



# COLOR TELEVISION RECEIVER

## 20K-20 CHASSIS MANUAL

MODEL NO.: MTV-208

*Samsung*

### SAFETY CAUTION:

Before servicing this chassis, it is important that the service technician read and follow the "Safety Precaution" and "Product Safety Notice" in this Service Manual.

\*For continued X-radiation protection, replace picture tube with original type.

**WARNING – SHOCK HAZARD** – Use isolation transformer when servicing.

Specifications	
POWER REQUIREMENT	120V/60HZ
POWER CONSUMPTION	77 WATTS NOMINAL
VIDEO SIGNAL SYSTEM	N.T.S.C. COLOR TV SIGNAL
TUNING RANGES	UHF CH. 14-83, VHF CH. 2-13
RESOLUTION	MONOCHROME; MORE THAN 250 LINES
PICTURE TUBE	TYPE 510UXB22
ANTENNA INPUT IMPEDANCE	300 OHM BALANCED TYPE FOR UHF
	75 OHM UNBALANCED TYPE FOR VHF
INTERMEDIATE FREQUENCY	PICTURE 45.75MHz SOUND 41.25MHz
X-RADIATION PROTECTOR	COLOR SUB CARRIER 42.17MHz
RF AGC	FAIL SAFE CIRCUIT
AUDIO POWER OUTPUT RATING	REVERSE AGC
SPEAKER	0.7W AT 10% DISTORTION
	102MMx102MM ROUND 8 OHMS

\* Design and specifications are subject to change without notice.

## SAFETY PRECAUTIONS

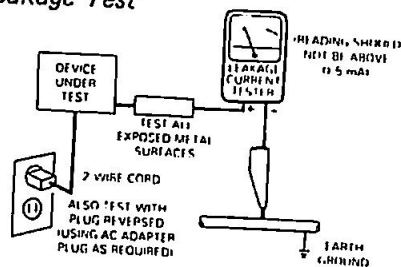
1. Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:

- a. Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.
- b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

c. **Antenna Cold Check** — With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the customer. Repeat this test with the instrument AC switch in the off position.

ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.

Figure 1.  
AC Leakage Test



d. **X-Radiation and High Voltage Limits** — Because the picture tube is the primary potential source of X radiation in solid-state TV receivers, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold-down.")

Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the *Product Safety & X-radiation Warning* note on the service data chassis schematic. High voltage is maintained within specified limits by close-tolerance safety-related components/adjustments in the

high-voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action.

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.
3. **Design Alteration Warning** — Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and will make you, the servicer responsible for personal injury or property damage resulting therefrom.
4. **Picture Tube Implosion Protection Warning** — The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.
5. **Hot Chassis Warning** — a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safely serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground. b. Some TV receiver chassis normally have 85V AC (RMS) between chassis and earth ground regardless of the AC plug polarity. These chassis can be safely serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection. c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.
6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges. b. near thermally hot parts — be sure that leads and components do not touch thermally hot parts. c. the AC supply. d. high voltage, and e. antenna wiring. Always inspect in all areas for pinched, out-of-place, or frayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage.
7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
8. **Product Safety Notice** — Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by shading on schematics and parts listed. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. Product Safety is under review continuously and new instructions are issued whenever appropriate.

## SERVICE NOTES

1. When replacing parts or circuit boards, crimp the lead wires to terminals before soldering.
2. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10 mm (½ in.) away from circuit board.
3. Keep wires away from high voltage or high temperature components.
4. If any Fuse in this TV receiver opens, replace it only with the Fuse specified in the chassis parts list.

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# GENERAL ALIGNMENT INSTRUCTIONS

THIS RECEIVER IS TRANSISTORIZED AND SPECIAL CARE MUST BE TAKEN WHEN SERVICING. READ THE FOLLOWING NOTES BEFORE ATTEMPTING ALIGNMENT.

1. Alignment requires an exacting procedure and should be undertaken only when necessary.
2. The test equipment specified or its equivalent is required to perform the alignment properly. Use of equipment which does not meet these requirements may result in improper alignment.
3. Correct matching of the equipment is essential. Failure to use proper matching could result in responses which may result in improper operation of the receiver.
4. Use of excessive signal from a sweep generator can cause overloading of receiver circuit. Overloading should be avoided to obtain a true response curve. Insertion of markers from the marker generator should not cause distortion of the response.
5. The receiver should be connected to an AC power source with voltage and frequency as specified in the nameplate of the backcover.
6. Do not attempt to connect or disconnect any wire while the receiver is in operation. Make sure the power cord is disconnected, before replacing any parts in the receiver.
7. Isolation transformer must be used to prevent shock hazard.

## INSTALLATION AND SERVICE ADJUSTMENT

(Refer to Figure 2)

### GENERAL

In the majority of cases, a color television receiver will need only slight touch-up adjustment upon installation. Check the basic characteristics such as height, vertical sync., horizontal sync. and focus. Observe the picture for good black and white details without objectionable color shading. If color shading is evident, demagnetize the receiver. If color shading still persists, perform purity and convergence adjustments. This should be all that is necessary to achieve optimum receiver performance.

### VERTICAL OSCILLATOR ADJUSTMENT

If the picture moves up or down on the screen, adjust the VERTICAL HOLD control (VR301) at the rear of the receiver.

### HORIZONTAL OSCILLATOR ADJUSTMENT

If there is an indication of unstable horizontal sync, adjust the HORIZONTAL HOLD control (VR401) to the center of the pull-in range.

### VERTICAL SIZE ADJUSTMENT

The V-SIZE controls (VR302) changes the size of the picture or pattern. Make final adjustment to overscan the CRT about 10% vertically.

### FOCUS ADJUSTMENT

Adjust the FOCUS control (T444) for well defined scanning lines on the picture screen.

### HIGH VOLTAGE CHECK

**CAUTION:** There is no HIGH VOLTAGE ADJUSTMENT on this chassis. The B<sup>+</sup> power supply (+125V) must be checked to insure the correct high voltage.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the AFT/AUTO COLOR switch to the OFF position. Set the BRIGHTNESS and CONTRAST controls to minimum (zero beam current).
3. High voltage must be about 27KV.
4. Rotate the BRIGHTNESS control to both extremes to be sure the high voltage does not exceed the 30kV limit under any conditions.

### FAIL SAFE CIRCUIT CHECK (FS)

The FS circuit check is mandatory for the final check after servicing. Follow the steps below.

1. Turn the power switch on and adjust customer controls for normal operation.
2. Temporarily short Pin X and Pin R on Main Board with a jumper wire. Raster and sound will disappear.
3. The receiver must remain in this state even after removing the jumper wire. This shows that the FS circuit is functioning properly.
4. To obtain a picture again, temporarily turn the receiver off and allow the FS circuit more than 20 seconds to reset. Then turn the power switch on to produce a normal picture.

## AGC ADJUSTMENT

1. Tune in the strongest station in your area.
2. Push "on" the AFT/AUTO COLOR switch SW501 located at the front of the receiver.
3. Turn the AGC DELAY control (VR123) fully counterclockwise, then turn it clockwise until snow noise just disappears from the screen.

## SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a color program.
2. Set the CONTRAST Control to minimum and the BRIGHTNESS Control to the maximum position.
3. Set the COLOR and TINT controls to center.
4. Set the SUB-BRIGHT control (VR203) to center and leave the receiver for five minutes in this state.
5. Connect VTVM between Pin Z and Pin Y, and then adjust the sub bright control (VR203) on Main Board for +0.2 volt reading.
6. Check for proper picture variation by rotating the CONTRAST and BRIGHTNESS controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS controls turned to minimum, or not bright enough with the controls turned to maximum, adjust the SUB-BRIGHT control for an acceptable picture.

## AFT (Automatic Fine Tuning) FIELD ALIGNMENT

1. Place AFT/AUTO COLOR Switch in OFF position. Tune the set to an active channel and adjust fine tuning for best picture.
2. Place AFT Switch in ON position, and adjust Trans. (L171) on MAIN Board for best picture. Picture quality should be the same as that obtained in Step 1.
3. Check the AFT action by turning the fine tuning clockwise and counterclockwise.

## AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 10 minutes in order that the automatic degaussing circuit operates properly.

Should the chassis or parts of the cabinet become magnetized to cause poor color purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 6' (2 m) before disconnecting it from AC source. If color shading still persists, perform the COLOR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENT procedures, as mentioned later.

## CRT GRAY SCALE ADJUSTMENT

1. Set the COLOR Control to minimum.
2. Adjust the BRIGHTNESS and CONTRAST Controls to obtain low light area.
3. Adjust RED, GREEN and BLUE BIAS Controls, (VR504, VR503, VR502) to obtain gray raster of low brightness.
4. Adjust the BRIGHTNESS and CONTRAST Controls to maximum.
5. Adjust the BLUE DRIVE (VR506) and RED DRIVE Controls (VR505) to obtain proper white-balanced picture in high light areas.
6. Repeat steps 2 through 5 for correct gray scale.

## PARTS LOCATION DIAGRAM

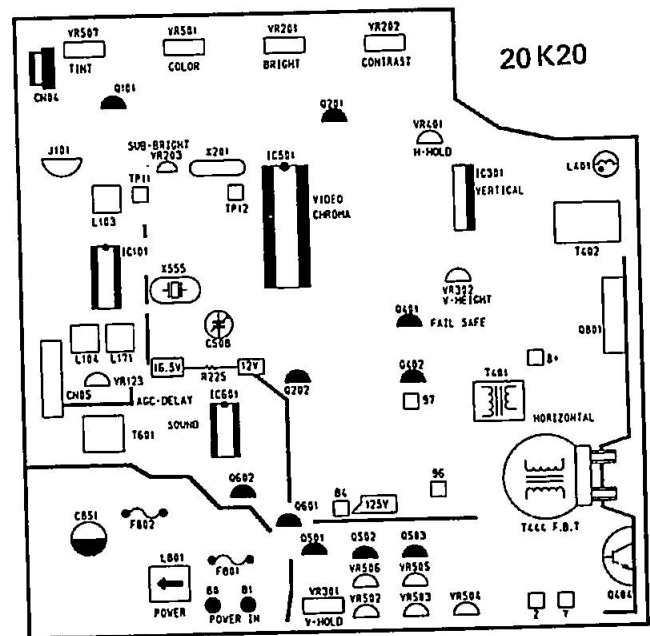


Figure 2.

## COLOR PURITY ADJUSTMENT

1. Operate the receiver for 20 minute to warm up the CRT with Bright control maximum.
2. Degauss the receiver fully by using an external degaussing coil.
3. Roughly adjust convergence.
4. Receive a black and white signal.
5. Turn red and blue Low Light controls (VR504, VR502) fully counterclockwise to obtain a green field. Adjust Drive controls when green field is not obtained.
6. Loosen the deflection yoke clamp screw and move

- the deflection yoke as close to the purity magnet as possible.
7. Loosen purity, magnet clamp and adjust the purity magnet to set the vertical green raster precisely at the center of the screen. The tighten the clamp.
8. Slowly move the deflection yoke forward and adjust for best overall green screen.
9. Tighten the deflection yoke clamp screw.
10. Produce the blue and red raster by Low Light controls and observe that good purity is obtained on the respective field.

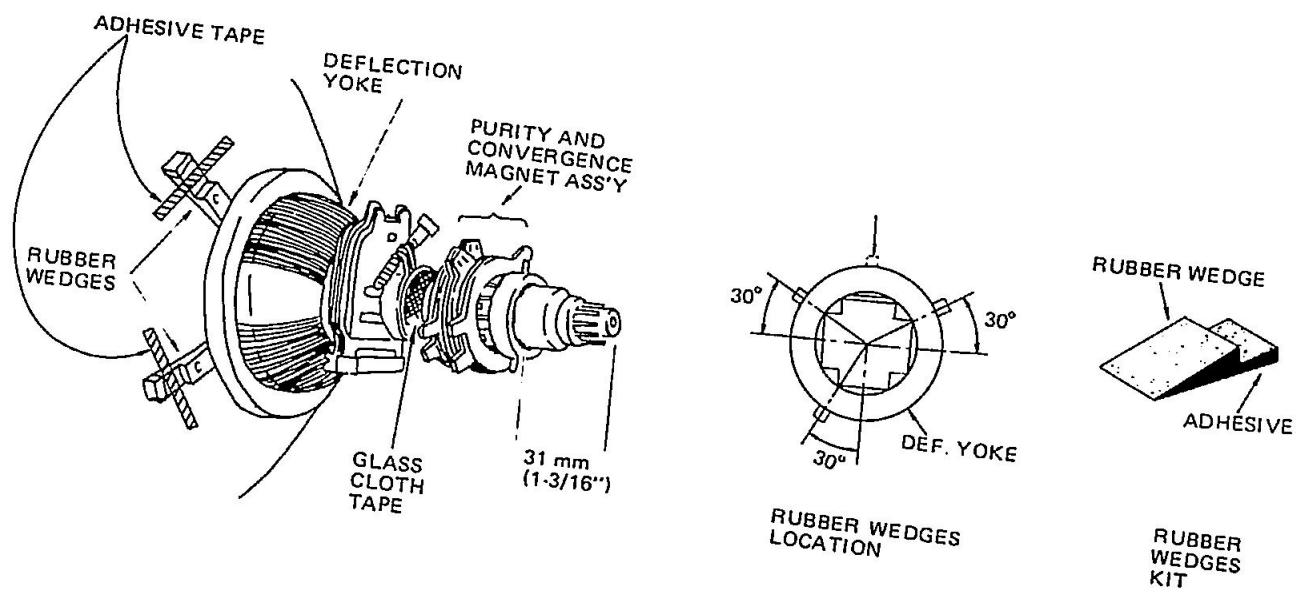


Figure 3. TUBE ASSEMBLY

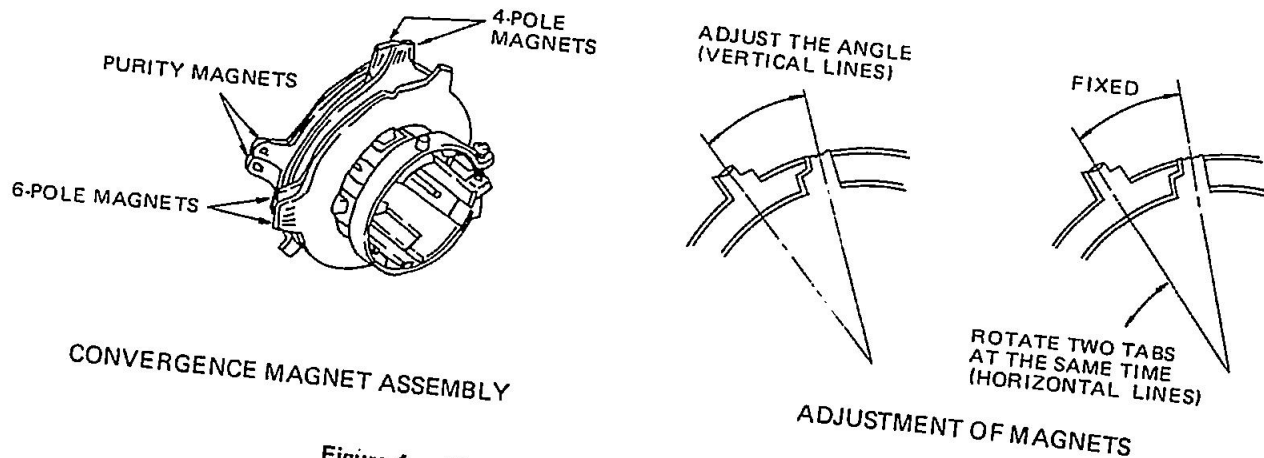


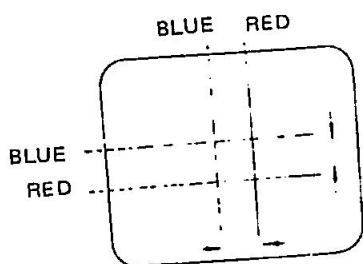
Figure 4. PURITY AND CONVERGENCE MAGNETS

## CONVERGENCE ADJUSTMENTS

NOTE : Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

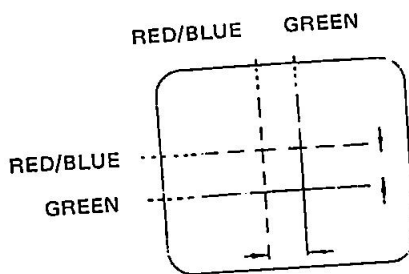
### CENTER CONVERGENCE ADJUSTMENTS

1. Receive crosshatch pattern with a color bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST Controls for well defined pattern.
3. Adjust the two tabs of the 4-Pole Magnets to change the angle between them and superimpose red and blue vertical lines in the center area of the picture screen.



4-POLE MAGNETS MOVEMENT

4. Turn both tabs at the same time without changing position between them, to superimpose red and blue horizontal lines at the center of the screen.
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line with green. Adjusting the angle affects the horizontal lines.
6. Repeat adjustments 3, 4, 5, observing red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets interact.



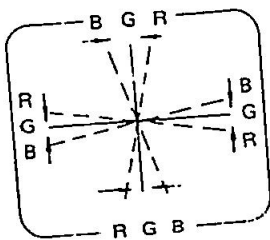
6-POLE MAGNETS MOVEMENT

Figure 5. CENTER CONVERGENCE ADJUSTMENT

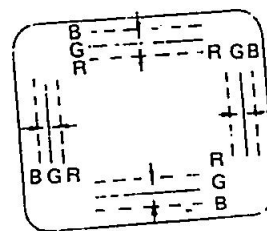
### CIRCUMFERENCE CONVERGENCE ADJUSTMENT

1. Loosen the clamp screw of deflection yoke to allow the yoke to tilt.
2. Place a wedge temporarily. (Temporary Mounting). (do not remove cover paper on adhesive part of a new wedge).
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. Push the mounted wedge into the space between picture tube and the yoke to hold the yoke temporarily in place.
4. Place other wedge at bottom and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference.

6. Keep the yoke positioned and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to secure the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to secure the yoke.
8. After inserting three wedges, recheck overall convergence. Tighten the screw firmly to hold the yoke tightly in place.
9. Place 3 adhesive tapes over wedges, as shown in Figure 3.



INCLINE THE YOKE UP (OR DOWN)



INCLINE THE YOKE RIGHT (OR LEFT)

Figure 6. CIRCUMFERENCE CONVERGENCE ADJUSTMENT

## TEST EQUIPMENT

Allow minimum of 10 minutes warm-up period for test equipment.

- Sweep/Marker Generator-Capable of furnishing markers at 42.75MHz, 45.75MHz.
- Oscilloscope-Wideband.
- External Bias-Battery or well regulated, isolated AC operated variable DC Bias supply (0-20V)
- Alignment Tool.

## PICTURE I-F SWEEP ALIGNMENT

Refer to figure 7 for alignment points and test equipment connections.

1. Connect output of sweep/marker generator to test point (TP) on the tuner. (See Fig. 7)
2. Connect the oscilloscope with direct probe to TP12 on the PWB Main Board through 100K ohm resistor.
3. Apply approximately +5 – +8V to TP-11 and +16.5V bias to the left side of R225 on the PWB Main Board.

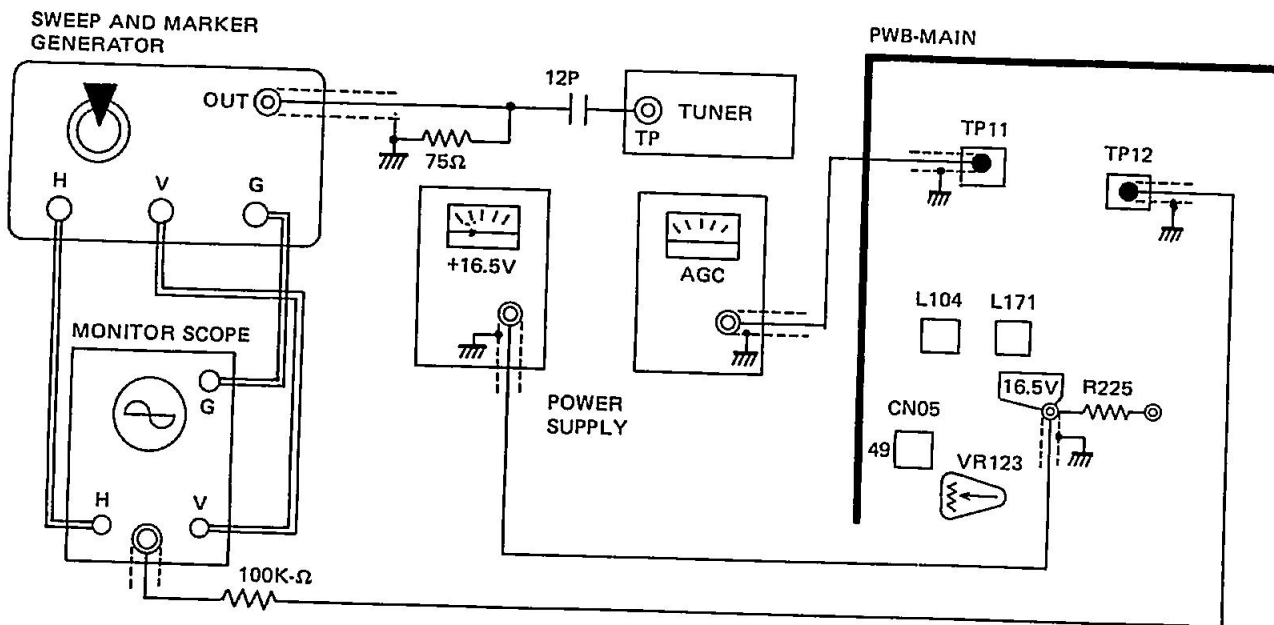


Figure 7. Picture I-F Sweep Alignment

## I-F (45.75MHz) ADJUSTMENT

1. Adjust the attenuator on the Sweep/Marker Generator and I-F AGC Bias (TP11) to achieve 1Vp-p on oscilloscope.
2. Adjust L104 for maximum amplitude at 45.75MHz. (See Fig. 8.)

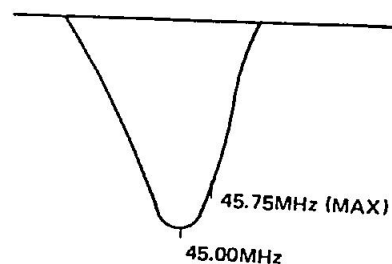


Figure 8. I-F (45.75MHz) Response Curve.



## I-F OVERALL ADJUSTMENT

1. Retain initial connections for I-F overall adjustment.
2. Adjust the core of tuner. (See Fig. 9)

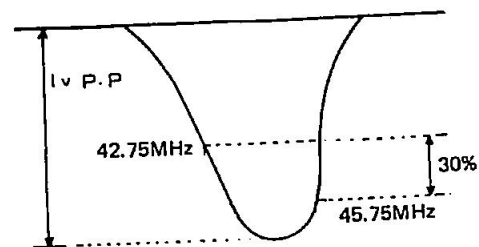


Figure 9. I-F OVERALL RESPONSE CURVE.

## AFT ADJUSTMENT

1. Remove detector probe from TP12.
2. Connect detector probe to pin 49.
3. Adjust coil L171 for exact marker position. (See Fig. 10)

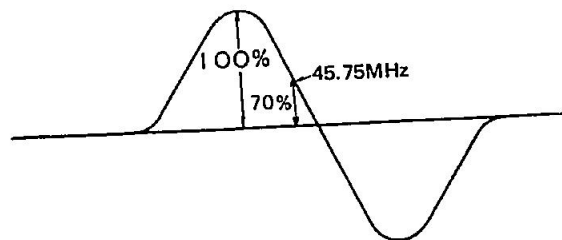


Figure 10. AFT RESPONSE CURVE.

## COLOR SYNC ADJUSTMENT

1. Tune in a color program and warm up for five minutes.
2. Connect a capacitor (0.47 mfd) to both sides of C502.
3. Set the controls as follows:  
CONTRAST : Minimum  
TINT : Fully counterclockwise  
COLOR : Maximum
4. Adjust the color sync. variable capacitor (C508) on the Main Board so that the color bar pattern stands still or drifts slowly across the picture screen.
5. Remove the capacitor (0.47 mfd).
6. Check that the color sync. is stable with channel changing and power on-off operation. If the color is slow to appear or the color is out of sync. retouch the color sync. variable capacitor (C508) for proper color display.

## TUNER TERMINAL VIEW

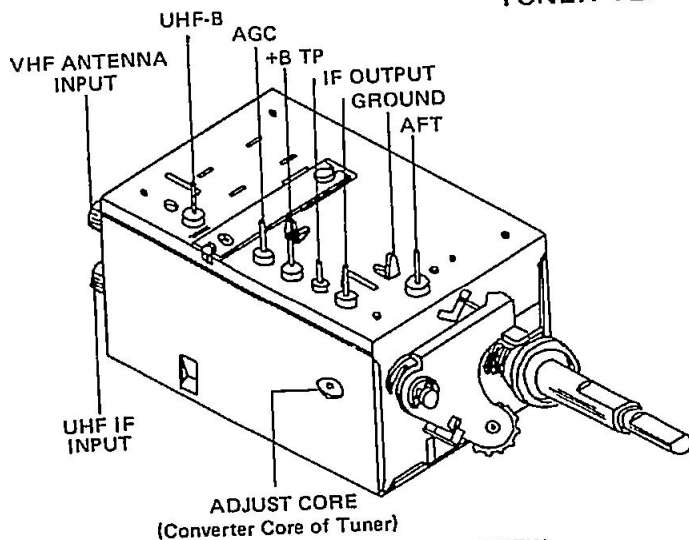


Figure 11. VHF TUNER VIEW

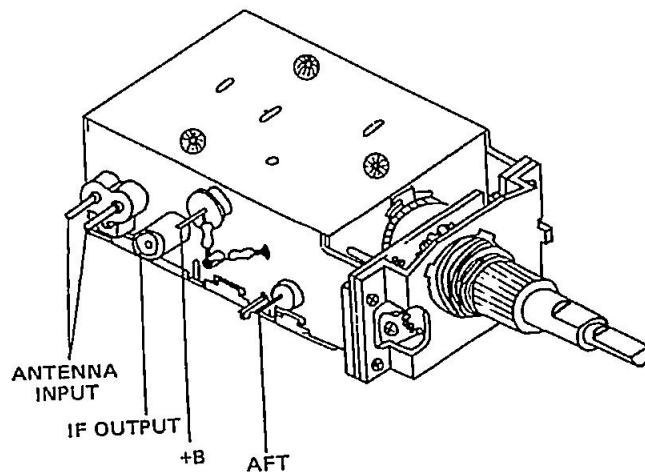
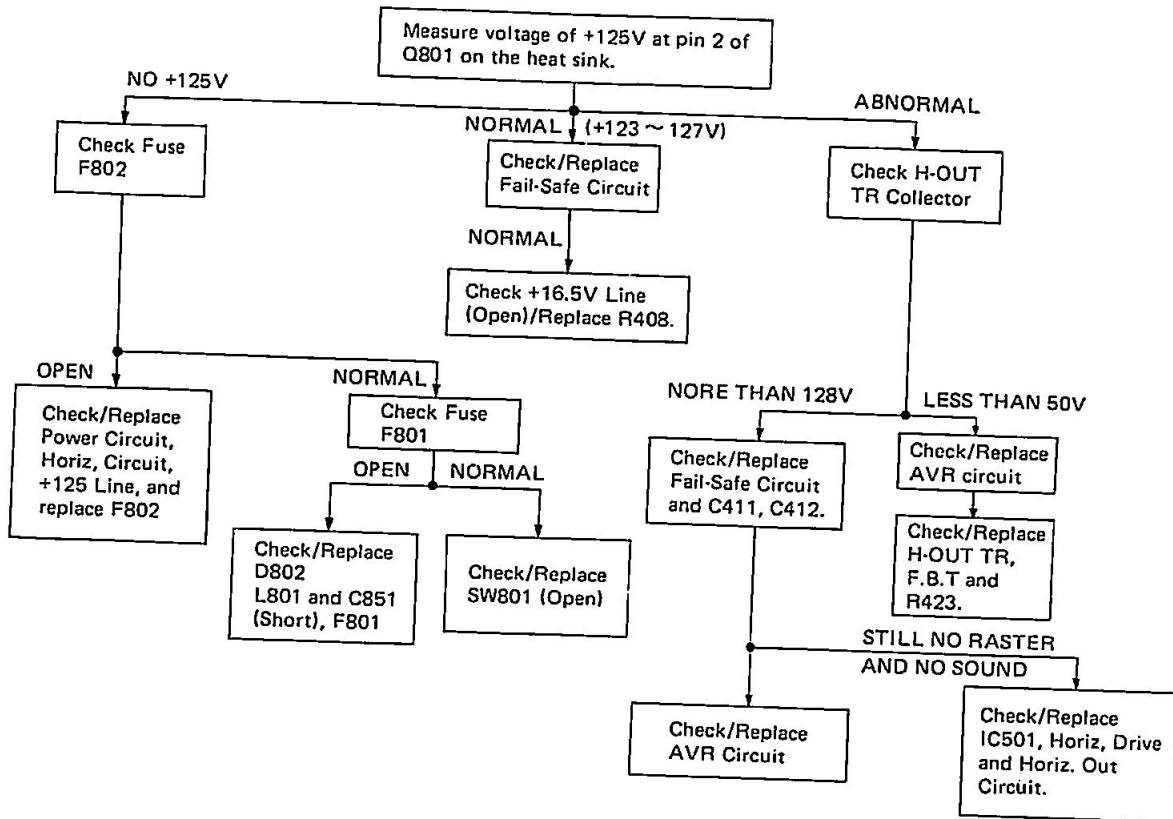


Figure 12. UHF TUNER VIEW

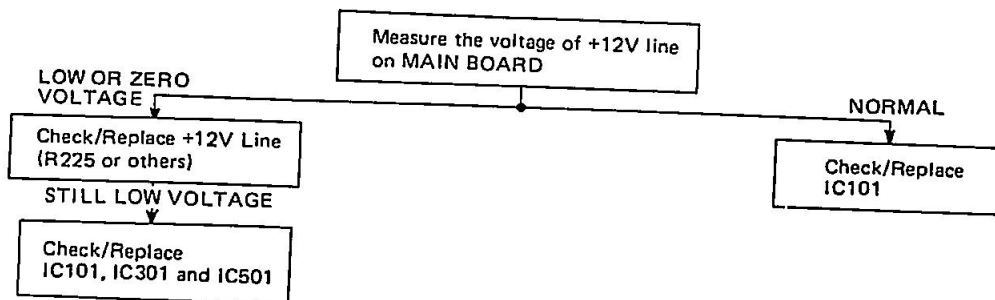
## TROUBLESHOOTING CHARTS

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

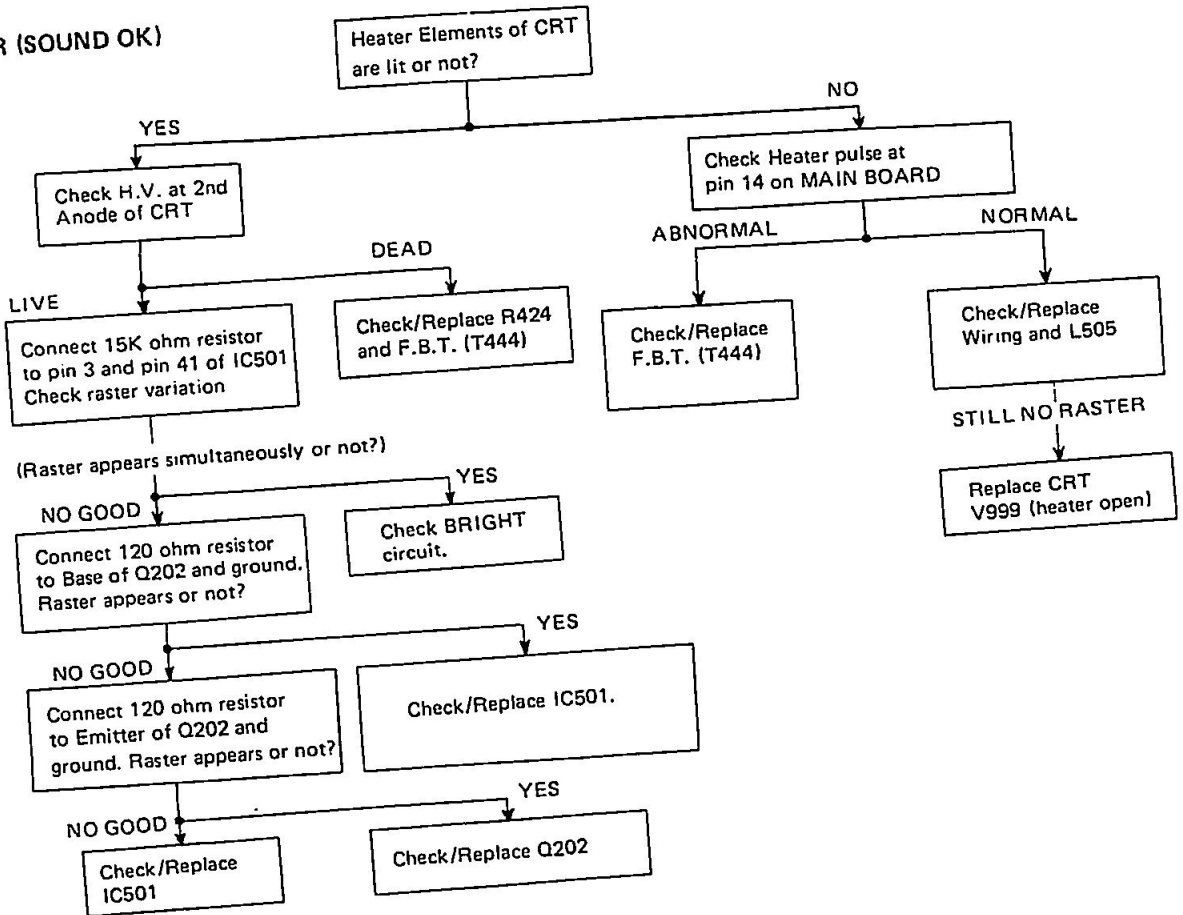
### NO RASTER AND NO SOUND



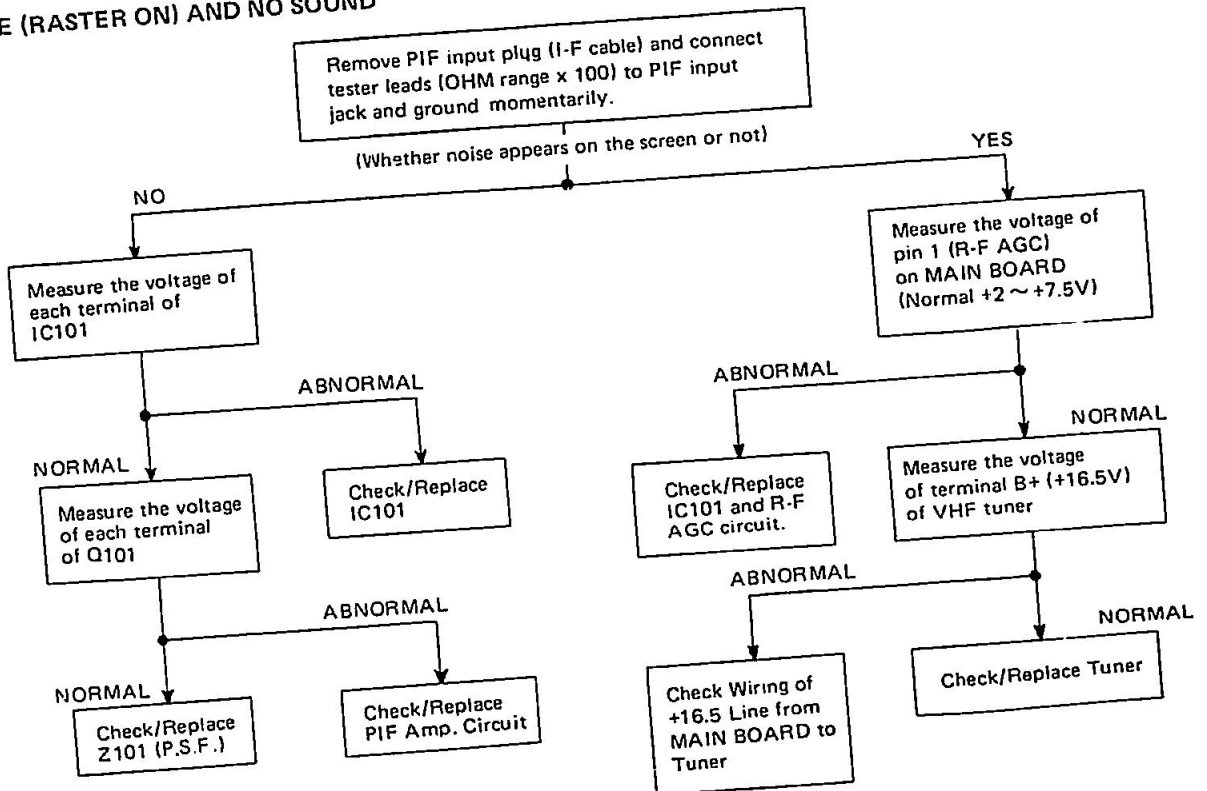
### NO RASTER (SOUND NOISE OR WEAK SOUND)



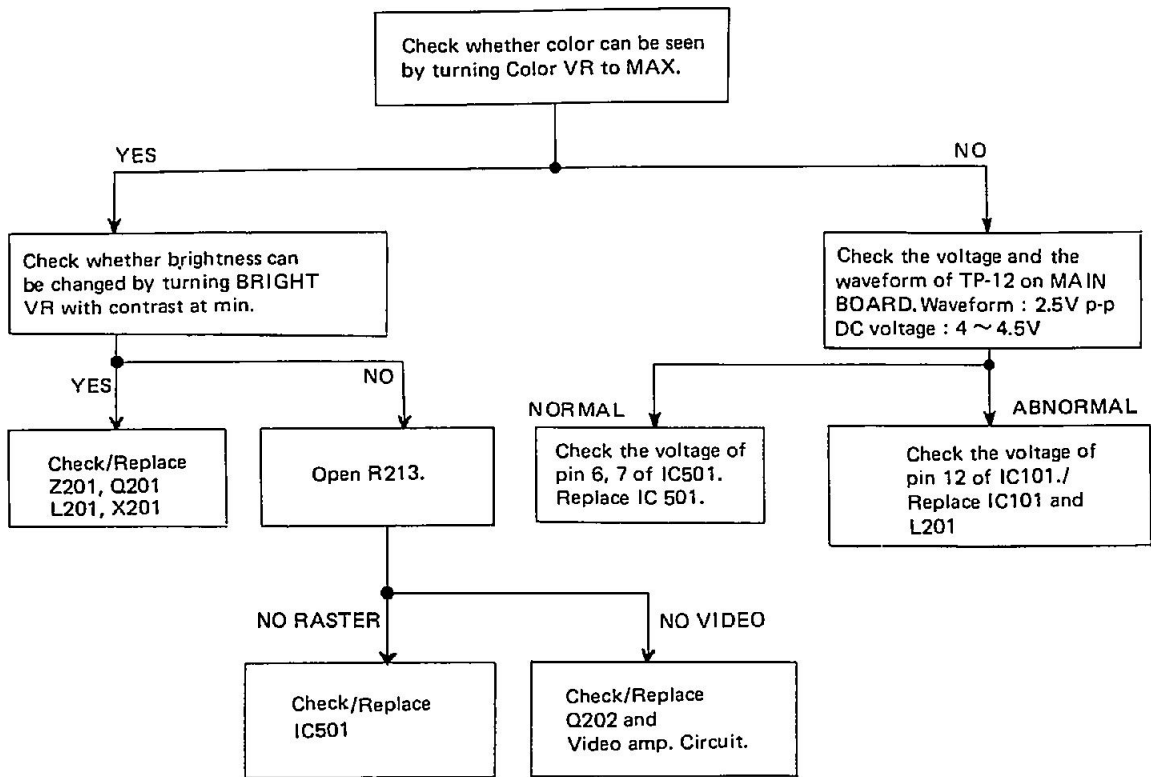
**NO RASTER (SOUND OK)**



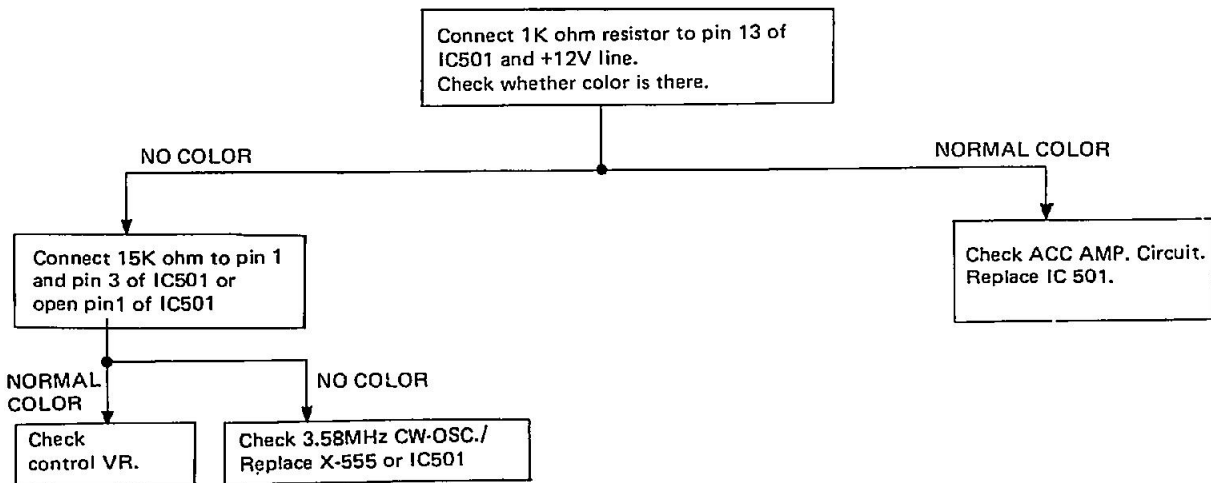
**NO PICTURE (RASTER ON) AND NO SOUND**



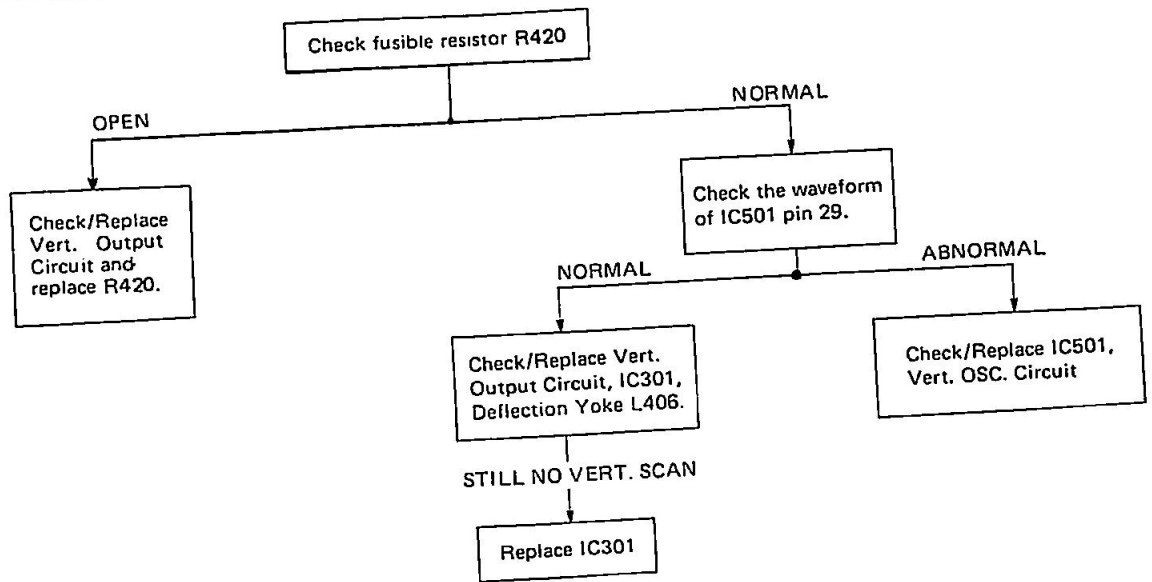
**NO PICTURE (RASTER AND SOUND OK)**



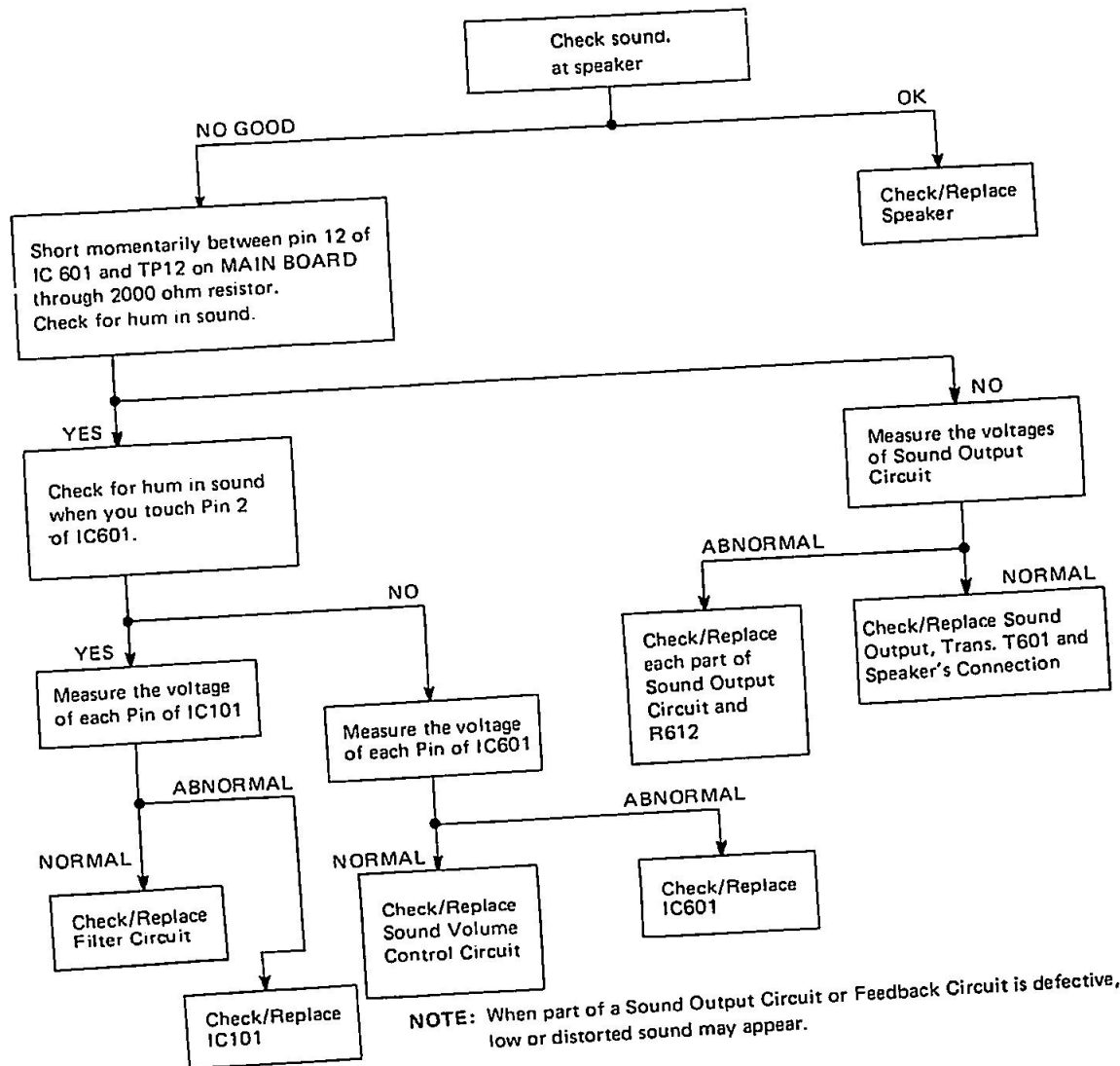
**NO COLOR**



**NO VERT. SCAN (ONE HORIZ. LINE RASTER)**

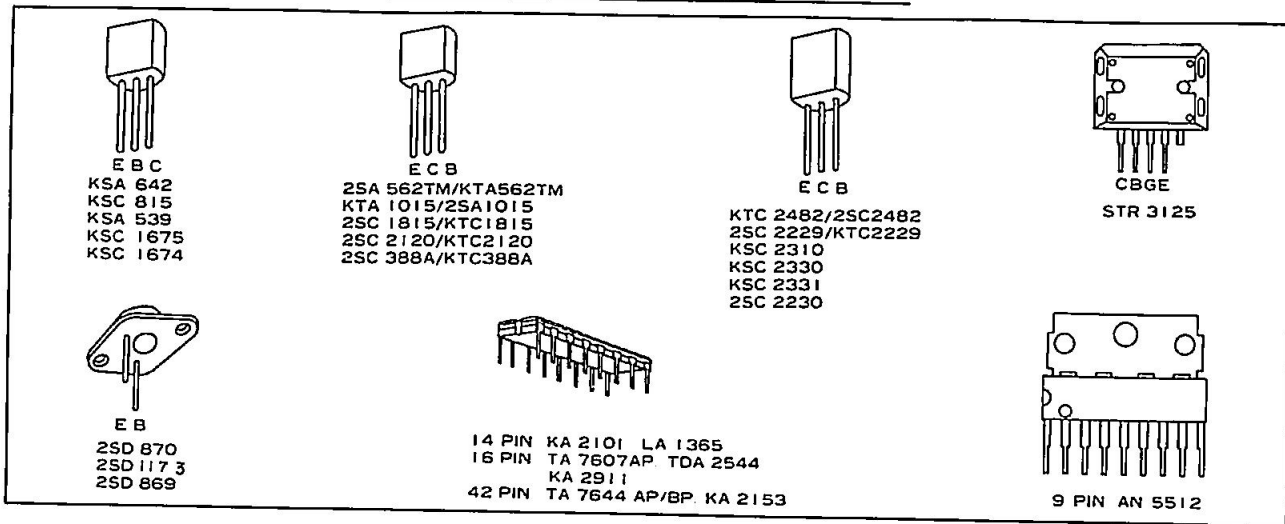


**NO SOUND**



NOTE: When part of a Sound Output Circuit or Feedback Circuit is defective, low or distorted sound may appear.

## SEMICONDUCTOR BASE DIAGRAMS



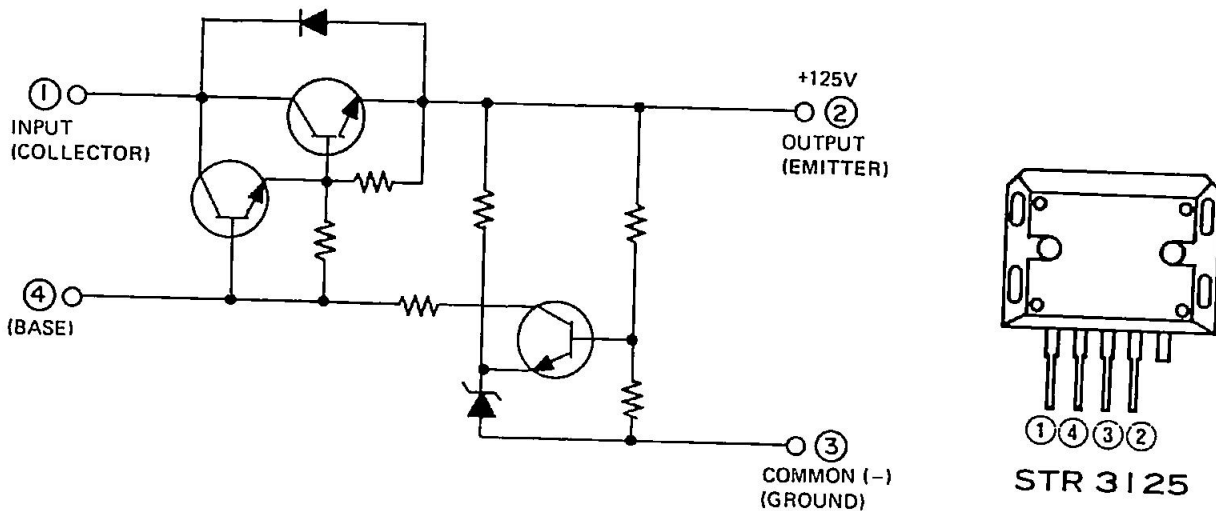
### STR3125 SPECIFICATION

#### 1. STRUCTURE & APPLICATION

- Hybrid type voltage regulator using a darlington transistor.
- Plastic Package
- For line operated TV.
- Output voltage constant.

#### 2. EQUIVALENT CIRCUIT

PIN NO.	FUNCTION
1	COLLECTOR
2	EMITTER
3	GROUND
4	BASE

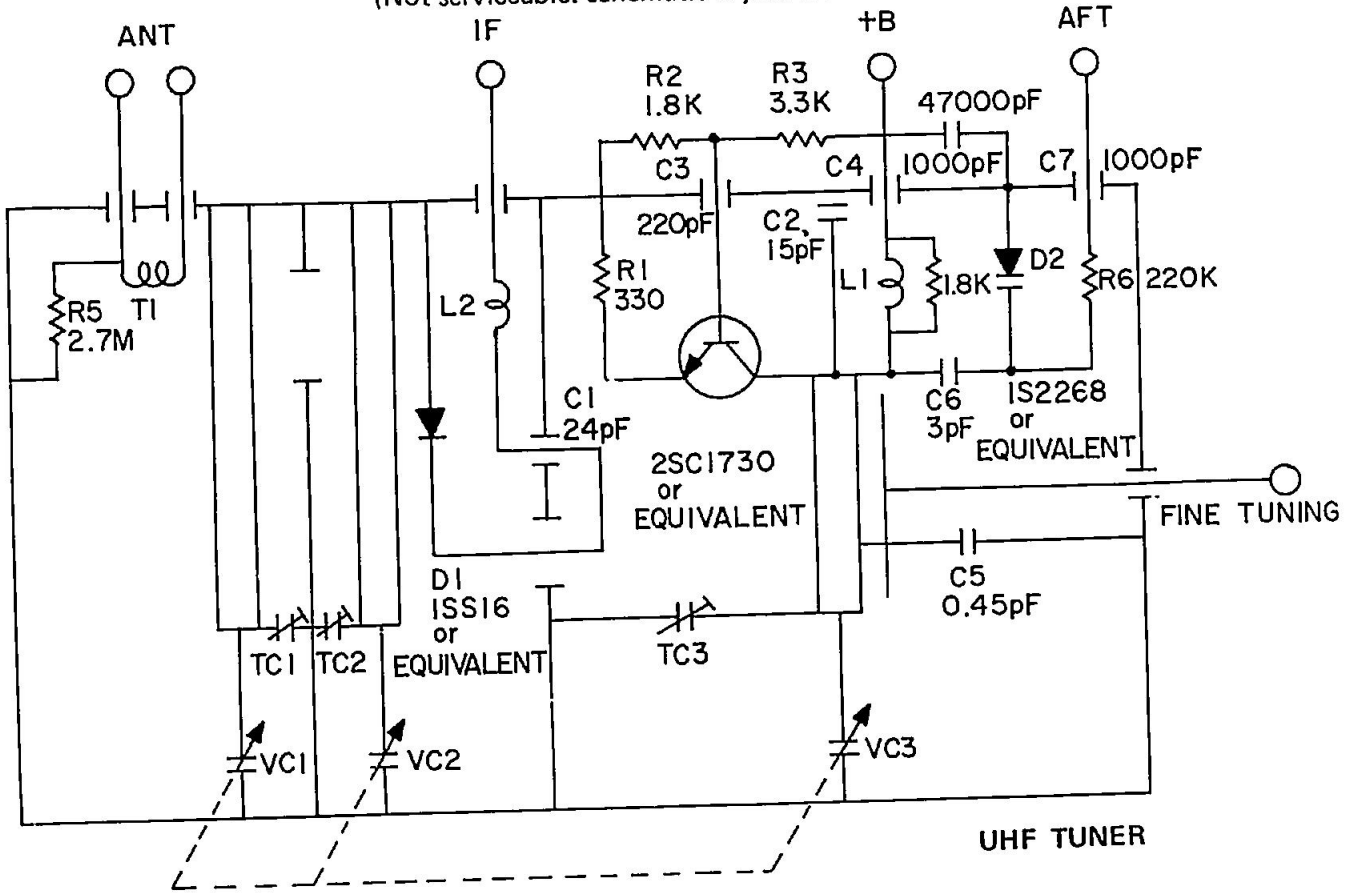


### X-RAY PRECAUTIONS FOR SERVICEMEN

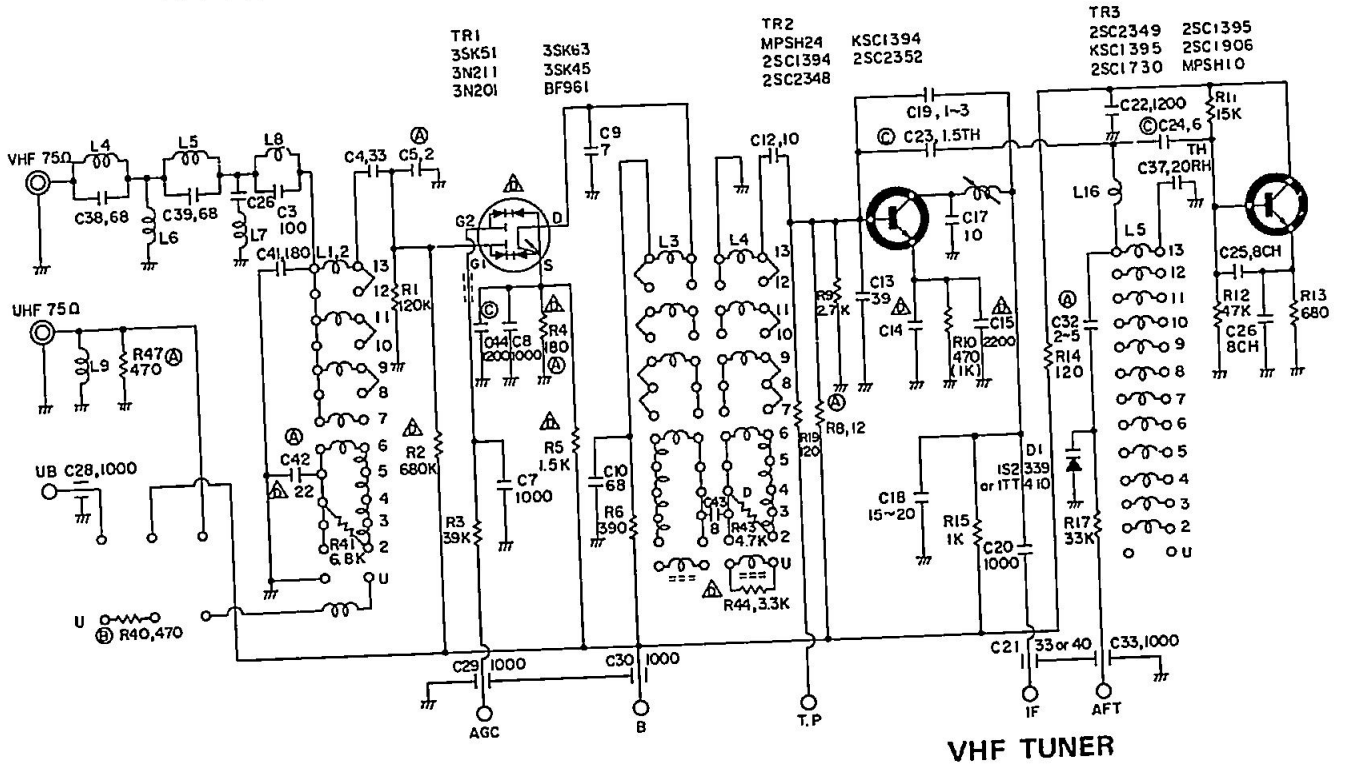
1. For replacement purposes, use only the types of picture tubes shown in the parts list.
2. For replacement purposes, parts which are influenced upon X-Ray Radiation in horizontal Deflection, High Voltage Circuits etc., use only types shown in the parts list.

# TUNER SCHEMATIC DIAGRAM

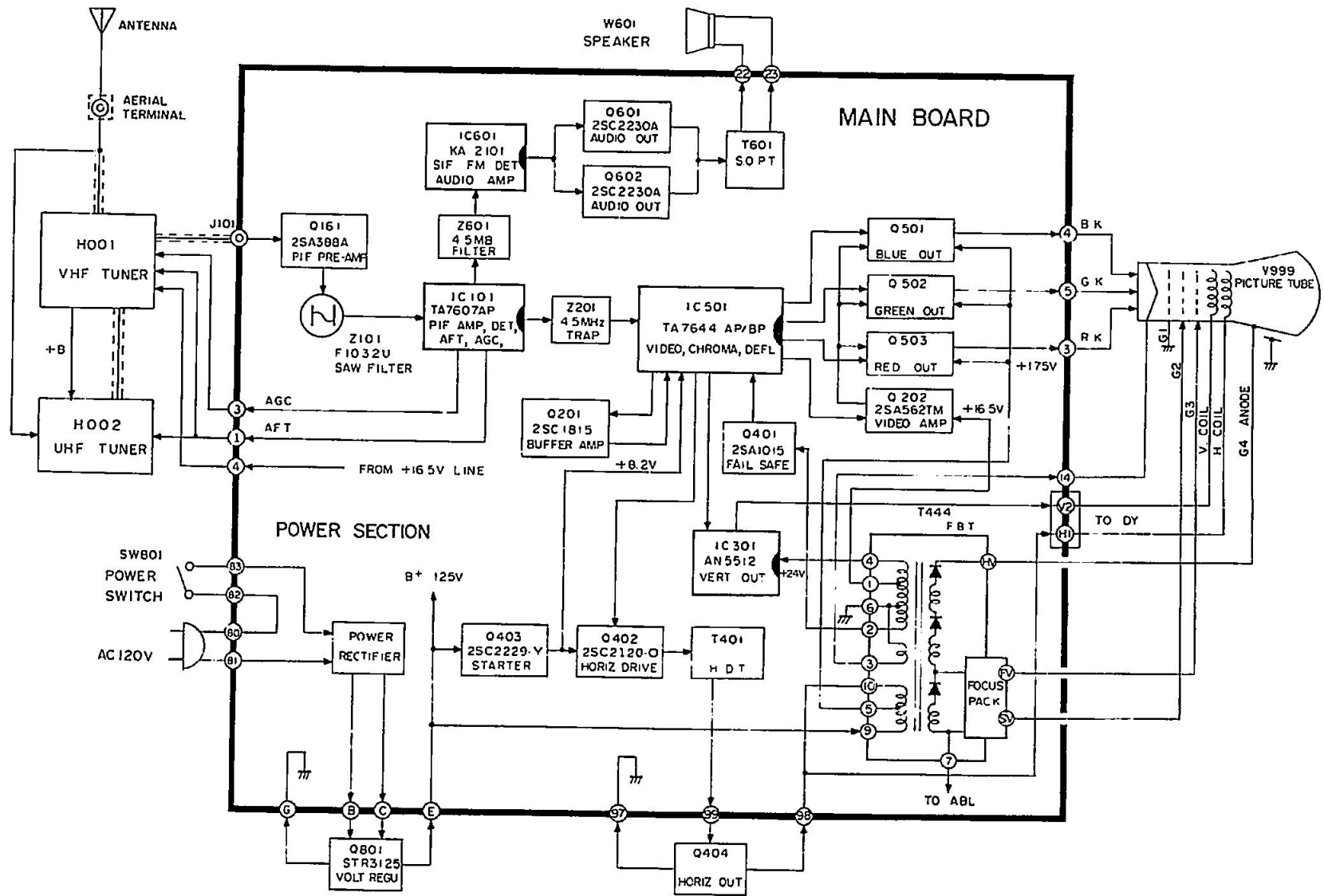
(Not serviceable. schematic is just for reference)



UHF TUNER



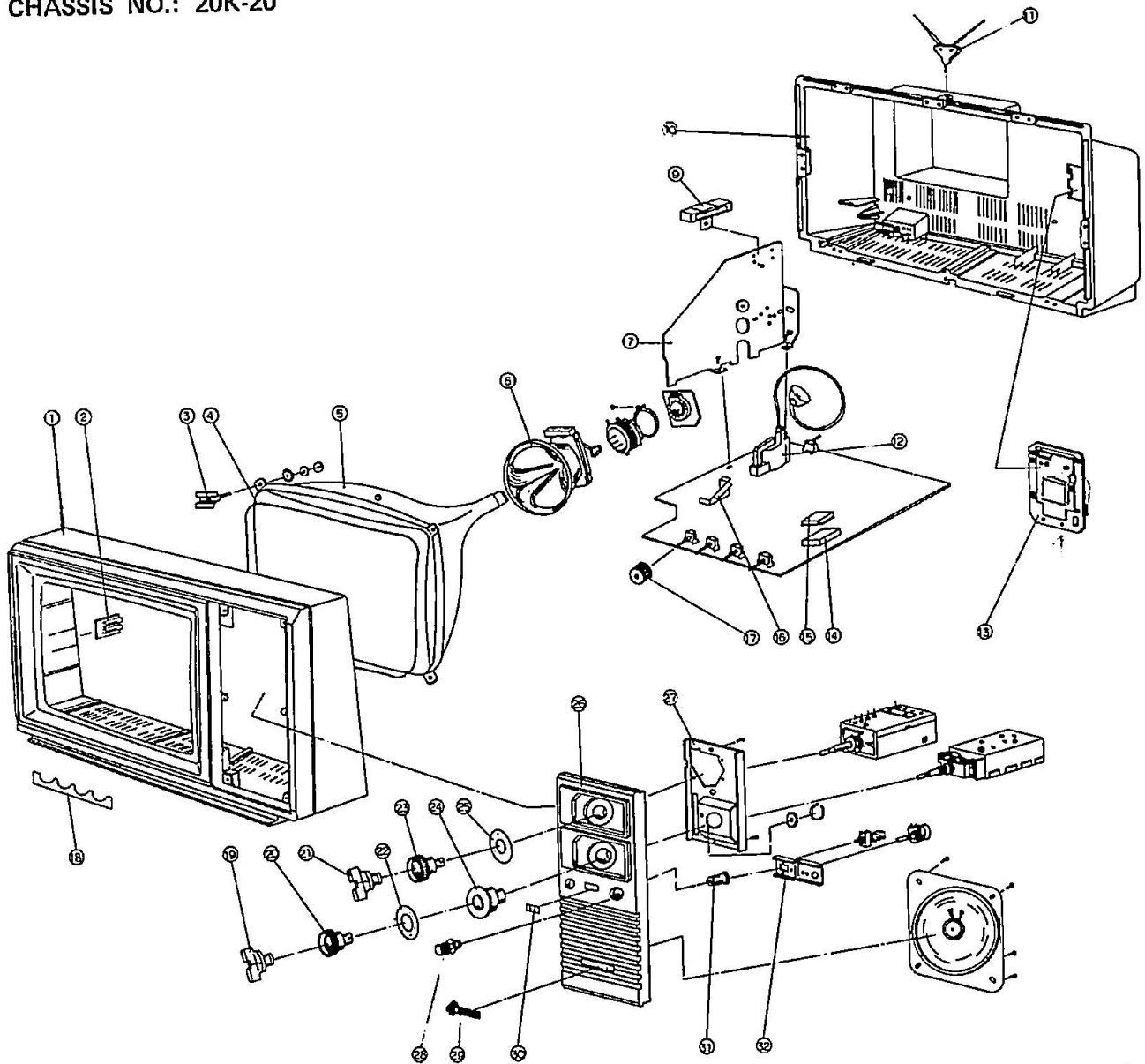
VHF TUNER



K-20 CHASSIS BLOCK DIAGRAM



**CABINET EXPLODED VIEW**  
**CHASSIS NO.: 20K-20**



Ref. No.	Supplier Part No.	Description	Ref. No.	Supplier Part No.	Description
1	6001-247-0103	CABINET, FRONT	18	7714-201-6109	INLAY, BOTTOM
2	6464-102-8205	BOSS, A	19	7624-128-3623	KNOB, VHF
3	6614-209-5104	BRACKET, CRT	20	7624-128-4309	KNOB, FINE
4	2479-028-5100	COIL, DEGAUSSING	21	7624-128-3720	KNOB, UHF
5	2019-250-8100	COLOR, CRT	22	8014-119-7304	DIAL, UHF
6	2439-090-0108	DEFLECTION YOKE	23	7624-128-4309	KNOB, FINE
7	5683-111-5109	HEAT SINK	24	7623-116-1300	DIAL BASE, UHF
9	6614-204-6104	BRACKET, R CEMENT	25	8014-122-9100	DIAL, VHF
10	6001-248-0106	CABINET, BACK	26	7701-104-1807	PANEL, CONTROL
11	4509-222-6105	ANTENNA, ROD	27	6613-144-9107	BRACKET, TUNER BASE
12	2859-129-0109	TRANS, FLYBACK	28	7624-145-2108	KNOB, POWER
13	3302-102-1103	TERMINAL BOARD, ANT.	29	8024-171-0102	BRAND, BADGE
14	4544-119-1115	SHIELD CASE	30	7714-214-8109	COLOR, PET
15	4544-119-2110	SHIELD CASE, TOP	31	7624-145-1112	KNOB, AFT
16	5684-110-9103	HEATSINK, VERTICAL	32	6614-208-0105	BRACKET, CONTROL
17	7624-137-3108	KNOB, BOTTOM			

## REPLACEMENT PARTS LIST

CHASSIS NO.: K-20

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

**CAUTION:** THE SHADED AREAS IN THE SCHEMATIC DIAGRAM AND THE PARTS LIST 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. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE PRODUCT SAFETY NOTICE. DO NOT DEGRADE THE SAFETY OF THE RECEIVER THROUGH IMPROPER SERVICING.

ABBREVIATIONS:	CC C-CERAMIC	RC R-COMPOSITION
	CE C-ELECTROLYTIC	RD R-CARBON
	CFS C-M, POLYESTER	RF R-FUSIBLE
	CK C-CERAMIC, HK	RM R-METAL, FILM
	CQ C-POLYPROPYLENE, POLYESTER	RP R-CEMENT WIRE
	CS C-TANTALIUM, SOLID	RS R-METAL, OXIDE

Loc. No.	Supplier Part No.	Parts Name & Description	Loc. No.	Supplier Part No.	Parts Name & Description
<b>ANT. TERMINAL, BOARD</b>			<b>CAPACITORS</b>		
C1	1409-101-2503	CC45 SL 50V 39-J	C413	1419-901-1806	CK45B 2KV 270-K
C2	1409-106-1804	CC45 RH 50V 18-J	<b>COILS</b>		
C3	1469-501-1106	CC45 SL AC125V, 39-M	L406	2439-090-0108	D.Y. DIE-1992GL
R1	1028-328-1856	RC ½P 1.8M-K	L407	4049-026-0104	FERRITE BEAD CORE
L	2429-834-0208	0.3µH-J COIL-SPRING	L802	2479-028-5100	DEGAUSSING COIL
CH	2429-834-0101	5.6µH-J	<b>SEMICONDUCTORS</b>		
	3054-100-0078	TWIN-LEAD FASTEN, 500MM	Q404	2139-401-1007	2SD 1426
C4	1499-005-1010	AL-34, 1000P (C-ANT, TERMINAL)	or	2149-040-0200	2SD870
	3053-400-2209	CONNECTOR-COAXIAL	or	2139-401-1308	2SD1398
	4542-100-6109	SHIELD CASE	Q801	2119-601-5005	HYBRID IC.STR3125
	4543-105-4101	SHIELD CASE, TOP	or	2119-601-2709	HYBRID IC.STR382
	3302-102-1103	TERMINAL-BOARD, ANT.	or	2119-601-5209	HYBRIC IC.EXT954-25C
	2759-115-0501	TRANS MATCHING, R300-R75	<b>RESISTOR</b>		
	3054-609-6362	IF-CABLE, 2P 400M	R808	1039-917-1706	RP 20B 210-J
<b>PARTS ON TUNER</b>			<b>SWITCHES</b>		
C153	1609-402-2208	CE04W 50V 2.2µF	SW501	3529-101-0085	T.J. NPB-PB21S
C155	1609-402-2208	CE04W 50V 2.2µF	or	3529-101-0067	SUB12 2C2P 18MM
C156	1609-401-6700	CE04W 25V 47µF	<b>PICTURE TUBE</b>		
CN01	3059-005-0273	LEAD CONNECTOR ASS'Y	V999	2019-250-8100	510UXB22
H001	4519-118-0302	TUNER VHF. 115-C-006A	<b>VARIABLE RESISTORS</b>		
H002	4519-905-3105	TUNER UHF. UCD-1400EL	VR201	1201-106-0038	B500 (BRIGHT)
	3054-609-5206	IF-CABLE, 1P 650MM	or	1202-105-0014	B500 (BRIGHT)
	3054-609-6308	IF-CABLE, 2P 150MM	VR202	1201-106-0047	B10K (CONTRAST)
			or	1202-105-0032	B10K (CONTRAST)
<b>CHASSIS MISCELLANEOUS</b>					

Loc.	Supplier	Part No.	Parts Name & Description
VR501		1201-106-0047	B10K (COLOR)
or		1202-105-0032	B10K (COLOR)
VR507		1201-106-0047	B10K (TINT)
or		1202-105-0032	B10K (TINT)
VR601		1252-101-1021	BC25F 4Z50K
or		1256-101-0307	EVV-355F 2554L
W601		4209-122-1102	SPEAKER 8 OHMS 1007BR
		3053-805-2103	POWER CORD AC
		4099-023-0100	CONVERGENCE MAGNET
or		4099-007-0100	CONVERGENCE MAGNET
<b>MISCELLANEOUS</b>			
C352		1629-201-5804	CS35V 0.22μF-M
C353		1609-401-5103	CE04W 16V 1000μF
C354		1629-201-3406	CS35V 2.2μF-K
C355		1609-402-5106	CE04W 50V 36μF
C356		1629-201-3503	CS35V 1μF-K
C357		1609-402-1009	CE04W 35V 100μF
C358		1609-402-2101	CE04W 50V 1μF
C359		1609-402-2004	CE04W 50V 0.47μF
C360		1609-402-2101	CE04W 50V 1μF
C401		1409-106-7600	CC45 RH 50V 150PF-J
C402		1519-101-0501	DSR 50V 0.0022μF-J
C403		1509-121-1309	CC921M 100V 0.0082μF-J
C404		1509-121-1105	CC921M 100V 0.0056μF-J
C406		1419-104-2701	CK45B 50V 680PF-K
C411		1509-391-1100	CC922M 1.6KV 0.0047μF-J
C412		1509-391-0202	CC922M 1.6KV 3300PF-J
C414		1509-335-1300	CC922M 200V 0.36μF-J
C415		1519-003-0207	CFS922M 400V 0.1μF-K
C418		1509-121-1406	CC921M 100V 0.01μF-J
C420		1419-106-0901	CK45B 500V 470PF-K
C421		1419-106-0901	CK45B 500V 470PF-K
C422		1419-106-0901	CK45B 500V 470PF-K
C451		1609-402-2101	CE04W 50V 1μF
C452		1609-402-2004	CE04W 50V 0.47μF
C453		1609-401-4506	CE04W 16V 33μF
C454		1609-401-4603	CE04W 16V 47μF
C455		1609-403-5808	CE04W 315V 2.2μF
C456		1609-402-1300	CE04W 35V 470μF
C457		1609-401-7103	CE04W 25V 470μF
C458		1619-018-1502	CE04W 160V 33μF
C459		1619-018-1706	CE04W 250V 22μF
C498		1419-104-0507	CK45B 50V 100PF-K
C501		1409-106-2304	CC45 RH 50V 30PF-J
C502		1409-101-1401	CC45 SL 50V 12PF-J
C503		1419-104-4002	CK45B 50V 1000PF-K
C504		1509-121-5406	CC921M 100V 0.039μF-K
C505		1419-109-1400	CK45F 50V 0.01μF-Z
C506		1409-101-1401	CC45 SL 50V 12PF-J
C507		1409-101-2406	CC45 SL 50V 33PF-J
C508		1829-105-6109	TZ03P 450E TRIMMER
C509		1409-106-1503	CC45 RH 50V 15PF-J
C510		1409-105-3209	CC45 CH 50V 82PF-J
C511		1419-104-3308	CK45B 50V 330PF-K
C512		1419-104-3308	CK45B 50V 330PF-K
C513		1419-104-3308	CK45B 50V 330PF-K
C514		1419-104-2507	CK45B 50V 470PF-K
C515		1419-104-0701	CK45B 50V 270PF-K
C516		1419-104-2507	CK45B 50V 470PF-K
C517		1419-109-1400	CK45F 50V 0.01μF-Z
C518		1419-109-1400	CK45F 50V 0.01μF-Z
C519		1419-109-1400	CK45F 50V 0.01μF-Z
C519		1419-109-1002	CK45F 50V 1000PF-Z
C120		1419-109-1002	CK45F 50V 1000PF-Z
C151		1609-902-2504	CE04W 50V 0.22μF
C152		1409-105-1209	CC45CH 50V 120PF-J
C225		1609-402-2402	CE04W 50V 4.7μF
C251		1609-401-4302	CE04W 25V 10μF
C252		1609-401-5006	CE04W 16V 470μF
C253		1609-402-2101	CE04W 50V 10μF
C254		1609-402-2509	CE04W 50V 10μF
C301		1509-121-2207	CC921M 100V 0.047μF-J
C302		1509-121-0304	CC921M 100V 0.0015μF-J
C303		1419-106-1906	CK45B 500V 3300PF-K
C304		1509-121-1503	CC921M 100V 0.015μF-J
C305		1419-104-5609	CK45B 50V 560PF-K
C306		1509-121-1406	CC921M 100V 0.01μF-J
C307		1419-104-2808	CK45B 50V 3900PF-K
C308		1509-121-5707	CC921M 100V 0.068PF-K
C309		1509-121-2207	CC921M 100V 0.047μF-J
C310		1419-104-5609	CK45B 50V 560PF-K
C311		1509-121-2207	CC921M 100V 0.047μF-J
C351		1609-402-2004	CE04W 50V 0.47μF

Loc. No.	Supplier Part No.	Parts Name & Description	Loc. No.	Supplier Part No.	Parts Name & Description
C551	1609-402-2004	CE04W 50V 0.47 $\mu$ F	D503	2169-406-4808	IN4148
C552	1609-402-2004	CE04W 50V 0.47 $\mu$ F	D504		
C601	1409-105-2602	CC45 CH 50V 47PF-J	D601		
C602	1409-105-2602	CC45 CH 50V 47PF-J	D301	2169-301-6309	RH-1
C603	1419-109-1400	CK45F 50V 0.01 $\mu$ F-Z	or	2169-202-2206	1S1887
C604	1419-109-1400	CK45F 50V 0.01 $\mu$ F-Z	or	2169-208-5704	ERB29-04
C605	1509-121-1406	CQ921M 100V 0.01 $\mu$ F-J	D402	2169-403-5600	RD 6.2E2 (ZENER)
C606	1509-121-2207	CQ921M 100V 0.047 $\mu$ F-J	or	2169-408-0804	EQA-02-06D (ZENER)
C607	1419-104-4002	CK45B 50V 1000PF-K	D403	2169-206-1106	S5295G
C651	1609-401-4700	CE04W 16V 100 $\mu$ F	D404		
C653	1609-402-2208	CE04W 50V 2.2 $\mu$ F	D407		
C654	1609-402-2101	CE04W 50V 1 $\mu$ F	D408		
C655	1609-403-2104	CE04W 160V 10 $\mu$ F	or	2169-218-1307	RU-1
C656	1609-403-4609	CE04 250V 2.2 $\mu$ F	or	2169-208-5102	ERB43-04
C802	1469-102-0108	AC125V 0.0022 $\mu$ F-P	D405	2169-201-0708	1N4003
C805	1569-204-1101	CFS922M 125V 0.22 $\mu$ F-M LF	D602	2169-408-0503	EQA02-05AB (ZENER)
C851	1619-007-0406	CE04W 200V 470 $\mu$ F	D802	2169-207-1109	1R 5GZ 61
C852	1609-403-3507	CE04W 180V 33 $\mu$ F	or	2169-208-5306	ERC04-04F
			or	2169-202-2206	1S1887
<b>COILS</b>			<b>INTERGRATED CIRCUITS</b>		
L101	2429-020-0106	0.5 $\mu$ H-K	IC101	2119-101-9408	TA7607AP
L102	2739-138-0104	0.6 $\mu$ H-K (TRF-1019)	or	2119-101-2607	TDA2544
L103	2739-138-0201	TRF1225	or	2109-103-2200	KA2911
L104	2719-048-0106	TRF-1222 (45.75MHz)	IC301	2119-102-5702	AN5512
L105	2429-014-0301	2.4 $\mu$ H-K	IC501	2119-101-9709	TA7644BP
L171	2719-050-0103	AFT-BAL. (45.75MHz)	IC601	2109-103-2006	KA2101
L201	2429-822-0104	15 $\mu$ H-J	or	2119-101-0500	LA1365
L202	2429-815-0102	22 $\mu$ H-K	<b>MISCELLANEOUS</b>		
L401	2449-712-0104	K-10/171 $\mu$ H	CN01	3344-108-1600	PLUG (IF)
L402	2429-034-0109	AZ9004S	CN04	3343-102-5304	WAFER 3P (TINT)
L403	2429-014-0709	100 $\mu$ H-K	CN05	3343-102-5508	WAFER 5P (AFT/VOLUME)
L404	2429-805-1106	1 $\mu$ H-K	J101	3343-101-3107	JACK 1P
L501	2429-805-8183	30 $\mu$ H-K	SW201	3549-007-0109	EVO-ROB L22 (SWITCH LEVER)
L502	2429-823-0107	330 $\mu$ H-K	V999A	3359-009-0201	CRT SOCKET
L505	2499-006-0107	20 $\mu$ H-K (HEATER)	or	3354-103-2100	CRT SOCKET
L514	2429-014-0806	10 $\mu$ H-K	Z101	4529-426-0105	F1032-U.SAW FILTER
L515	2429-014-0806	10 $\mu$ H-K	or	4529-428-3106	TSF1202C.SAW FILTER
L516	2429-014-0806	10 $\mu$ H-K	Z201	4529-421-0100	TPS4.5MC.CERAMIC FILTER
L601	2429-816-0105	24 $\mu$ H-K	Z601	4529-310-0107	SFE4.5MB.CERAMIC FILTER
L602	2429-805-4606	13 $\mu$ H-K	Z602	4529-310-0204	CDA4.5MD3.CERAMIC FILTER
L801	2429-622-0106	LINE FILTER	X201	2469-010-9100	162401T.DELAY LINE
<b>DIODES</b>			X555	4539-013-0104	QUARTZ-CRYSTAL(3.579545MHz)
D201	2169-406-4808	IN4148	or	4539-004-0106	QUARTZ-CRYSTAL(3.579545MHz)
D202					
D203					
D204					
D205					
D206					
D401					
D501					
D502					
					F801
			F802	4709-004-0301	DC250V 1.2A FUSE
			<b>RESISTORS</b>		
			R101	1018-227-1017	RD 1/4P 100-J
			R102	1018-227-1521	RD 1/4P 1.5K-J

Loc. No.	Supplier Part No.	Parts Name & Description
R103	1018-227-5628	RD %P 5.6K-J
R104	1018-227-3309	RD %P 3.3-J
R105	1018-227-3910	RD %P 330-J
R106	1018-227-3318	RD %P 330-J
R107	1018-227-4313	RD %P 430-J
R108	1018-227-2216	RD %P 220-J
R109	1018-227-5628	RD %P 4.7K-J
R110	1018-227-5628	RD %P 5.6K-J
R111	1018-227-3929	RD %P 3.9K-J
R112	1049-101-2608	RS 1P 68-J
R113	1018-227-8243	RD %P 820K-J
R114	1018-227-9132	RD %P 91K-J
R115	1018-327-2206	RD %P 22-J
R116	1018-227-1026	RD %P 1K-J
R201	1018-227-2429	RD %P 2.4K-J
R202	1018-227-3318	RD %P 330-J
R203	1018-227-3929	RD %P 3.9K-J
R204	1018-227-1628	RD %P 1.6K-J
R205	1018-227-1628	RD %P 1.6K-J
R206	1018-227-1831	RD %P 18K-J
R207	1018-326-1244	RD %P 120K-G
R208	1049-311-8005	RD %P 110K-F
R209	1018-227-2021	RD %P 2K-J
R210	1018-227-3910	RD %P 390-J
R211	1018-227-3637	RD %P 36K-J
R212	1018-227-5628	RD %P 5.6K-J
R213	1018-227-1035	RD %P 10K-J
R214	1018-227-1026	RD %P 1K-J
R215	1018-227-4711	RD %P 470-J
R216	1018-227-2720	RD %P 2.7K-J
R217	1018-227-3929	RD %P 3.9K-J
R219	1018-227-4720	RD %P 4.7K-J
R221	1018-327-4711	RD %P 470-J
R223	1018-227-1239	RD %P 12K-J
R224	1018-227-1026	RD %P 1K-J
R225	1049-103-5104	RS 2P 47-J
R301	1018-227-6845	RD %P 680K-J
R302	1018-227-2225	RD %P 2.2K-J
R303	1018-227-5628	RD %P 5.6K-J
R304	1018-227-1035	RD %P 10K-J
R305	1018-227-2243	RD %P 220K-J
R306	1018-227-6827	RD %P 6.8K-J
R307	1018-226-1731	RD %P 17K-G
R308	1018-227-8225	RD %P 8.2K-J
R309	1049-311-2607	RS %P 27K-J
R310	1018-327-2792	RD %P 2.7-J
R311	1018-227-1026	RD %P 1K-J
R312	1018-227-1239	RD %P 12K-J
R313	1018-227-2438	RD %P 24K-J
R314	1018-227-1831	RD %P 18K-J
R315	1049-101-5117	RS 1P 510-J
R316	1049-311-2500	RS %P 1K-J
R317	1018-227-3318	RD %P 330-J
R318	1018-227-3336	RD %P 33K-J
R319	1018-227-3956	RD %P 3.9M-J
R320	1018-227-1220	RD %P 1.2K-J
R322	1018-227-8216	RD %P 820-J
R323	1018-227-8243	RD %P 820K-J
R324	1018-227-1026	RD %P 1K-J
R400	1018-327-1016	RD %P 100-J
R401	1049-974-1902	RM %P 3.3K-G
R402	1018-227-3929	RD %P 3.9K-J
R403	1018-227-5637	RD %P 56K-J
R404	1018-227-2720	RD %P 2.7K-J
R405	1018-327-1830	RD %P 18K-J
R406	1018-327-2729	RD %P 2.7K-J
R407	1018-327-3919	RD %P 390-J
R408	1059-002-0102	RF %P 1-J
R409	1018-227-2216	RD %P 220-J
R411	1018-327-6808	RD %P 68-J
R413	1049-101-3506	RS 1P 1K-J
R414	1018-227-2711	RD %P 270-J
R416	1018-227-1044	RD %P 100K-J
R417	1049-307-0400	RS %P 6.8K-F
R418	1018-326-1244	RD %P 120K-G
R419	1018-227-4748	RD %P 470K-J
R420	1059-002-0102	RF %P 1-J
R423	1059-002-0102	RF %P 1-J
R424	1018-327-1025	RD %P 1K-J
R425	1049-974-2004	RM %P 15K-G
R427	1049-313-2001	RS 1P 390-J
R428	1059-002-0528	RF %P 1K-J
R429	1049-311-4403	RS %P 39K-J
R430	1018-227-4720	RD %P 4.7K-J
R431	1018-227-3336	RD %P 33K-J
R501	1018-227-3318	RD %P 330-J
R502	1018-227-2243	RD %P 220K-J
R503	1018-227-3929	RD %P 3.9K-J
R504	1018-227-1026	RD %P 1K-J
R505	1018-227-4711	RD %P 470-J
R506	1018-227-6818	RD %P 680-J
R507	1018-227-2225	RD %P 2.2K-J
R508	1018-227-3318	RD %P 330-J
R509	1018-227-2225	RD %P 2.2K-J
R510	1018-227-3318	RD %P 330-J
R511	1018-227-2225	RD %P 2.2K-J
R512	1018-227-3318	RD %P 330-J
R514	1049-101-4097	RS 1P 15K-J
R515	1049-101-4097	RS 1P 15K-J
R516	1049-101-4097	RS 1P 15K-J
R517	1018-227-8207	RD %P 82-J
R518	1018-227-1211	RD %P 120-J
R519	1018-227-5637	RD %P 56K-J

Parts Name & Description

Supplier Part No.

Loc. No.

Parts Name & Description

Supplier Part No.

Loc. No.





RTS SHOWN IN  
SAFETY.REPLACE  
RTS,REFER TO

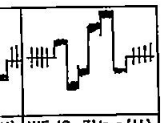
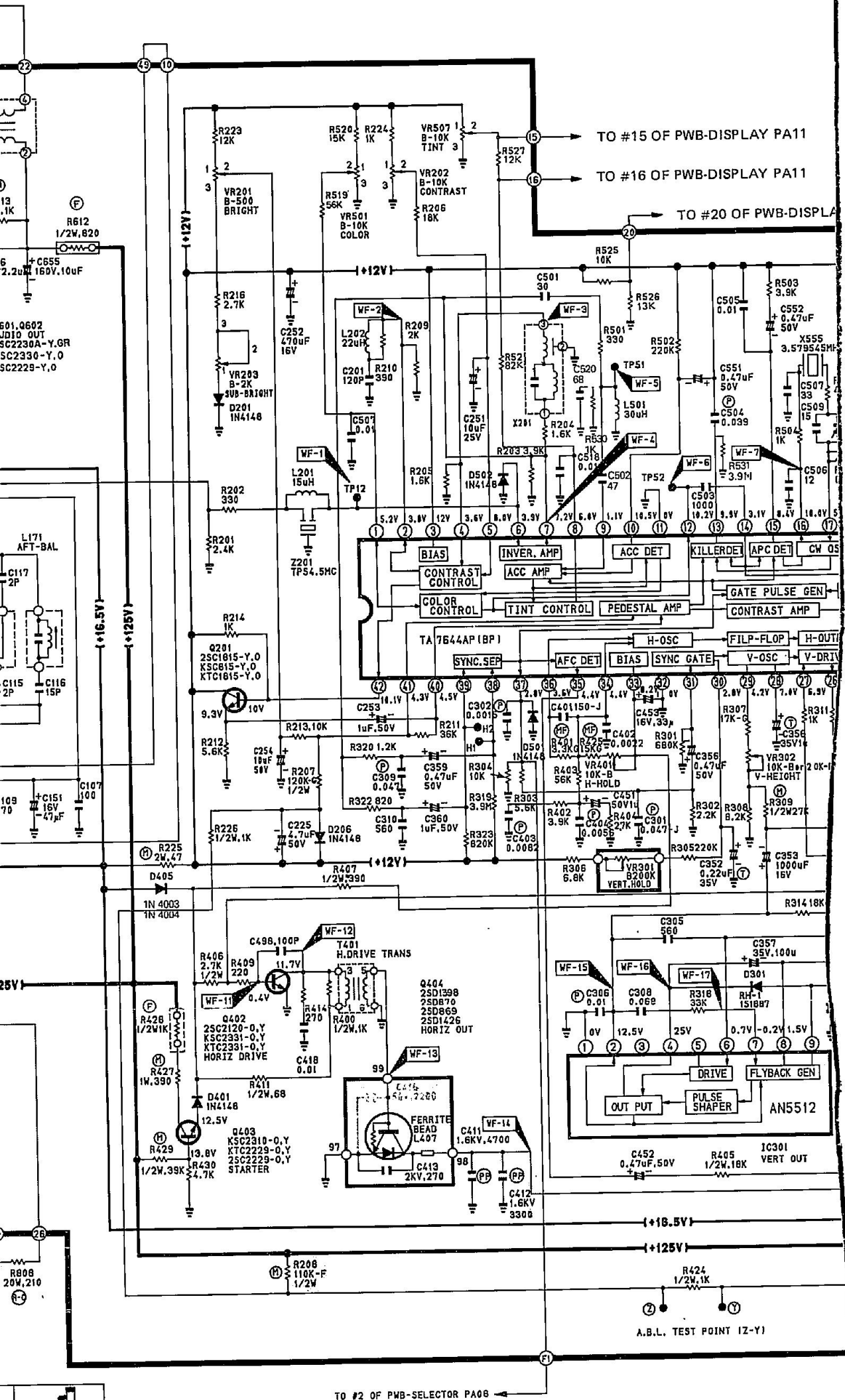
UR LA SECURITE.  
QUES POUR LA  
LES COMPOSANTS  
RECOMMANDEES  
ES PIECES DE

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

**CAUTION :** The shaded area in the schematic diagram and parts list 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. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE in this manual. Do not degrade the safety of the receiver through important servicing.

**NOTE**

- 1 Resistance is shown in ohm K=1,000 M=1,000,000
- 2 Unless otherwise noted in schematic, all capacitor and the values more than 1 in pF.
- 3 Unless otherwise noted in schematic all inductor
- 4 Voltages read with "V.T.V.M"(input impedance: 20K) to chassis ground using color bar signal with all controls in normal position.
- 5 Waveforms in chrominance circuit are taken using an air signal.
- 6 Waveforms in other circuits are taken using an air signal.
- 7 Voltage reading shown are normal values and may vary.



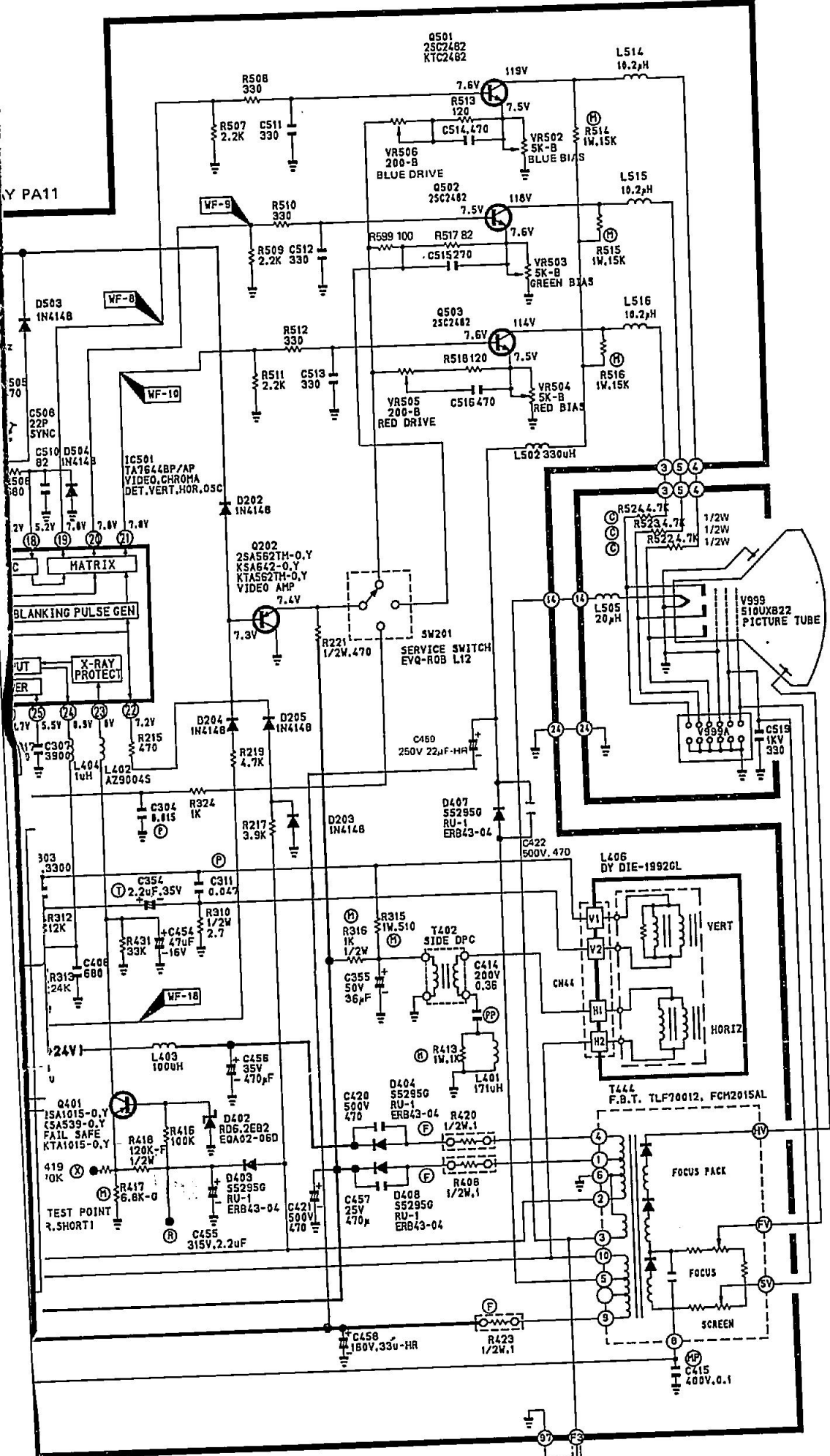
WF-10	WF-11	WF-12	WF-13	WF-14	WF-15	WF-16	WF-17	WF-18	WF-19	WF-20
2.1Vp-p (H)	4.2Vp-p (H)	4.6Vp-p (H)	7Vp-p (H)	2.2Vp-p (H)	2.9Vp-p (H)	1.5Vp-p (H)	0.4Vp-p (H)	0.8Vp-p (H)	0.6Vp-p (H)	0.6Vp-p (H)
IC501#34	IC501#35	IC501#36	IC501#37	IC501#38	IC501#39	IC501#40	IC501#41	IC501#42	WF-21	WF-22



B This fundamental circuit diagram some production change may be made without revision of the diagram.

9 FUSIBLE RESISTORS (PP) C-POLYPROPYLENE  
 ELECTROLYTIC CAPACITORS (P) C-POLYESTER  
 COMPOSITION RESISTORS POSISTOR  
 TANTALUM CAPACITORS  
 METAL OXIDE RESISTORS  
(MP) C-METAL POLYESTER

100 values less than 1 are expressed in  $\mu F$   
 values more than 1 are expressed in  $\mu H$ .  
 Meg ohm/all range from point indicated  
 initials at normal line voltage 120 volts.  
 eq a color bar signal with enough sensitivity,  
 gnal under normal receiving conditions,  
 vary  $\pm 20\%$  except H.V.

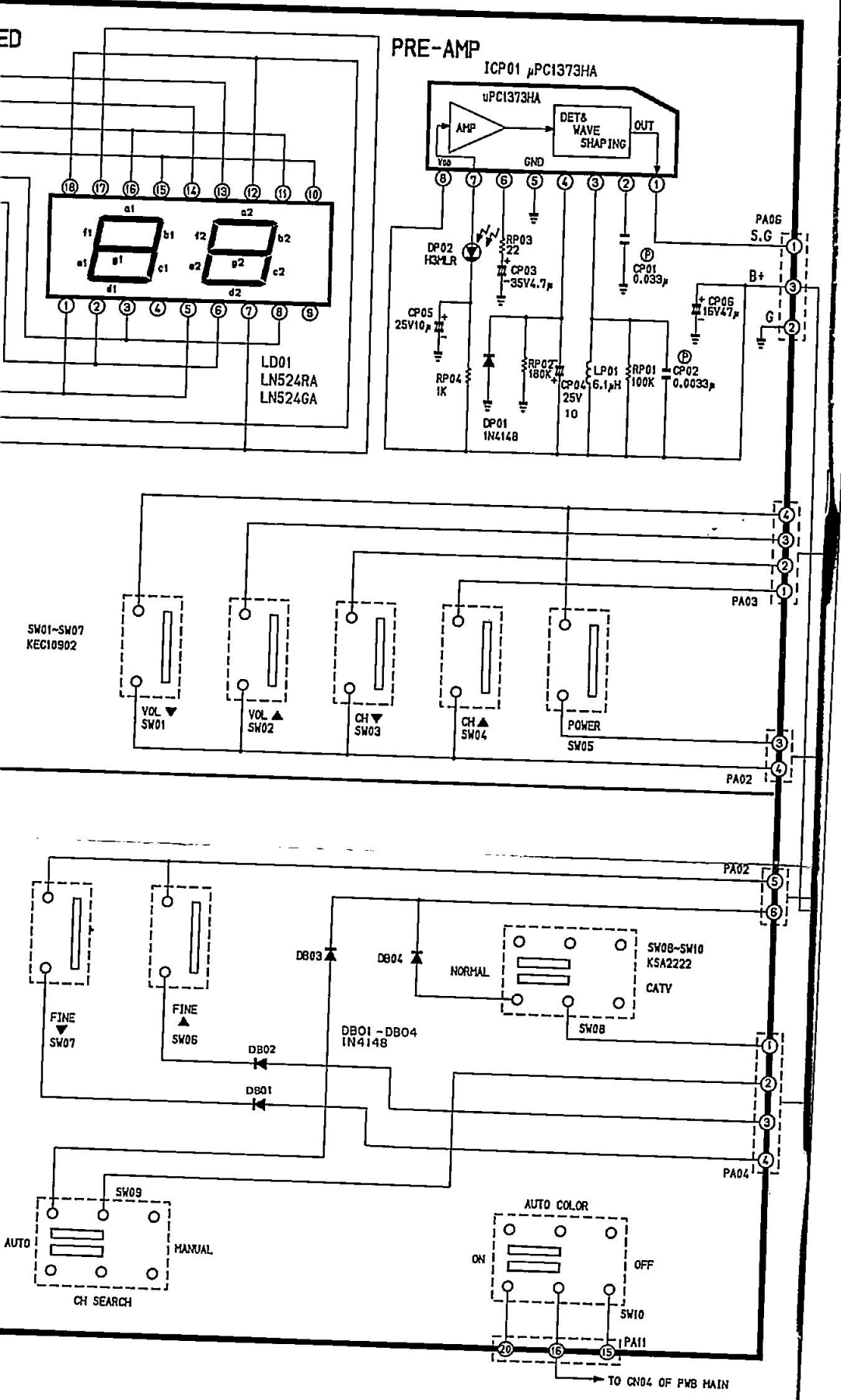


TO #4 OF PWB-SELECTOR PADD

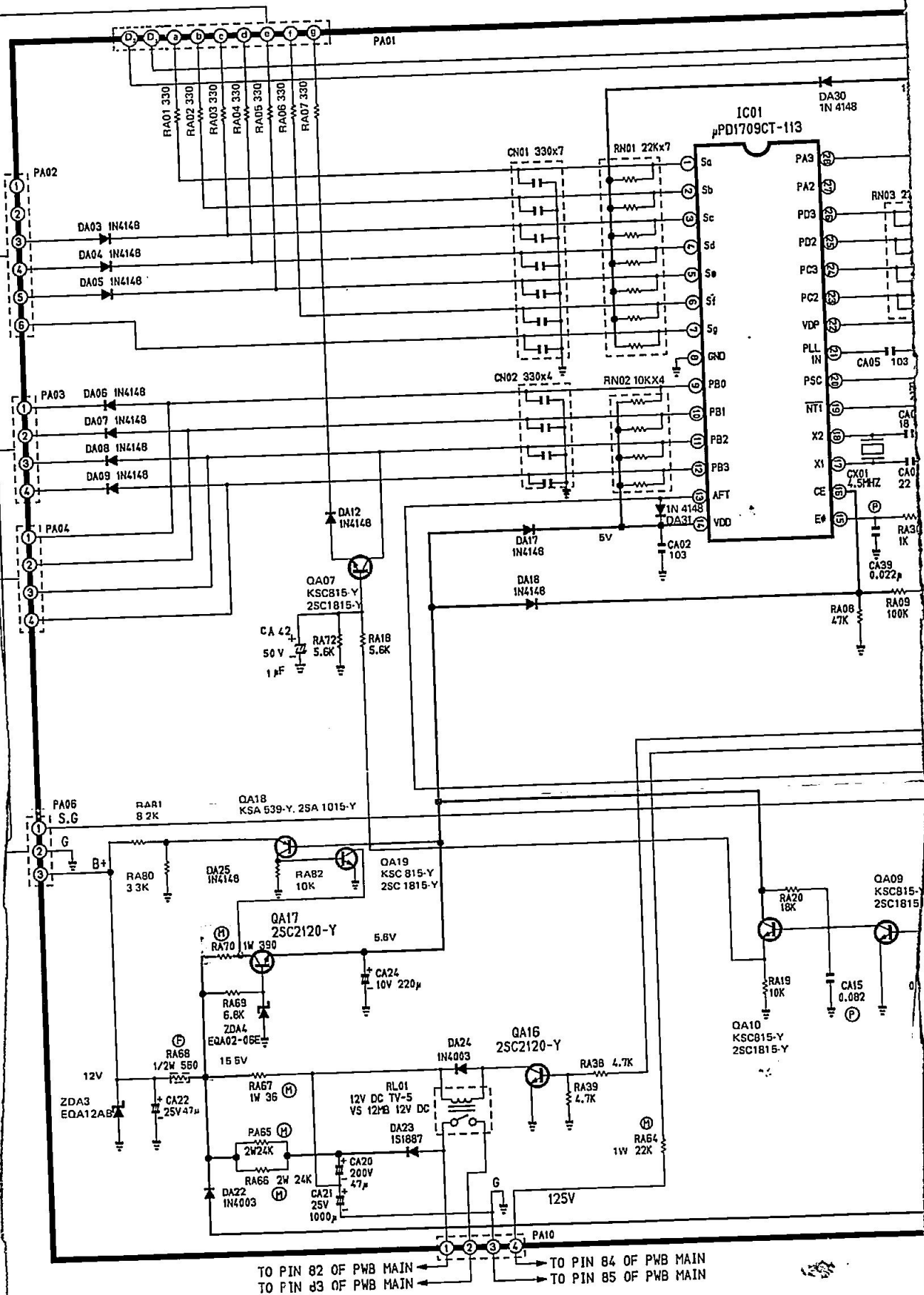
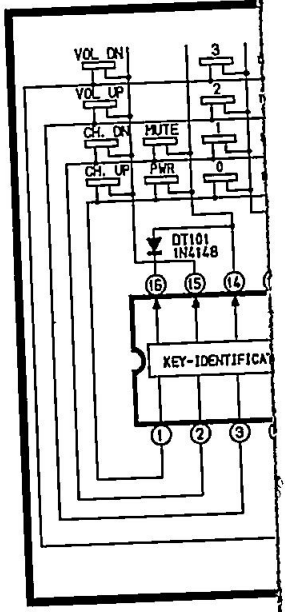
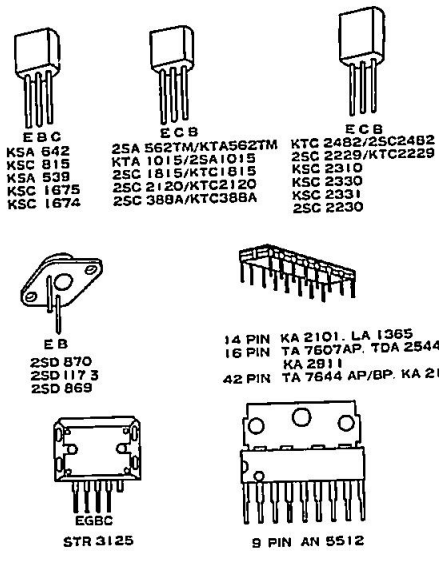
8104-178-980

Vp-p (H)	21Vp-p (H)	9.3Vp-p (H)	920Vp-p (H)	44Vp-p (V)	25Vp-p (V)	2Vp-p (V)	1.8Vp-p (V)
-11	WF-12	WF-13	WF-14	WF-15	WF-16	WF-17	WF-18

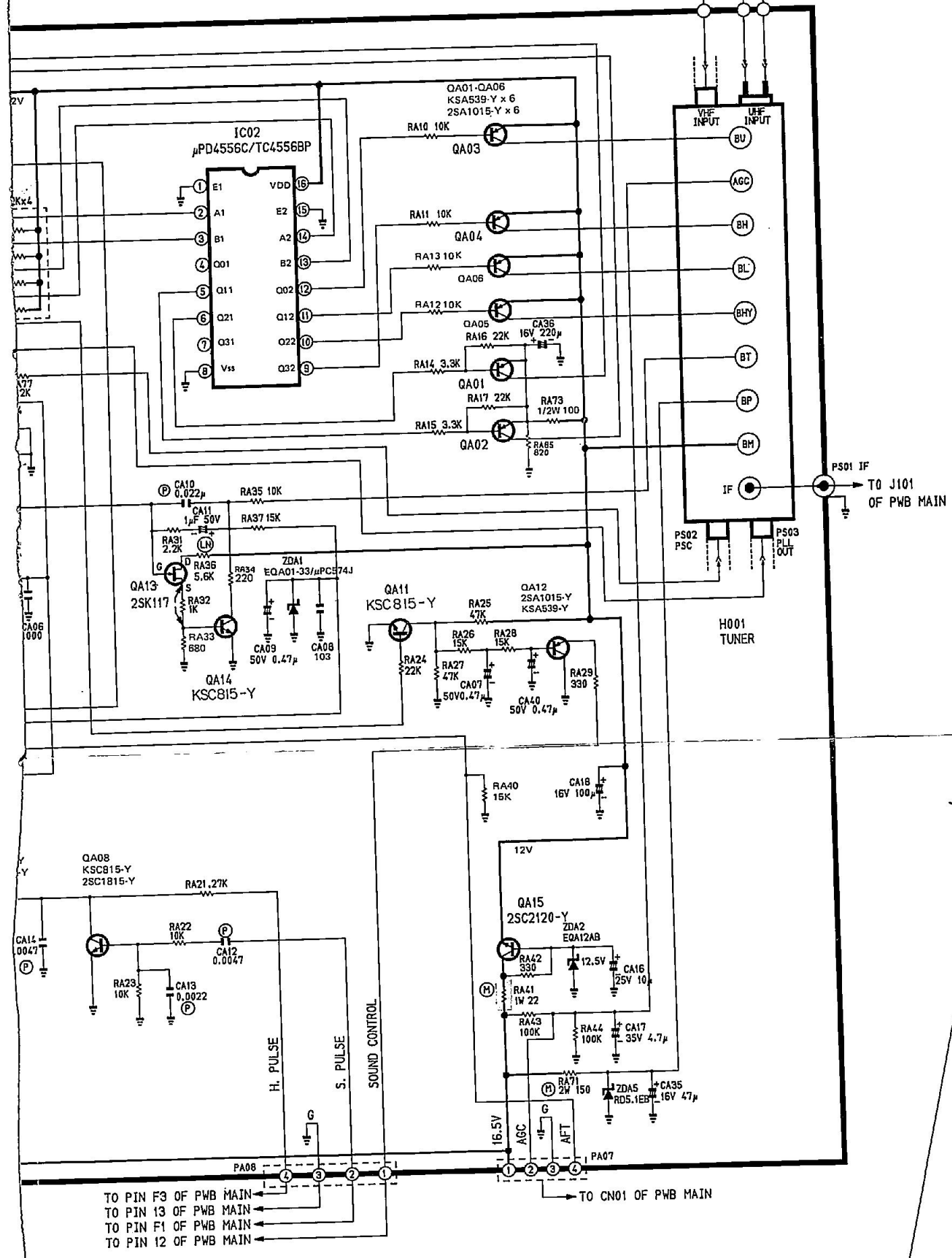
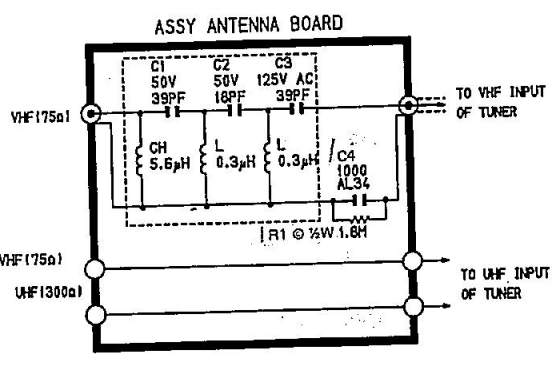
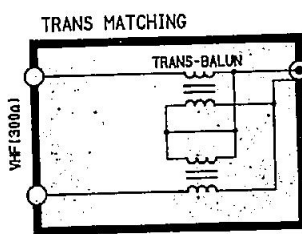
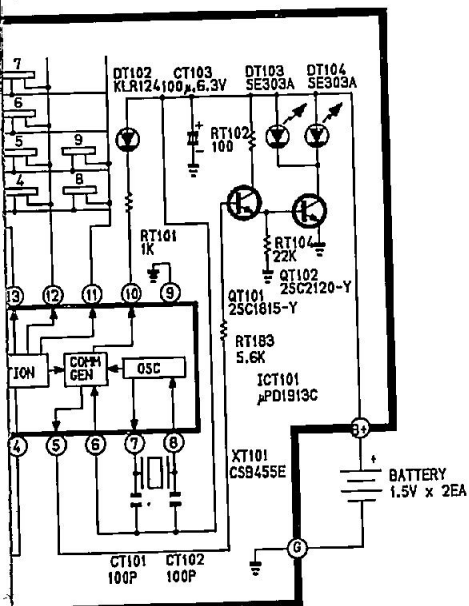
WB-DISPLAY



PWB-TRANSMIT



TER



TO PIN F3 OF PWB MAIN  
 TO PIN F1 OF PWB MAIN  
 TO PIN F1 OF PWB MAIN  
 TO PIN 12 OF PWB MAIN

TO CN01 OF PWB MAIN