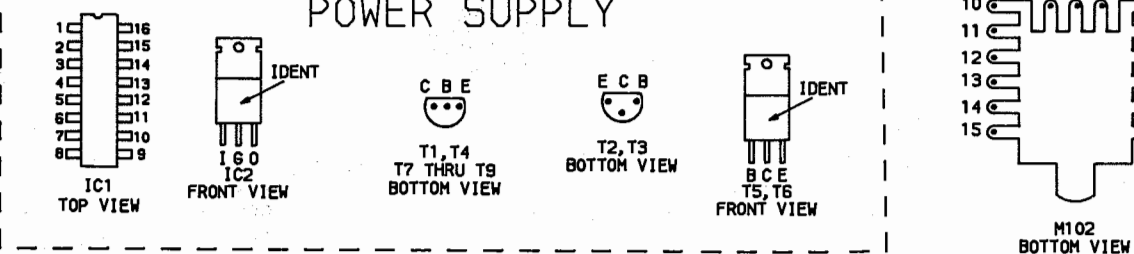
### MAIN BOARD



### VIDEO BOARD



### POWER SUPPLY



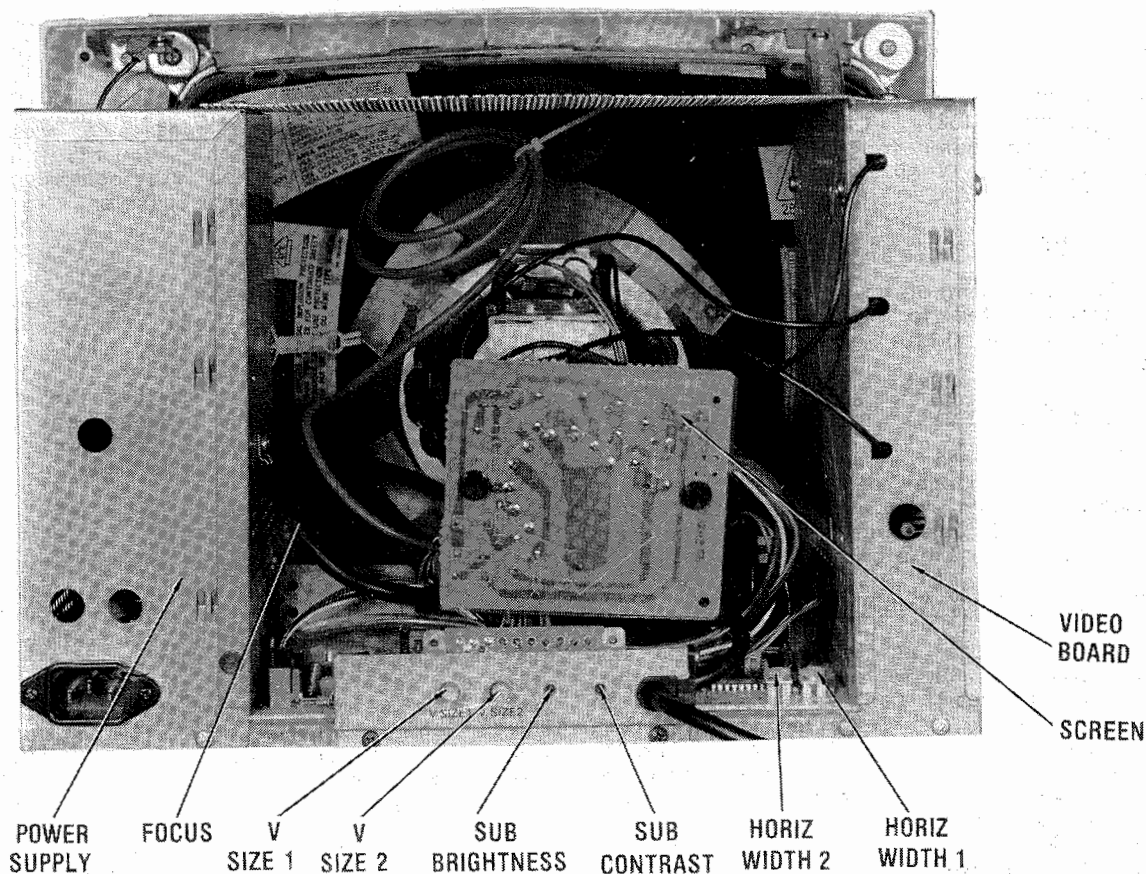
## SCHEMATIC NOTES

- ★ Circuitry not used in some versions
  - Circuitry used in some versions
  - e See parts list
  - ⊕ Ground
  - ▽ Common tie point
- Waveforms and voltages are taken from ground, unless noted otherwise.  
Waveforms: triggered scope, RGB pattern generator.  
Item numbers in rectangles appear in the alignment/adjustment instructions.  
Supply voltages maintained as shown at input.

Voltages measured with digital meter, with signal applied.  
Controls adjusted for normal operation.  
Terminal identification may not be found on unit.  
Capacitors are 50 volts or less, 5% unless noted.  
Electrolytic capacitors are 50 volts or less, 20% unless noted.  
Resistors are 1/2W or less, 5% unless noted.  
Value in ( ) used in some versions.  
Measurements with switching as shown, unless noted.

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FOLDER 2



CABINET-REAR VIEW

## DISASSEMBLY INSTRUCTIONS

### CHASSIS REMOVAL

Remove two caps from cabinet top and remove the two Phillips screws under the caps. Remove four screws from cabinet bottom that hold cabinet back to cabinet front. Remove cabinet back.

Disconnect HV anode, CRT socket and ground leads. Remove knobs from cabinet front. Remove two screws holding control assembly to cabinet front and remove control assembly. Remove screw holding indicator assembly to cabinet front and remove indicator assembly. Remove screw holding cabinet bracket to Power Supply cage. Remove screw holding cabinet bracket to Video Board cage. Remove two screws from cabinet bottom holding main chassis assembly to cabinet front. Remove main chassis assembly from cabinet.

Remove four screws holding grid shield between Power Supply cage and Video Board cage. Remove three screws holding Power Supply cage to main chassis. Remove two screws attaching AC Power Connector to Power Supply cage. Discon-

nect Connectors M3 and M4 from Power Supply Board. Remove Power Supply cage from main chassis. Pull Power Supply Board up firmly to disconnect from Main Board.

Loosen two screws holding Video Board cage side panel facing CRT neck. Slide panel upward and remove from cage. Disconnect Connectors A2, A3 and A4 from Video Board. Disconnect Connector H1 from the CRT Board. Remove three screws holding Video Board cage to main chassis. Remove Video Board cage. Pull Video Board up firmly to disconnect from Main Board.

### CRT REMOVAL

CAUTION: Monitor employs CRT with neck assemblies permanently bonded to the CRT. DO NOT attempt to remove neck assemblies from the CRT.

Follow "Chassis Removal" procedures and lay Monitor facedown on a soft protective surface. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. DO NOT lift CRT by neck.

## TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

### TEST EQUIPMENT (COMPUTERFACTS)

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1570A,1590A,1596	SC61	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
ANALOG VOM	277,111,116		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	
COLOR BAR GENERATOR	1211A,1251,1260,1249	CG25,VA62	
RGB GENERATOR	1260,1249		
FUNCTION GENERATOR	3020,3011,3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
TEMPERATURE PROBE	TP-28,TP-30		
CRT ANALYZER	467,470	CR70	
DIGITAL IC TESTER	560,550,552		
CAPACITANCE ANALYZER		LC53,LC75,LC76 LC77	
INDUCTANCE ANALYZER		LC53,LC75,LC76 LC77	

## TROUBLESHOOTING

### POWER SUPPLY

Check the AC Line Fuse (F1). If Fuse is bad, check Bridge Rectifier Diodes (D1 thru D4), Oscillator Transistor (T5), Diode D14 and associated circuitry for possible shorts. Check for 321V (with respect to isolated ground) at the cathode of Diode D2. If the 321V is missing at the cathode of D2, check voltages and waveforms associated with Switch Transistors (T5, T6). Also check voltages, waveforms and components associated with Pulse Width Modulating Regulator (IC1) and Oscillator Transistors (T2, T3). Check Switching Transformer (MM1). If 321V is present at the cathode of D2, check for 12V at the output of Voltage Regulator (IC2). If 12V is missing, check for 14.5V at the cathode of Diode D17. If 14.5V is present at the cathode of D17, check IC2 by substitution. Check for 5V at the output of Voltage Regulator (IC500). If 5.0V is missing, check for 10V at the input of the Regulator. If 10V is present, check IC500 by substitution. If 10V is missing, check L256 and R574. If 14.5V is missing at the cathode of D17, check D17 and Switching Transformer (MM2). Check for 21.2V at the cathode of Diode D18. If the 21.2V is missing, check D18 and Switching Transformer (MM2). Check for 56.7V at the cathode of Diode D19. If 56.7V is missing at the cathode of D19, check D19 and Switching Transformer (MM2). Check for 154V at the cathode of Diode D20. If 154V is

missing, check D20 and Switching Transformer (MM2). Check for -6.3V at pin 7 of Connector M1. If -6.3V is missing, check Diode D16, Resistors R33, R41 and Electrolytic C23. Also check Switching Transformer (MM2).

### HIGH VOLTAGE

Check for approximately 22kV on the CRT high voltage anode. If the high voltage is missing, check for 244V at the collector of High Voltage Output Transistor (T103). If T103 collector voltage is incorrect, check Diode D109. Check High Voltage Transformer (M102) and associated components and voltages. If 244V is present at the collector of T103, check for proper waveform at the collector of T103. If waveform is correct, check High Voltage Transformer (M102) and High Voltage Tripler. If waveform is incorrect at the collector of T103, check for a proper waveform at the base of T103. If waveform at the base of T103 is correct, check T103 and associated components. If waveform at the base of T103 is missing or incorrect, check for proper waveform on Pin 3 of Horizontal Processing IC (IC200). If waveform on pin 3 of IC200 is incorrect, check waveforms, voltages and components associated with IC200 and IC201. If waveform on pin 3 of IC200 is correct, check High Voltage Driver Transistor (T101), High Voltage Driver Transformer (M101), Transistor T102 and associated components.

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## TROUBLESHOOTING (Continued)

### HORIZONTAL

If high voltage is present on the CRT anode, but there is no horizontal sweep or there is horizontal foldover, check for 41.7V on the collector of Amplifier Transistor (T400). If voltage is incorrect, check for 5.7V on pin 14 of IC401. If voltage is correct on pin 14 of IC401, check Amplifier Transistors (T400, T401) and associated components. If voltage is incorrect on pin 14 of IC401, check waveform on pin 15 of IC400. If waveform is correct on pin 15 of IC400, check IC401 and associated components. If waveform is incorrect on pin 15 of IC400, check voltages, waveforms and components associated with pins 9 thru 16 of IC400. If voltage is correct on the collector of T400, check for proper waveform on the collector of Horizontal Output Transistor (T251). If the collector waveform is incorrect, check for proper waveform on the base of T251. If waveform on the base of T251 is correct, check T251 and associated components. If waveform on the base of T251 is incorrect, check Horizontal Driver Transistor (T250), Horizontal Driver Transformer (M250) and associated components. If waveform on the collector of Horizontal Output Transistor (T251) is correct, check Coils L251, L253, L254, Deflection Yoke (L300), Resistor R259 and Electrolytic C256. Also check Horizontal Centering Control (RT251) and Diodes D251 and D252.

### VERTICAL

If there is no vertical deflection, inject a vertical drive signal at pin 2 of Vertical Deflection IC (IC300). If vertical deflection returns, remove the substitute vertical drive signal and check for a vertical signal at pin 11 of IC505. If a vertical signal is present at pin 11 of IC505, check Resistors R302 and R565 and Diode D301. If signal is missing at pin 11 of IC505, check for a vertical signal at pin 5 of Buffer IC (IC501). If signal is present at pin 5 of IC501, check IC505 and associated components. If signal is missing at pin 5 of IC501, check for a vertical sync signal at pin 15 of IC501. If signal is present at pin 15 of IC501, check IC501 by substitution. If signal is missing at pin 15 of IC501, check for a good connection at pin 5 of Connector A4. If vertical deflection does not return when a substitute vertical signal is injected at pin 2 of IC300, check voltages, waveforms and components associated with IC300. Check IC300 by substitution. Also check Deflection Yoke (L300). Vertical linearity or

foldover problems may be caused by a defect in the vertical feedback or bias circuits. Check Diodes D301, D302, D303 and Electrolytics C311 and C312. Check voltages, waveforms and components associated with pins 1, 3, 9 and 11 of IC300.

### VIDEO

Input a RGB signal at Connector A4. With controls set for normal operation, check for proper display on the CRT. If display is missing, check voltages and components associated with IC501, IC502 and IC503. Check voltage on the collectors of Transistors T601, T602, T701, T702, T801 and T802. If the collector voltages are incorrect, check voltages and components associated with Transistors T501, T502, T503 and IC504. Check 154V source at Red, Green and Blue Output stages. If 154V source is missing, refer to the "Power Supply" section of this Troubleshooting guide. Check the CRT and associated voltages and waveforms. If retrace lines appear in the display, check voltages and components associated with Transistors T504, T505, T506 and IC504.

### RASTER

If there is no raster, check for approximately 22kV on the CRT high voltage anode. If the high voltage is missing, refer to the "High Voltage" section of this Troubleshooting guide. If high voltage is normal, check the CRT and associated voltages and components. If there is no green, check voltages, waveforms and components associated with Transistors T701, T702, T703, T705, T706, T707 and pin 6 of the CRT socket. If there is no red, check voltages, waveforms and components associated with Transistors T601, T602, T603, T605, T606, T607 and pin 8 of the CRT socket. If there is no blue check voltages, waveforms and components associated with Transistors T801, T802, T803, T805, T806, T807 and pin 11 of the CRT socket.

### SYNC

If there is no horizontal sync, check voltages, waveforms and components associated with Horizontal Processing IC (IC201). Check IC201 by substitution. If there is no vertical sync, check voltages, waveforms and components associated with pins 1 thru 11 of Vertical Deflection IC (IC300). Check IC300 by substitution.

## MISCELLANEOUS ADJUSTMENTS

### B+ ADJUSTMENT

Connect a DC voltmeter to the output of Voltage Regulator (IC2). Connect the negative lead of the voltmeter to ground. Turn Monitor On and adjust the V ADJ Control (RT1) for 12V at the output of IC2.

### 22KV ADJUSTMENT

Set Brightness Control to MINIMUM. Connect a high voltage meter to the CRT anode. Adjust 22KV ADJ Control (RT101) for 22KV on the CRT anode.

### PINCUSHION ADJUSTMENT

Connect a RGB video pattern generator to the Monitor. Set pattern generator to produce a crosshatch pattern. Adjust E/W APL Control (RT404) so that the vertical lines on each side of the screen are straight.

### HORIZONTAL FREQUENCY ADJUSTMENT

Connect Monitor to a computer. If a CGA Display Board is installed in the computer, use the Horiz Freq 1 Control (RT201). If an EGA Display Board is installed in the computer, use the Horiz Freq 2 Control (RT202). Turn Horizontal Frequency Control clockwise until the horizontal just goes out of sync and note position of control. Turn Horizontal Frequency Control counterclockwise until the horizontal just goes out of sync and again note position of control. Set Horizontal Frequency Control at center of previously noted positions.

### HORIZONTAL WIDTH ADJUSTMENT

Connect Monitor to a computer. If a GCA Display Board is installed in the computer, use Horiz Width 1 Control (RT402). If an EGA Display Board is installed in the computer, use Horiz Width 2 Control (RT401). Adjust the Width Control for proper width of the display.

### HORIZONTAL AND VERTICAL CENTERING ADJUSTMENT

Connect a RGB video pattern generator to Monitor. Set generator to produce a color-bar pattern. Adjust Horizontal Centering Control (RT251) for best horizontal centering of the raster. Adjust Vertical Centering Control (RT302) for best vertical centering of the raster. If horizontal centering cannot be accomplished by adjusting RT251, adjust Horiz Phase 1 Control (RT203). If Monitor is connected to a computer with an EGA Display Board installed, adjust Horiz Phase 2 Control (RT204).

### VERTICAL FREQUENCY ADJUSTMENT

Connect a RGB video pattern generator to Monitor. Set pattern generator to produce a crosshatch pattern. Turn Vertical Frequency Control (RT301) clockwise until the vertical goes out of sync and note position of control. Turn control counterclockwise until the vertical goes out of sync and note position of control. Set Vertical Frequency Control to the center of noted positions.

### VERTICAL LINEARITY ADJUSTMENT

Connect a RGB video pattern generator to Monitor. Set generator to produce a crosshatch pattern. Adjust Vertical Linearity Control (RT303) so that the top and bottom of the crosshatch pattern are in proportion.

### PURITY ADJUSTMENT

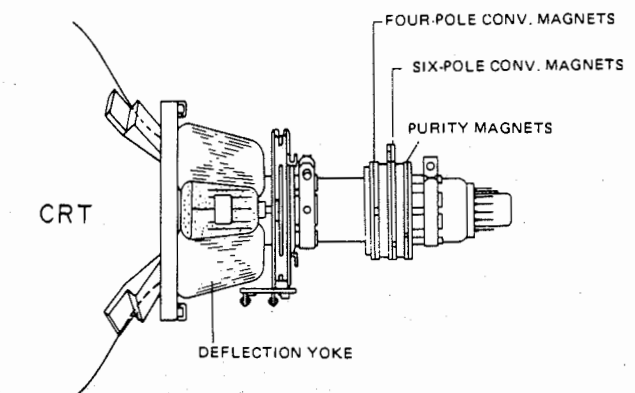
Degauss the CRT if necessary. Set Blue Cutoff Control (RT803) and Green Cutoff Control (RT703) to MINIMUM. Set Red Cutoff Control (RT603) to produce a red raster. Adjust purity magnets to produce a uniform red raster. Check for pure green and blue screens by advancing Green Cutoff Control (RT703) and Blue Cutoff Control (RT803) one at a time.

### COLOR TEMPERATURE ADJUSTMENT

Connect a RGB video pattern generator to Monitor. Set generator to produce a crosshatch pattern. Set Blue Cutoff Control (RT803) and Green Cutoff Control (RT703) to MINIMUM. Adjust Red Cutoff Control (RT603) to the point where dim red lines appear on the screen. Advance Blue Cutoff Control (RT803) and Green Cutoff Control (RT703) to produce dim white lines on the screen. Set Blue LSB Control (RT802) and Green LSB Control (RT702) to the point just before the lines bloom with Brightness Control set at Maximum. Pull out Contrast Control. Adjust Blue MSB Control (RT801) and Green MSB Control (RT701) so that the background ranges from dark to bright without retrace lines when Brightness Control is turned from MINIMUM to Maximum.

### CONVERGENCE ADJUSTMENT

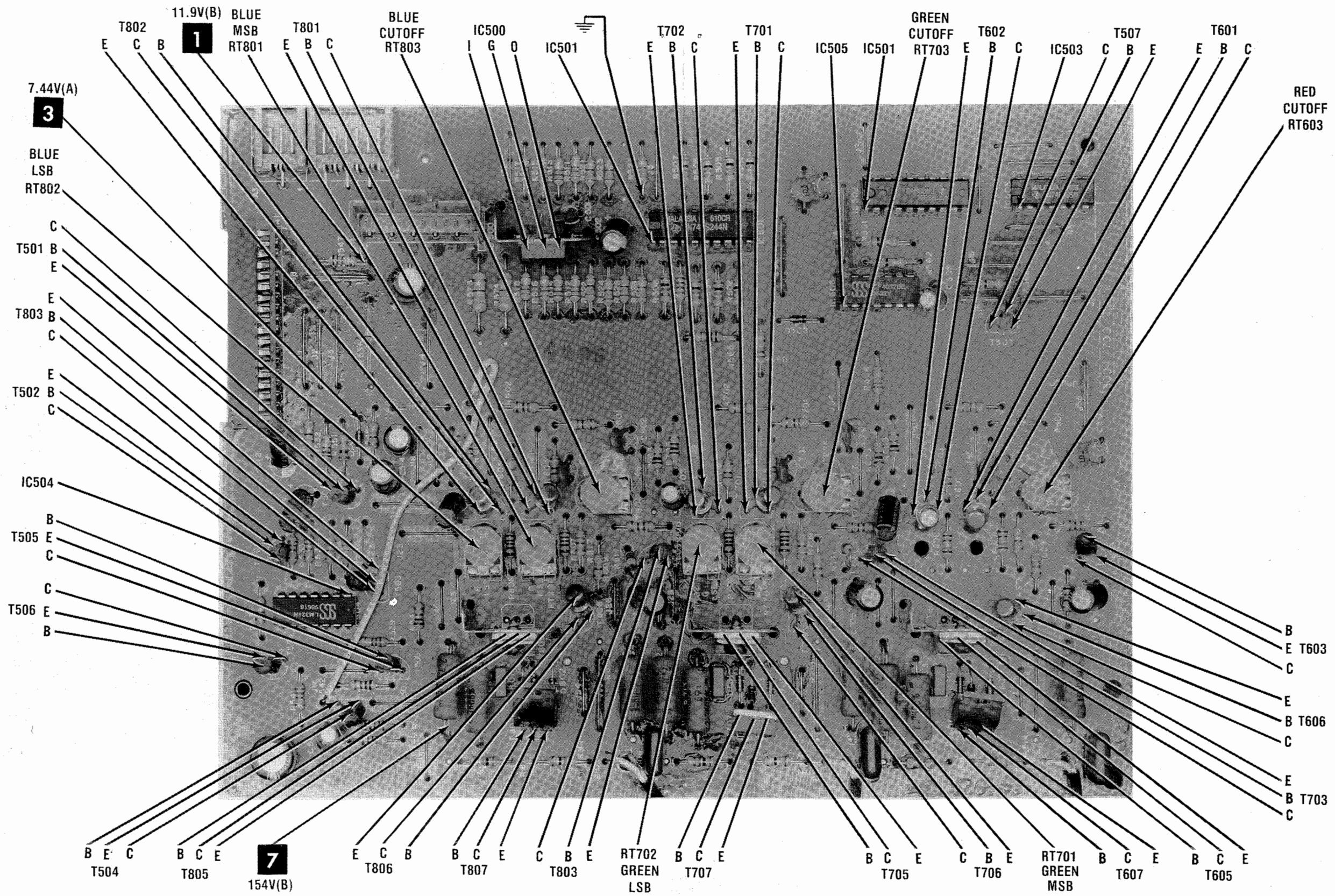
Connect a RGB video pattern to Monitor and set generator to produce a dot pattern. Adjust 4-pole convergence magnets to converge the red and blue dots at the center of the screen. Adjust 6-pole convergence magnets to converge the red/blue dots over the green dots at the center of the screen.



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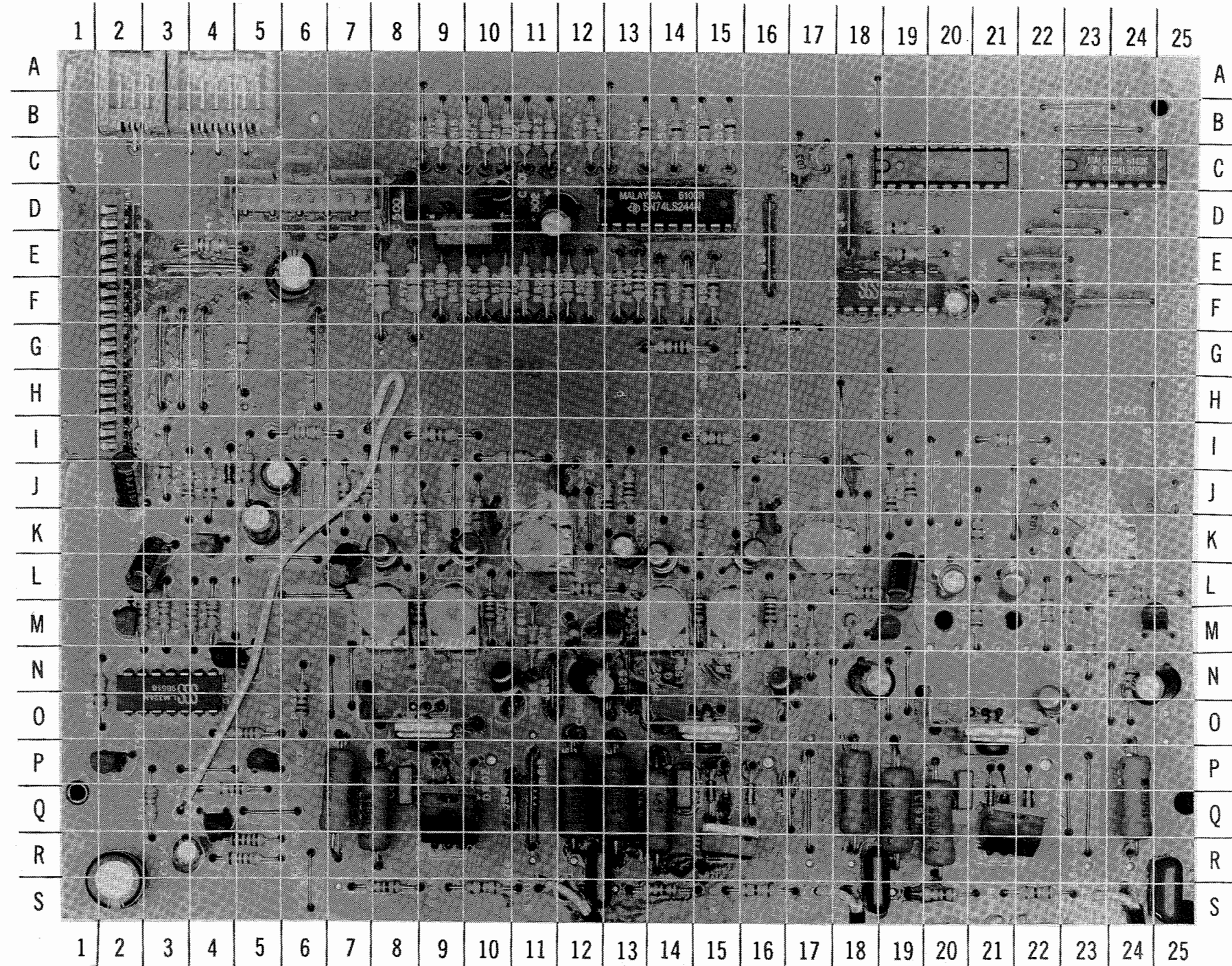


NOTE: ARROWS INDICATE PIN 1 UNLESS NOTED

A Howard W. Sams **CIRCUITRACE** Photo

**GridTrace LOCATION GUIDE**

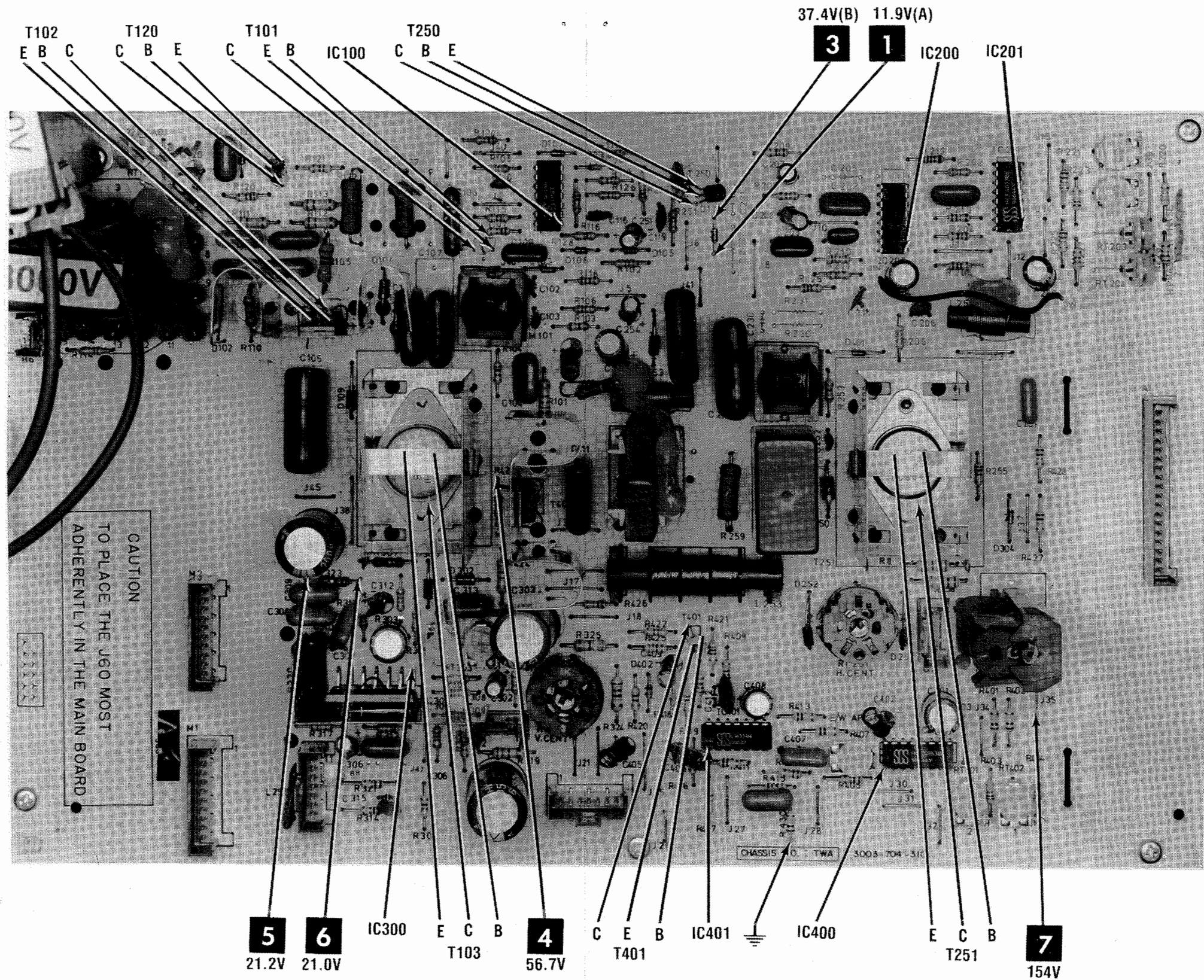
A1	G-2	R528	F-12	R813	Q-8
A2	B-4	R530	I-6	R814	S-10
A3	B-2	R531	M-3	R816	Q-12
A4	D-6	R532	J-3	R817	M-10
B OUT	S-11	R533	M-3	R818	S-8
C501	D-10	R534	M-4	R OUT	S-23
C502	D-11	R535	M-4	RT603	K-23
C504	R-3	R536	G-5	RT701	M-15
C506	E-6	R537	N-2	RT702	M-14
C508	F-20	R538	R-5	RT703	K-17
C509	S-2	R539	O-5	RT801	M-9
C510	K-5	R540	R-5	RT802	M-8
C511	C-17	R541	Q-3	RT803	K-11
C512	J-2	R542	Q-4	T501	K-4
C513	L-3	R544	O-6	T502	M-2
C514	J-5	R545	J-3	T503	N-4
C601	K-22	R546	J-5	T504	Q-4
C602	J-24	R547	E-4	T505	P-5
C603	L-19	R551	J-4	T506	P-2
C604	P-20	R560	G-15	T507	F-22
C605	N-24	R561	D-19	T601	L-21
C606	S-25	R562	E-19	T602	L-20
C701	K-16	R563	E-22	T603	M-25
C702	J-18	R564	H-19	T605	O-21
C703	K-13	R565	G-14	T606	O-22
C704	Q-14	R566	F-13	T607	Q-21
C705	N-18	R573	F-8	T701	K-16
C706	R-16	R574	F-8	T702	K-14
C801	K-10	R601	I-23	T703	M-19
C802	J-12	R602	I-21	T705	O-15
C803	L-7	R603	J-19	T706	N-16
C804	Q-8	R604	J-22	T707	R-15
C805	N-12	R605	J-19	T801	K-10
C806	R-12	R606	K-21	T802	K-8
D501	J-4	R607	M-22	T803	M-13
D502	F-17	R608	M-21	T805	Q-9
D601	Q-21	R609	M-23	T806	N-10
D602	Q-22	R610	L-24	T807	Q-9
D603	Q-21	R611	M-24		
D701	Q-15	R612	Q-19		
D702	Q-16	R613	Q-20		
D703	Q-15	R614	S-22		
D801	P-9	R616	Q-24		
D802	P-10	R617	M-23		
D803	P-9	R618	S-20		
G OUT	S-17	R701	I-16		
IC500	E-10	R702	I-15		
IC501	D-13	R703	J-13		
IC502	C-19	R704	K-16		
IC503	C-23	R705	J-13		
IC504	N-4	R706	K-15		
IC505	F-18	R707	M-16		
R501	B-15	R708	M-15		
R502	F-15	R709	M-17		
R503	B-15	R710	L-18		
R504	F-14	R711	M-18		
R505	B-14	R712	Q-13		
R506	F-14	R713	Q-14		
R507	B-13	R714	S-16		
R508	F-13	R716	P-18		
R511	B-10	R717	M-17		
R512	F-10	R718	S-14		
R513	B-10	R801	I-11		
R514	F-10	R802	I-9		
R515	B-10	R803	J-7		
R516	F-10	R804	K-10		
R517	B-9	R805	J-7		
R518	F-9	R806	K-9		
R521	B-11	R807	M-10		
R522	F-11	R808	M-8		
R523	B-11	R809	M-11		
R524	F-11	R810	L-12		
R526	F-12	R811	M-12		
R527	B-12	R812	S-7		



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MODEL 5154001

FOLDER 2

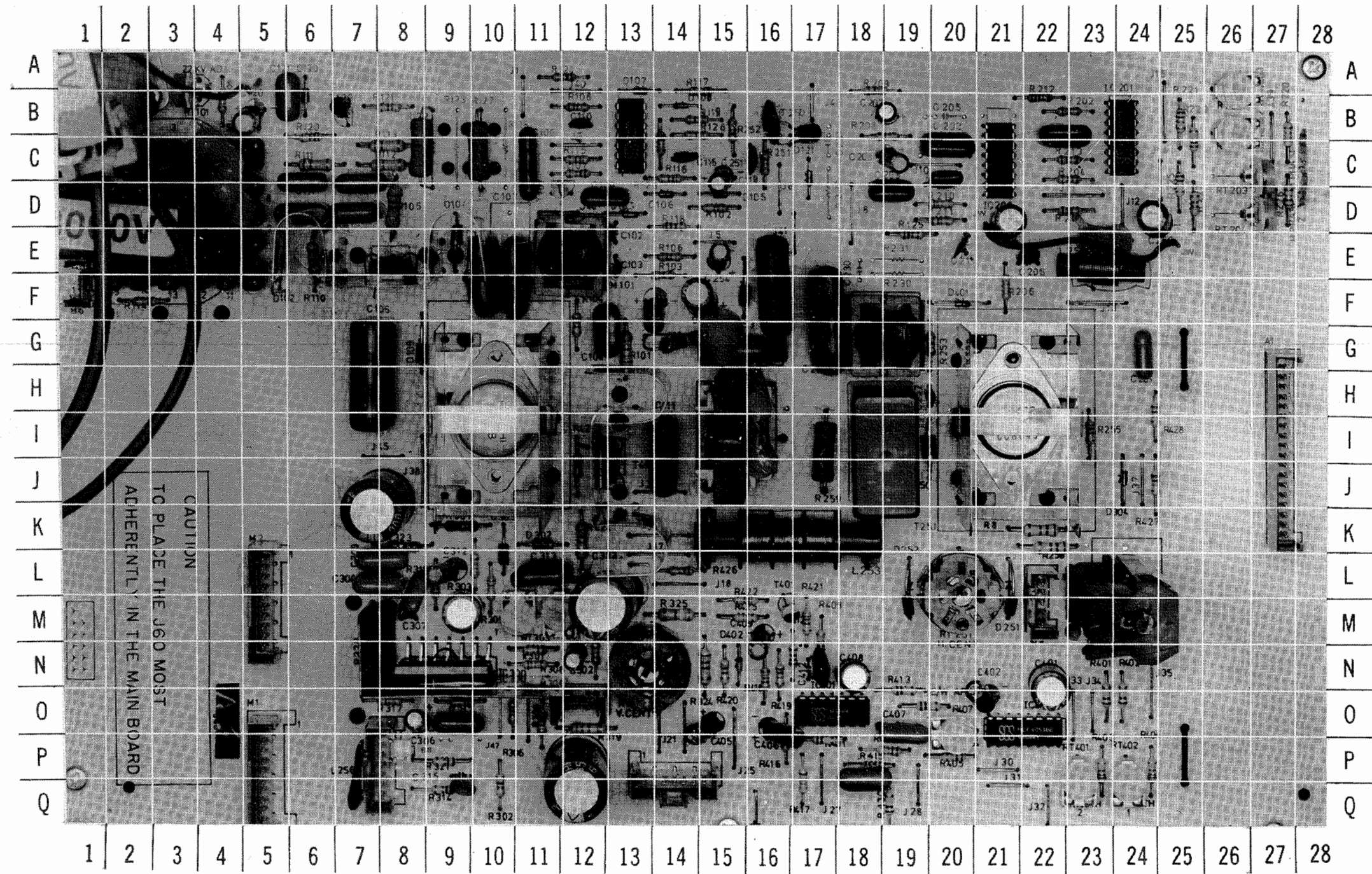


NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED

A Howard W. Sams **CIRCUITRACE** Photo

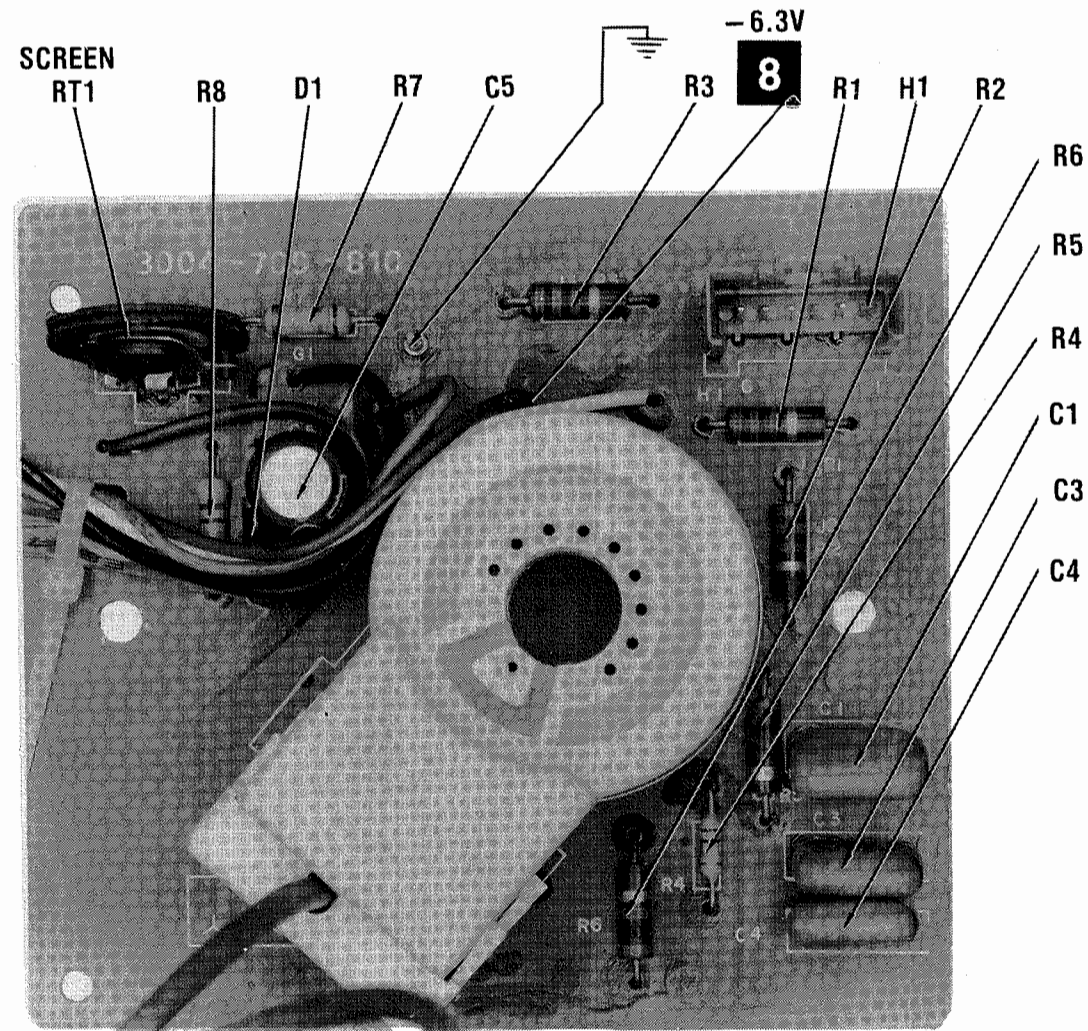
**GridTrace LOCATION GUIDE**

A1	I-27	D106	D-14	R223	C-25	R303	L-10	R321	P-9	R413	O-19	R428	I-24	T101	D-11
B1	P-8	D107	B-13	R224	D-27	R305	L-10	R323	K-8	R415	P-18	R430	Q-19	T102	F-8
B2	C-12	D108	B-14	R225	D-25	R306	O-10	R324	N-15	R416	P-16	RT101	B-3	T103	I-10
B3	M-22	D109	G-8	R226	D-27	R307	K-9	R325	M-14	R417	Q-17	RT201	A-26	T120	B-7
B6	F-1	D120	B-6	R227	D-25	R308	N-11	R401	O-23	R418	N-16	RT202	B-26	T250	B-17
B7	Q-14	D121	C-17	R251	C-16	R309	O-11	R402	O-24	R419	N-16	RT203	C-27	T251	I-21
B8	P-8	D250	I-20	R252	B-15	R311	N-12	R403	P-23	R420	N-15	RT204	D-27	T400	J-13
C101	F-14	D251	M-21	R253	G-20	R313	O-9	R404	P-24	R421	M-17	RT251	L-20	T401	M-16
C102	E-13	D252	L-19	R254	G-14	R314	Q-9	R405	P-20	R422	M-16	RT301	M-11		
C103	E-13	D253	F-15	R255	I-23	R316	O-8	R406	P-19	R423	J-12	RT302	N-13		
C104	G-12	D301	O-9	R256	K-22	R317	O-8	R407	O-20	R424	K-12	RT303	M-11		
C105	H-7	D302	K-11	R259	I-17	R318	L-9	R409	M-17	R425	M-16	RT401	Q-23		
C106	C-11	D303	L-10	R301	N-11	R319	O-12	R411	P-17	R426	L-14	RT402	Q-24		
C107	E-10	D304	J-24	R302	Q-10	R320	N-7	R412	N-17	R427	J-24	RT404	P-20		
C109	D-13	D401	F-20												
C110	B-12	D402	N-15												
C111	C-6	IC100	C-13												
C112	D-7	IC200	C-21												
C113	D-6	IC201	B-24												
C114	D-7	IC300	N-9												
C116	C-14	IC400	O-17												
C117	K-7	IC401	O-22												
C118	E-11	L251	M-24												
C119	D-15	L252	I-15												
C120	B-5	L253	K-17												
C121	A-6	L254	G-16												
C201	G-24	L255	E-24												
C202	C-20	L256	Q-7												
C203	C-20	M1	P-5												
C204	D-21	M2	M-5												
C206	E-22	M101	E-12												
C207	B-19	M102	E-2												
C208	C-19	M250	G-19												
C209	D-19	R8	K-22												
C210	B-23	R101	G-13												
C211	E-20	R102	D-15												
C251	C-16	R103	F-14												
C252	H-20	R104	G-12												
C254	E-15	R105	D-8												
C255	G-17	R106	E-14												
C256	F-15	R107	C-12												
C257	I-19	R108	B-12												
C258	F-16	R109	B-4												
C259	B-16	R110	E-6												
C260	D-24	R111	C-6												
C301*	P-11	R112	C-8												
C302	N-12	R113	C-8												
C303	M-12	R114	F-2												
C304	Q-12	R115	C-12												
C305	O-9	R116	C-14												
C306	O-8	R117	A-15												
C307	M-8	R118	D-14												
C308	L-8	R119	B-14												
C309	L-8	R120	C-6												
C310	M-8	R121	B-8												
C311	M-9	R122	C-8												
C312	L-9	R124	A-12												
C313	L-11	R125	E-19												
C315	Q-9	R126	B-14												
C401	O-22	R127	C-10												
C402	O-21	R128	C-14												
C405	O-15	R201	E-24												
C406	P-16	R202	B-23												
C407	O-19	R204	C-23												
C408	N-18	R205	D-23												
C409	N-16	R206	F-21												
C411	I-14	R208	B-19												
C412	N-17	R209	A-18												
C415	Q-18	R210	D-20												
D101	F-9	R211	D-20												
D102	E-5	R212	B-22												
D103	D-13	R213	C-23												
D104	E-9	R220	B-28												
D105	D-15	R221	B-25												

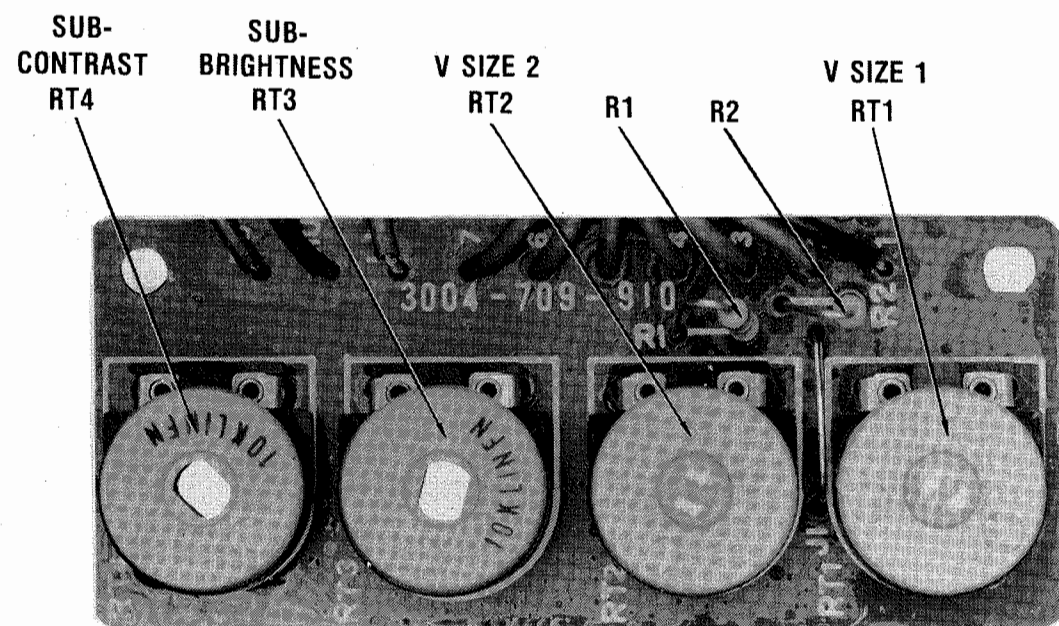


\* Located on bottom of board.

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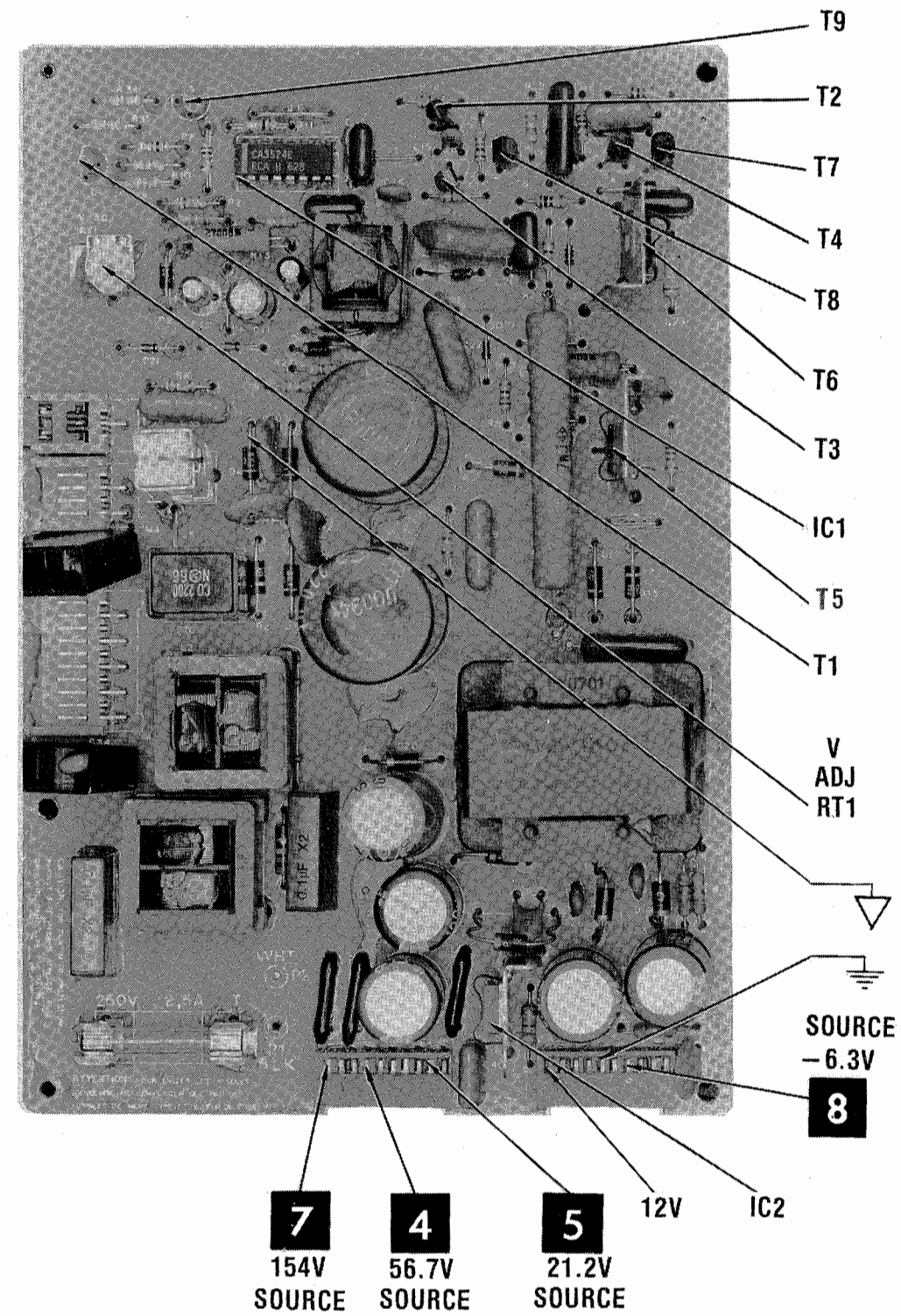


CRT BOARD



CONTROL BOARD

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NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED

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POWER SUPPLY BOARD

FOLDER 2

**PARTS LIST AND DESCRIPTION**

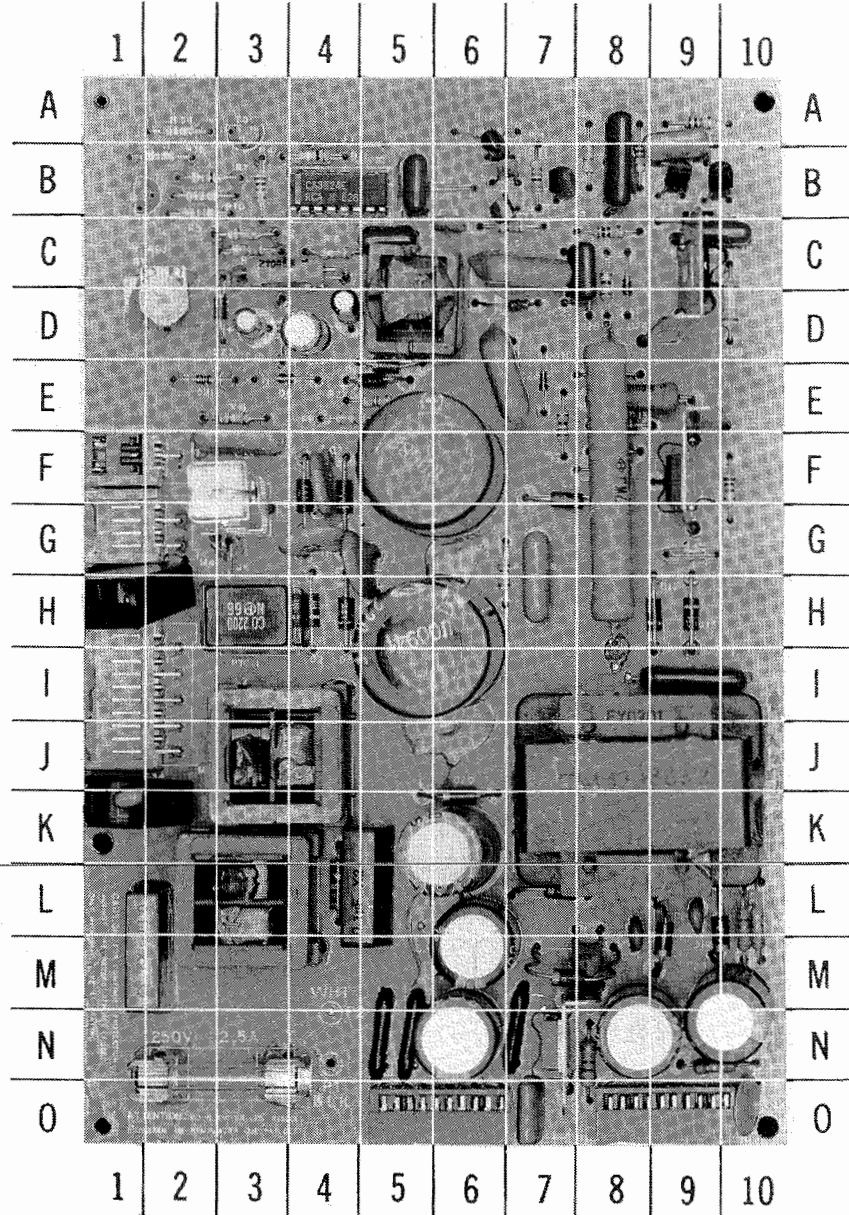
When ordering parts, state Model, Part Number, and Description

**SEMICONDUCTORS (Select replacement for best results)**

ITEM No.	MFR. PART No./TYPE No.	NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
MAIN BOARD						
D101	TFK613	NTE558	ECG558	SK3998/558	103-279-10	
D102	BA159	NTE5010A	ECG5010A	SK5A1/5010A	103-287	
D103	ZPD5.1	NTE552	ECG552	SK9000/552	103-131	
D104	RGPT10G	NTE519	ECG519	SK3100/519		
D105, 6, 7	1N4148					
D108	ZPD6.8	NTE5014A	ECG5014A	SK6A8/5014A	103-29009	
D109	RGPT10K	NTE558	ECG558	SK3998/558	103-131	
D120, 1	1N4148	NTE519	ECG519	SK3100/519	103-287	
D250	RGPT15M	NTE506	ECG506	SK9000/552	103-287	
D251, 2, 3	RGPT10G	NTE552	ECG552	SK9000/552	103-287	
D301	1N4148	NTE519	ECG519	SK3100/519	103-131	
D302, 3	1N4002	NTE116	ECG116	SK3311	212-76-02	
D304	1N4148	NTE519	ECG519	SK3100/519	103-131	
D401	BAV21	NTE177	ECG177	SK9091/177	103-131	
D402	ZPD6.2	NTE5013A	ECG5013A	SK6A2/5013A	103-29008	
IC100	LM324N	NTE987	ECG987	SK3643/987	HE-442-602	
IC200	TDA2593	NTE4053B	ECG4053B	SK4053B	905-354	
IC201	HCF4053BE	NTE4053B	ECG4053B	SK4053B	905-354	
IC300	TDA2653A					
IC400	HCF4053BE					
IC401	LM524N	NTE987	ECG987	SK3643/987	HE-442-602	
T101	F422P	NTE399*	ECG399*	SK9352/399*	121-29045*	
T102	MJE15005	NTE379	ECG379	SK9085/379	121-29111	
T103	BU208	NTE165	ECG165	SK3115/165	121-1029	
T120	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-29000A+	
T250	C1008Y					
T251	BUX238					
T400	TI P30B					
T401	F422P	NTE292	ECG292	SK3441/292	121-29048	
		NTE399*	ECG399*	SK9352/399*	121-29045*	

**GridTrace LOCATION GUIDE**

C1	F-4	R1	F-2	R18	B-8	R35	B-2
C2	G-4	R2	C-3	R19	A-9	R40	L-4
C3	G-4	R3	B-2	R20	C-8	R41	L-10
C5	M-1	R4	B-3	R21	G-8	R42	N-8
C6	L-4	R5	C-3	R22	E-8	RT1	D-2
C7	I-5	R6	C-4	R23	E-8	T1	B-1
C8	F-5	R7	B-2	R24	F-10	T2	A-6
C9	F-7	R8	D-3	R25	E-7	T3	B-6
C11	D-4	R9	R-9	R26	C-8	T4	B-9
C12	C-5	R10	B-2	R27	E-5	T5	F-9
C13	D-3	R11	B-4	R28	B-8	T6	C-9
C14	D-4	R12	A-6	R29	D-10	T7	B-10
C15	B-7	R13	C-3	R30	C-8	T8	B-7
C16	C-6	R14	B-7	R31	A-9	T9	A-3
C17	A-5	R15	C-7	R32	L-10		
C18	B-8	R16	D-3	R33	N-9		
C19	C-7	R17	G-6	R34	A-2		
C20	C-8						
C21	I-6						
C22	F-6						
C23	F-10						
C24	F-9						
C25	F-8						
C26	F-8						
C27	F-6						
C28	F-8						
C29	F-6						
C31	F-6						
C33	F-3						
C34	F-1						
C35	F-1						
C40	O-7						
C41	A-9						
C42	C-10						
C43	B-8						
C44	O-10						
D1	F-4						
D2	F-4						
D3	F-4						
D4	F-4						
D6	F-5						
D7	F-5						
D8	F-3						
D9	B-9						
D10	F-7						
D12	F-9						
D13	F-8						
D14	F-7						
D15	F-9						
D16	L-10						
D17	F-9						
D18	M-7						
D19	L-7						
D20	K-6						
D21	F-2						
D23	D-3						
D24	O-8						
DT11	D-7						
F1	N-3						
IC1	B-4						
IC2	N-7						
L1	L-3						
L2	J-3						
L3	F-7						
L4	F-5						
L5	F-5						
M1	O-9						
M2	O-6						
M3	I-1						
M4	G-1						
M5	F-1						
MM1	D-5						
MM2	K-8						
PTC1	F-3						



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**POWER SUPPLY BOARD**

IBM  
MODEL 5154001

FOLDER 2

**PARTS LIST AND DESCRIPTION (Continued)**

When ordering parts, state Model, Part Number, and Description

**CONTROLS (All wattages 1/2 watt, or less, unless listed)**

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
RT1	CRT BOARD			
	Screen	890K		
RT1	POWER SUPPLY			
	Voltage Adjust	1000		
RT1	CONTROL BOARD			
	PANEL			
RT1	Vertical Size 1	1000		
RT2	Vertical Size 2	1000		
RT3	Sub-Brightness	10K		
RT4	Sub-Contrast	10K		
	FRONT PANEL			
RT5	Bright	10K		
RT6	Contrast	10K		
	MAIN BOARD			
RT101	22KV Adjust	22K		
RT201	Horiz Frequency #1	47K		
RT202	Horiz Frequency #2	22K		
RT203	Horiz Phase 1	47K		
RT204	Horiz Phase 2	47K		
RT301	Vertical Frequency	27K		
RT302	Vertical Cent	1000		
RT303	Vertical Line	240K		
RT401	Horiz Width #2	4700		
RT402	Horiz Width #1	4700		
RT404	BW APL	10K		
RT500	HV Tripler			
	VIDEO OUTPUT BOARD			
RT603	Red Cutoff	470		
RT701	Green MSB	2200		
RT702	Green LSB	2200		
RT703	Green Cutoff	470		
RT801	Blue MSB	2200		
RT802	Blue LSB	2200		
RT803	Blue Cutoff	470		

**FUSE DEVICES**

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
F1	2.5 Amp @ 250VAC Slow Blow			

**MISCELLANEOUS**

ITEM No.	PART NAME	MFGR. PART No.	NOTES
DG1	Degaussing Coil		
LED1	LED		
P1	Cord		Power
SW2	Switch		AC Power
SW99	Switch		Fixed Contrast
Y1	CRT	M34JDU30X15	Power

**PARTS LIST AND DESCRIPTION (Continued)**

When ordering parts, state Model, Part Number, and Description

**SEMICONDUCTORS (Select replacement for best results)**

ITEM No.	MFGR. PART No./TYPE No.	NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
POWER SUPPLY						
D1 THRU D4	BY133	NTE506	ECG506	SK9000/552	103-287	
D6,7	RGP10G	NTE592	ECG592	SK3100/519	103-287	
D8	1N4148	NTE519	ECG519	SK3998/558	103-131	
D9	BA159	NTE558	ECG558	SK3100/519	103-131	
D10	1N4148	NTE519	ECG519			
D12 THRU D15	BA159	NTE558	ECG558	SK3998/558		
D16 THRU D20	RGP15J	NTE580	ECG580	SK5036/580	212-Z9000	
D21	1N4148	NTE519	ECG519	SK3100/519	103-131	
D23	1N4002	NTE116	ECG116	SK3311	212-76-02	
D24	1N4148	NTE519	ECG519	SK3100/519	103-131	
DT11	CA3524E					
IC1	7812CT					
IC2	BC237B	NTE966	ECG966	SK3592/966	HE-442-674	
T1	C637(EUROPE)	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T2		NTE297	ECG297	SK3449/297	921-340	
T3	F422(EUROPE)	NTE399	ECG399	SK9352/399	121-Z9045	
T4	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T5,6	MJE13005	NTE379	ECG379	SK9085/379	121-Z9111	
T7	BC307B	NTE159+	ECG159+	SK3466/159+	121-Z9003+	
T8	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T9	BC307B	NTE159+	ECG159+	SK3466/159+	121-Z9003+	
VIDEO BOARD						
D501,2	1N4148	NTE519	ECG519	SK3100/519	103-131	
D601,2,3	1N4148	NTE519	ECG519	SK3100/519	103-131	
D701,2,3	1N4148	NTE519	ECG519	SK3100/519	103-131	
D801,2,3	1N4148	NTE519	ECG519	SK3100/519	103-131	
IC500	UA7805 [UA7805]	NTE960	ECG960	SK3591/960	221-Z9043	

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FOLDER 2

**14 PARTS LIST AND DESCRIPTION (Continued)**

When ordering parts, state Model, Part Number, and Description

**SEMICONDUCTORS (Select replacement for best results)**

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
IC501	SN74LS244N	NTE74LS244	ECG74LS244	SK74LS244	HE-443-791	
IC502	TBP28L22N	NTE74LS05	ECG74LS05	SK74LS05	HE-443-818	
IC503	SN74LS05N	NTE987	ECG987	SK3643/987	HE-442-602	
IC504	LM324N	NTE4077B	ECG4077B	SK4077B		
IC505	HCF4077BE					
T501	BC307B	NTE159+	ECG159+	SK3466/159+	121-Z9003+	
T502,3,4	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T505,6	BC307B	NTE159+	ECG159+	SK3466/159+	121-Z9003+	
T507	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T601,2	2N2369	NTE123A	ECG123A	SK3444/123A	121-Z9000A	
T603	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T605	C1507	NTE198	ECG198	SK3219	121-Z9028	
T606	2N2369	NTE123A	ECG123A	SK3444/123A	121-Z9000A	
T607	C1507	NTE198	ECG198	SK3219	121-Z9028	
T701,2	2N2369	NTE123A	ECG123A	SK3444/123A	121-Z9000A	
T703	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T705	C1507	NTE198	ECG198	SK3219	121-Z9028	
T706	2N2369	NTE123A	ECG123A	SK3444/123A	121-Z9000A	
T707	C1507	NTE198	ECG198	SK3219	121-Z9028	
T801,2	2N2369	NTE123A	ECG123A	SK3444/123A	121-Z9000A	
T803	BC237B	NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
T805	C1507	NTE198	ECG198	SK3219	121-Z9028	
T806	2N2369	NTE123A	ECG123A	SK3444/123A	121-Z9000A	
T807	C1507	NTE198	ECG198	SK3219	121-Z9028	

\* Lead configuration may vary from original.  
 + Rotate 180° to conform with original lead configuration.

**WIRING DATA**

High Voltage Lead ..... Use BELDEN No. 9867 (30 KV) or 8866 (40 KV)  
 Shielded Hook-up Wire ..... Use BELDEN No. 8401 or 8421 (Single-Conductor)  
 General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8208 (Two-Conductor)  
 8529 (Solid) Available in 13 Colors  
 8522 (Stranded) Available in 13 Colors

**PARTS LIST AND DESCRIPTION (Continued)**

When ordering parts, state Model, Part Number, and Description

**CAPACITORS**

ITEM No.	RATING	MFGR. PART No.
C5	.1 250VAC	

ITEM No.	RATING	MFGR. PART No.
C6	.1 250VAC	

Items Not Listed Are Normally Available At Local Distributors.

**RESISTORS (Power and Special)**

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
PTC1	POWER SUPPLY NTC 492 Cold @ TAP 21 PTC			
R212 R213	MAIN BOARD 15K 1½ 1/4W Carbon Film 10K 2½ 1/4W Carbon Film		QW310	
R538 R540 R607 R608 R707 R708 R807 R808	VIDEO OUTPUT BOARD 1500 1½ 1/4W Carbon Film 8200 1½ 1/4W Carbon Film 1681 1½ 1/4W Carbon Film 1681 1½ 1/4W Carbon Film 1000 1½ 1/4W Carbon Film 1000 1½ 1/4W Carbon Film 1000 1½ 1/4W Carbon Film 1000 1½ 1/4W Carbon Film			

**COILS & TRANSFORMERS**

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
L251 L252 L253 L254 L300 M101 M102 M250	MAIN BOARD Horizontal Linearity Choke Choke Choke Deflection Yoke High Voltage Driver High Voltage Output Horizontal Driver			
L1 L2 L3 L4 L5 LF1 MM1 MM2	POWER SUPPLY AC Line Choke AC Line Choke RF Choke RF Choke RF Choke AC Line Filter Switching Transformer Switching Transformer			

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FOLDER 2