

SERVICE MANUAL

MODEL 1802 MONITOR (NTSC)

SEPTEMBER, 1986

PN-602155-85

 **commodore**
COMPUTERS

INSTALLATION AND CHASSIS PARTS LOCATION

INSTALLATION OF THIS COLOR MONITOR CHASSIS AND INITIAL CHECK POINTS

When installing this color monitor chassis, first check operation on a black and white telecast. Check and if necessary, adjust centering, size, and focus. Observe the picture for proper black and white reproduction (tracking) over all areas of the screen. No objectionable color shading or fringing should be evident. If shading or fringing is evident, degauss the monitor.

In most instances after installation, a technician need only degauss the faceplate area and touch-up the static (center) convergence.

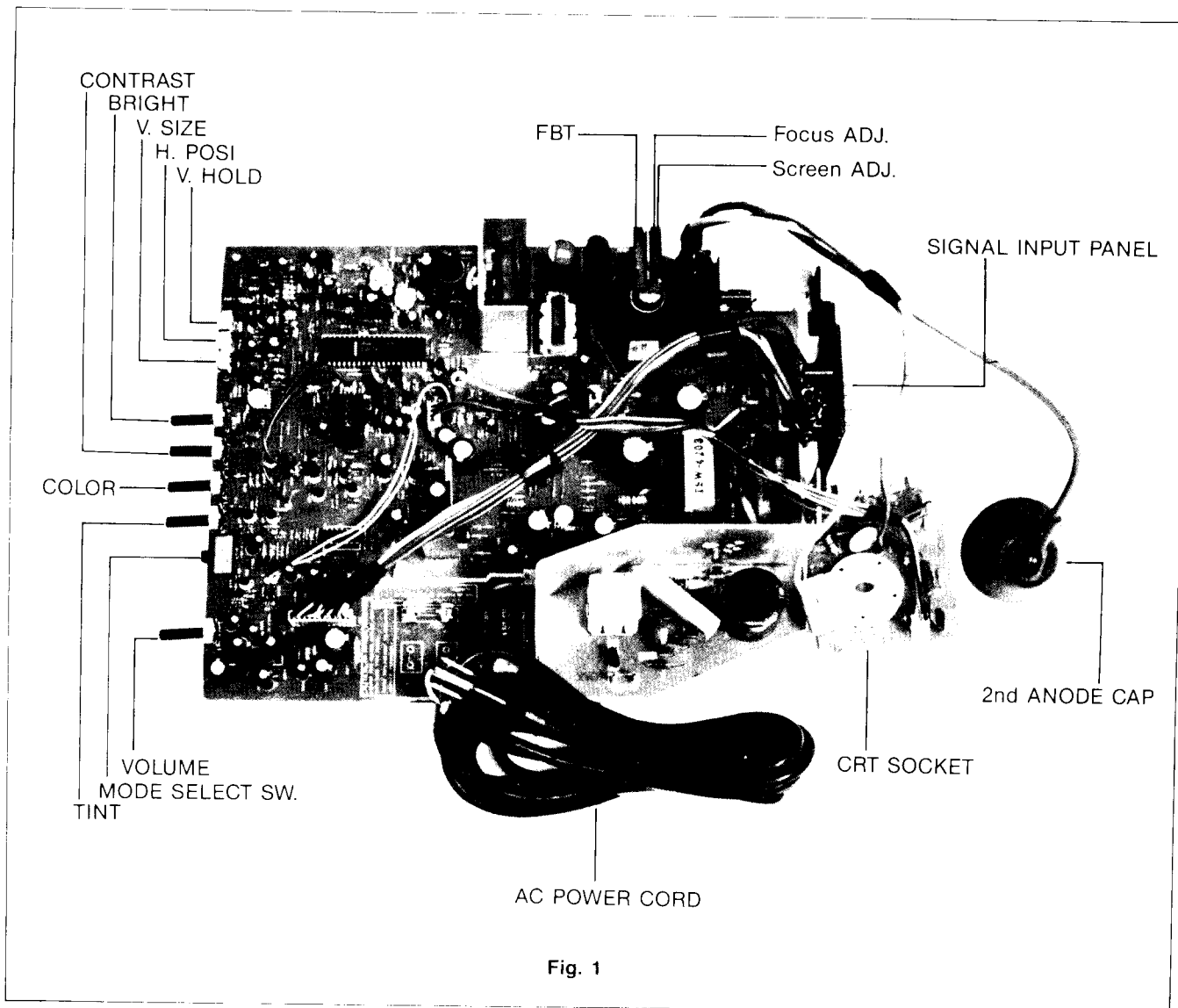
CHASSIS PARTS LOCATION

The degaussing coil should be moved slowly around the front faceplate of the picture tube and around the sides and front of the monitor. The coil should then be withdrawn slowly to a distance of at least six to ten feet before disconnecting from the AC supply.

This monitor chassis is equipped with an automatic degaussing circuit which effectively demagnetizes the faceplate each time the monitor is switched ON after having been OFF for at least ten minutes.

Note:

See 'SERVICE ADJUSTMENT' on page 12 for details of adjusting procedures.



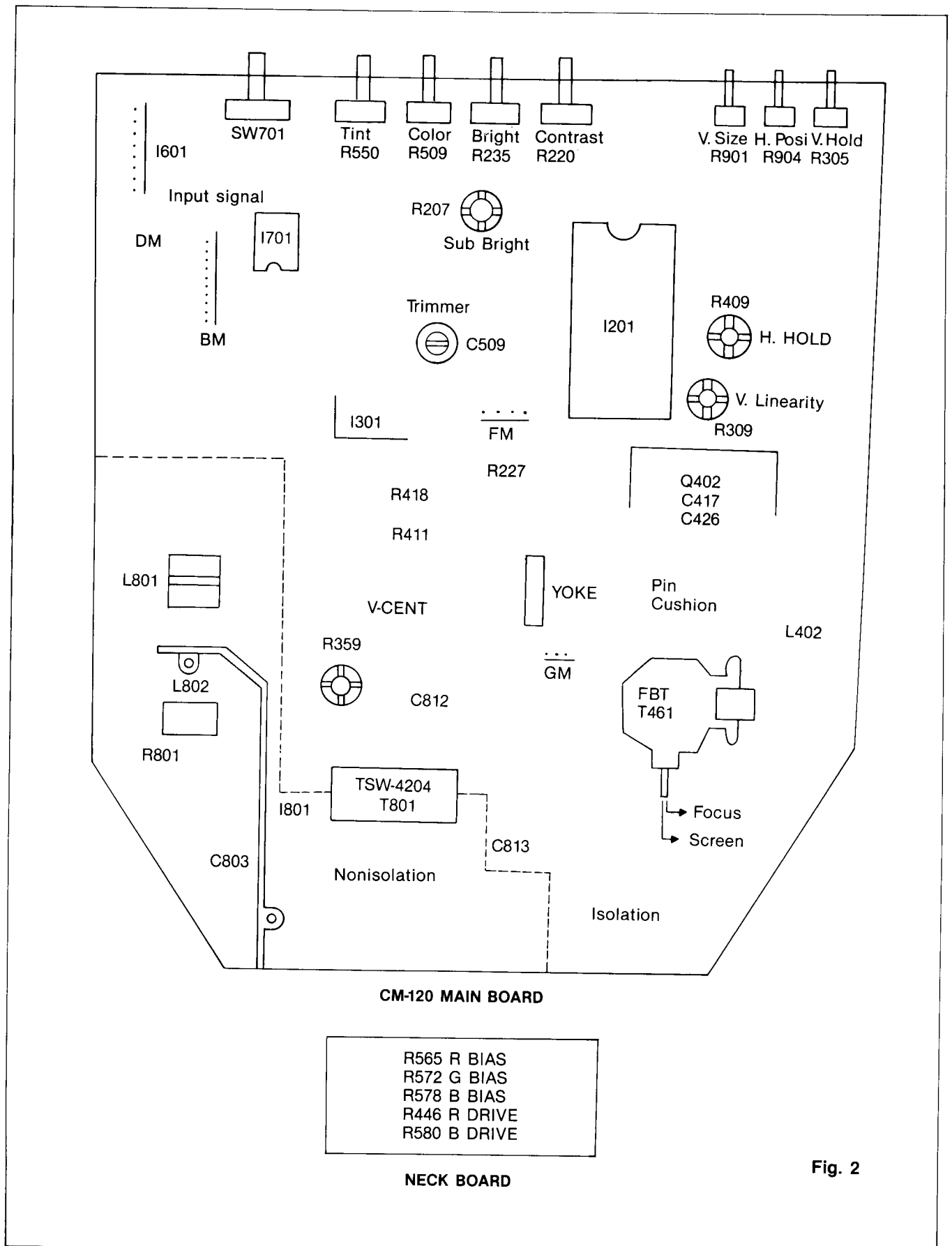
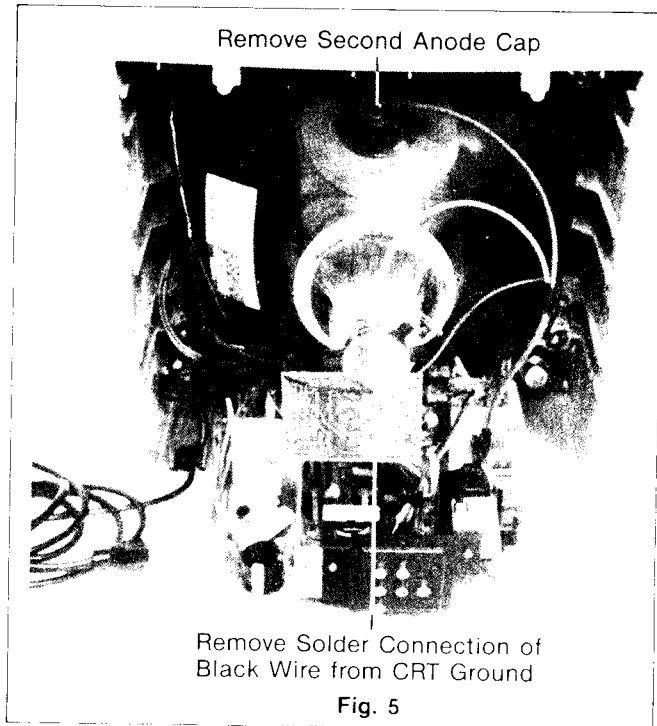
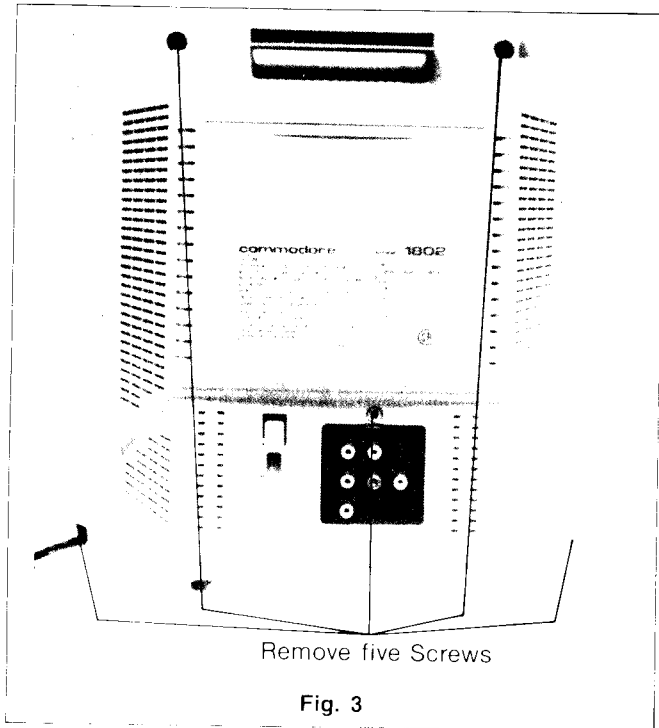


Fig. 2

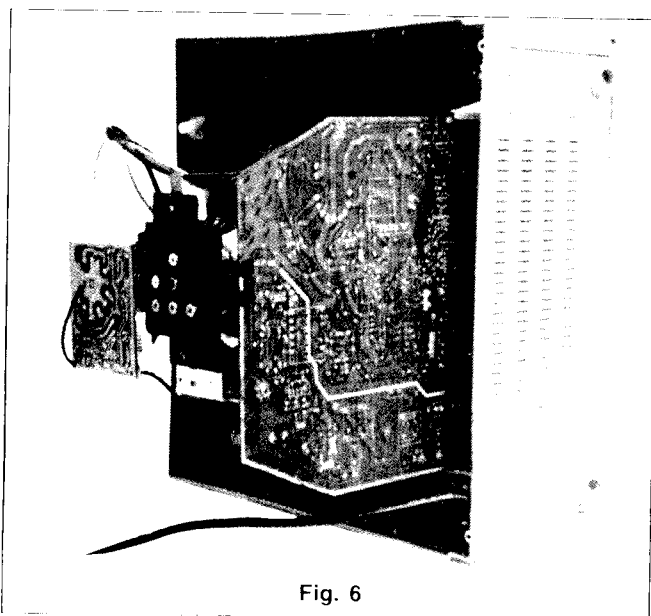
SERVICE INSTRUCTIONS

CHASSIS REMOVAL (SEE FIGS. 3/4)

1. Remove the five screws securing the rear cover of the cabinet. (See **Fig. 3**)
2. Pull the rear cabinet about 10cm to the rear.
3. Remove the rear cabinet.
4. Remove solder connection of the black wire connecting CRT grounding and neck p.c board, then remove the neck p.c board from the picture tube. (See **Fig. 5**)
5. Remove the second anode cap.
6. Remove the connectors as follows:
 - 1) Deflection yoke connector
 - 2) Degaussing coil connector
 - 3) Speaker connector
7. Remove the two screws securing the power switch.
8. Take the chassis out of the cabinet.
9. To install the chassis, repeat the above procedure in reverse order.



MAIN CHASSIS SERVICING

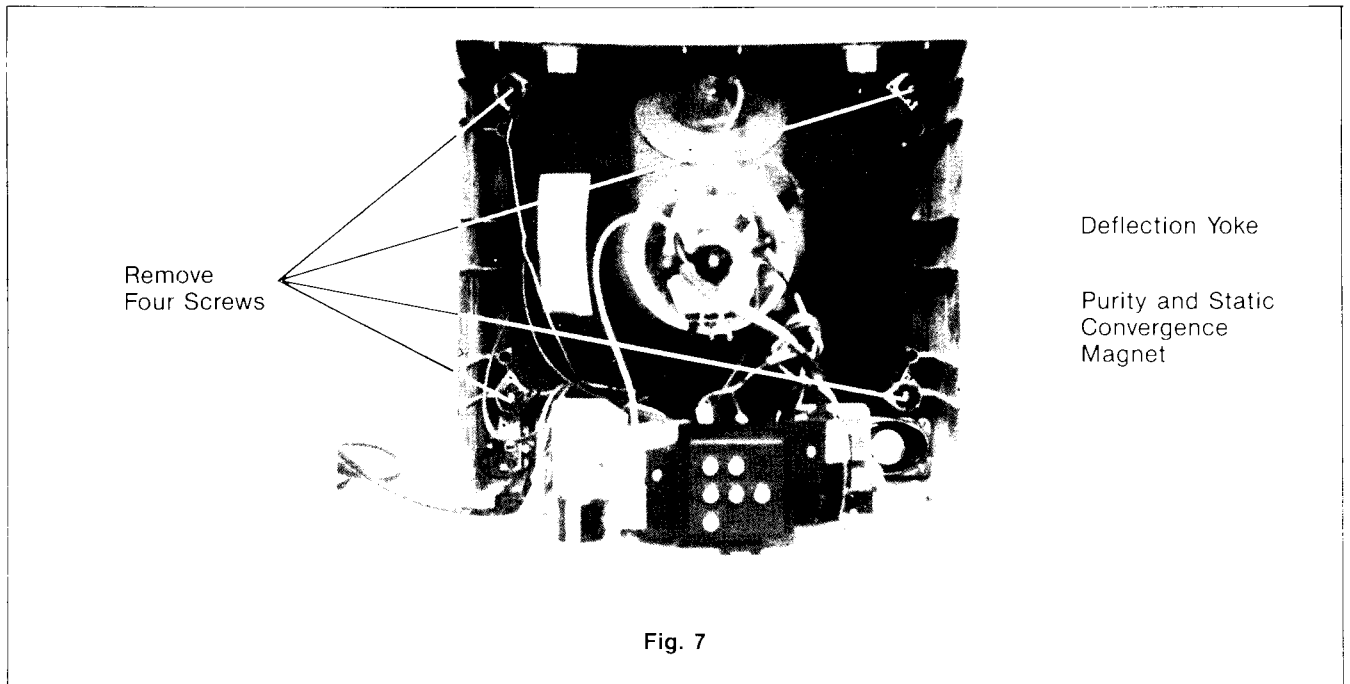


1. Remove the rear cabinet.
2. Repairing of main chassis can be done easily, if stood as shown in **Fig. 6**.

PICTURE TUBE REMOVAL

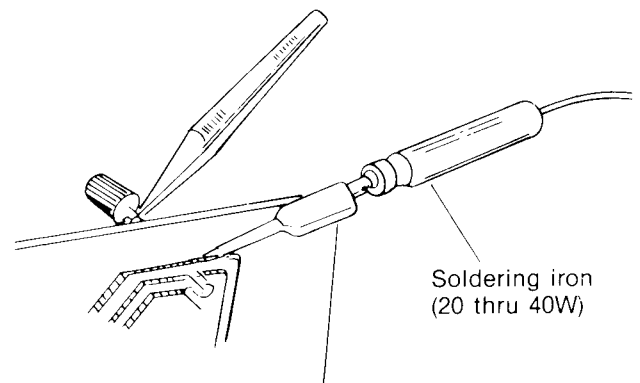
In order to remove or replace the picture tube, the chassis must first be removed. Refer to Chassis Removal procedure. After the chassis has been removed, proceed as follows.

1. Loosen the clamping screws on the deflection yoke, purity and static convergence magnet, and remove them.
2. Remove four screws securing the picture tube to the front cabinet.



PRECAUTIONS FOR REPAIRS

1. Check for bad contacts on connectors on the main PC board and elsewhere by applying hand pressure.
2. Check AC power supply for problems-e.g. blown fuse, bad switch or AC outlet.
3. Check for intermittents or defective soldering on the main board by striking the reverse side of the board gently with an insulated bar.
4. When soldering PC boards, limit the soldering iron temperature to 500°F (200°C) to avoid peeling of the foil.
5. When soldering transistors or other semiconductors, use tweezers or a heat sink clip as shown in **Fig. 8** to prevent heat damage.



TROUBLESHOOTING

As major parts of this chassis employ ICs, defects can often be isolated by referring to the table of symptoms in **Table 1**. Additional checks of transistor and IC DC voltages and waveforms as shown on the schematic will assist in pinpointing the problem area. Remember also to check for faulty resistors and capacitors, etc. around defective ICs and transistors.

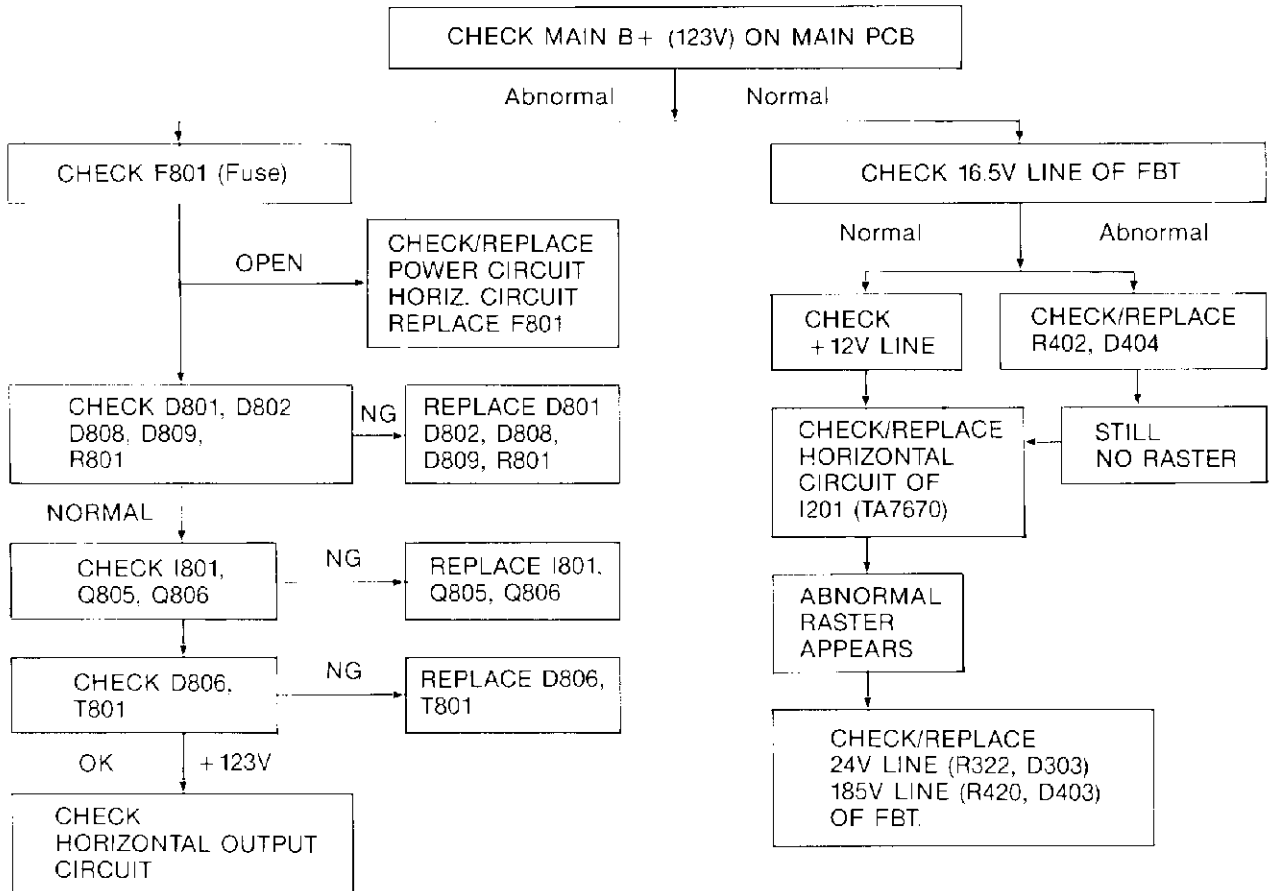
Table 1 IC/TR Failure and Symptoms

IC/TR	SYMPTOM
I201: Video Chroma Circuit Vert./Horiz. osc., Drive/Sync. sep. circuit	Composite/Separate/Monochrome-mode reception No picture and poor picture. No color and monochrome. Poor color synchronization. Hue discrepancy. Vertical line only. No picture, No high voltage. Unstable picture.
I301: Vert. output circuit	Horizontal line only. Poor vertical scan.
I801: S.M.P.S. circuit	No. power (No Lamp)
I701: Video interface circuit switch.	No picture or poor picture. Incorrect color.
I601: Audio amp. circuit	No sound or poor sound
Q001, Q005—Q007 Video amp. circuit	Composite/Separate mode/Mono No picture or poor picture.
Q701: 3.58MHz trap. circuit	Composite mode Small dotted stripes appear in the picture.
Q203: Video drive output circuit	Composite/Separate mode/Mono No video or poor video
Q702: Chroma amp. circuit	Separate mode No color or incorrect color.
Q201, Q204, Q205 Video sharpness	Poor picture
Q401: Horiz. drive circuit	No picture Does not generate high voltage.
Q402: Horiz. output circuit	No picture, does not generate high voltage, fuse is blown.
Q202: ABL circuit	Dark or brighter picture.
Q553: Blue output circuit	No blue picture. Blue with retrace line picture.
Q552: Green output circuit.	No green picture. Green with retrace line picture.
Q551: Red output circuit	No red picture. Red with retrace line picture.

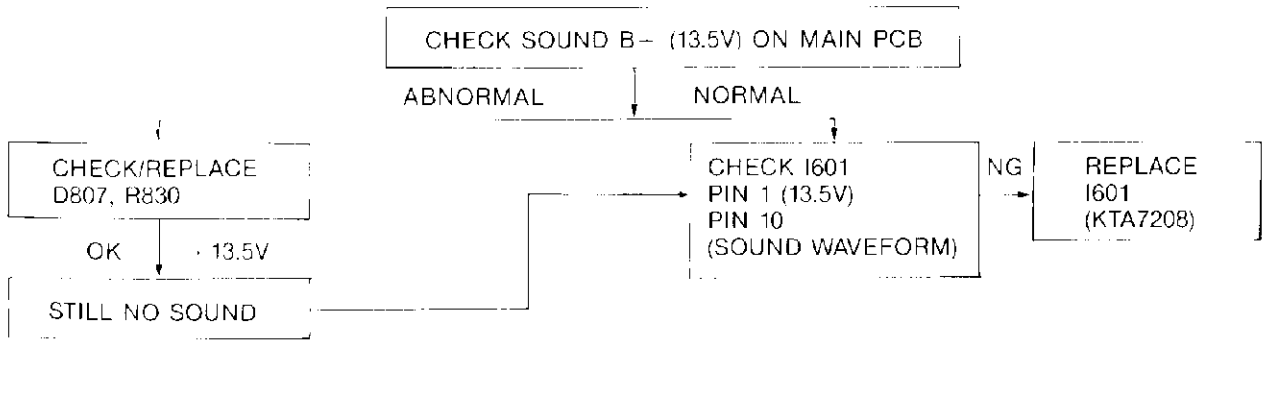
TROUBLESHOOTING CHARTS

The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the collect stage. In order to utilize the charts (fault trees), firstly establish the complaint, i.e. no raster.
 Locate the chart applicable and then progress through the various alternatives until a final block the offending components or stage.

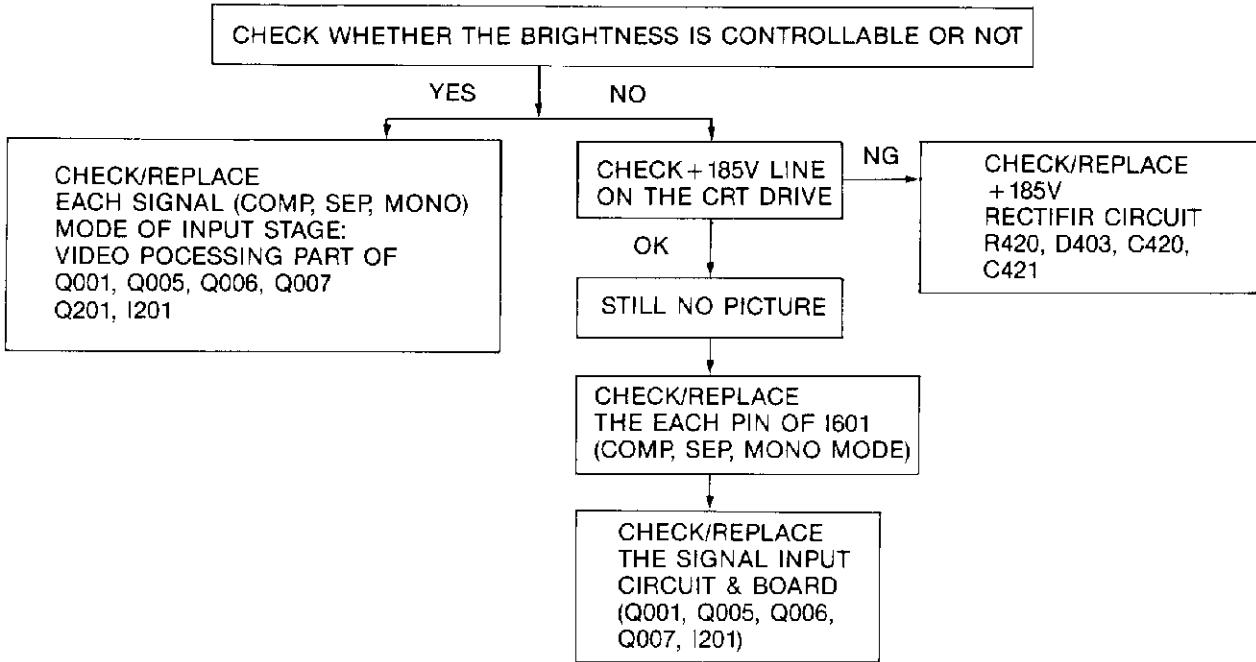
1. NO RASTER



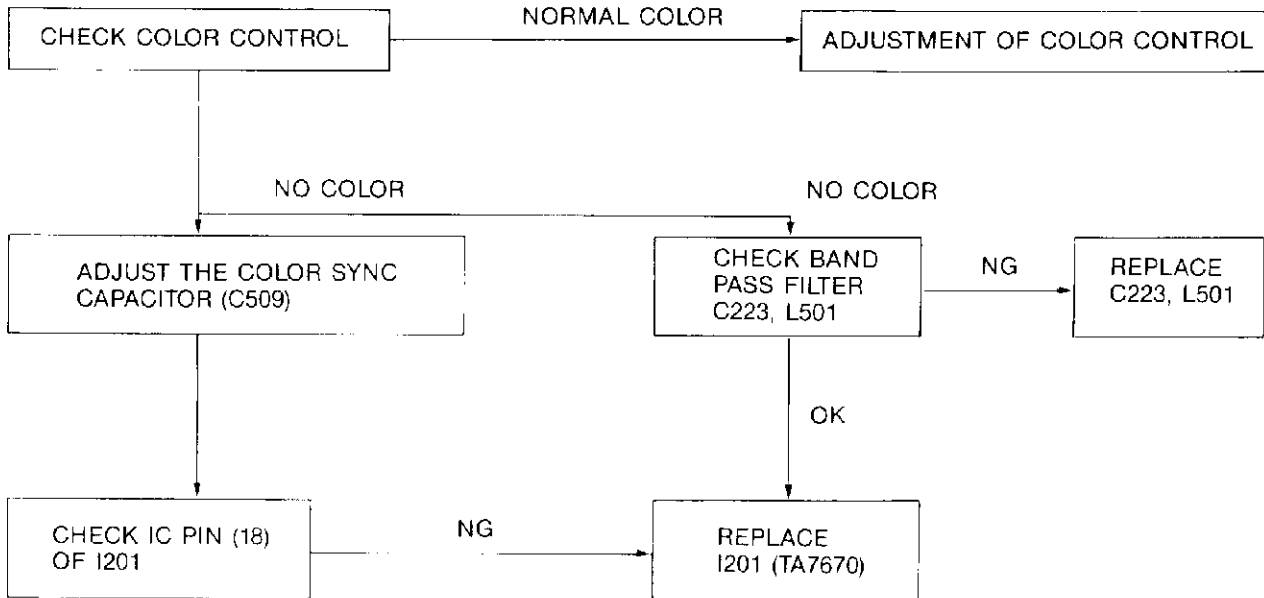
2. NO SOUND



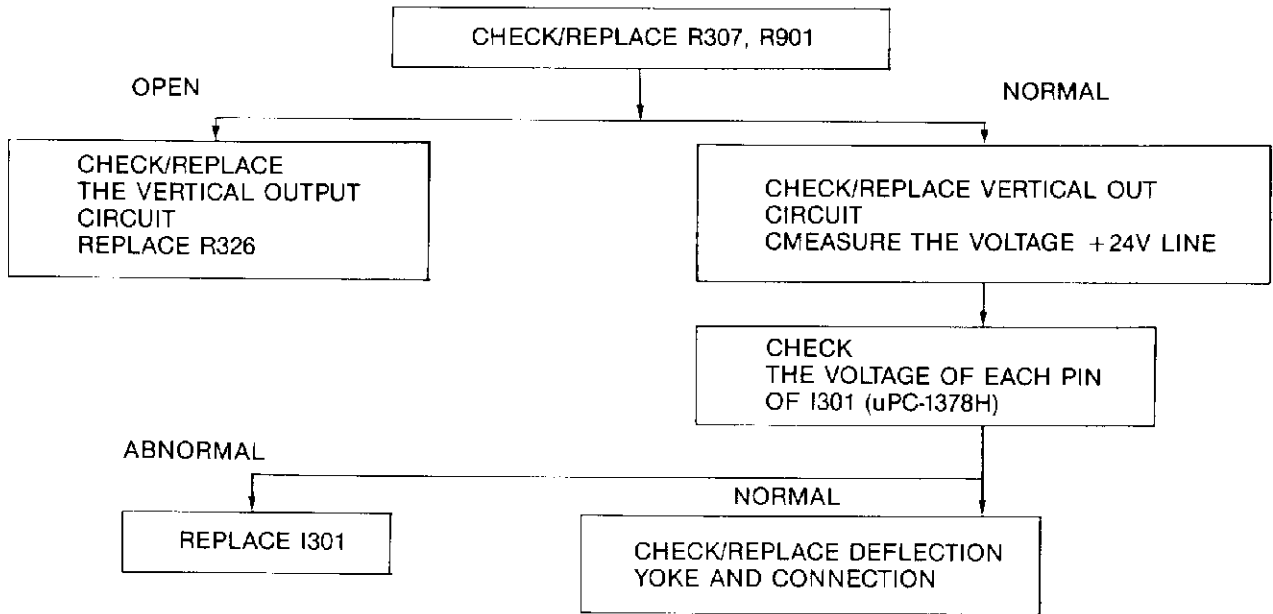
3. NO PICTURE



4. NO COLOR (FOR COMP. & SEP MODE)



5. NO VERTICAL SCAN (ONE HORIZ. ONE LINE RASTER)



6. OUT OF VERTICAL SYNC AND HORIZ. SYNC

CHECK/REPLACE SYNC, SEPARATION CIRCUIT AND I201

7. OUT OF VERTICAL SYNC

CHECK/REPLACE VERTICAL OSC. PART OF I201

8. OUT OF HORIZ. SYNC

CHECK/REPLACE HORIZ OSC PART OF I201, AFC CIRCUIT

STATIC CONVERGENCE ADJUSTMENT

A recently developed deflection yoke and electron guns construction has been used on this equipment in combination with in-line guns and black stripe screen to make a barrel-type magnetic-field distribution for vertical deflection and pin-cushion-type magnetic field for horizontal deflection with which a self-converging system can be obtained. this type is different from conventional unity magnetic field distribution type deflection yoke. 4-pole magnets and 6-pole magnets are employed for static convergence instead of a convergence yoke.

1. A crosshatch signal should be connected to the video input terminal of the monitor.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust two tabs of the 4-pole Magnets to change the angle between them (See Fig. 11) and superimpose red and blue vertical lines in the center area of the picture screen. (See Fig. 12).
4. Turn both tabs at the same time keeping their angles constant to superimpose red and blue horizontal lines at the center of the screen. (See Fig. 12)
5. Adjust two tabs of 60-pole Magnets to superimpose red/blue line with green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5, keeping in mind red, green and blue movement, because 4-pole Magnets and 6-pole Magnets interact and make dot movement complex.

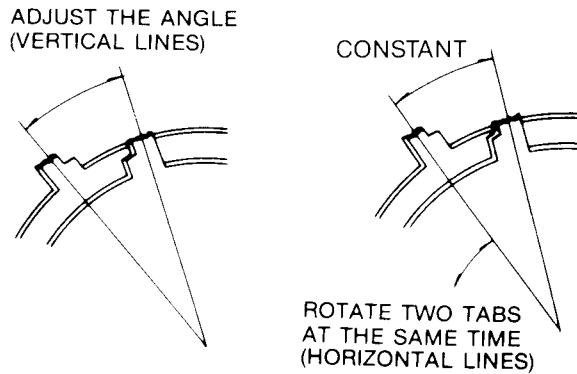
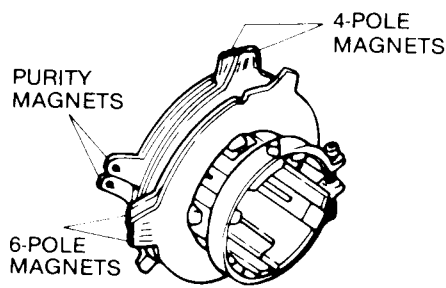


Fig. 11 CONVERGENCE MAGNET ASSEMBLY

Fig. 13 ADJUSTMENT OF MAGNETS

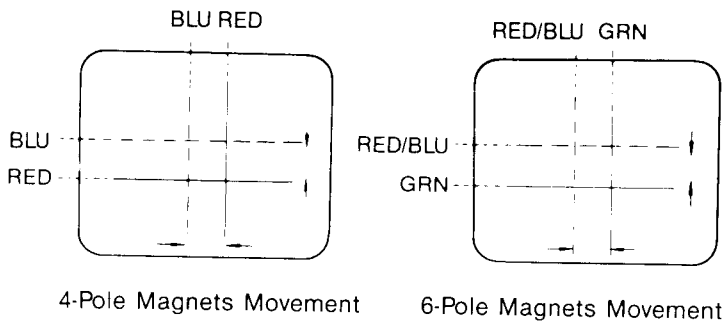


Fig. 12 CENTER CONVERGENCE BY CONVERGENCE MAGNETS

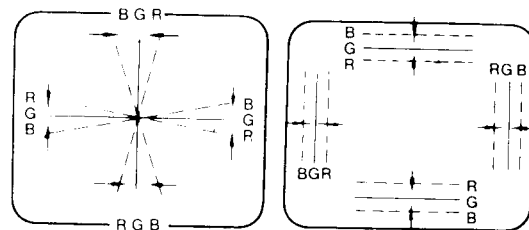


Fig. 14 CIRCUMFERENCE CONVERGENCE BY DEF. YOKE

PRECISE ADJUSTMENT OF DYNAMIC CONVERGENCE (SEE FIGS. 13 AND 14)

NOTE:

This adjustment requires Rubber Wedge Kit.

1. Loosen the clamping screw of deflection yoke to allow the yoke to tilt.
2. Place a wedge as shown in **Fig. 15** temporarily. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See **Fig. 14**) Push the mounted wedge into the space between picture tube and the yoke to hold the yoke temporarily.
4. Place other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See **Fig. 14**).
6. Hold the yoke position and put another wedge in either upper space.
Remove cover paper and stick the wedge on picture tube to hold the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space.
Stick it on picture tube to fix the yoke.
8. After placing three wedges, recheck overall convergence.
Tighten the screw firmly to hold the yoke tightly in place.
9. Stick 3 adhesive tapes on wedges as shown in **Fig. 15**.

BLACK AND WHITE TRACKING

The purpose of this procedure is to optimize the picture tube to obtain a good black and white picture at all brightness levels, while at the same time achieving maximum usable brightness. Normal purity adjustment must precede this procedure.

1. Set the Video mode switch to SEP Mode position.
2. Connect the black signal to SEP input terminal.
3. Set the brightness and contrast control at the mechanical center position.
4. Rotate the red, green and blue cut off controls fully counter-clockwise.
5. Rotate the G. drive and R. drive controls to midrange.
6. Rotate screen VR fully counter-clockwise.
7. Short circuit G and H with a jumper clip to produce a horizontal line.
8. Slowly turn the screen control on FBT clockwise until color (colors) appears faintly on the screen.
9. Adjust each cut-off control so that color becomes lightest and horizontal lines are turned to white color.
10. Remove the jumper clip.
11. Receive the white signal.
12. Adjust R/G drive controls (R555, 565) to produce a hi-lite white screen.
13. Set the brightness and picture controls to minimum.
Then, the raster should appear dark.
14. Move the brightness control until a dim raster is obtained.
15. If necessary, touch-up adjustment of the three cut off controls to obtain best white uniformity on the CRT screen.
16. Set the brightness and picture controls at the mechanical center position. If necessary, adjust the R. drive and G. drive controls to produce a uniform black and white picture.

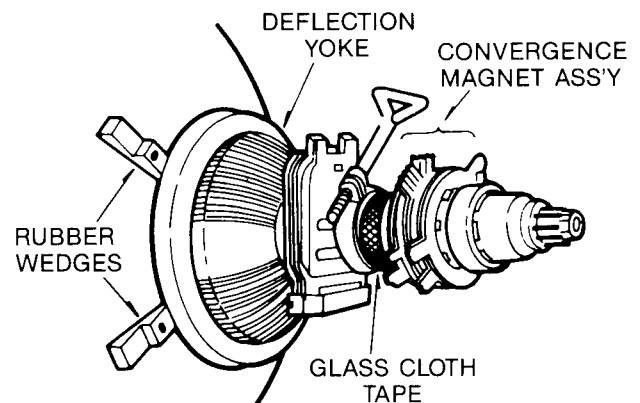
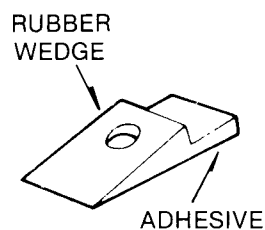
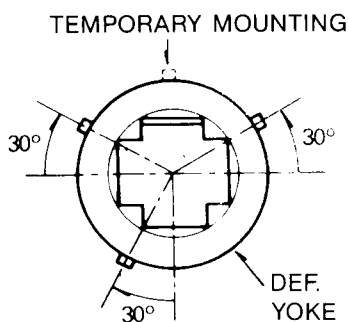


Fig. 15 RUBBER WEDGES LOCATION

Fig. 16 Picture Tube Neck Components Location

SERVICE INFORMATION

REAR CONNECTION PANEL

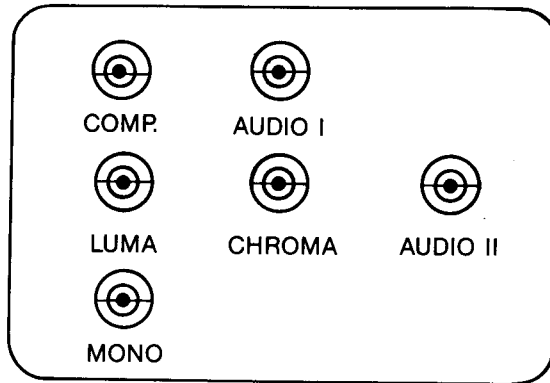


Fig. 17 Signal Input Panel

P.C. BOARD LAYOUT

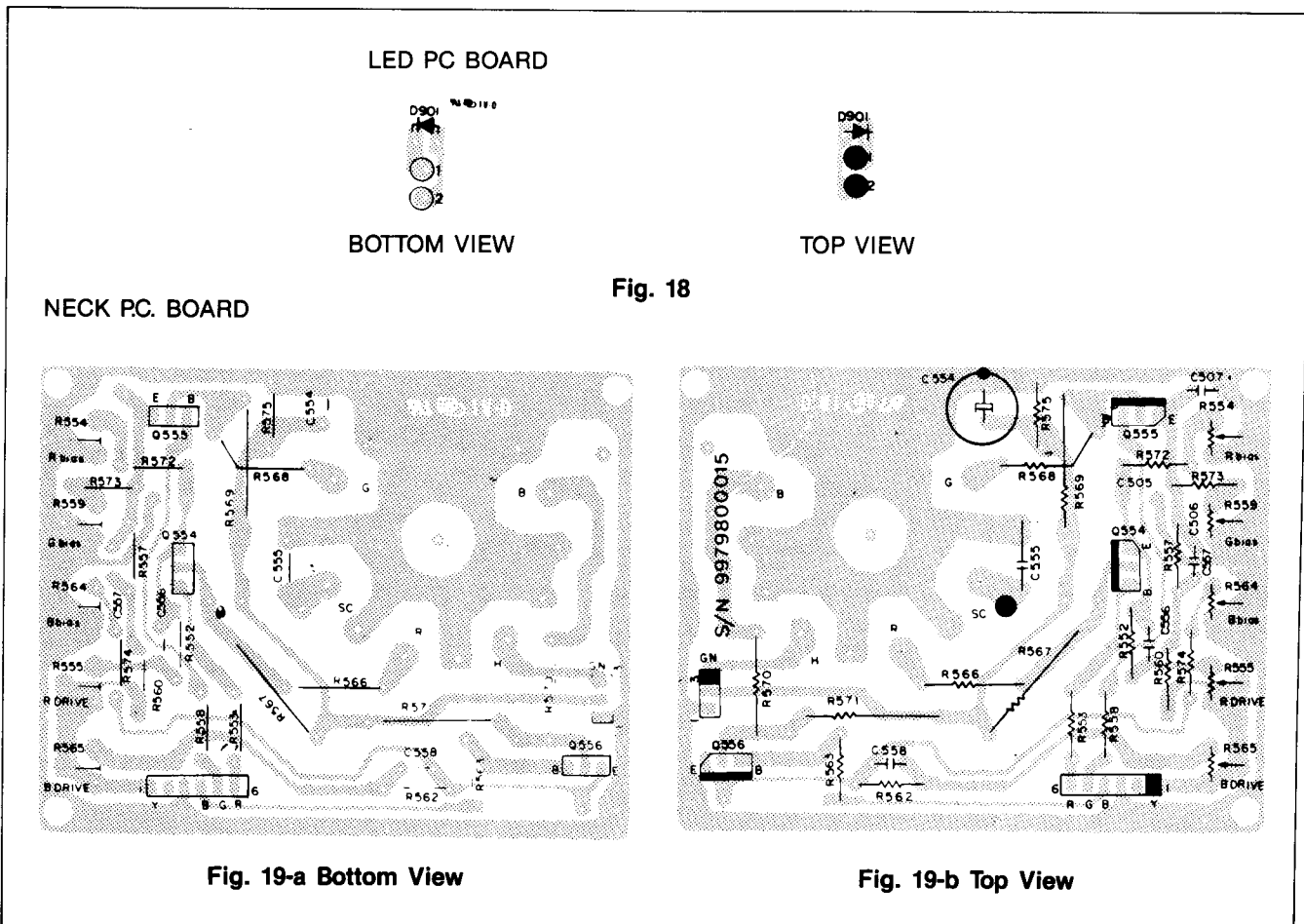


Fig. 18

Fig. 19-a Bottom View

Fig. 19-b Top View

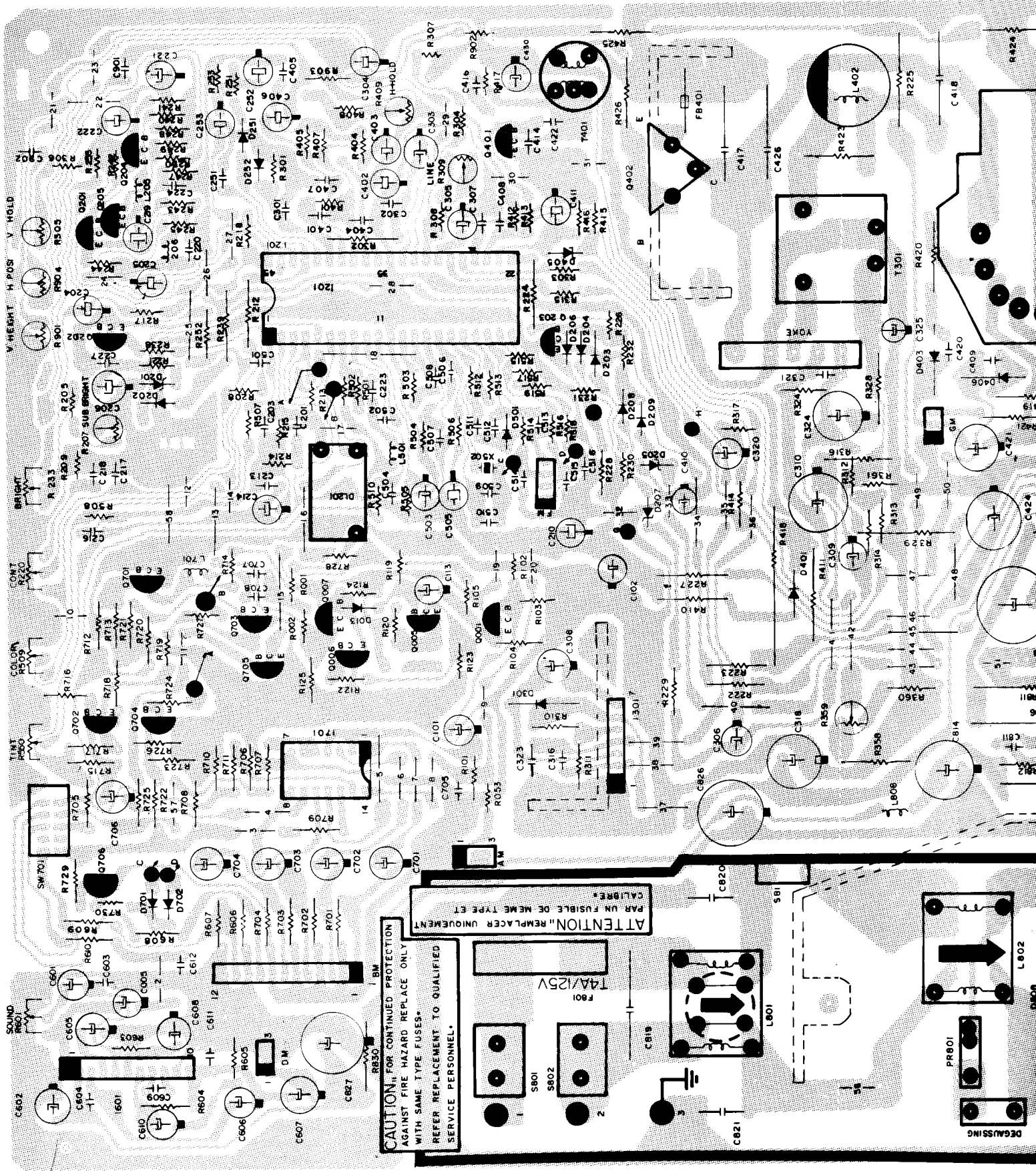
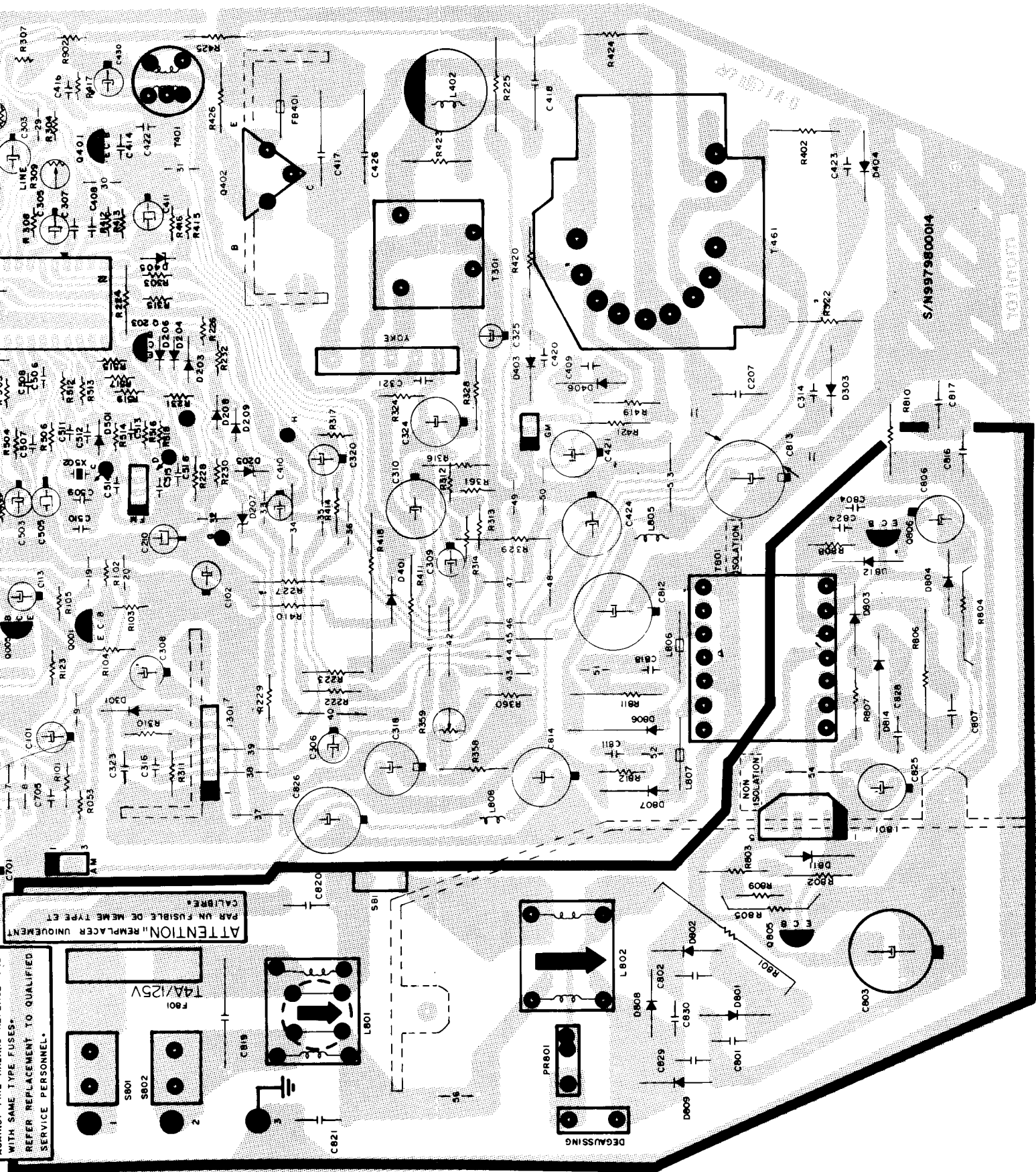
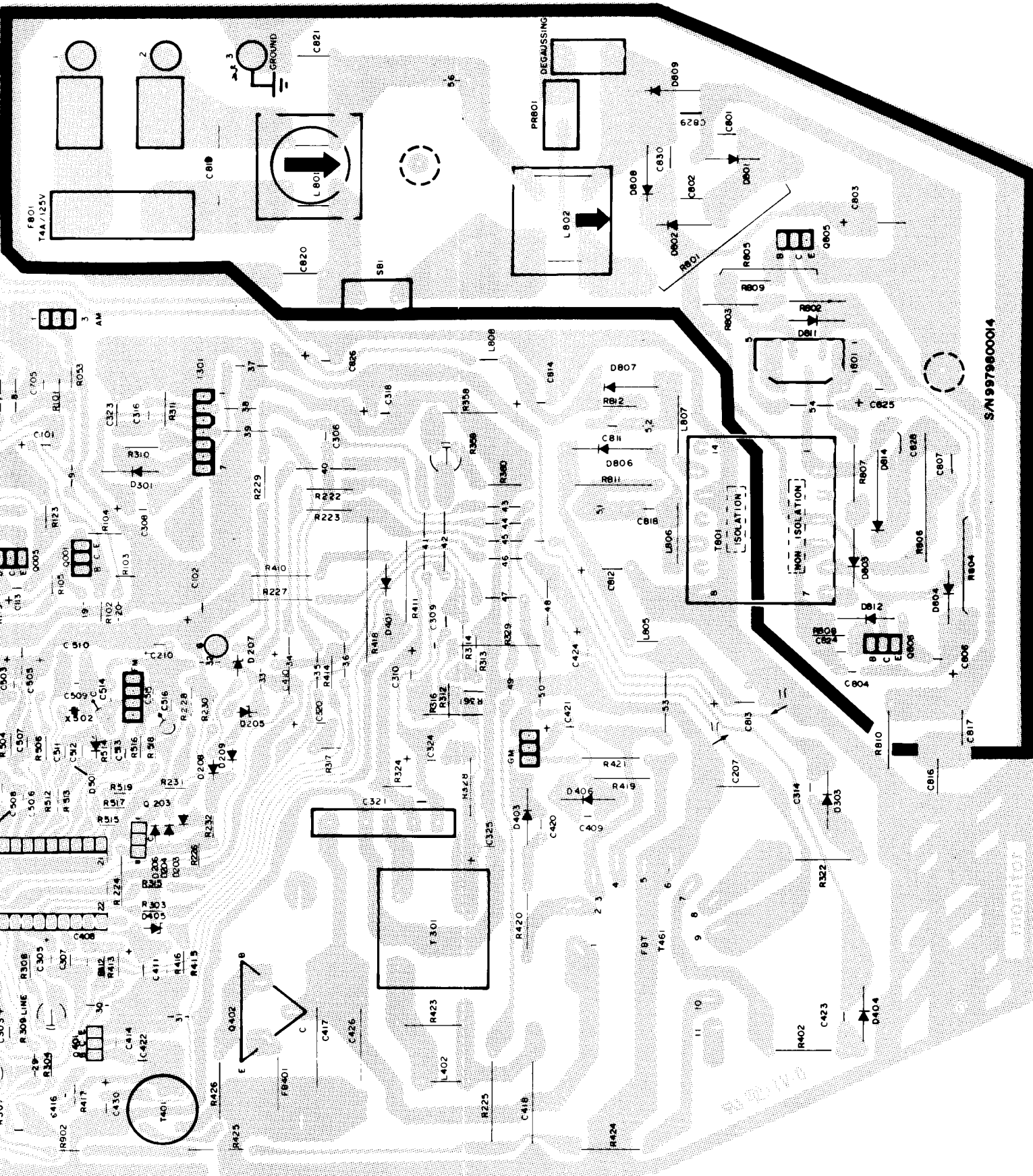


Fig. 20-a Top View (Component Side)



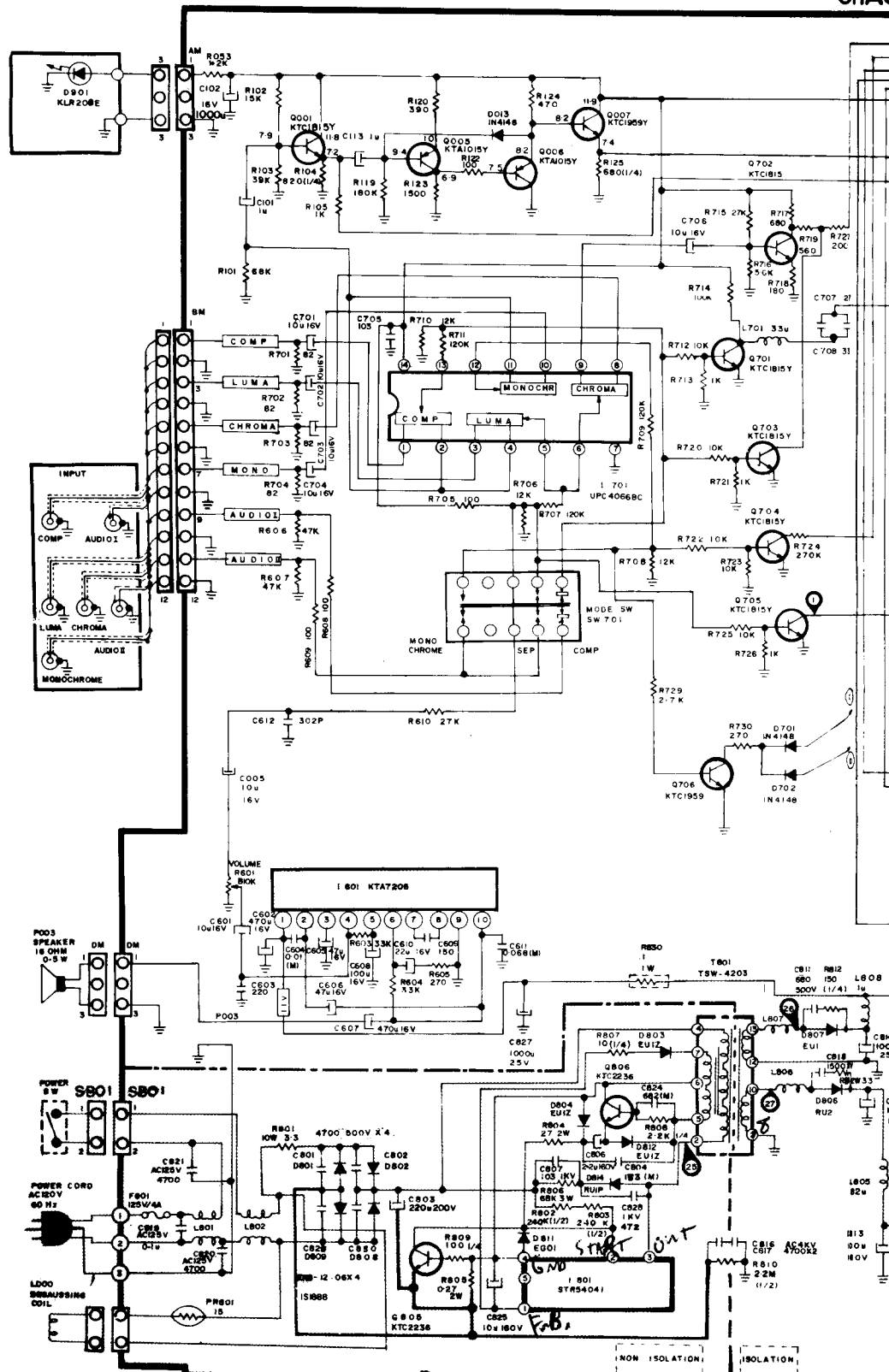
Top View (Component Side)



View (Solder side)

CIRCUIT DIAGRAM

SCH
CHAS



NO COLOUR
Check R225
5.1K
1W

NO Vertical
check R305 &
R401

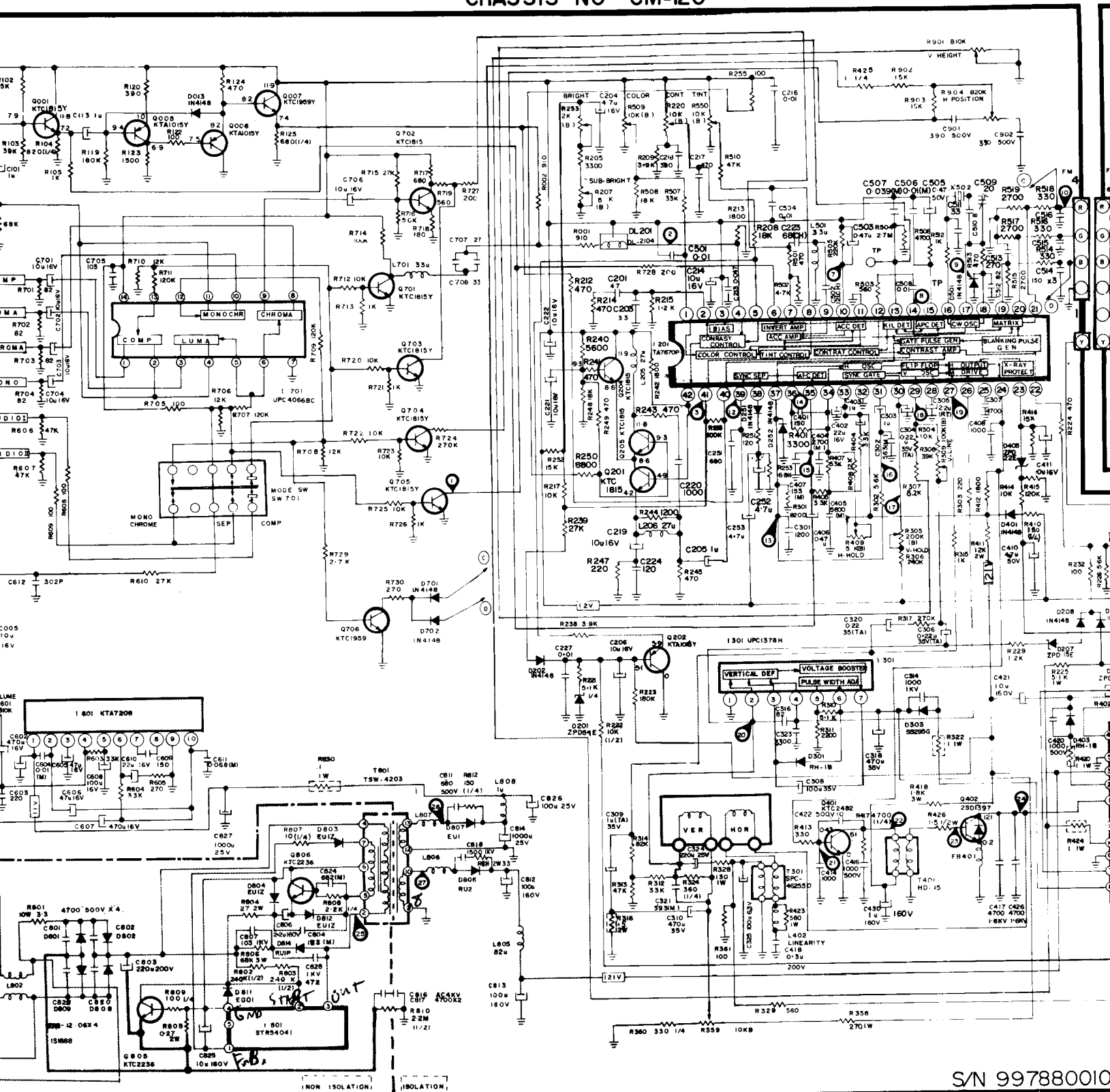
NOTE

1. RESISTANCE IS SHOWN IN OHM, K=1,000, M=1,000,000.
2. UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR VALUES LESS THAN 1 ARE EXPRESSED IN μ F AND THE VALUES MORE THAN 1 IN pF.
3. UNLESS OTHERWISE NOTED IN SCHEMATIC ALL INDUCTOR VALUES MORE THAN 1 ARE EXPRESSED IN μ H AND THE VALUES LESS THAN 1 IN mH.

4. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND, USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL LINE VOLTAGE (120 VOLTS AC).
5. VOLTAGE READINGS SHOWN ARE NOMINAL VALUES AND MAY VARY $\pm 20\%$ EXCEPT H.V.
6. THIS CIRCUIT DIAGRAM IS A STANDARD ONE. CIRCUITS PRINTED MAY BE SUBJECT TO CHANGE FOR PRODUCT IMPROVEMENT WITHOUT PRIOR NOTICE.

CAUTION - THE S
BEFORE RETURNING THE RE
TO MAKE APPROPRIATE LE
MEASUREMENTS DETER
ARE PROPERLY CALIBRATED

SCHEMATIC DIAGRAM CHASSIS NO CM-120



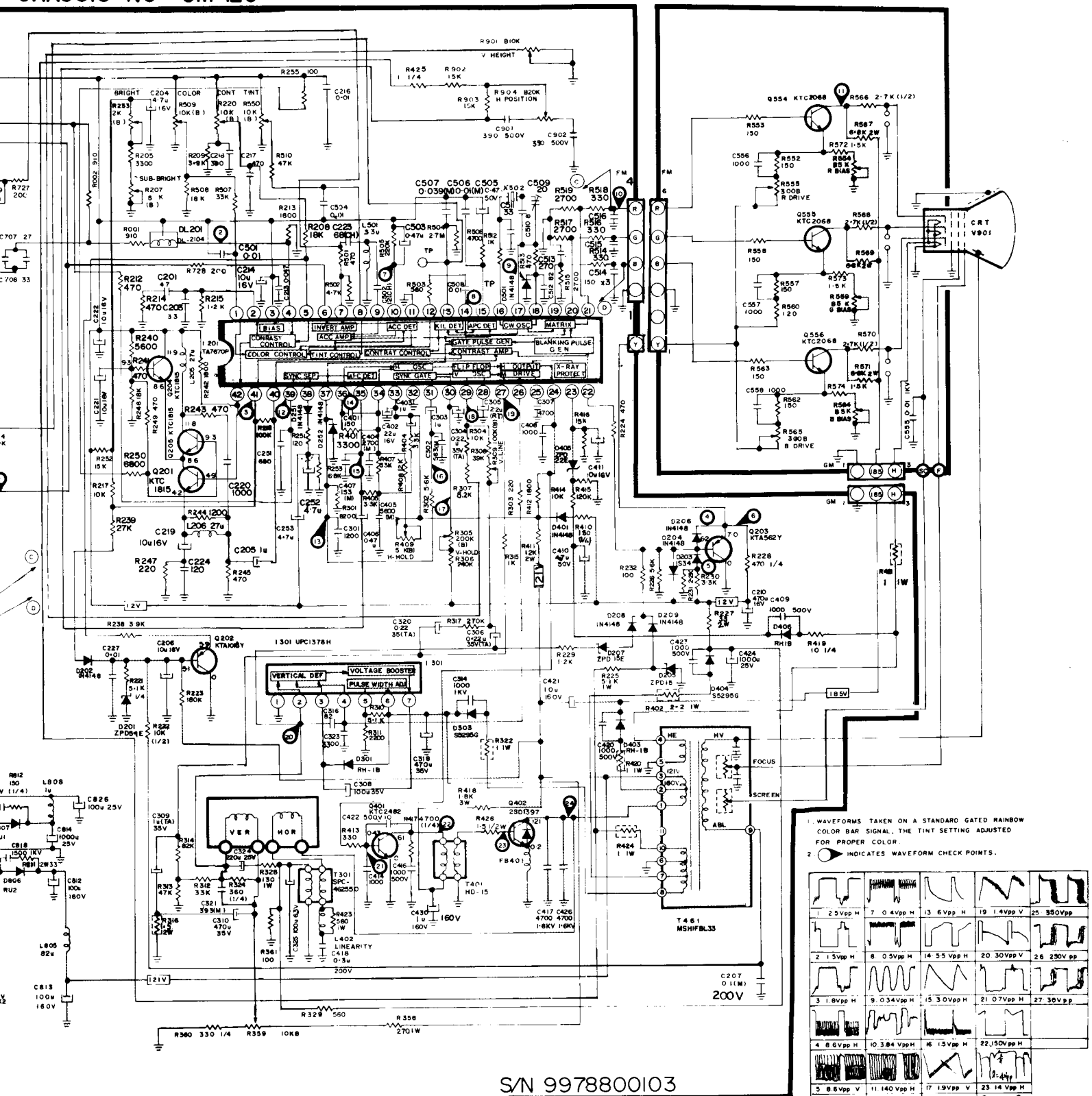
4. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND, USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL. LINE VOLTAGE 120 VOLTS AC.
 5. VOLTAGE READINGS SHOWN ARE NOMINAL VALUES AND MAY VARY ± 20% EXCEPT H.V.
 6. THIS CIRCUIT DIAGRAM IS A STANDARD ONE. CIRCUITS PRINTED MAY BE SUBJECT TO CHANGE FOR PRODUCT IMPROVEMENT WITHOUT PRIOR NOTICE.

CAUTION - TO THE SERVICE TECHNICIANS;
 BEFORE RETURNING THE RECEIVER TO THE CUSTOMER, TO MAKE APPROPRIATE LEAKAGE CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE PROPERLY INSULATED FROM THE SUPPLY CIRCUIT.

"WARNING"
 BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION," "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" IN THE SERVICE MANUAL.

S/N 997880010
CAUTION: THE SHADED AREA DESIGNATE COMPONENTS SPECIAL CHARACTERISTICS IDENTICAL TO THOSE IN THE OR SPECIFIED IN THE PARTS LIST. DO NOT DEGRADE THE SAFETY THROUGH IMPROPER SERVICE.

SCHEMATIC DIAGRAM CHASSIS NO CM-120



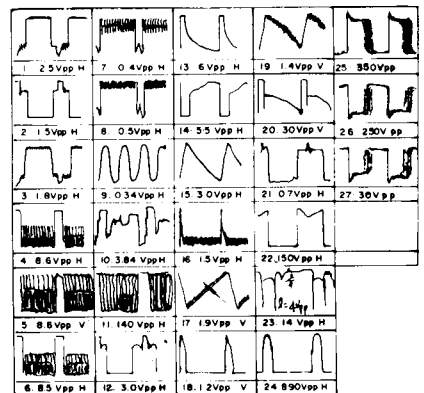
S/N 9978800103

ION TO THE SERVICE TECHNICIANS;
RETURNING THE RECEIVER TO THE CUSTOMER.
THE APPROPRIATE LEAKAGE CURRENT OR RESISTANCE
MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS
PROPERLY INSULATED FROM THE SUPPLY CIRCUIT

"WARNING":
BEFORE SERVICING THIS CHASSIS, READ THE
"X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION"
AND "PRODUCT SAFETY NOTICE" IN THE SERVICE MANUAL.

CAUTION: THE SHADED AREAS IN THE SCHEMATIC
DIAGRAM DESIGNATE COMPONENTS WHICH HAVE
SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY
AND SHOULD BE REPLACED ONLY WITH TYPES
IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT
OR SPECIFIED IN THE PARTS LIST.
DO NOT DEGRADE THE SAFETY OF THE RECEIVER
THROUGH IMPROPER SERVICING.

1. WAVEFORMS TAKEN ON A STANDARD GATED RAINBOW
COLOR BAR SIGNAL, THE TINT SETTING ADJUSTED
FOR PROPER COLOR.
2. ● INDICATES WAVEFORM CHECK POINTS.



All pins MID - Separate Colour Bars. - Composite D.K.

IC 201	Pin	Label	Value	Resistor	Pin	Value	Label
	1	Pin coat cont	5.96V	0.6V with 23.6K (CALIB).	22	7.22V	2.95V P-P
	2		4.00V	1.96V P-P	23	0.00V	
			1.19K		24	9.39V	2.23V P-P
	3	POWER	12.27V	250K	25	1.94V	2.30V P-P
	4	CHROMA IN	3.69V	1.03K	26	0.844V	1.20V P-P
	5	CONTRAST	2.44V	21K	27	7.01V	1.81V P-P
	6	Comp IN	7.52V	1.03V P-P	28	7.09V	1.77V "
	7	EXT CHROMA IN	1.664V	1.03V P-P	29	4.28V	6.20V "
			1.5K		30	2.77V	2.53V "
	8	TWT POT	6.16V	27K	31	-0.431V	1.94V "
	9	CHROMA RETN.	1.16V	4.1K	32	0.00V	
	10		10.19V	220K	33	8.32V	
	11	GND	0.00V	0Ω	34	4.40V	2.45V "
	12	CHROMA	9.73V	7.0K	35	4.66V	4.01V "
	13	COLOUR KIL.	9.30V	(7.7V mono)	36	3.32V	5.57V "
	14	CHROMA	3.03V	4.6K	37	2.57V	7.7V "
	15		8.06V	0Ω	38	7.42V	1.65V "
	16	3.5T AC	9.72V	71K	39	7.50V	3.20V 1.0K "
	17	"	5.09V	0.79V P-P	40	4.43V	1.30V 1.5K "
	18	"	5.09V	0.65V P-P	41	4.10V	15K "
	19	"	8.07V	2.7K	42	6.20V	1.06V "
	20	"	7.82V	1.07V P-P		2.0K	
	21	"	7.87V	2.85V P-P			

BLOCK DIAGRAM

