SERVICE MANUAL

BUSH

2114 2020 2321

COLOUR TELEVISION

ALBA BUSH harvard HiNARi

SPECIFICATIONS

TV BROADCAST STANDARD	PAL 1 CCIR	
RECEIVING CHANNELS	UHF (BAND I & III)	2114
	UHF (BAND U)	2114
	UHF (BAND U)	2020/2321
NUMBER OF PRESET CHANNELS	39	
CHANNEL INDICATOR	LED DISPLAY	
RF AERIAL INPUT	75 OHM (UNBALANCED)	
PICTURE TUBES	14" PIL 90°	2114
	20" PIL 90°	2020
	21" FST PIL 90°	2321
SPEAKER	8 OHM	
AUDIO OUTPUT POWERS	1.5W (MAX)	
OPERATING VOLTAGES	180-270V AC 50 HZ	
POWER CONSUMPTIONS	65W	2114
	85W	2020
	85W	2321
DIMENSIONS (MM)	460X315X350	2114
	610X420X455	2020
	577X422X465	2321
NET WEIGHTS (KG)	12.5	2114
	22.5	2020
	22.5	2321

SAFETY INSTRUCTIONS

WARNING:
BEFORE SERVICING THIS CHASSIS, PLEASE READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" DESCRIBED BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltages can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 22.5KV at zero beam current (minimum brightness) under specified power source. The high voltage must not under any circumstances exceed 25.3V.

2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be of the same type tube as that specified in the parts list.

SAFETY PRECAUTION

1. Potentials as high as 24,000 volts are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back cover removed presents a shock hazard from the receiver.

(a) Servicing should not be attempted by anyone who is not thoroughly familiar with the precuations necessary when working on high-voltage equipment.
(b) Always discharge the picture tube anode to the CHASSIS GROUND to remove shock hazard before disconnecting the anode cap.
(c) Completely discharge the high potential of the picture tube before handling. The picture tube is highly evacuated and if broken glass fragments will be violently expelled.

2. In the event of fuse replacement, it should be replaced with the fuse type specified in the chassis parts list.

3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering

4. When replacing a high wattage resistor (oxide metal film resistor) in the circuit board the resistor should be mounted 10mm away from circuit board.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety charactersitics are identified by ⚠ in this manual and its supplements.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION.

SERVICING PRECAUTIONS

WARNING:
BEFORE SERVICING PRODUCTS COVERED BY THIS SERVICE MANUAL AND ITS SUPPLEMENTS AND ADDENDUMS READ AND FOLLOW THE SAFETY PRECAUTIONS ON PAGE 2 OF THIS PUBLICATION. NOTE: IF UNFORESEEN CIRCUMSTANCES CREATE CONFLICT BETWEEN THE FOLLOWING SERVICING PRECAUTIONS AND ANY OF THE SAFETY PRECAUTIONS ON PAGE 2 OF THIS PUBLICATION, ALWAYS FOLLOW THE SAFETY PRECAUTIONS. **REMEMBER: SAFETY FIRST.**

GENERAL SERVICING PRECAUTIONS

1. Always remove the product AC power cord from the AC power supply before:

(a) Removing or installing any component, circuit board, module, or any other instrument assembly.
(b) Disconnecting or reconnecting any instrument electrical plug or other electrical connection.
(c) Connecting a test substitute component in parallel with an electrolytic capacitor in the instrument.

Caution: A wrong part substitution or incorrect plarity installation of electrolytic capacitors may result in an explosion hazard.

(d) Discharging the picture tube anode

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc.) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".

3. Discharging the picture tube anode only by (a) first connecting one end of an insulated clip lead to the degaussing or CRT aquadag grounding system shield at the point where the picture tube socket ground lead is connected and then touching the other end of the insulated clip lead to the picture tube anode connection using an insulating handle to avoid personal contact with high voltage.

4. Do not spray any chemicals on or near this instrument or any of its assemblies.

5. Unless specified otherwise in this service manual, clean electrical contacts with a pipe cleaner, cotton-lipped stick or comparable nonabrasive applicator: 10% (by volume) Acetone and 90% (by volume) isoproply alcohol (90%-99% strength).
Unless specified otherwise in this service manual, lubrication of contacts is not required.

6. Do not apply AC power to this produce and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.

ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components are commonly called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, discharge any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminium foil to prevent electrostatic charge buildup or exposure of the assembly

3. Only use a grounded-tip soldering iron to solder or unsolder ES devices

4. Only use an anti-static type solder removal device some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices

5. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminium foil or comparable conductive material).

6. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices

7. Immediately before removing the protective material from the leads of a replacment ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily movement when handling unpackaged replacement ES devices. (Otherwise harmless movement such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

GENERAL SOLDERING GUIDELINES

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range 500°F to 600°F.

2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.

3. Ensure the soldering iron tip is clean and well tinned.

4. Thoroughly clean the surfaces to be soldered. Use a small wire-bristle (0.5", or 1.25 cm) brush with a metal handle Do not use freonpropelled spray-on cleaners.

5. Use the following unsoldering techniques:

a) Allow the soldering iron tip to reach normal temperature (500°F to 600°F).
b) Heat the component lead until the solder melts.
c) Remove the melted solder with an anti-static, suction-type solder removal device or with solder braid.

CAUTION: Work quickly to avoid overheating the circuit board printed foil.

6. Use the following soldering techniques:

a) Allow the soldering iron tip to reach normal temperature (500°F to 600°F).
b) First, hold the soldering iron tip and solder strand against the component lead until the solder melts.
c) Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.

CAUTION: Work quickly to avoid overheating the circuit board printed foil.

d) Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC REMOVAL/REPLACEMENT

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are of the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

REMOVAL

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.

2. Remove the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

REPLACEMENT

1. Carefully insert the replacement IC in the circuit board.

2. Carefully bend each IC lead against the circuit foil pad and solder it.

3. Clean the soldered areas with a small wire-bristle brush, (it is not necessary to reapply coating to the areas).

POWER OUTPUT TRANSISTOR DEVICES REMOVAL / REPLACEMENT

1. Heat and remove all solder from around the transistor leads.
2. Remove the heatsink mounting screw where fitted.
3. Carefully remove the transistor and heat sink from the circuit board.
4. Insert new transistor in circuit board.
5. Solder each transistor lead, and clip off excees lead.

WARNING:

DUE TO HIGH VACUUM AND LARGE SURFACE AREA OF PICTURE TUBE. GREAT CARE MUST BE EXERCISED WHEN HANDLING THE PICTURE TUBE. ALWAYS LIFT THE PICTURE TUBE BY GRASPING IT FIRMLY AROUND FACEPLATE. NEVER LIFT THE TUBE BY ITS NECK. THE PICTURE TUBE MUST NOT BE SCRATCHED OR SUBJECTED TO EXCESSIVE PRESSURE AS A FRACTURE OF THE GLASS MAY RESULT IN AN IMPLOSION OF CONSIDERABLE VOILENCE WHICH CAN CAUSE PERSONAL INUJURY OR PROPERTY DAMAGE.

ANTENNA CONNECTIONS

LOOP ANTENNA

Under difficult reception conditions, it might be impossible to obtain good reception. In order to improve the quality of reception use an outdoor antenna.

DISASSEMBLY INSTRUCTIONS

MAIN CHASSIS REMOVAL

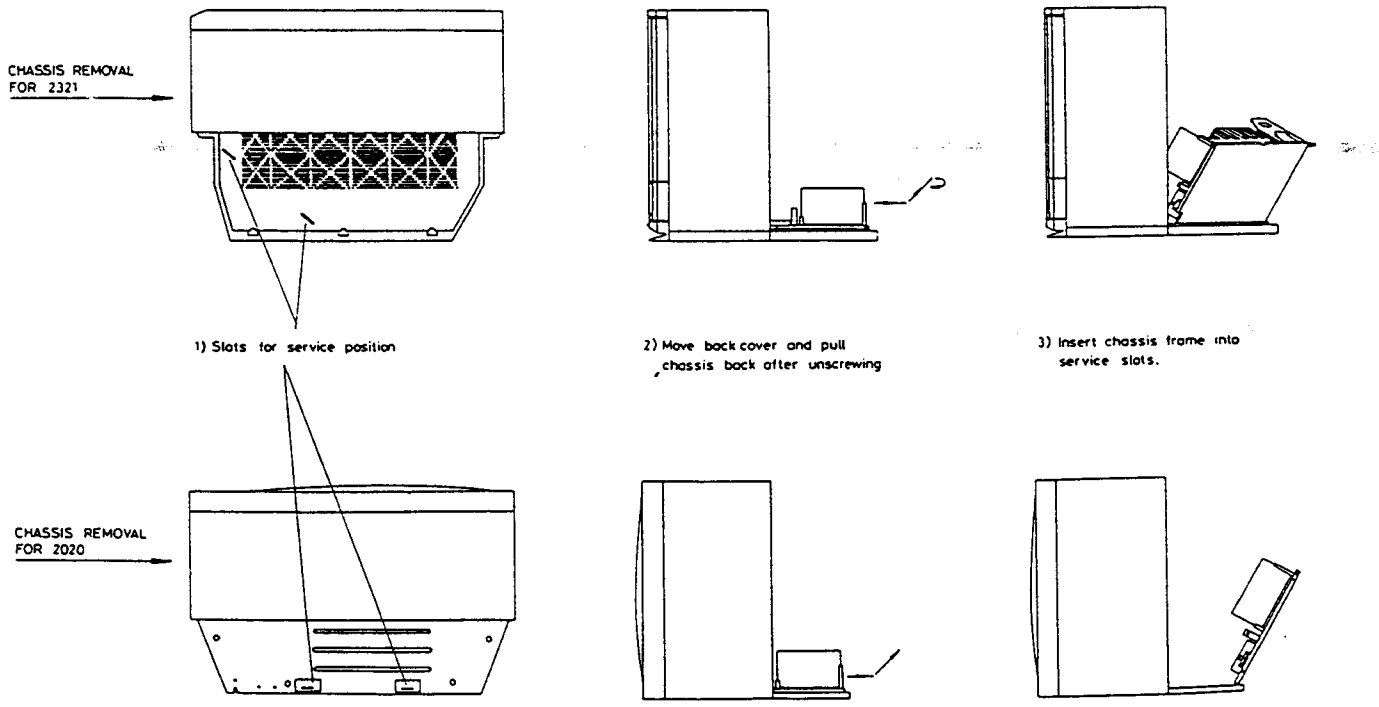
1. Remove chassis retaining screws.
2. Grasp both sides of main chassis and pull it backward approximately ½ way.
3. Lift main chassis up and it may be removed.

CONTROL BOARD REMOVAL

1. Remove 2 screws securing the control board

CRT REMOVAL

1. Place the CRT on soft material against its face
2. Remove 4 screws fixing the CRT



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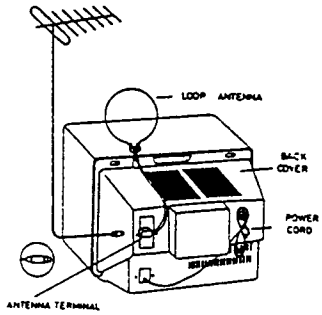
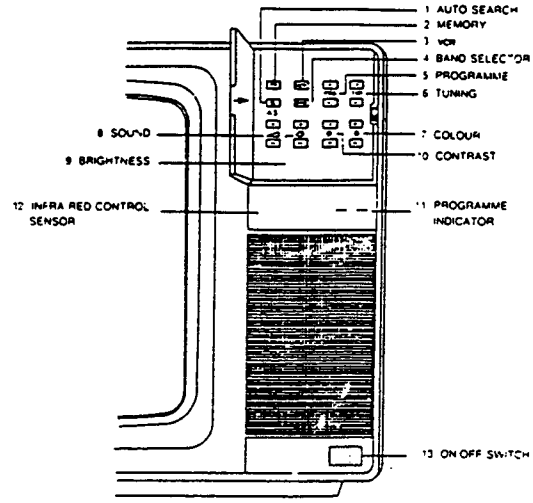


CONTROLS LOCATION



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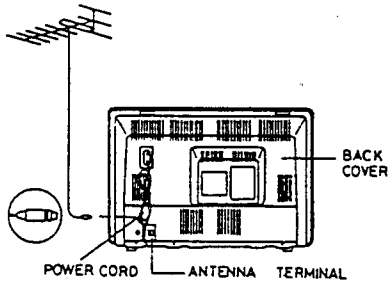
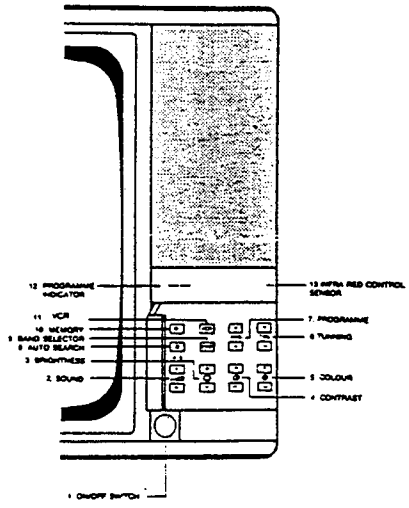


CONTROLS LOCATION



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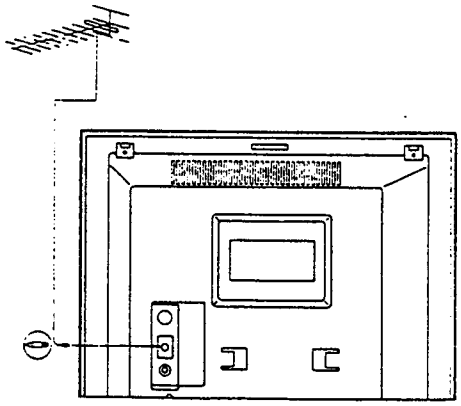
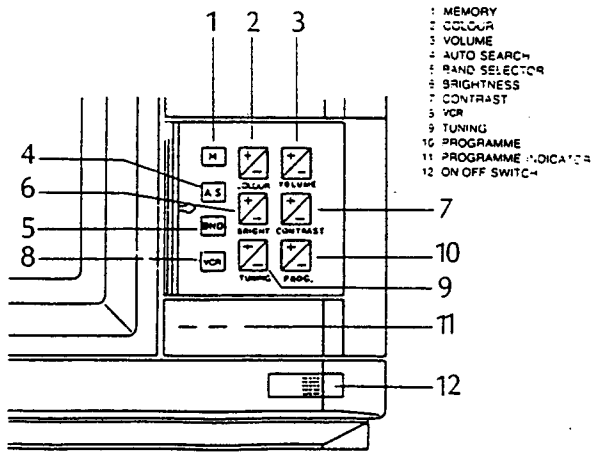
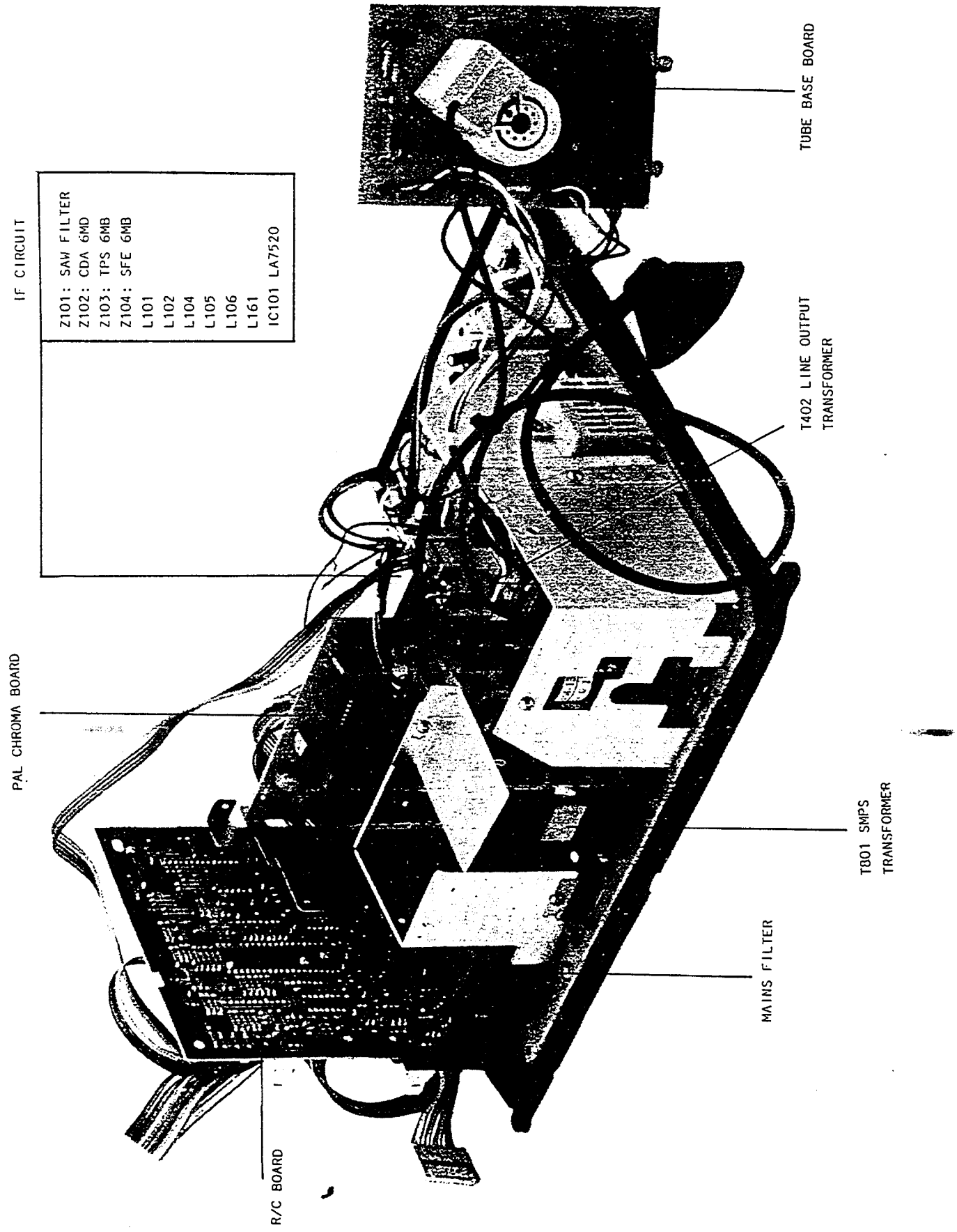


CONTROLS LOCATION



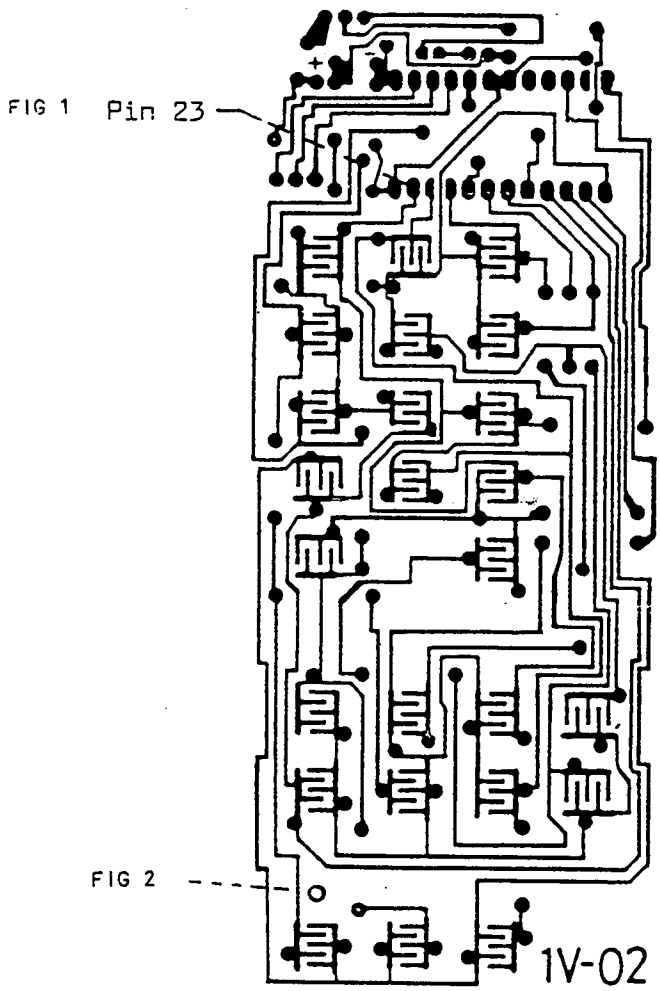
PART LOCATION

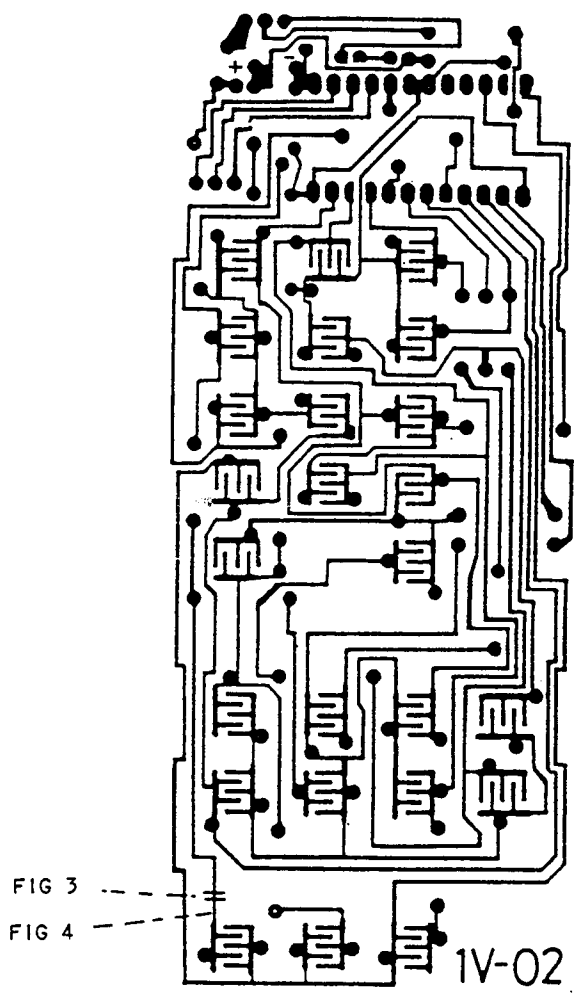


PROCEDURE TO CONVERT HAND SET INTO AN EEPROM GENERATOR

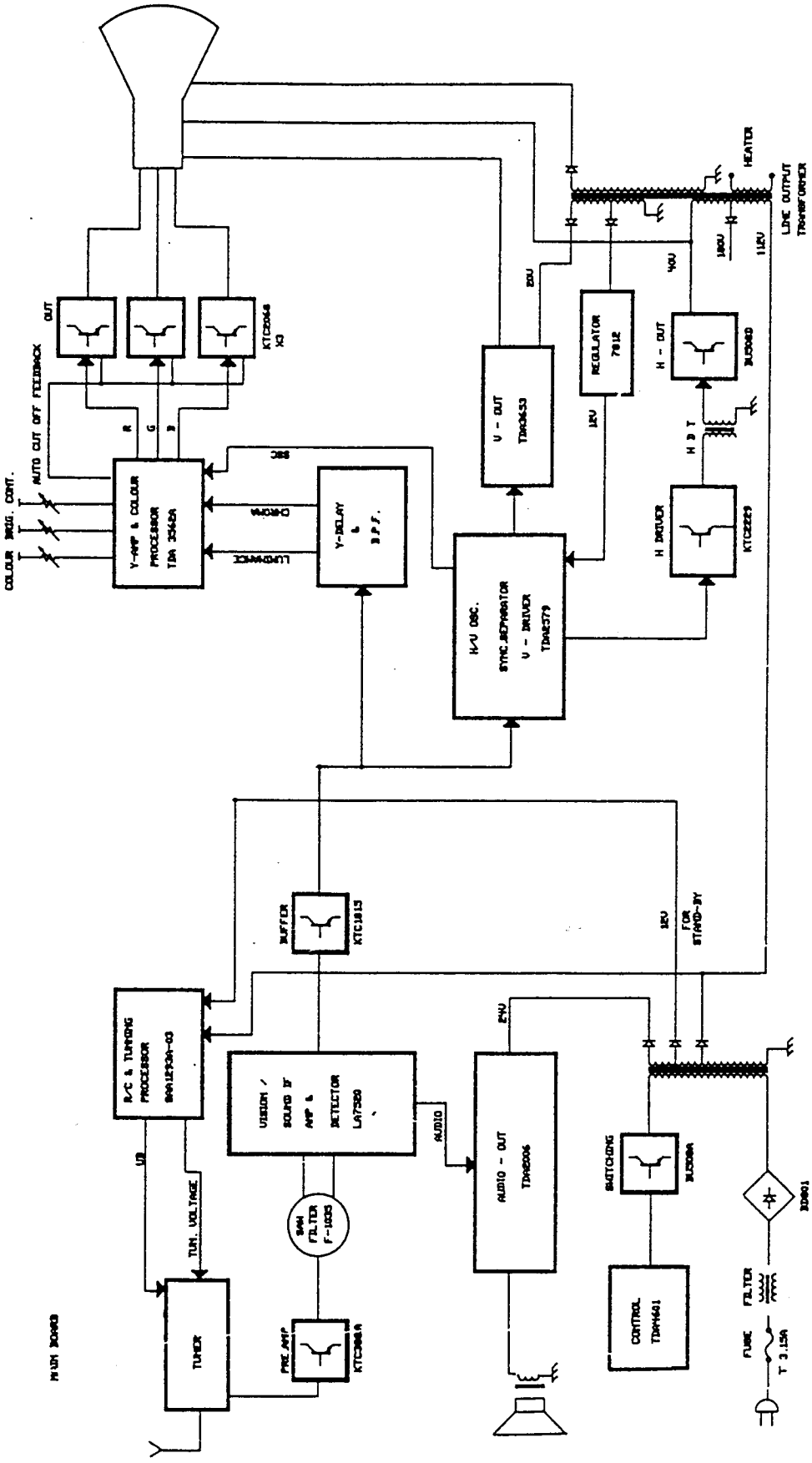
1. Solder a thin insulated wire to Pin 23 on IC SAA 1250 (see Fig. 1)
2. Run this wire through the tiny hole provided to the other side of the PCB (see Fig. 2)
3. Break the print between normal and number 4 control by cutting with a sharp blade (see Fig. 3)
4. Solder the wire to the little spot of the normal control conductive track where it has been cut (see Fig. 4)

AFTER THE ABOVE PROCEDURE NORMAL FUNCTION BUTTON WILL WORK AS SERVICE BUTTON

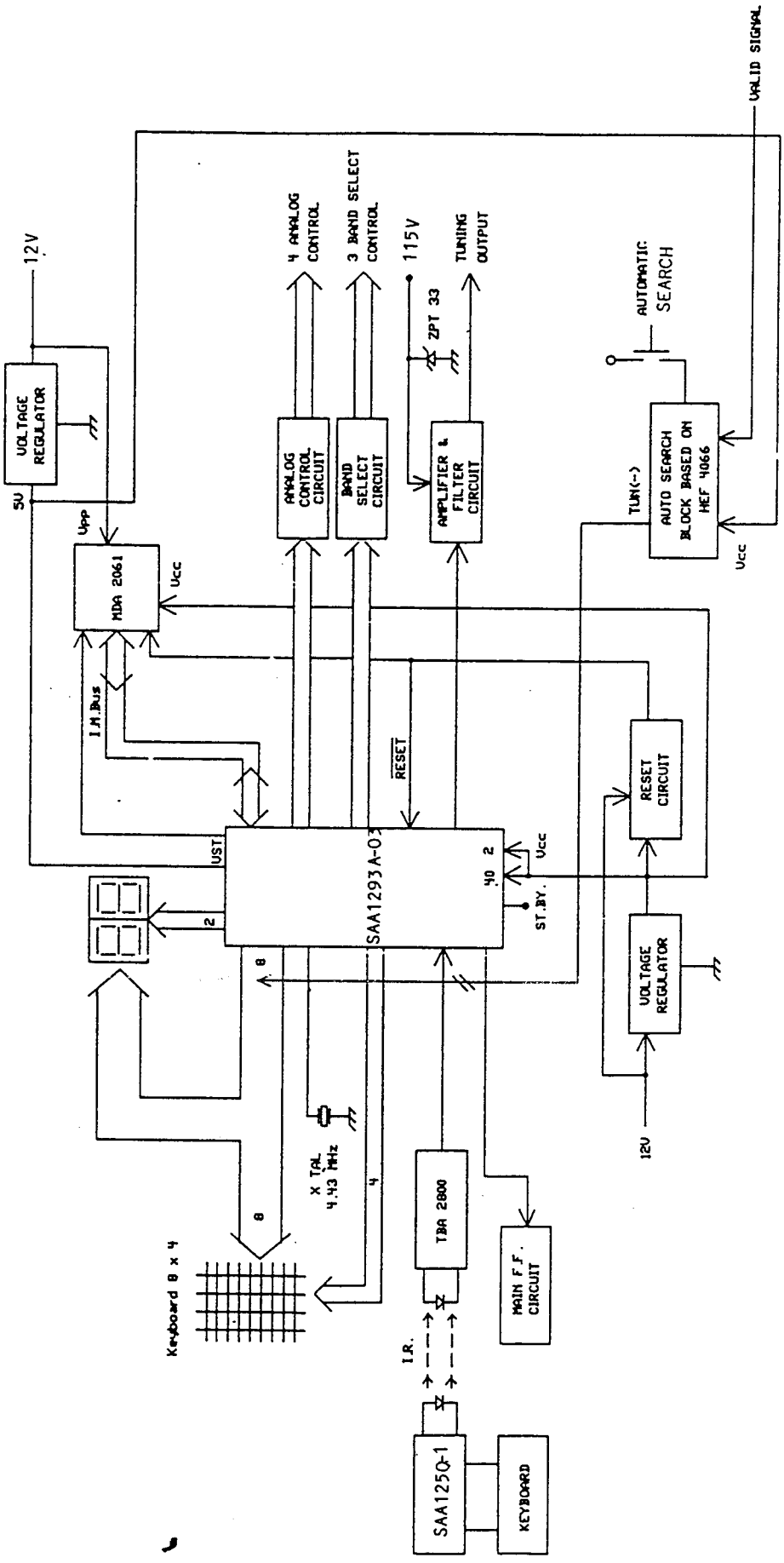




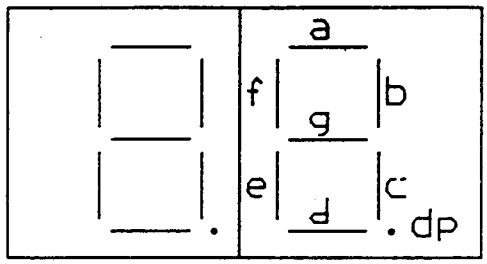
BLOCK DIAGRAM



VOLTAGE SYNTHESIZED TUNING BLOCK DIAGRAM



DISPLAY DIGIT



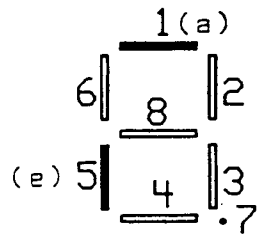
DIGIT 1 DIGIT 2

SEGMENT	TRANSMITTER
a	1 – Programme Button
b	2 – Programme Button
c	3 – Programme Button
d	4 – Programme Button
e	5 – Programme Button
f	6 – Programme Button
g	7 – Programme Button
dp	8 – Programme Button

The above table shows which segments can be made on or off by using the buttons on the remote control handset.

OPTIONS	SAA 1293-02	SAA 1293-03
Option 1	c-d-g	c-d
Option 2	b-dp	
Option 3	a-f-d-c	
Option 4	a-e	

Segments that must be "ON" with option 4 for example. a-e



Digit 1 shows the option number, Digit 2 shows the information that will be loaded. If you press the service button in succession, all four options appear one after another. Digit 2 segments can be switched "ON" or "OFF" by pressing the channel program buttons (1-8) on the remote control transmitter.

FUNCTIONS ON REMOTE TRANSMITTER	TABLE "A"	TABLE "B" UHF/VHF	TABLE "B" UHF
	D.1. D.2.	D.1 D.2.	D.1 D.2.
PRESS THE SERVICE BUTTON ONCE	CH	CH	CH
PRESS THE SERVICE BUTTON SECOND TIME	OP	OP	OP
OPTION 1 PRESS THE SERVICE BUTTON THIRD TIME	1 0	1	1
OPTION 2 PRESS THE SERVICE BUTTON FOURTH TIME	2 0	2 1	2 1
OPTION 3 PRESS THE SERVICE BUTTON FIFTH TIME	3 0	3 5	3 6
OPTION 4 PRESS THE SERVICE BUTTON SIXTH TIME	4 0	4 7	4 7
PRESS THE STAND BY BUTTON	- -	- -	- -

NOTES

TABLE "A"

If I.C. MDA 2061 has never been programmed or data has been lost, all of the segments in digit 2 will be illuminated.

TABLE "B"

If the segments in digit 2 are not illuminated, then the I.C. 8 (MDA2061) Database has been interrupted, and requires reprogramming by actioning the series of commands as illustrated above.

ADJUSTMENT INSTRUCTIONS

VISION IF ALIGNMENT

DETECTOR COIL ALIGNMENT

1. Connect test equipment to the main board as shown in Figure 1 and turn power on.

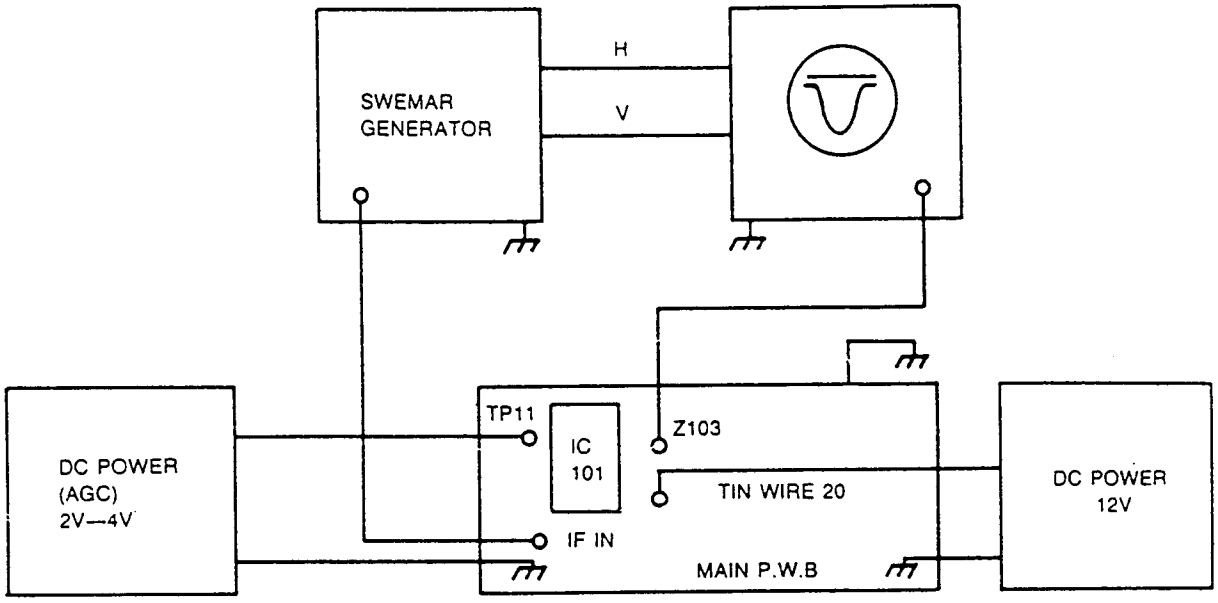


Figure 1 : Connection Diagram for VIF and AFT alignment

2. Adjust L104 main board so that the waveform is as indicated in Figure 2. Adjust, L104 so as to set the picture carrier to minimum. The adjustment should be such as not to decrease the amplitude of the whole waveform.

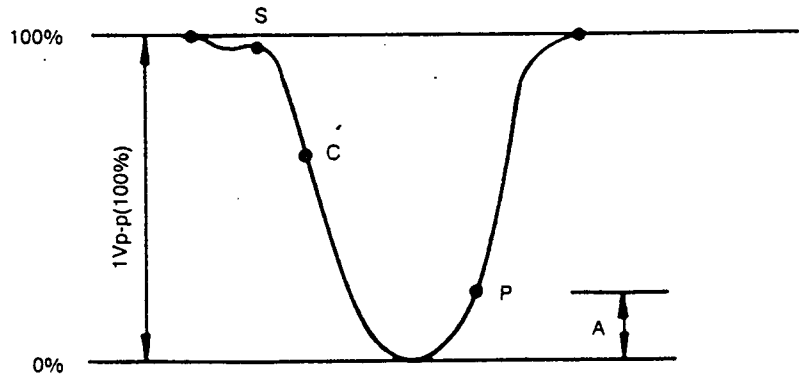
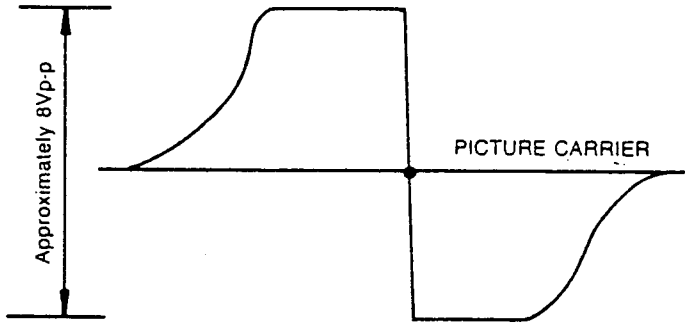


Figure 2 : L 104 Alignment Waveform

AFT ALIGNMENT

1. Remove the alignment scope connection from Z103 and connect to AFT pin of tuner.
2. Adjust L105 so that the waveform should be as shown in Figure 3.
3. Connect C164 after the adjustment.



DELAY AGC ALIGNMENT

1. Apply the standard bar signal (60 dB ± 1 dB) to the antenna terminal of the TV set.
2. Connect a DC voltmeter to TP14.
3. Adjust VR101 so that the voltmeter reads:

   6.5V ± 0.1V (For the tuner TEMD5)
   5.5V ± 0.1V (For the tuner TEMD1)
   6.0V ± 0.1V (For the tuner TEMB1)

+ B (115V) ALIGNMENT (*)

1. Set the contrast, brightness and colour control to minimum.
2. Connect DVM to TP44.
3. Adjust VR801 so that the VDM reads 115V ± 0.1V.

(*) When FBT will be changed readjust 115V DC.

HORIZONTAL SYNC. ALIGNMENT

1. Apply a standard colour signal (more than 60 dB) to the antenna terminal of the TV set.
2. Short between M (IC 401 pin 5) and N (GROUND).
3. Adjust VR401 so as to obtain the best synchronization in vertical and horizontal direction.

VERTICAL LINEARITY AND AMPLITUDE ALIGNMENT

1. Appy a standard colour signal (PM 5544 digital pattern) to the antenna input of the TV set.
2. Adjust VR301 so that the circle may be located at a position 5mm distance from top and bottom of the effective screen (AMPLITUDE ALIGNMENT).
3. Adjust VR301 so as to obtain an optimum circle (LINEARITY ALIGNMENT).

PAL MATRIX ALIGNMENT

1. Set the contrast, brightness and colour control to maximum.
2. Connect the alignment oscilloscope to the base of Q905 on the CRT board or pin 17 of IC501.
3. Apply the standard PAL signal (PM 5544-digital pattern, more than 60 dB) to the antenna input of the TV set.
4. Adjust VR501 for minimum amplitude of point A and B as shown in Figure 4.

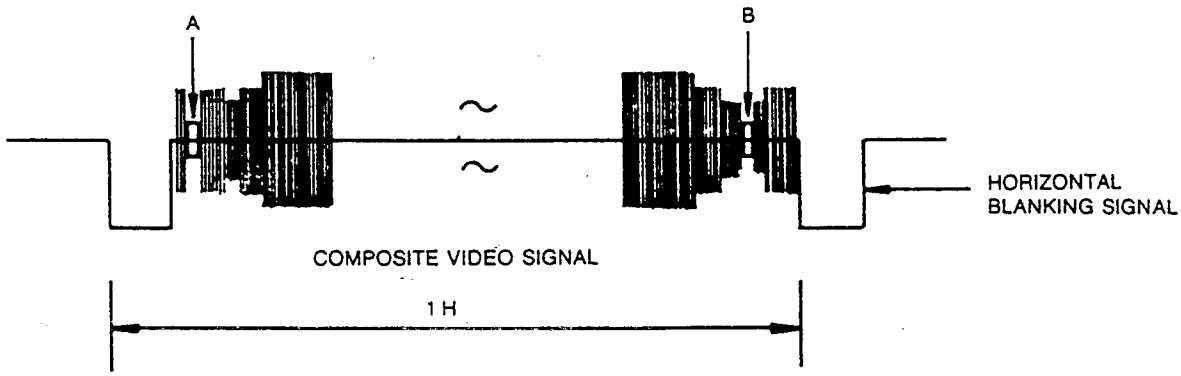
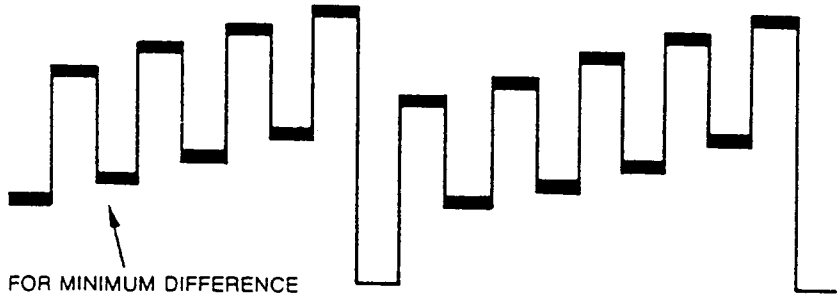


Figure 4 : Waveform of Alignment Oscilloscope

5. Change the applied signal to the standard colour bar signal.
6. Adjust L502 to obtain minimum difference.

Figure 5 : Oscilloscope Alignment Waveform



SCREEN VOLTAGE ALIGNMENT
(WHITE BALANCE ADJUSTMENT IN LOW AMBIENT LIGHT)

1. Connect a colour signal more than 60 dB to the antenna terminal of the TV set.
2. Set R951 and R953 on the CRT board to the mechanical centre and the COLOUR CONTROL to minimum.
3. ADJUST the CONTRAST and BRIGHTNESS CONTROL gradually counter-clockwise to obtain picture brightness of 40-100 LUX.
4. Vary the SCREEN CONTROL right and/or left and set it to the position WHERE a FLYBACK line and smear DOES NOT appear on the screen.
5. Set the CONTRAST and BRIGHTNESS CONTROL to minimum and check the screen condition.

WHITE BALANCE ALIGNMENT IN HIGH AMBIENT LIGHT

1. CONNECT a standard colour signal more than 60 dB to the antenna board of the TV set.
2. Set the COLOUR CONTROL to minimum and CONTRAST and BRIGHTNESS CONTROL to maximum.
3. Adjust R951 and R953 on the CRT board in ORDER to obtain the white screen (colour temperature : 8500°C - 9500°C).

HORIZONTAL CENTRE ALIGNMENT

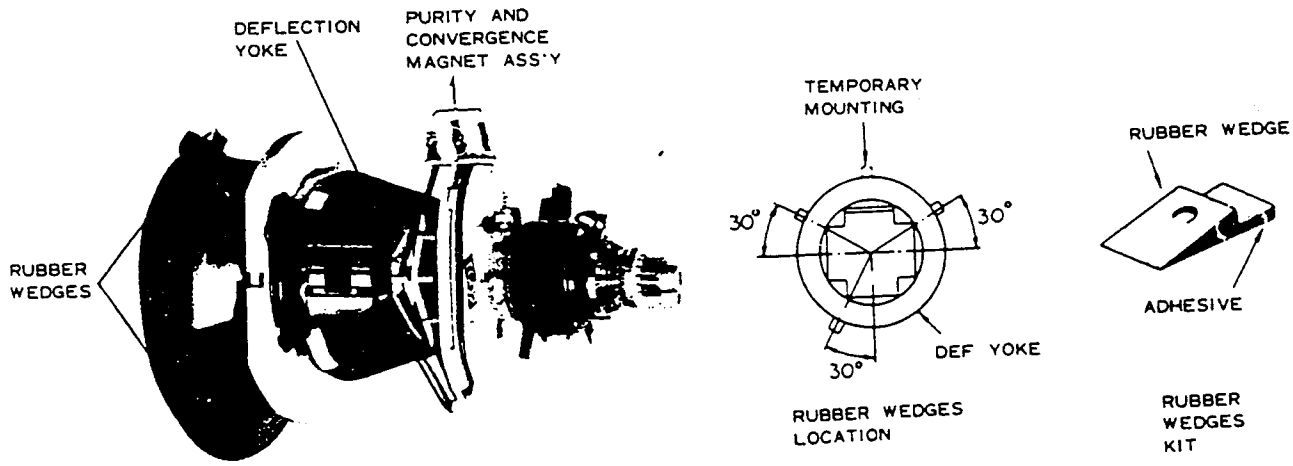
1. Receive a standard OFF AIR signal.
2. Adjust VR402 so that right HAND SIDE position of screen is equal to the left.

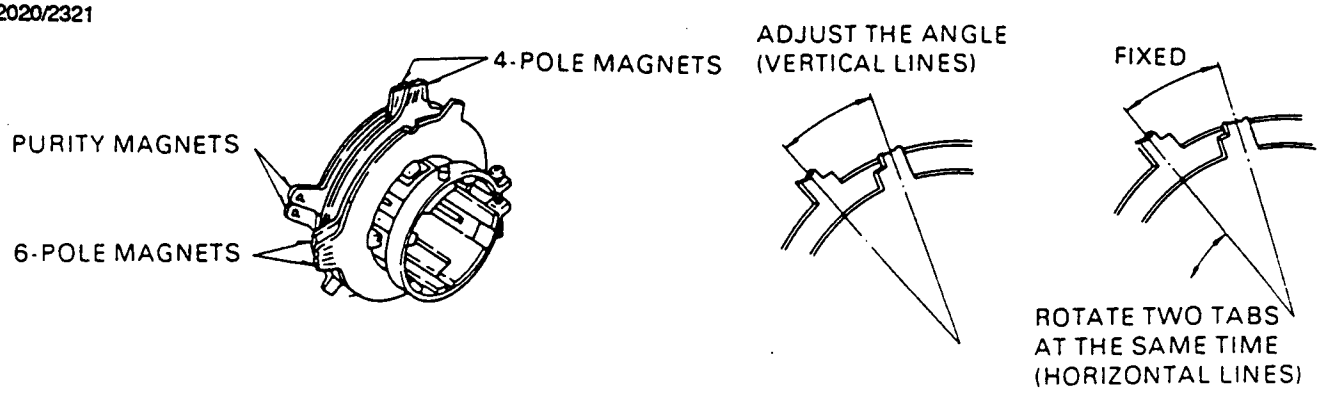
PURITY AND CONVERGENCE ADJUSTMENT

WARNING:
CONVERGENCE AND PURITY HAVE BEEN FACTORY ALIGNED. DO NOT ATTEMPT TO TAMPER WITH THESE ALIGNMENTS. HOWEVER, THE EFFECTS OF ADJACENT RECEIVER COMPONENTS OR REPLACEMENT OF PICTURE TUBE OR DEFLECTION YOKE MAY REQUIRE THE NEED TO READJUST PURITY AND CONVERGENCE. CONVERGENCE MAGNET ASSEMBLY AND RUBBER WEDGES NEED MECHANICAL POSITIONING FOLLOWING THE FIGURE 1. BEFORE ATTEMPTING ANY CONVERGENCE ADJUSTMENT THIS RECEIVER SHOULD BE OPERATED FOR AT LEAST FIFTEEN MINUTES. IF ADJUSTMENT IS REQUIRED THE ADJUSTMENTS SHOULD BE MADE IN THE FOLLOWING SEQUENCE.

COLOUR PURITY ADJUSTMENT

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Turn the CONTRAST and BRIGHTNESS controls to maximum.
3. Rotate RED and BLUE BIAS controls (R557 & R559) fully clockwise. Slowly rotate GREEN BIAS control clockwise to produce a green raster.
4. Loosen the clamp screw holding the yoke and slide the yoke backward to provide vertical green bar (zone) in the picture screen.
5. Remove the rubber wedges.
6. Rotate and spread the tabs of the purity magnet (See Fig. 1) around the neck of the picture tube until the green bar is in the centre of the screen. At the same time, centre the raster vertically.
7. Move the yoke slowly forward or backward until a uniform green screen is obtained. Temporarily tighten the clamp screw of the yoke.
8. Check the purity of the red and blue rasters by adjusting the BIAS controls.
9. Obtain a white raster, referring to "WHITE BALANCE ADJUSTMENT".
10. Proceed with convergence adjustment.





CONVERGENCE MAGNET ASSEMBLY **ADJUSTMENT OF MAGNETS**

Figure 7

1. Apply crosshatch pattern with a colour bar signal generator.
2. Adjust the BRIGHTNESS and CONTRAST controls for a well defined pattern.
3. Adjust the two tabs of the 4-pole magnets to change the angle between them (See Figure 8-a) and superimpose the red and blue vertical lines in the centre area of the picture screen.
4. Turn both tabs at the same time keeping their angles constant to superimpose red and blue horizontal lines at the centre of the screen (See figure 8-b).
5. Adjust the two tabs of 6-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 1,2,3 keeping in mind red, green and blue movements, because 4-pole magnets and 6-pole magnets interact and make movement complex.

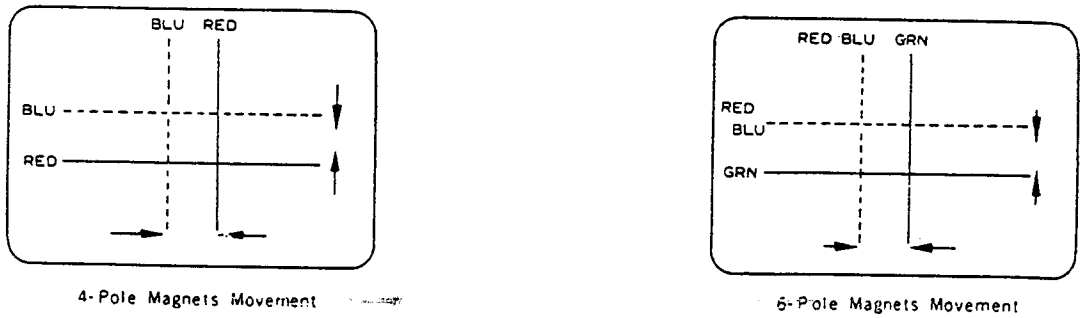
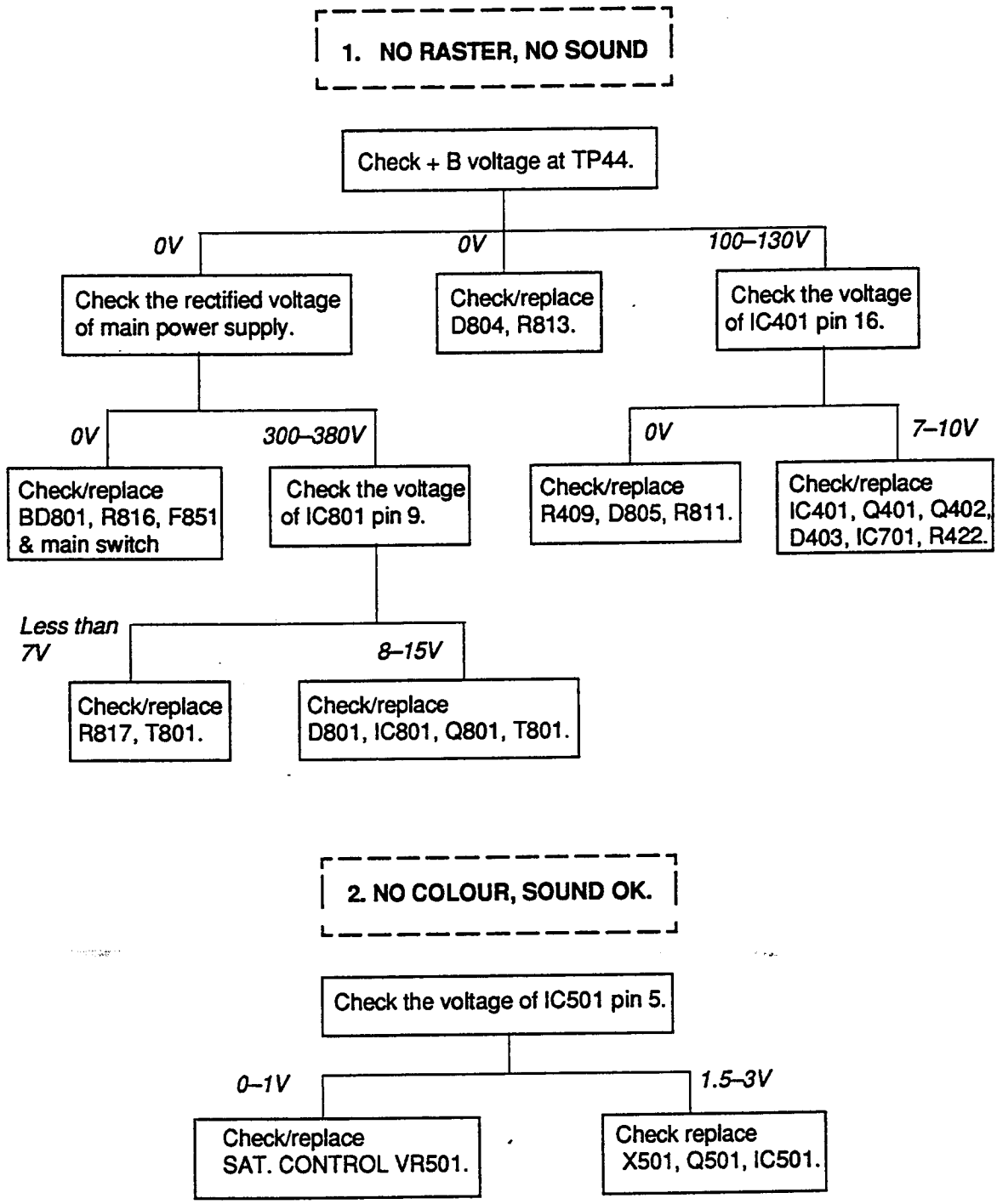


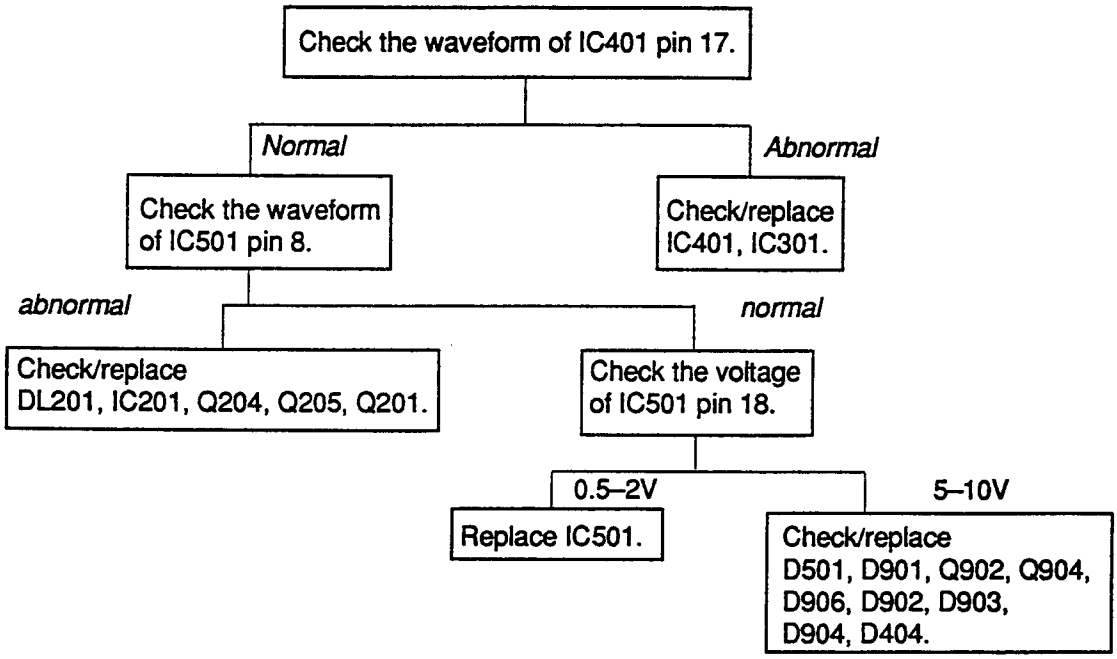
Figure 8-a
Centre Static Convergence by Convergence Magnets

Figure 8-b
Outeredge Dynamic Convergence by Deflection Yoke

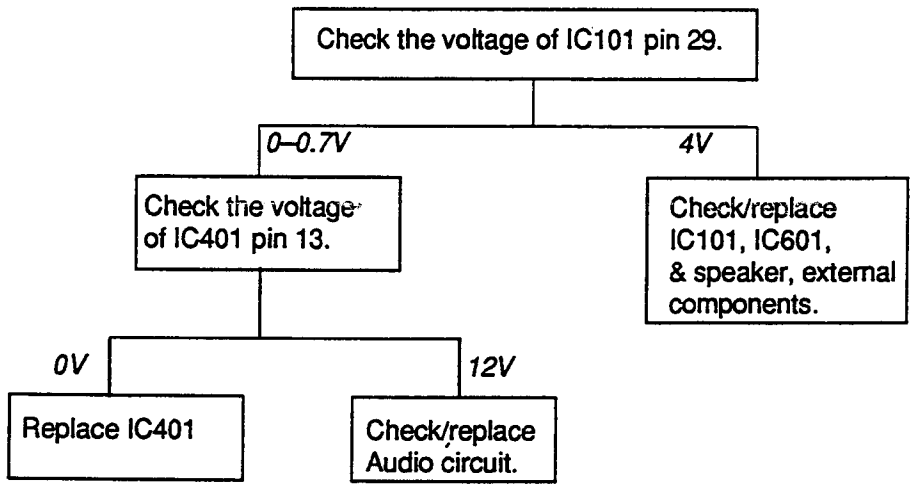
TROUBLESHOOTING CHART



3. NO PICTURE, SOUND OK.



4. NO SOUND, PICTURE OK.

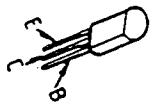
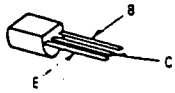
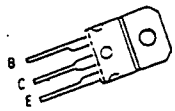
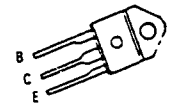
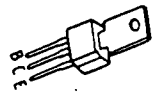
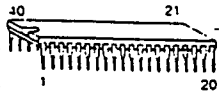


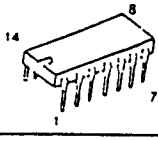
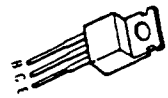
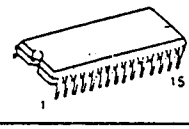
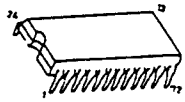
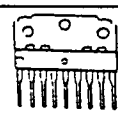
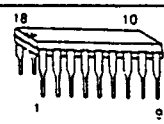
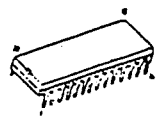
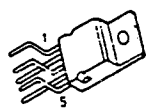
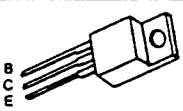
2020 2114 2321 PART LIST DIFFERENT PARTS

MODEL	ITEM	PART NO.	DESCRIPTION	POS
2321	1	100315502	CABINET ASSY	
2020	2	100355120	CABINET ASSY	
2114	3	104547100	FRONT PANEL	
2114	4	100444360	CABLE ASSY CRT EARTH	
2321	5	100444560	CABLE ASSY CRT EARTH	
2020	6	100444510	CABLE ASSY CRT EARTH	
2020	7	100298030	CHASSIS ASSY MAIN	
2321	8	100220210	CHASSIS ASSY MAIN	
2114	9	100220170	CHASSIS ASSY MAIN	
2020	10	013305601	COIL DEGAUSSING	
2321	11	013305601	COIL DEGAUSSING	
2114	12	013315001	COIL DEGAUSSING	
2020	13	100205110	CONTROL ASSY	
2321	14	100240510	CONTROL ASSY	
2114	15	100200240	CONTROL ASSY	
2114	16	100220736	CRT ASSY 14" (HITACHI)	
2114	17	100225136	CRT ASSY 14" (GOLDSTAR)	
2020	18	100255120	CRT ASSY 20"	
2321	19	100215502	CRT ASSY 21"	
2020	20	014922412	CRT + D COIL 510YUB22-TC03	
2114	21	014911421	CRT + D COIL HIT370LHB22-TC02	
2114	22	014920502	CRT + D COIL A36JUF60*60	
2321	23	014922502	CRT + D COIL A51JSY61X03	
2114	24	013317752	DEFLECTION COIL 14"	
2020	25	013317852	DEFLECTION COIL 20"	
211	26	100152470	PCB ASSY CRT BASE (MININECK)	
2114	27	100152460	PCB ASSY CRT BASE	
2321	28	100153460	PCB ASSY CRT BASE	
2020	29	100152460	PCB ASSY CRT BASE	
2321	30	100150050	PCB ASSY DISP&TOUCH	
2114	31	100148930	PCB ASSY DISP&TOUCH	
2020	32	100148910	PCB ASSY DISP&TOUCH	
2020	33	100112520	PCB ASSY MAIN	
2321	34	100112580	PCB ASSY MAIN	
2114	35	100112620	PCB ASSY MAIN	
2114	36	100152860	PCB ASSY PAL	
2020	37	100152860	PCB ASSY PAL	
2321	38	100152860	PCB ASSY PAL	
2020	39	100108420	PREAMP ASSY	
2114	40	100108420	PREAMP ASSY	
2321	41	100108500	PREAMP ASSY	
2020	42	014599942	RUBBER PAD (TV)	
2114	43	014599942	RUBBER PAD (TV)	
2321	44	014599972	RUBBER PAD (TV)	
2114	45	013909551	SPEAKER 8 OHM	
2321	46	013914352	SPEAKER 8 OHM	
2020	47	013905701	SPEAKER 8 OHM	
2321	48	100299960	TV STAND ASSY	

MODEL	ITEM	PART NO.	DESCRIPTION	POS
2020	49	100299950	TV STAND ASSY	
2114	50	012633912	CAP SP 50V J 390P SL	C903
2321	51	012702212	CAP EL 50V M 220N	C164
2020	52	012702212	CAP EL 50V M 220N	C164
2114	53	012704712	CAP EL 50V M 470N	C164
2321	54	012546812	CAP MPP 1K6V J 6N8	C411
2020	55	012546812	CAP MPP 1K6V J 6N8	C411
2114	56	012548212	CAP MPP 1K6V J 8N2	C411
2321	57	012953302	CAP MY 100V K 33N	C602
2114	58	012951002	CAP MY 100V K 10N	C602
2020	59	012953302	CAP MY 100V K 33N	C602
2114	60	013326702	COIL LINEARITY	L403
2321	61	013312702	COIL LINEARITY	L403
2020	62	013312702	COIL LINEARITY	L403
2114	63	013311502	COIL SPL 6800UH J	L406
2114	64	013311502	COIL SPL 6800UH J	L805
2020	65	013311702	COIL 330K	L805
2321	66	013311702	COIL 330K	L805
2020	67	011151201	RES CF 1/4W J 12K	R108
2321	68	011151201	RES CF 1/4W J 12K	R108
2114	69	011151821	RES CF 1/4W J 18K	R108
2321	70	011157501	RES CF 1/4W J 75K	R252
2114	71	011159101	REC CF 1/4W J 91K	R252
2020	72	011157501	RES CF 1/4W J 75K	R252
2114	73	011931001	RES MO 1W J 100R	R415
2321	74	011932211	RES MO 1W J 220R	R415
2020	75	011932211	RES MO 1W J 220R	R415
2321	76	011311022	RES FUSING 1W J 1R	R421
2020	77	011311822	RES FUSING 1W J 1R8	R421
2114	78	011304702	RES FUSING 1/2W K OR47	R421
2321	79	011152701	REC CF 1/4W J 27K J	R424
2020	80	011152701	RES CF 1/4W J 27K J	R424
2114	81	011154302	RES CF 1/4W J 43K J	R424
2020	82	014010482	SUPPORTER RIGHT (TV STAND)	
2020	83	014010492	SUPPORTER LEFT (TV STAND)	
2321	84	014010761	SUPPORTER RIGHT (TV STAND)	
2321	85	014010771	SUPPORTER LEFT (TV STAND)	
2020	86	013616502	SOCKET CRT HPS-0099-010	
2321	87	013616502	SOCKET CRT HPS-0099-010	
2114	88	013616502	SOCKET CRT HPS-0099-010	
2114	89	013620101	SOCKET HPS071-010 (MININECK)	

TERMINAL VIEW OF SEMICONDUCTORS

REFERENCE NO	FIGURE	DESCRIP-TION
D301.D402.D403.D404 D406.D407.D451.D501 D801.D803.D804.D805 D806.D807.D902 D903.D904		IN4003 RGP10J,RGP15J
D1,D2,D3,D4 D02,D11-14,D02-08 D101,D102,D201 D202,D251,D501 D503,D505,D901		IN4148 IS2471
BD801		RB-156
D01		HP3FR2
Q401,Q902,Q904 Q906		KTC2229-O/Y BF421
Q01,Q161,Q201 Q203,Q204,Q205 Q501		KTC388A KTA1015-O/Y KTC1815-O/Y KTC1815-Y KTC1915-Y
Q402		BU508D
Q801		BU508A
Q901,Q903,Q905 Q907		2SC2068
IC 2001		SAA 1293-03

REFERENCE NO	FIGURE	DESCRIP-TION
IC03 IC04 IC1701 IC2002 - 2004 - 2301		MDA2061 LMN324 TDA4433 LM2901 HEF4066 TBA2800
IC05 IC2005-6		LM78M05CT MC7805 TDA 16055
IC101		KA2919 LA7520
IC01		SAA 1250
IC801 - 301		TDA 4601 - 3653
IC401		TDA2579
IC501 IC1601		TFK TDA3562A M193
IC601		TDA2006
IC701		GL7812

COMMON PARTS

ITEM	PART NO.	DESCRIPTION	POS.
1	010211311	TUNER (UHF/VHF)	
	010211321	TUNER (UHF ONLY)	
2	100270000	TRANSMITTER ASSY	
3	100150950	PCB ASSY TRANSMITTER	
4	010420302	CORD POWER	
5	011181011	RES CF 1/2W J 10M	
6	013602652	SWITCH POWER ON/OFF	
7	013610402	SOCKET IC 14P	
8	013614501	SOCKET IC 40P	
9	013614561	SOCKET IC 18P	
10	100156450	PCB ASSY R/C	
	100156460	PCB ASSY R/C (2020)	
11	100200030	HEAT SINK ASSY	
12	100200050	HEAT SINK ASSY	
13	100200180	HEAT SINK ASSY	
14	100254710	SWITCH ASSY POWER ON/OFF	
15	104500010	COVER SWITCH	
MAIN PCB ASSY			
16	013008302	DIODE BRIDGE RB156	BD801
17	011128201	RES CF 1/4W J 82R	B.SIDE
18	012641022	CAP CER, 50V K 1N	C102
19	012721001	CAP EL 16V M 10U	C103
20	012721001	CAP EL 16V M 10U	C104
21	012704712	CAP EL 50V M 470N	C105
22	012641022	CAP CER 50V K 1N	C106
23	012721001	CAP EL 16V M 10U	C107
24	012651002	CAP CER 50V Z 10N F	C109
25	012704712	CAP EL 50V M 470N	C111
26	012651002	CAP CER 50V Z 10N F	C115
27	012651002	CAP CER 50V Z 10N F	C119
28	012651002	CAP CER 50V Z 10N F	C120
29	012731001	CAP EL 16V M 100U	C121
30	012622402	CAP CER 50V J 24P	C122
31	012651002	CAP CER 50V Z 10N F	C123
32	012651002	CAP CER 50V Z 10N F	C124
33	012651002	CAP CER 50V Z 10N F	C125
34	012616002	CAP CER 50V D 6P	C126
35	012641022	CAP CER 50V K 1N	C127
36	012714702	CAP EL 50V M 4U7	C160
37	012714702	CAP EL 50V M 4U7	C161
38	012714702	CAP EL 50V M 4U7	C162
39	012724742	CAP EL 16V M 47U	C163
40	012651002	CAP CER 50V Z 10N F	C165
41	012651002	CAP CER 50V Z 10N F	C166
42	012721072	CAP EL 25V M 10U	C183
43	012721001	CAP EL 16V M 10U	C201

ITEM	PART NO.	DESCRIPTION	POS.
44	012721001	CAP EL 16V M 10U	C204
45	012732212	CAP EL 16V M 220U	C206
46	012651002	CAP CER 50V Z 10N F	C207
47	012714702	CAP EL 50V M 4U7	C208
48	012961012	CAP MY 100V K 100N	C302
49	012722262	CAP EL 16V M 22U	C303
50	012711012	CAP EL 50V M 1U	C304
51	012631542	CAP CER 50V K 150P	C305
52	012162232	CAP MR 100V J 220N	C306
53	012163352	CAP MR 100V J 330N	C307
54	012951002	CAP MY 100V K 10N	C308
55	012634722	CAP CER 50V K 470P B	C309
56	012731012	CAP EL 25V M 100U	C310
57	012951002	CAP MY 100V K 10N	C311
58	012741012	CAP EL 25V M 1000U	C312
59	012954702	CAP MY 100V K 47N	C313
60	012711012	CAP EL 50V M 1U	C314
61	012742242	CAP EL 16V M 2200U	C315
62	012724732	CAP EL 25V M 47U	C316
63	012731001	CAP EL 16V M 100U	C401
64	012961012	CAP MY 100V K 100N	C402
65	012443302	CAP PS 50V J 3N3	C403
66	012714702	CAP EL 50V M 4U7	C404
67	012961012	CAP MY 100V K 100N	C405
68	012961012	CAP MY 100V K 100N	C406
69	012633312	CAP CER 50V K 330P	C407
70	012956802	CAP MY 100V K 68N	C408
71	012723302	CAP EL 16V M 33U	C410
72	012951002	CAP MY 100V K 10N	C412
73	012731001	CAP EL 16V M 100U	C413
74	012733322	CAP EL 25V M 330U	C414
75	012632702	CAP CER 500V K 270P B	C415
76	012721051	CAP EL 250V M 10U	C416
77	012632702	CAP CER 500V K 270P B	C417
78	012564702	CAP PP 200V K 470N	C418
79	012711041	CAP EL 160V M 1U	C419
80	012554712	CAP PP 200V K 47N	C420
81	012554712	CAP PP 200V K 47N	C421
82	012732282	CAP EL 25V M 220U	C430
83	012651002	CAP CER 50V Z 10N F	C455
84	012714702	CAP EL 50V M 4U7	C601
85	012724732	CAP EL 25V M 47U	C603
86	012721072	CAP EL 25V M 10U	C604
87	012961012	CAP MY 100V K 100N	C605
88	012741012	CAP EL 25V M 1000U	C606
89	012734752	CAP EL 16V M 470U	C607
90	012724732	CAP EL 25V M 47U	C801
91	012731001	CAP EL 16V M 100U	C802
92	012148202	CAP PE 100V K 8N2	C803
93	012542212	CAP MPP 2KV J 2N2	C804
94	012632702	CAP CER 500V K 270P B	C805
95	012741052	CAP EL 16V M 1000U	C806

ITEM	PART NO.	DESCRIPTION	POS.
96	012632702	CAP CER 500V K 270P B	C807
97	012741012	CAP EL 25V M 1000U	C808
98	012632702	CAP CER 500V K 270P B	C809
99	012732272	CAP EL 160V M 220U	C810
100	012942222	CAP ECK-DNS 2N2 MEX	C811
101	012731202	CAP EL 400V M 120U	C812
102	012641032	CAP CER 500V K 1N B	C813
103	012641032	CAP CER 500V K 1N B	C814
104	012641032	CAP CER 500V K 1N B	C815
105	012641032	CAP CER 500V K 1N B	C816
106	012721001	CAP EL 16V M 10U	C817
107	012711012	CAP EL 50V M 1U	C818
108	012148202	CAP PE 100V K 8N2	C819
109	012631012	CAP CER 50V J 100P	C820
110	012732282	CAP EL 25V M 220U	C830
111	012161102	CAP PE 250VAC M 100N	C851
112	013003801	DIODE IN4148	D102
113	013003801	DIODE IN4148	D211
114	013008002	DIODE IN4003	D301
115	013019102	DIODE RU-1AV	D402
116	013019102	DIODE RU-1AV	D403
117	013018902	DIODE ERB24-06D	D404
118	013008002	DIODE IN4003	D406
119	013006502	DIODE KDS1553	D407
120	013003801	DIODE IN4148	D410
121	013019102	DIODE RU-1AV	D801
122	013019102	DIODE RU-1AV	D803
123	013004202	DIODE RGP 15J	D804
124	013019102	DIODE RU-1AV	D805
125	013019102	DIODE RU-1AV	D806
126	013019102	DIODE RU-1AV	D807
127	013329802	DELAY LINE	DL201
128	013905302	FUSE T 3.15A/250V	F851
129	013229402	IC LA7520	IC101
130	013229802	IC TDA3653	IC301
131	013229702	IC TDA2579	IC401
132	013229602	IC TDA2006	IC601
133	013229102	IC GL7812	IC701
134	013223402	IC TDA4601	IC801
135	011912202	RES MO 2W J 2R2	J37
136	013311602	COIL SPL 15UH	L102
137	013328202	COIL VIF	L104
138	013330002	COIL AFT	L105
139	013328302	COIL SAW	L106
140	013311602	COIL SPL 15UH	L107
141	013328102	COIL CHOKE 0.85UH	L161
142	013906402	CORE FERRITE	L401
143	013311502	COIL SPL 6800UH J	L402
144	013328002	COIL CHOKE 10UH	L404
145	013328002	COIL CHOKE 10UH	L405
146	013326402	COIL 1UH	L801
147	013326502	COIL SPL 2.2UH	L802

ITEM	PART NO.	DESCRIPTION	POS.
148	013906402	CORE FERRITE	L803
149	013326802	COIL HOR.CHOKE 1UH	L804
150	013616302	CONN 5P 5.08	P10
151	013625211	SOCKET TMK2014	P101
152	013613001	SOCKET TMK2003	P104
153	013616302	CONN 5P 5.08	P11
154	013615131	SOCKET TMK2006	P251
155	013606802	PIN FLAT WAFER 6P	P401
156	013616102	CONN 4P 3.96	P451
157	013616202	CONN 2P 3.96	P601
158	013607501	PIN FLAT WAFER 2P	P851
159	013607501	PIN FLAT WAFER 2P	P852
160	013104202	TR KTC388A	Q161
161	013104302	TR KTC1815-0	Q201
162	013117302	TR KTC2229-0	Q401
163	013116402	TR.2SD1911	Q402
164	013108102	TR.BU508A	Q801
165	011133301	RES CR 1/4W J 330R	R100
166	011132701	RES CR 1/4W J 270R	R101
167	011136801	RES CR 1/4W J 680R	R102
168	011132201	RES CR 1/4W J 220R	R103
169	011153901	RES CR 1/4W J 39K	R104
170	011141001	RES CR 1/4W J 1K	R105
171	011132201	RES CR 1/4W J 220R	R106
172	011148201	RES CR 1/4W J 8K2	R107
173	011142201	RES CR 1/4W J 2K2	R109
174	011141801	RES CR 1/4W J 1K8	R111
175	011154701	RES CR 1/4W J 47K	R112
176	011141001	RES CR 1/4W J 1K	R113
177	011141801	RES CR 1/4W J 1K8	R115
178	011152701	RES CR 1/4W J 27K	R116
179	011152201	RES CR 1/4W J 22K	R117
180	011141001	RES CR 1/4W J 1K	R119
181	011141001	RES CR 1/4W J 1K	R121
182	011142201	RES CR 1/4W J 2K2	R122
183	011132201	RES CR 1/4W J 220R	R123
184	011132201	RES CR 1/4W J 220R	R124
185	011154701	RES CR 1/4W J 47K	R160
186	011132201	RES CR 1/4W J 220R	R163
187	011145601	RES CR 1/4W J 5K6	R165
188	011141001	RES CR 1/4W J 1K	R167
189	011121801	RES CR 1/4W J 18R	R169
190	011121801	RES CR 1/4W J 18R	R183
191	011151001	RES CR 1/4W J 10K	R183
192	011133901	RES CR 1/4W J 390R	R213
193	011152201	RES CR 1/4W J 22K	R251
194	011156801	RES CR 1/4W J 68K	R255
195	011153301	RES CR 1/4W J 33K	R258
196	011145601	RES CR 1/4W J 5K6	R301
197	011151201	RES CF 1/4W J 12K	R302
198	011138201	RES CF 1/4W J 820R	R303
199	011128201	RES CF 1/4W J 82R	R304

ITEM	PART NO.	DESCRIPTION	POS.
200	011145601	RES CF 1/4W J 5K6	R305
201	011141001	RES CF 1/4W J 1K	R306
202	011163302	RES CF 1/4W J 330K	R307
203	011146801	RES CF 1/4W J 6K8	R308
204	011151501	RES CF 1/4W J 15K	R309
205	011132201	RES CF 1/4W J 220R	R310
206	011162201	RES CF 1/4W J 220K	R311
207	011141001	RES CF 1/4W J 1K	R312
208	011146801	RES CF 1/4W J 6K8	R313
209	011164701	RES CF 1/4W J 470K	R315
210	011133331	RES CF 1/2W J 330R	R316
211	011151001	RES CF 1/4W J 10K	R317
212	011151501	RES CF 1/4W J 15K	R318
213	011161801	RES CF 1/4W J 180K	R319
214	011409102	RES MF 1/2W J 0R91	R320
215	011133331	RES CF 1/2W J 330R	R321
216	011142201	RES CF 1/4W J 2K2	R322
217	011131001	RES CF 1/4W J 100R	R381
218	011131001	RES CF 1/4W J 100R	R382
219	011136801	RES CF 1/4W J 680R	R383
220	011151001	RES CF 1/4W J 10K	R402
221	011161001	RES CF 1/4W J 100K	R403
222	011141001	RES CF 1/4W J 1K	R404
223	011146801	RES CF 1/4W J 6K8	R405
224	011132201	RES CF 1/4W J 220R	R407
225	011141821	RES CF 1/2W J 1K8	R409
226	011154701	RES CF 1/4W J 47K	R410
227	011152201	RES CF 1/4W J 22K	R411
228	011141521	RES CF 1/2W J 1K5	R413
229	011152401	RES CF 1/4W J 24K	R416
230	011952202	RES MO 1/2W J 22K	R417
231	011931802	RES MO 1/2W J 180R	R418
232	011164712	RES CF 1/2W J 470K	R419
233	011312002	RES FUSING 2W J 2R	R422
234	011812202	RES W/W 5W K 2R2	R423
235	011155601	RES CF 1/4W J 56K	R425
236	011141001	RES CF 1/4W J 1K	R426
237	011152201	RES CF 1/4W J 2K	R428
238	011942222	RES MO 1/2W J 2K2	R429
239	011141501	RES CF 1/4W J 1K5	R432
240	011161001	RES CF 1/4W J 100K	R602
241	011161001	RES CF 1/4W J 100K	R603
242	011148201	RES CF 1/4W J 8K2	R604
243	011158201	RES CF 1/4W J 82K	R605
244	011412202	RES MF 1/2W J 2R2	R606
245	011421102	RES MF 1W J 10R	R607
246	011161001	RES CF 1/4W J 100K	R608
247	011406802	RES MF 1/4W J 0R68	R801
248	011161001	RES CF 1/4W J 100K	R802
249	011132201	RES CF 1/4W J 220R	R803
250	011141201	RES CF 1/4W J 1K2	R804
251	011151201	RES CF 1/4W J 12K	R805

ITEM	PART NO.	DESCRIPTION	POS.
252	011151001	RES CF 1/4W J 10K	R806
253	011931001	RES MO 1W J 100R	R807
254	011162721	RES CF 1/2W J 270K	R808
255	011131001	RES CF 1/4W J 100R	R809
256	011831802	RES W/W 5W J 180R	R810
257	011311012	RES FUSING 1/2W J 1R	R811
258	011161041	RES CF 1/2W J 100K	R812
259	011311012	RES FUSING 1/2W J 1R	R813
260	011974752	RES SAFETY 1/2W 4M7	R814
261	011168201	RES CF 1/4W J 820K	R815
262	011814722	RES W/W 5W J 4R7	R816
263	011942712	RES MO 1/2W J 2K7	R817
264	013915211	RELAY	RL401
265	013328402	TRANS LINE DRIVER	T401
266	013330351	TRANS FBT	T402
	013330361	TRANS FBT (SUN)	
267	013328502	TRANS SMPS	T801
268	013326602	COIL LINE (27MH)	T851
269	013915402	PTC P2462-J29	TH801
270	013906802	TERM PTH451A02BG180M290	TH851
271	011002702	POT SR-19R 10K	VR101
272	011002702	POT SR-19R 10K	VR301
273	011008002	POT SR-19R 220K	VR302
274	011002402	POT SR-19R 1KB	VR380
275	011002702	POT SR-19R 10K	VR401
276	011002802	POT SR-19R 100K	VR402
277	011002502	POT SR-19R 4K7	VR801
278	013329652	FILTER SAW 39.5Z	Z101
279	013329502	DISCR. CER CDA6.0MHZ	Z102
280	013329402	TRAP CER TPS6.0MHZ	Z103
281	013329302	FILTER CER SFE6.0MHZ	Z104

CRT BASE PCB ASSY

282	012635602	CAP CER 50V J 560P	C901
283	012633322	CAP CER 50V J 330P	C902
284	012635602	CAP CER 50V J 560P	C903
285	012633322	CAP CER 50V J 330P	C904
286	012635602	CAP CER 50V J 560P	C905
287	012633322	CAP CER 50V J 330P	C906
288	012651112	CAP CER 1KV P 10N	C907
289	012152262	CAP PE 100V K 22N	C908
290	012714782	CAP EL 16V M 4U7	C910
291	013006802	DIODE IS2471	D901
292	013008002	DIODE IN4003	D902
293	013008002	DIODE IN4003	D903
294	013008002	DIODE IN4003	D904
295	013104802	TR KTC2068	Q901
296	013116502	TR BF421	Q902
297	013104802	TR KTC2068	Q903
298	013116502	TR BF421	Q904
299	013104802	TR KTC2068	Q905

ITEM	PART NO.	DESCRIPTION	POS.
300	013116502	TR BF421	Q906
301	013104102	TR KTA1015-Y	Q907
302	011141201	RES CF 1/4W J 1K2	R901
303	011132701	RES CF 1/4W J 270R	R902
304	011123302	RES CF 1/4W J 33R	R903
305	011166812	RES CF 1/2W J 680K	R904
306	011141201	RES CF 1/4W J 1K2	R905
307	011141521	RES CF 1/2W J 1K5	R906
308	011951201	RES MO 1W J 12K	R907
309	011141201	RES CF 1/4W J 1K2	R908
310	011132701	RES CF 1/4W J 270R	R909
311	011123302	RES CF 1/4W J 33R	R910
312	011166812	RES CF 1/2W J 680K	R911
313	011141201	RES CF 1/4W J 1K2	R912
314	011141521	RES CF 1/2W J 1K5	R913
315	011951201	RES MO 1W J 12K	R914
316	011141201	RES CF 1/4W J 1K2	R915
317	011132701	RES CF 1/4W J 270R	R916
318	011123302	RES CF 1/4W J 33R	R917
319	011166812	RES CF 1/2W J 680K	R918
320	011141201	RES CF 1/4W J 1K2	R919
321	011141521	RES CF 1/2W J 1K5	R920
322	011951201	RES MO 1W J 12K	R921
323	011132401	RES CF 1/4W J 240R	R922
324	011141501	RES CF 1/4W J 1K5	R923
325	011171001	RES CF 1/4W J 1M	R924
326	011164712	RES CF 1/2W J 470K	R925
327	011134701	RES CF 1/4W J 470R	R952
328	011007802	POT SR-29D 1K	VR951
329	011007802	POT SR-29D 1K	VR953
	013616502	CRT SOCKET (FOR G.S)	
	013620101	CRT SOCKET (FOR HIT.)	

PAL PCB ASSY

330	012651002	CAP CER 50V Z 10N F	C501
331	012651002	CAP CER 50V Z 10N F	C502
332	012626812	CAP CER 50V J 68P SL	C503
333	012621502	CAP CER 50V J 15P CH	C504
334	012953302	CAP MY 100V K 33N	C505
335	012711012	CAP EL 50V M 1UC506	
336	012651002	CAP CER 50V Z 10N F	C507B
337	012953302	CAP MY 100V K 33N	C508
338	012164712	CAP MR 100V J 470N	C509
339	012164712	CAP MR 100V J 470N	C510
340	012714702	CAP.EL,50V M 4U7	C511
341	012721001	CAP EL 16V M 10U	C512
342	012164712	CAP MR 100V J 470N	C513
343	012702212	CAP EL 50V M 220N	C514
344	012714702	CAP EL 50V M 4U7	C515
345	012714702	CAP EL 50V M 4U7	C516
346	012651002	CAP CER 50V Z 10N F	C517

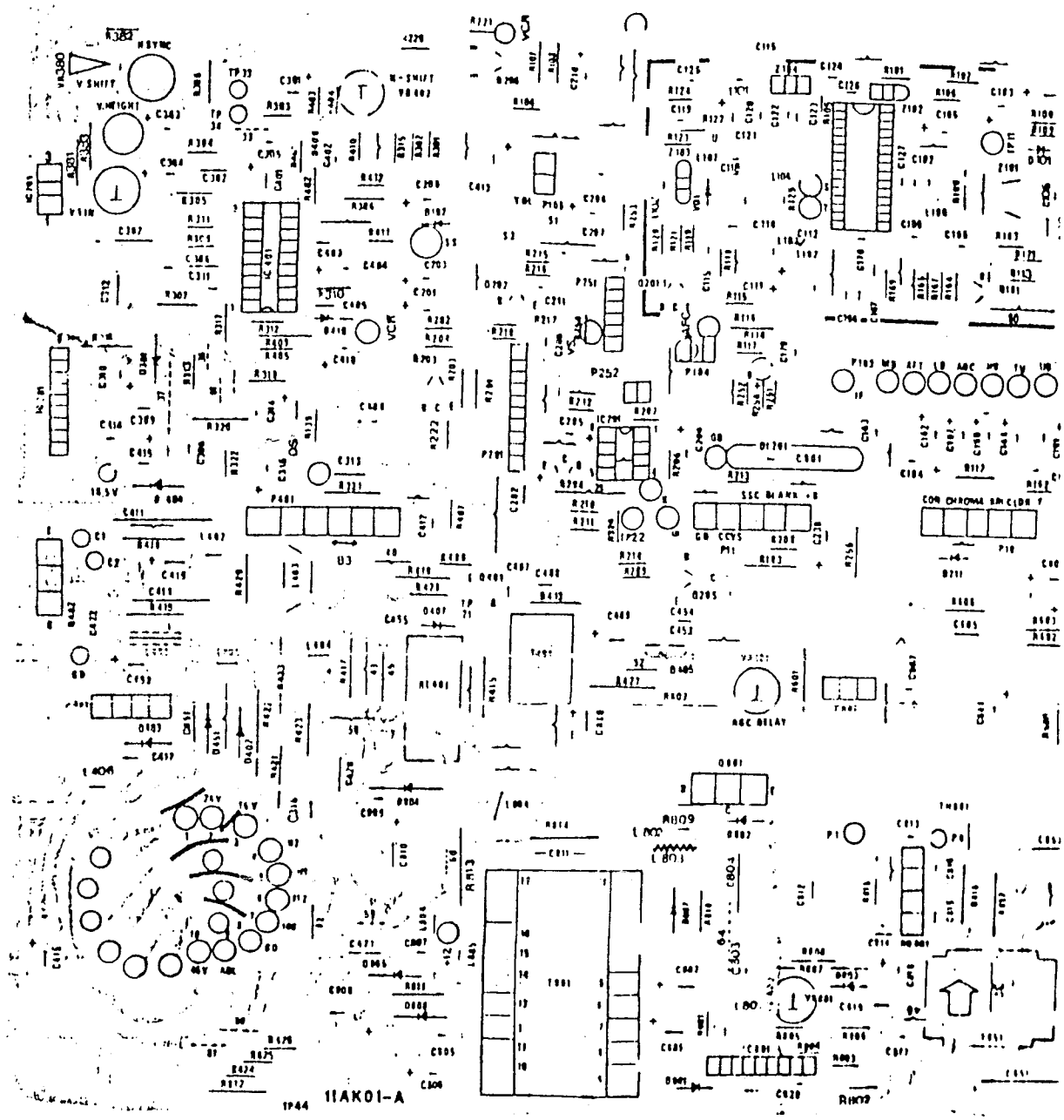
ITEM	PART NO.	DESCRIPTION	POS.
347	012714702	CAP EL 50V M 4U7	C518
348	012731001	CAP EL 16V M 100U	C519
349	012724742	CAP EL 16V M 47U	C520
350	012661052	CAP CER 50V Z 100N F	C521
351	013008002	DIODE IN4003	D501
352	013003801	DIODE IN4148	D502
353	013003801	DIODE IN4148	D503
354	013003801	DIODE IN4148	D506
355	013327202	DELAY LINE (4.43MHZ)	DL501
356	013327702	DELAY LINE 1H ADL-CP344E	DL502
357	013203301	IC TDA3562A	IC501
358	013326302	COIL PEAKING PL100JF	L501
359	013329702	COIL DELAY ADJ.1H	L502
360	013618152	SOCKET TMK2005	P500
361	013616802	PIN MOLEX 5045-06AH 2.5	P501
362	013615902	SOCK.HOUSING 2767-05AH 5.08	P504
363	013615902	SOCK.HOUSING 2767-05AH 5.08	P505
364	013104102	TR.KTA1015-Y	Q501
365	011133901	RES CF 1/4W J 390R	R501
366	011131001	RES CF 1/4W J 100R	R502
367	011133901	RES CF 1/4W J 390R	R504
368	011131001	RES CF 1/4W J 100R	R507
369	011133901	RES CF 1/4W J 390R	R509
370	011151501	RES CF 1/4W J 15K	R510
371	011151001	RES CF 1/4W 10K J	R512
372	011161801	RES CF 1/4W J 180K	R513
373	011141801	RES CF 1/4W J 1K8	R514
374	011161201	RES CF 1/4W J 120K	R515
375	011141801	RES CF 1/4W J 1K8	R516
376	011151001	RES CF 1/4W 10K J	R517
377	011141001	RES CF 1/4W J 1K	R518
378	011161001	RES CF 1/4W J 100K	R520
379	011168201	RES CF 1/4W J 820K	R521
380	011141001	RES CF 1/4W J 1K	R523
381	011136801	RES CF 1/4W J 680R	R524
382	011142201	RES CF 1/4W J 2K2	R525
383	011141801	RES CF 1/4W J 1K8	R526
384	011132701	RES CF 1/4W J 270R	R527
385	011002402	POT SR-19R 1KB	VR501
386	011002502	POT SR-19R 4K7	VR502
387	013915311	XTAL 8.867MHZ	X501
R/C PREAMPLIFIER PCB ASSY			
388	012651102	CAP CER 25V K 10N B	C2301
389	012641202	CAP CER 50V K 1N2 B	C2302
390	012722262	CAP EL 16V M 22U	C2303
391	012712280	CAP EL 16V M 2U2	C2304
392	013000501	DIODE BPW41	D2301
393	013226102	IC TBA2800	IC2301
394	011131001	RES CF 1/4W J 100R	R2301
395	011131001	RES CF 1/4W J 100R	R2302

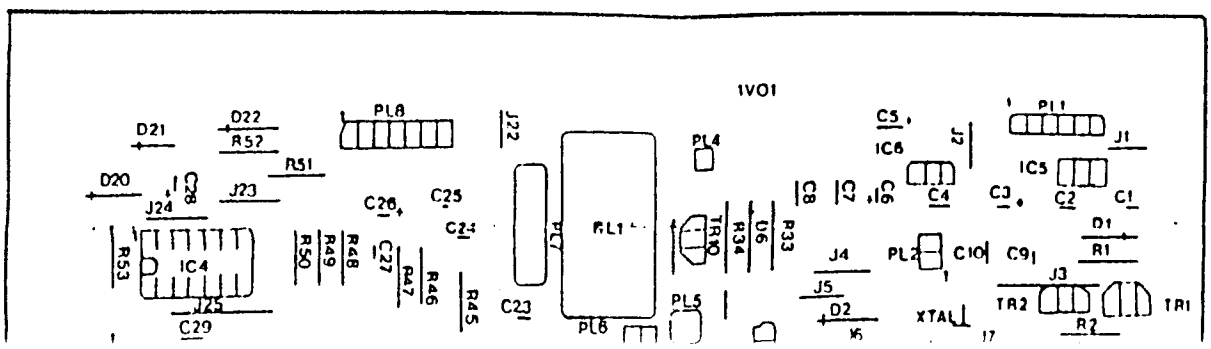
ITEM	PART NO.	DESCRIPTION	POS.
DISPLAY PCB ASSY			
396	013016902	LED DISP COMMON ANODE RED	DP2201
R/C RECEIVER PCB ASSY			
397	012961022	CAP MY 100V J 100N	C2001
398	012652212	CAP CER 50V K 22N	C2002
399	012721062	CAP EL 35V M 10U	C2003
400	012961022	CAP MY 100V J 100N	C2004
401	012642201	CAP CER 50V K 2N2 B	C2004B
402	012721062	CAP EL 35V M 10U	C2005
403	012721062	CAP EL 35V M 10U	C2006
404	012652212	CAP CER 50V K 22N	C2007
405	012661052	CAP CER 50V Z 100N F	C2008
406	012661052	CAP CER 50V Z 100N F	C2009
407	012721062	CAP EL 35V M 10U	C2010
408	012712280	CAP EL 50V M 2U2	C2011
409	012624712	CAP CER 50V K 47P B	C2012
410	012651102	CAP CER 25V K 10N B	C2013
411	012634722	CAP CER 50V K 470P B	C2014
412	012164742	CAP PE 63V K 470N	C2015
413	012162242	CAP PE 63V K 220N	C2016
414	012661052	CAP CER 50V Z 100N F	C2017
415	012721062	CAP EL 35V M 10U	C2018
416	012631012	CAP CER 50V J 100P 2L	C2020
417	012641022	CAP CER 50V K 1N	C2021
418	012734702	CAP EL 6V3 M 470U	C2022
419	012661052	CAP CER 50V Z 100N F	C2023
420	012661052	CAP CER 50V Z 100N F	C2024
421	012661052	CAP CER 50V Z 100N F	C2025
422	012721062	CAP EL 35V M 10U	C2027
423	012721062	CAP EL 35V M 10U	C2028
424	012631012	CAP CER 50V J 100P SL	C2029
425	012711021	CAP EL 16V M 1U	C2030
426	012642201	CAP CER 50V K 2N2 B	C2043
427	012661052	CAP CER 50V Z 100N F	C2043B
428	013017002	DIODE ZPD20	D2001
429	013003801	DIODE IN4148	D2003
430	013017102	DIODE ZPD5V6	D2004
431	013017202	DIODE ZTK33	D2005
432	013003801	DIODE IN4148	D2008
433	013003801	DIODE IN4148	D2009
434	013003801	DIODE IN4148	D2010
435	013003801	DIODE IN4148	D2011
436	013003801	DIODE IN4148	D2021
437	013003801	DIODE IN4148	D2023
438	013225802	IC SA1293-3	IC2001
439	013225902	IC MDA2061	IC2002
440	013226701	IC HFE4066	IC2004
441	013226002	IC TDD1605S	IC2005
442	013226002	IC TDD1605S	IC2006

ITEM	PART NO.	DESCRIPTION	POS.
443	013009802	DIODE ZTE2V4	J32
444	013615161	SOCKET TMK2012	PL10
445	013615141	SOCKET TMK2010	PL11
446	013613001	SOCKET TMK2003	PL12
447	013615191	SOCKET TMK2007	PL8
448	013120702	TR.BC548B/BC547B/BC237B	Q2001
449	013120702	TR.BC548B/BC547B/BC237B	Q2002
450	013115102	TR BF240	Q2003
451	013120902	TR.BC558B/BC308B	Q2004
452	013120902	TR.BC558B/BC308B	Q2005
453	013120902	TR.BC558B/BC308B	Q2006
454	013120902	TR.BC558B/BC308B	Q2007
455	013120902	TR.BC558B/BC308B	Q2008
456	013117202	TR BC517	Q2010
457	013120702	TR.BC548B/BC547B/BC237B	Q2014
458	011951522	RES MO 1W J 15K	R2001
459	011133301	RES CF 1/4W J 330R	R2002
460	011133301	RES CF 1/4W J 330R	R2003
461	011142201	RES CF 1/4W J 2K2	R2004
462	011154701	RES CF 1/4W J 47K	R2005
463	011135601	RES CF 1/4W J 560R	R2006
464	011151001	RES CF 1/4W J 10K	R2007
465	011171001	RES CF 1/4W J 1M	R2008
466	011134701	RES CF 1/4W J 470R	R2009
467	011134701	RES CF 1/4W J 470R	R2010
468	011154701	RES CF 1/4W J 47K	R2011
469	011151501	RES CF 1/4W J 15K	R2013
470	011153901	RES CF 1/4W J 39K	R2014
471	011144701	RES CF 1/4W J 4K7	R2015
472	011151001	RES CF 1/4W J 10K	R2017
473	011951522	RES MO 1W J 15K	R2018
474	011151001	RES CF 1/4W J 10K	R2022
475	011151001	RES CF 1/4W J 10K	R2023
476	011151001	RES CF 1/4W J 10K	R2024
477	011151001	RES CF 1/4W J 10K	R2025
478	011122202	RES CF 1/4W J 22R	R2026
479	011152201	RES CF 1/4W J 22K	R2027
480	011152201	RES CF 1/4W J 22K	R2028
481	011152201	RES CF 1/4W J 22K	R2029
482	011152201	RES CF 1/4W J 22K	R2030
483	011154701	RES CF 1/4W J 47K	R2031
484	011144701	RES CF 1/4W J 47K	R2032
485	011143301	RES CF 1/4W J 3K3	R2034
486	011144701	RES CF 1/4W J 4K7	R2035
487	011141001	RES CF 1/4W J 1K	R2036
488	011153301	RES CF 1/4W J 33K	R2038
489	011168201	RES CF 1/4W J 820K	R2041
490	011154701	RES CF 1/4W J 47K	R2042
491	011146801	RES CF 1/4W J 6K8	R2043
492	011142201	RES CF 1/4W J 2K2	R2044
493	011152701	RES CF 1/4W J 27K	R2045
494	011146801	RES CF 1/4W J 6K8	R2046

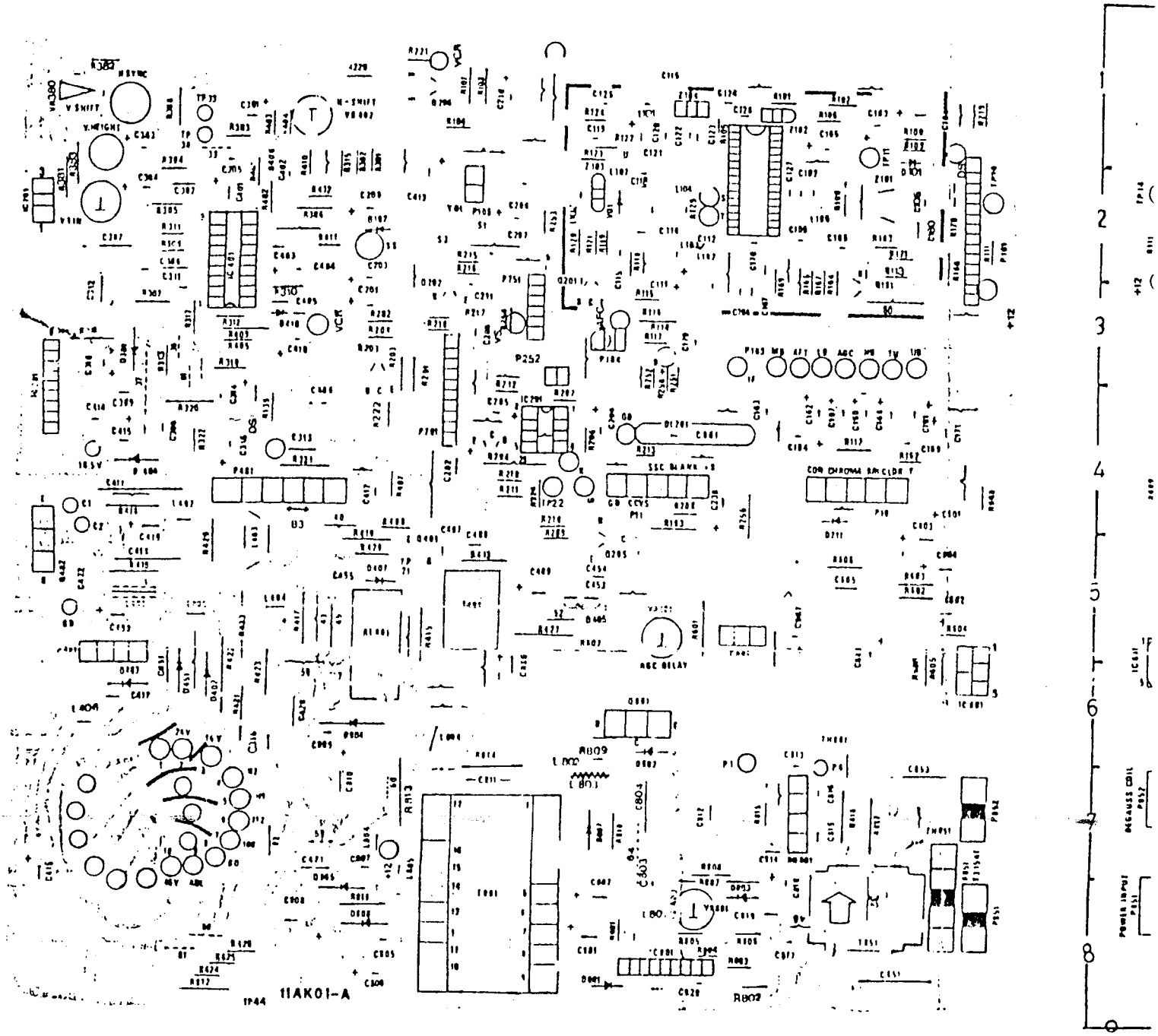
ITEM	PART NO.	DESCRIPTION	POS.
495	011143901	RES CF 1/4W J 3K9	R2047
496	011142201	RES CF 1/4W J 2K2	R2048
497	011131801	RES CF 1/4W J 180R	R2049
498	011141001	RES CF 1/4W J 1K	R2050
499	011152701	RES CF 1/4W J 27K	R2051
500	011162201	RES CF 1/4W J 220K	R2047
501	011155601	RES CF 1/4W J 56K	R2067
502	011152701	RES CF 1/4W J 27K	R2068
503	011151001	RES CF 1/4W J 10K	R2084
504	011154701	RES CF 1/4W J 47K	R2085
505	011152201	RES CF 1/4W J 22K	R2086
506	011133301	RES CF 1/4W J 330R	R2087
507	011133301	RES CF 1/4W J 330R	R2088
508	011133301	RES CF 1/4W J 330R	R2089
509	011133301	RES CF 1/4W J 330R	R2090
510	011133301	RES CF 1/4W J 330R	R2091
511	011133301	RES CF 1/4W J 330R	R2092
512	011133301	RES CF 1/4W J 330R	R2093
513	011133301	RES CF 1/4W J 330R	R2094
514	013906702	XTAL 4.43MHZ	XTAL

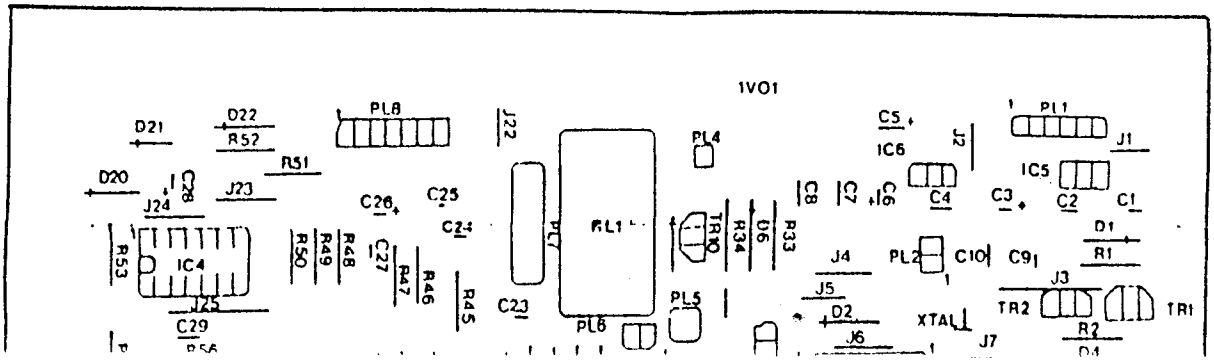
11 AK 01 COMPONENT LAYOUT DIAGRAM - COPPER SIDE

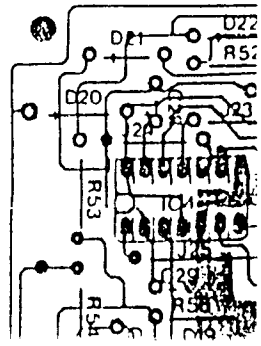




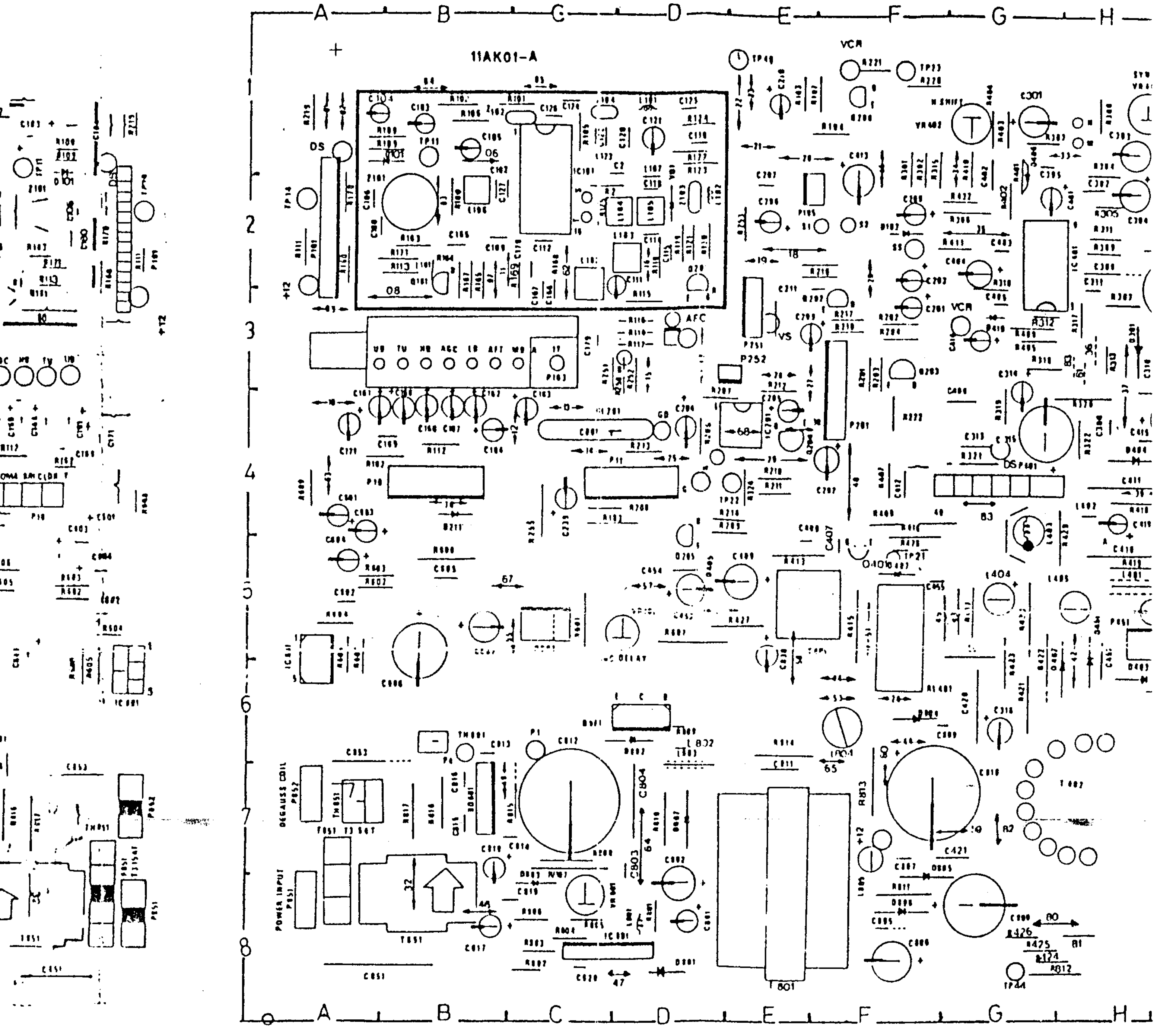
11 AK 01 COMPONENT LAYOUT DIAGRAM - COPPER SIDE

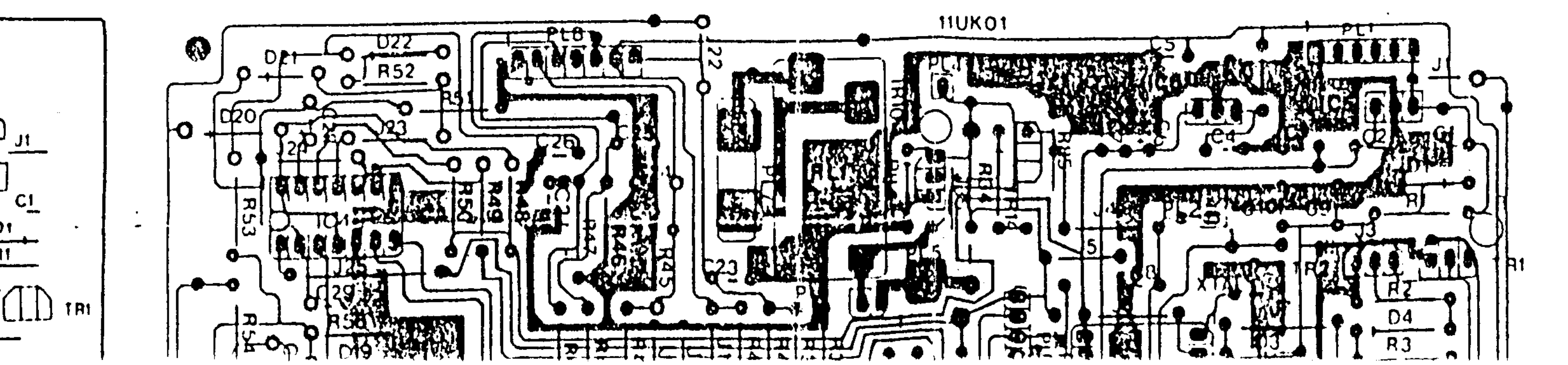




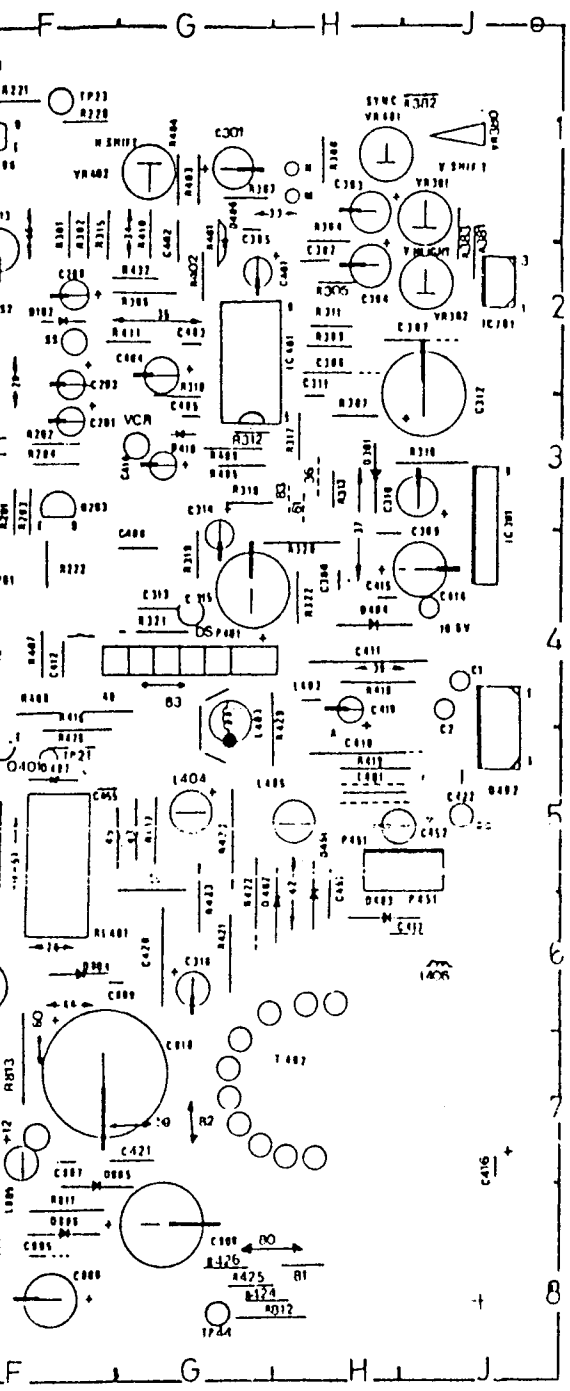


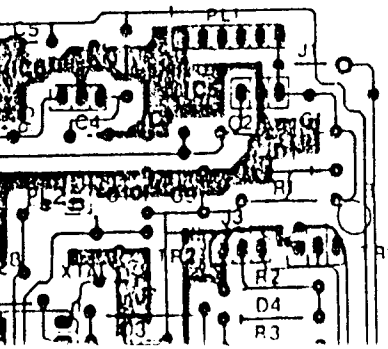
11 AK 01 COMPONENT LOCATION DIAGRAM - COMPONENT SIDE

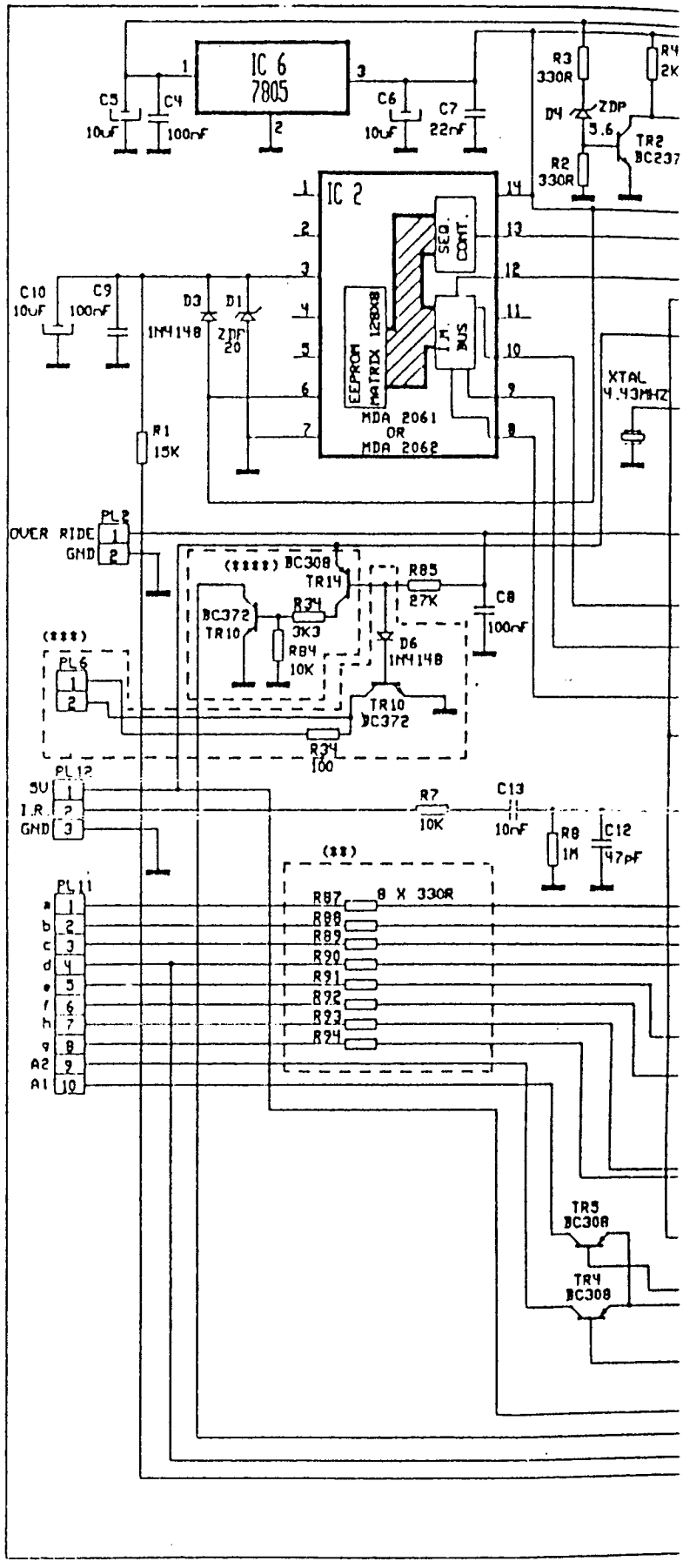


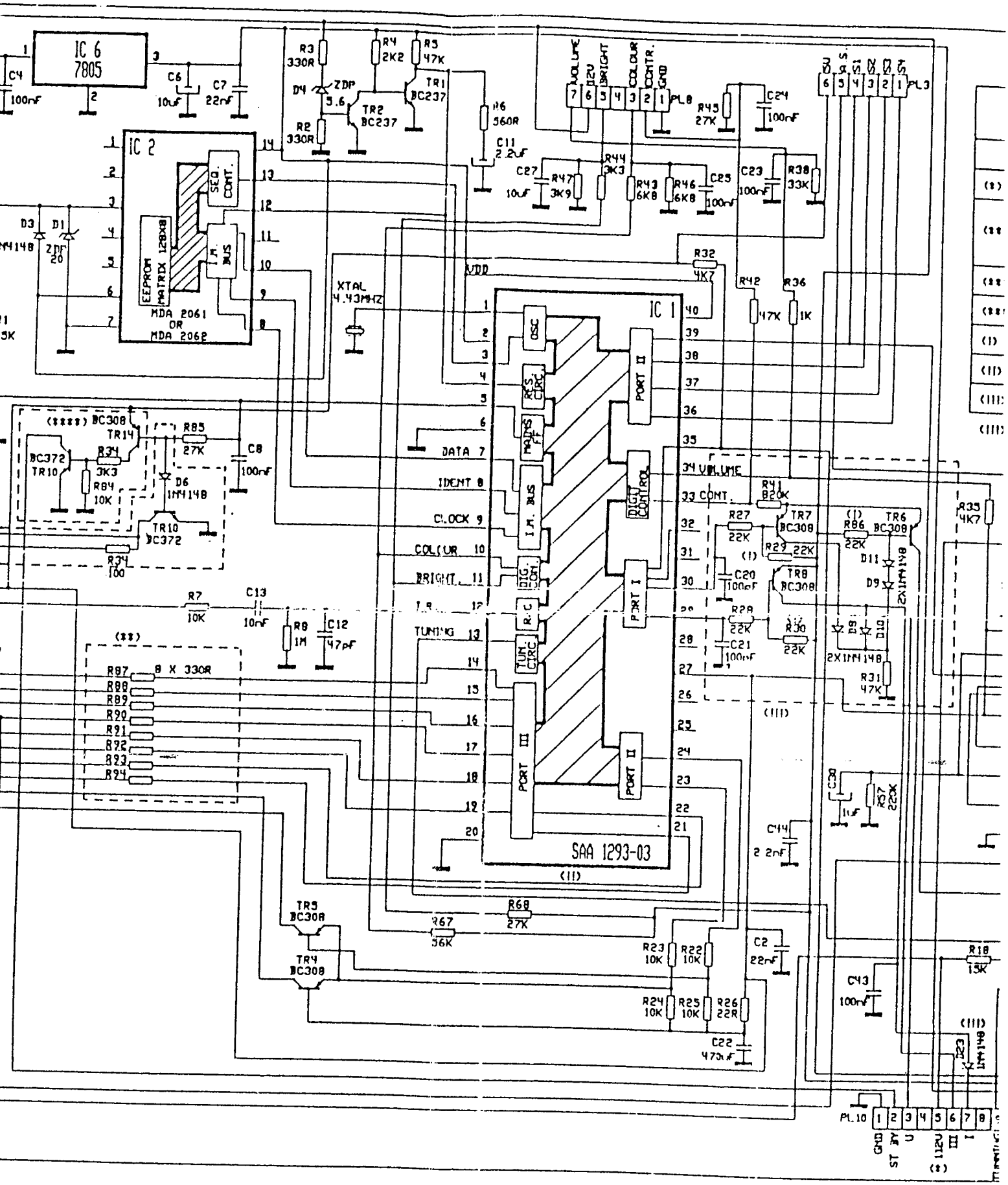


RAM - COMPONENT SIDE

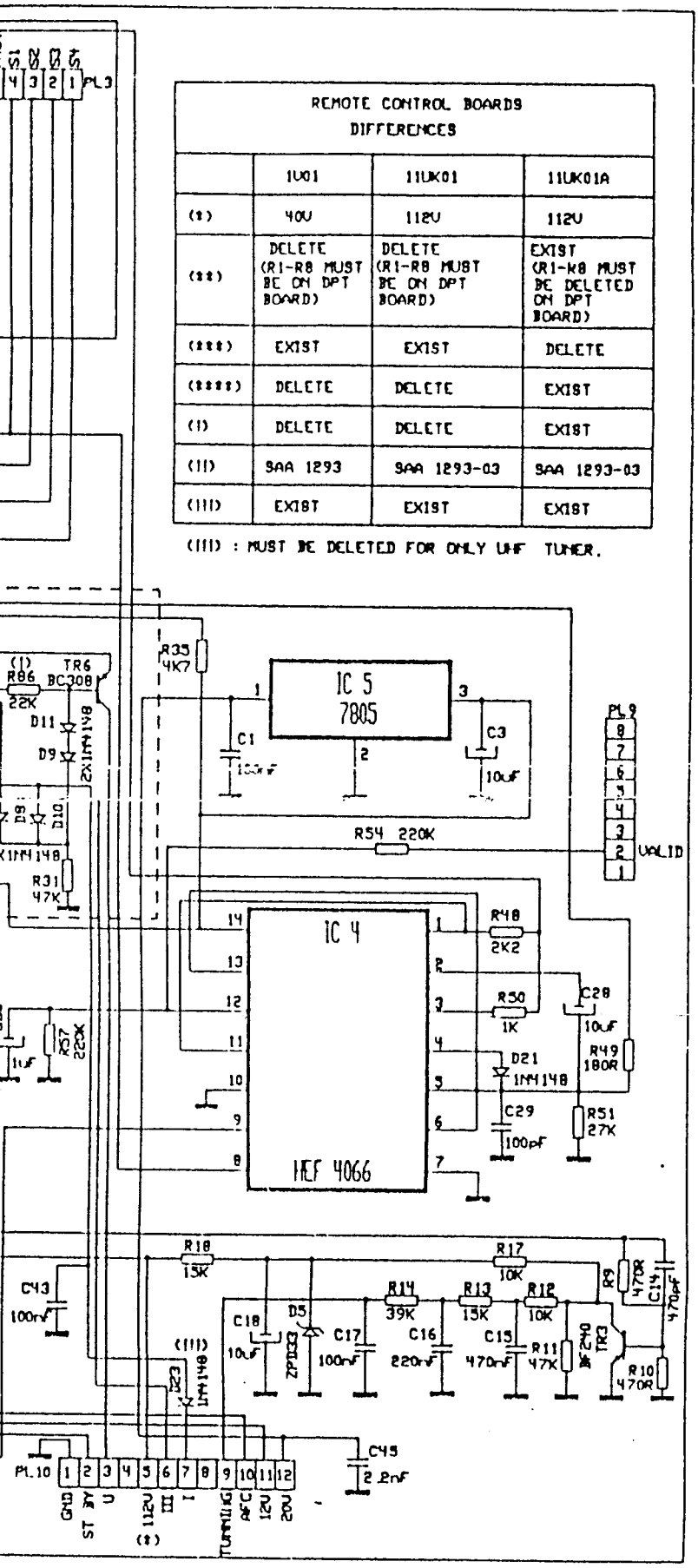






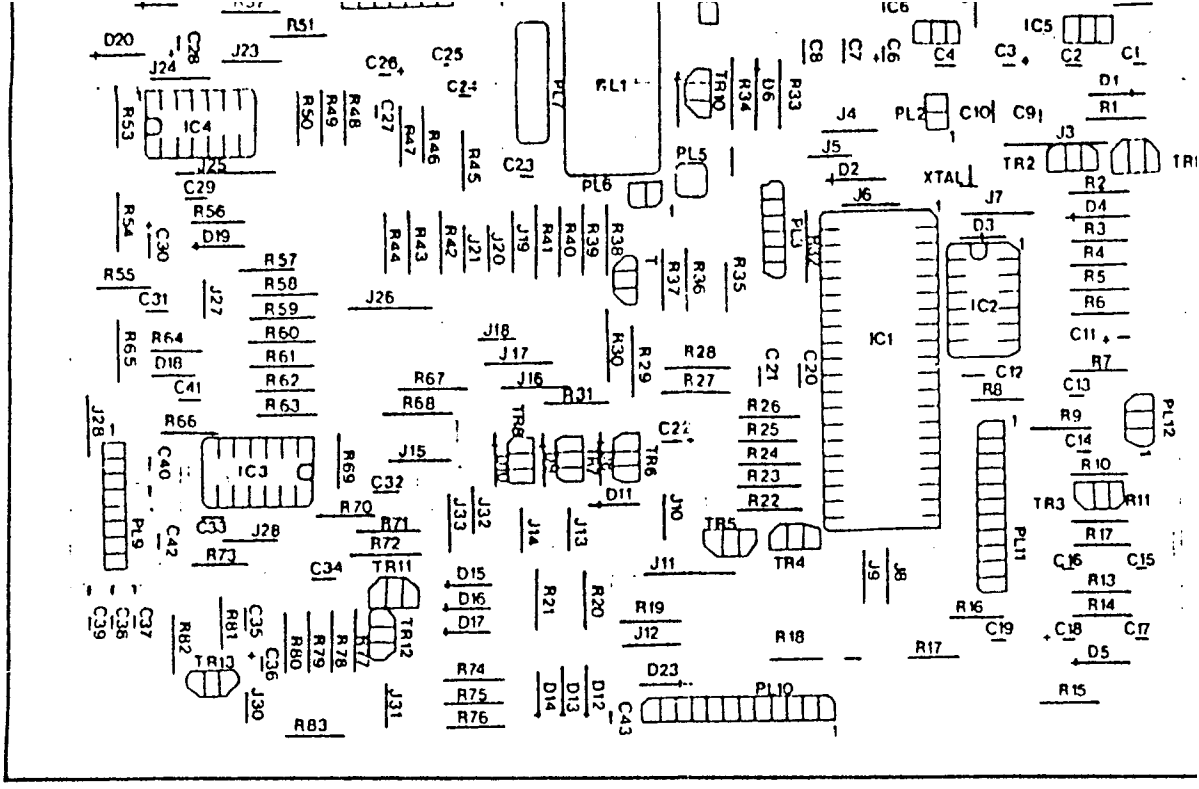


REMOTE CONTROL RECEIVER BOARDS
CIRCUIT DIAGRAM

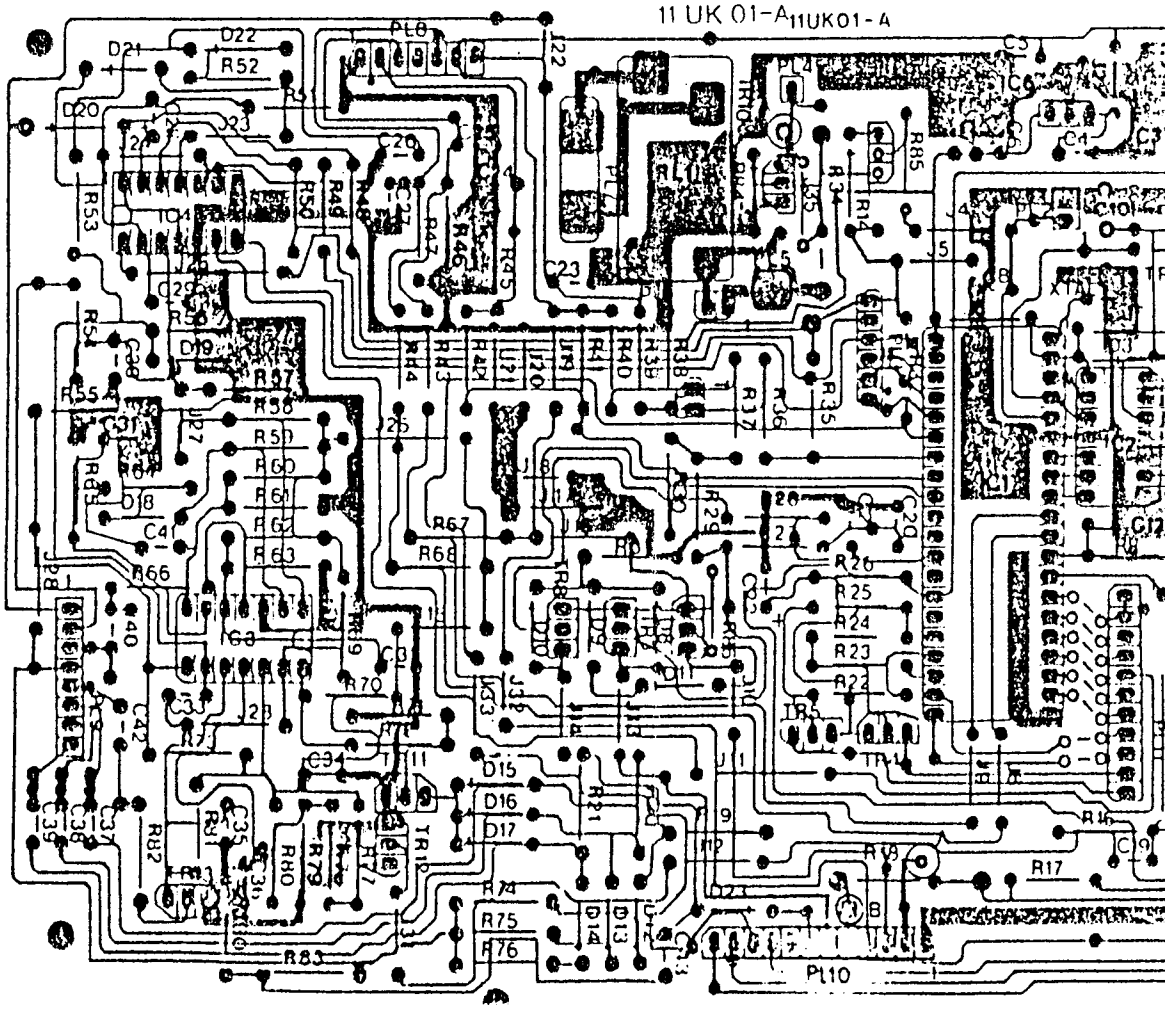


REMOTE CONTROL BOARDS DIFFERENCES			
	1U01	11UK01	11UK01A
(*)	40V	112V	112V
(**)	DELETE (R1-R8 MUST BE ON DPT BOARD)	DELETE (R1-R8 MUST BE ON DPT BOARD)	EXIST (R1-R8 MUST BE DELETED ON DPT BOARD)
(***)	EXIST	EXIST	DELETE
(****)	DELETE	DELETE	EXIST
(I)	DELETE	DELETE	EXIST
(II)	SAA 1293	SAA 1293-03	SAA 1293-03
(III)	EXIST	EXIST	EXIST

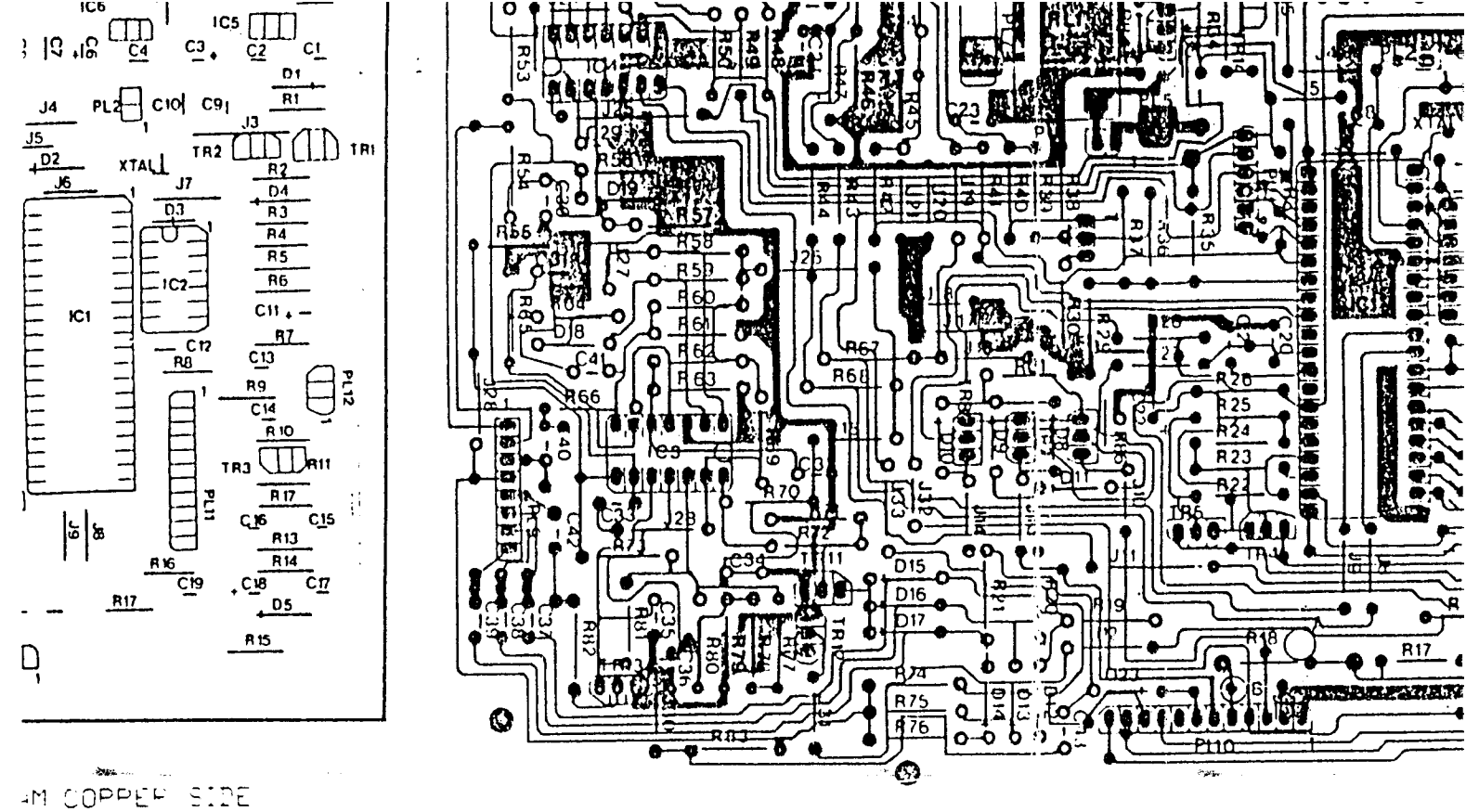
(III) : MUST BE DELETED FOR ONLY UHF TUNER.



1V01 COMPONENT LAYOUT DIAGRAM COPPER SIDE

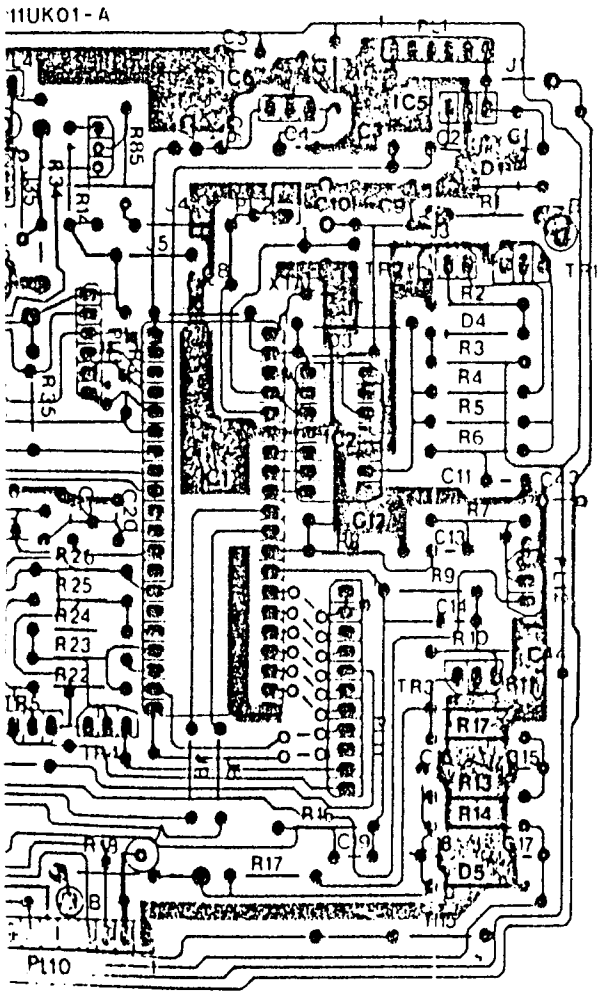


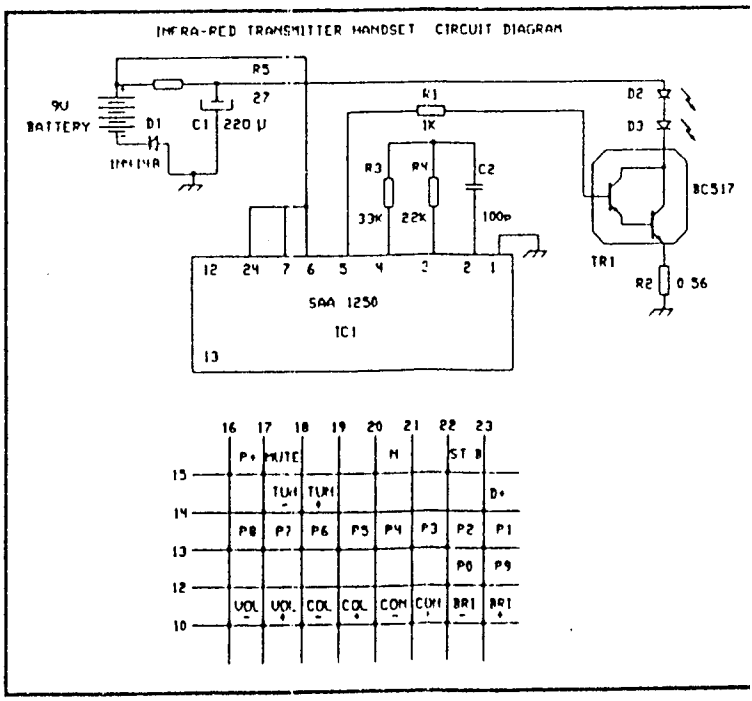
11UK01A COMPONENT LAYOUT DIAGRAM COPPER SIDE



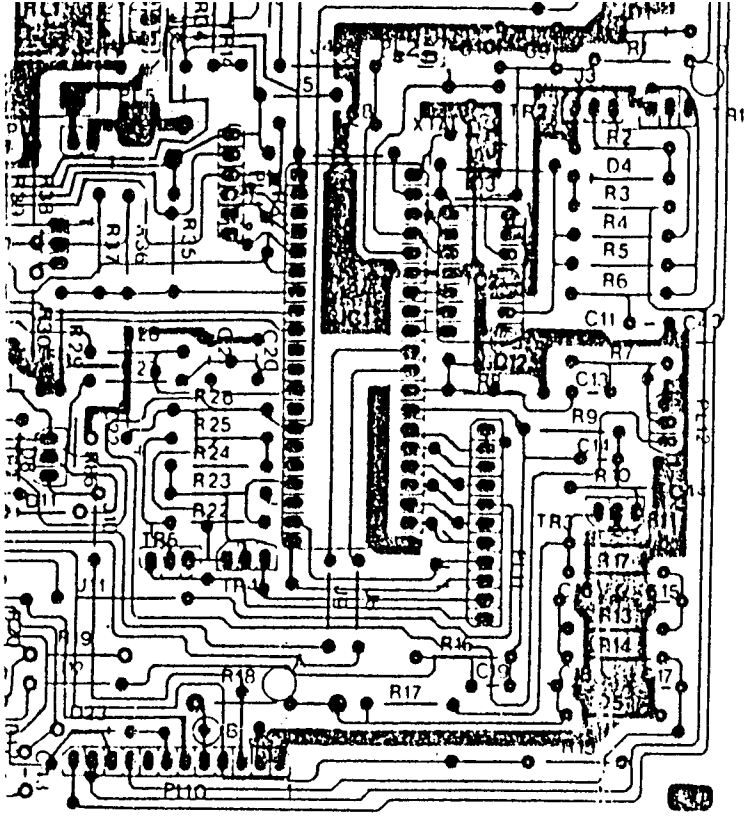
-M COPPER SIDE

11UK01 COMPONENT LAYOUT DIAGRAM COPPER S

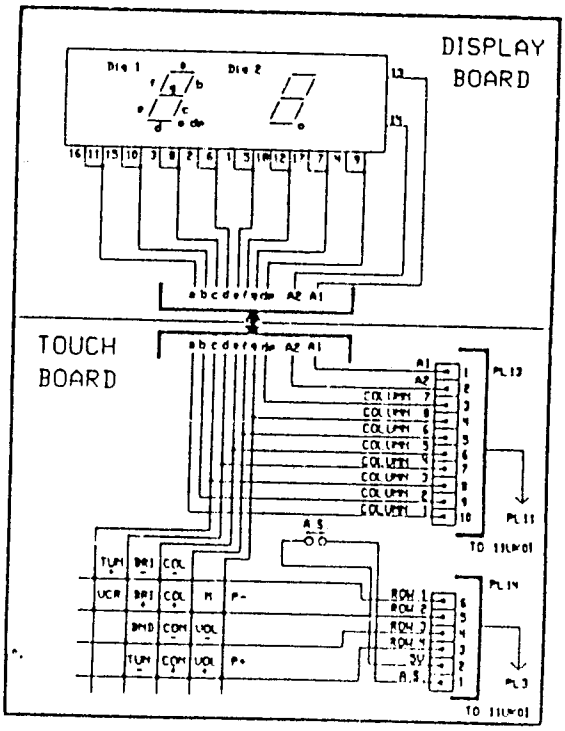


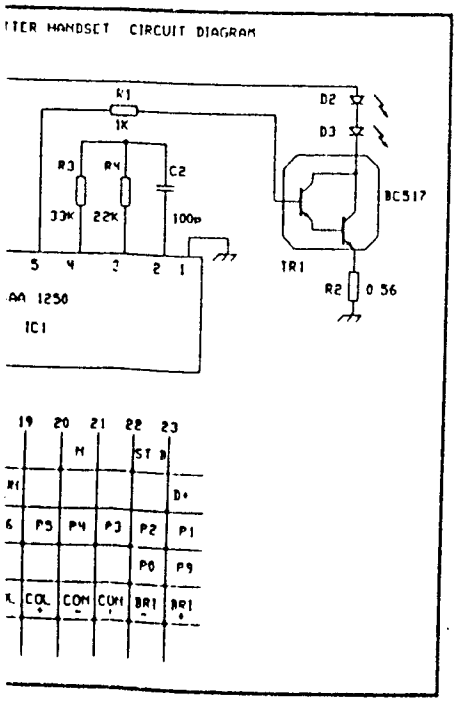


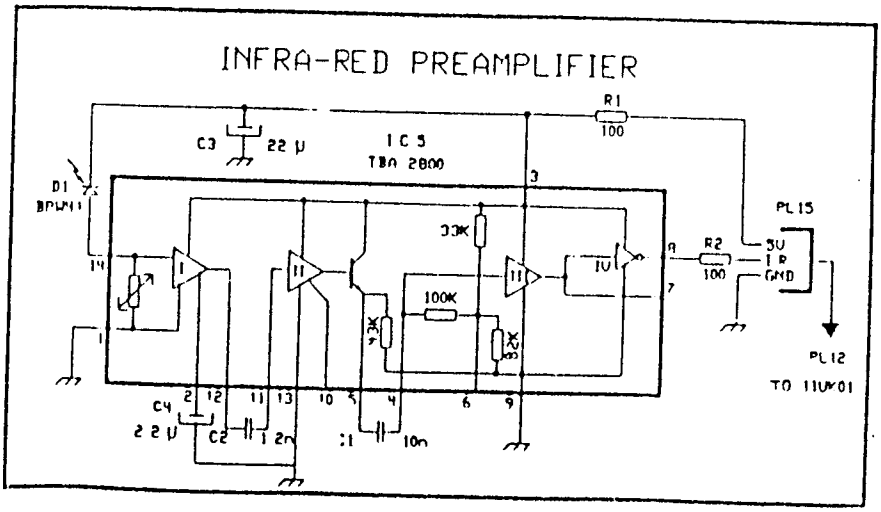
IAGRAM COPPER SIDE



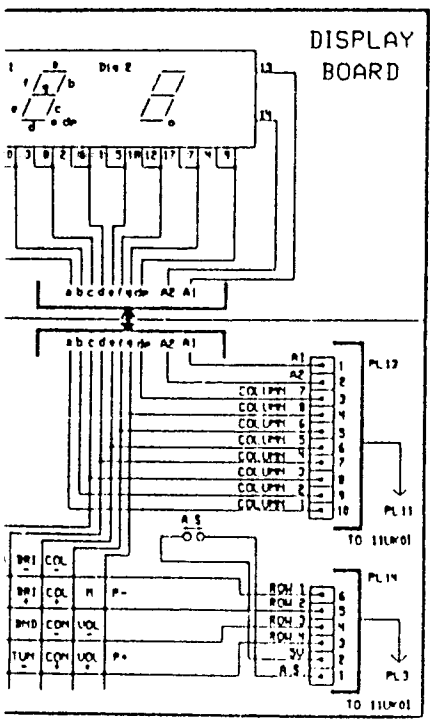
LAYOUT DIAGRAM COPPER SIDE

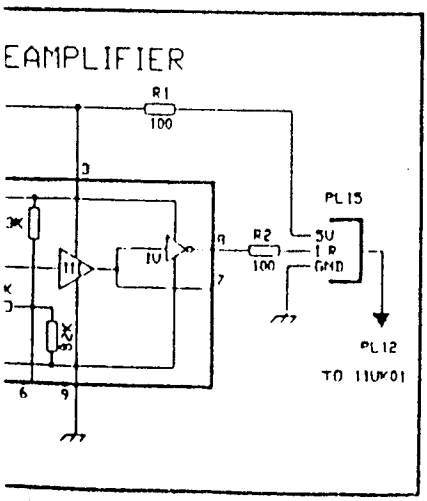






REMOTE CONTROL RECEIVER BOA
CIRCUIT DIAGRAM

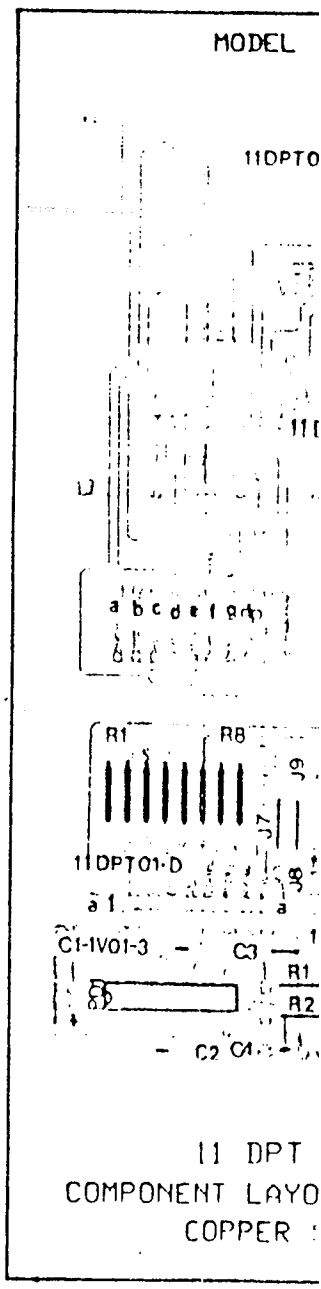




PLUG CONNECTIONS OF REMOTE CONTROL BOARD

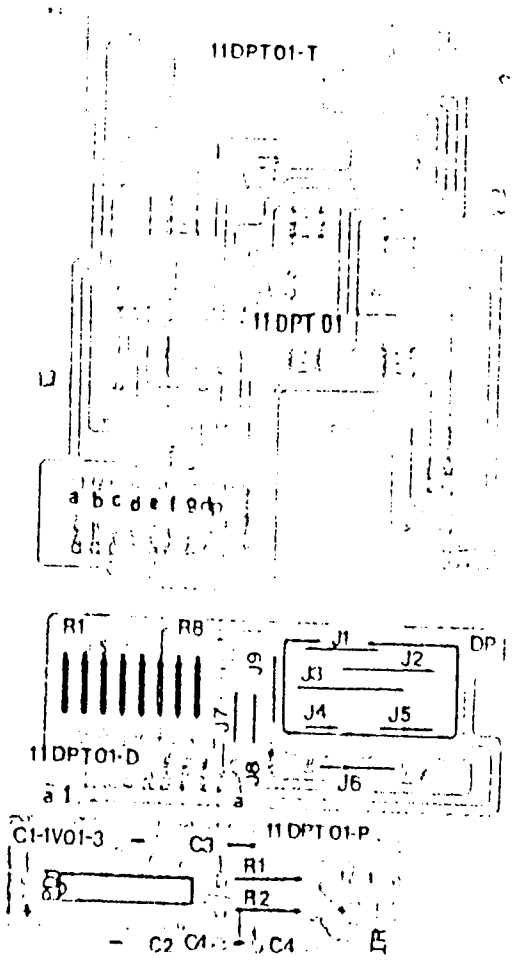
PLUG NO	PIN NO	PIN NO	PLUG NO	MODULE NO
PL12	1 ⟷ 1 2 ⟷ 2 3 ⟷ 3		PL15	1U01-3
PL11	1 ⟷ 11 2 ⟷ 10 3 ⟷ 9 4 ⟷ 8 5 ⟷ 7 6 ⟷ 6 7 ⟷ 5 8 ⟷ 4 9 ⟷ 3 10 ⟷ 2 11 ⟷ 1		PL13	1U01-2 (11 DPT 01)
PL 3	1 ⟷ 6 2 ⟷ 5 3 ⟷ 4 4 ⟷ 3 5 ⟷ 2 6 ⟷ 1		PL14	1U01-3 (11 DPT 01)
PL 2	1 2	OVERRIDE	POWER	SWITCH
PL10	1 ⟷ 1 2 ⟷ 2 3 ⟷ 3 4 ⟷ 4 5 ⟷ 5 6 ⟷ 6 7 ⟷ 7 8 ⟷ 8 9 ⟷ 9 10 ⟷ 10 11 ⟷ 11 12 ⟷ 12 13 ⟷ 13 14 ⟷ 14		P101	11UK01
PL8	1 ⟷ 6 2 ⟷ 5 3 ⟷ 4 4 ⟷ 3 5 ⟷ 2 6 ⟷ 1		P251	11UK01

MODULE CODES in parenthesis are used for model 2321



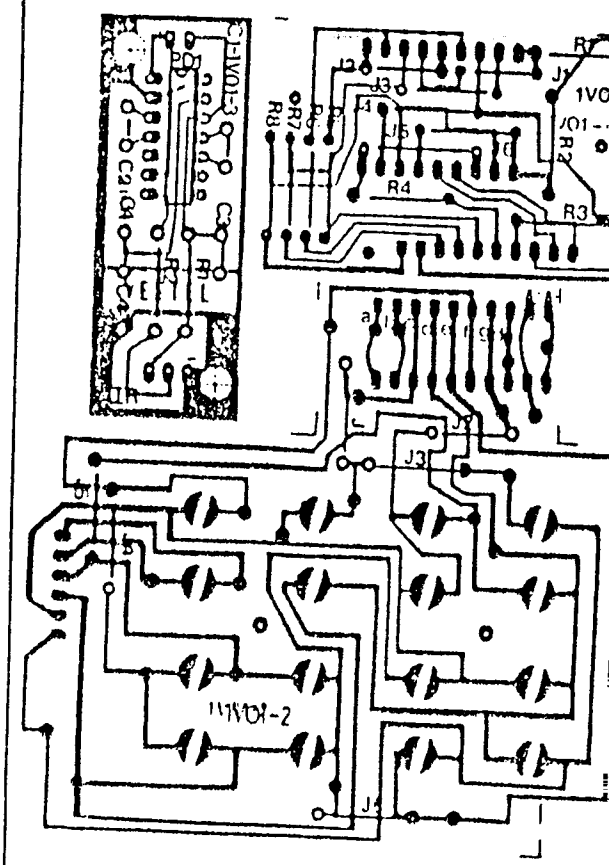
REMOTE CONTROL RECEIVER BOARDS
CIRCUIT DIAGRAM

MODEL 2321



11 DPT 01
COMPONENT LAYOUT DIAGRAM
COPPER SIDE

MODEL 2020 AND 2114



11 TK 01
COMPONENT LAYOUT DIAGRAM
COPPER SIDE

2321

)1-T

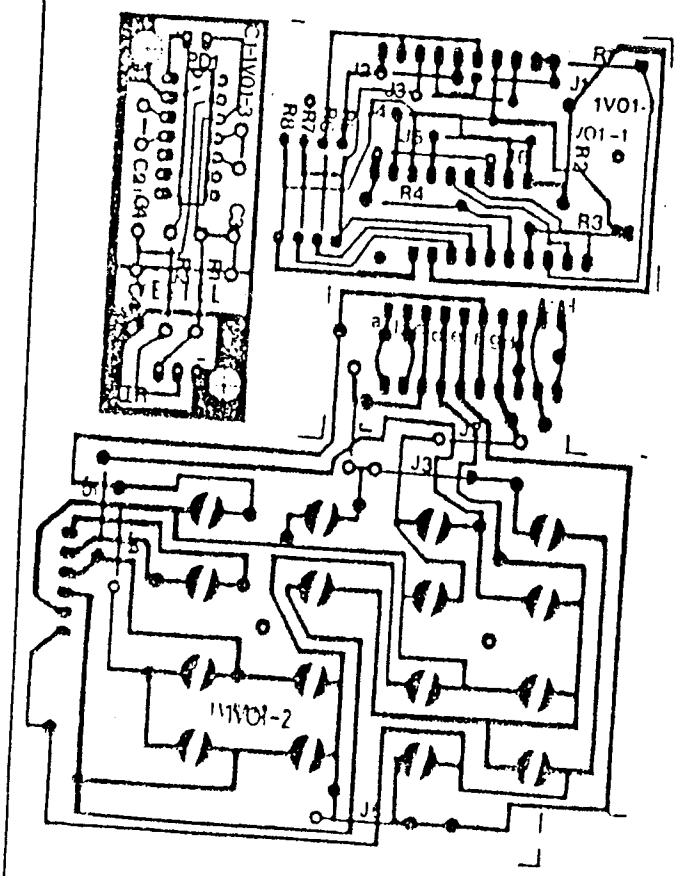
PT 01

J1 DP
J3 J2
J4 J5
J6

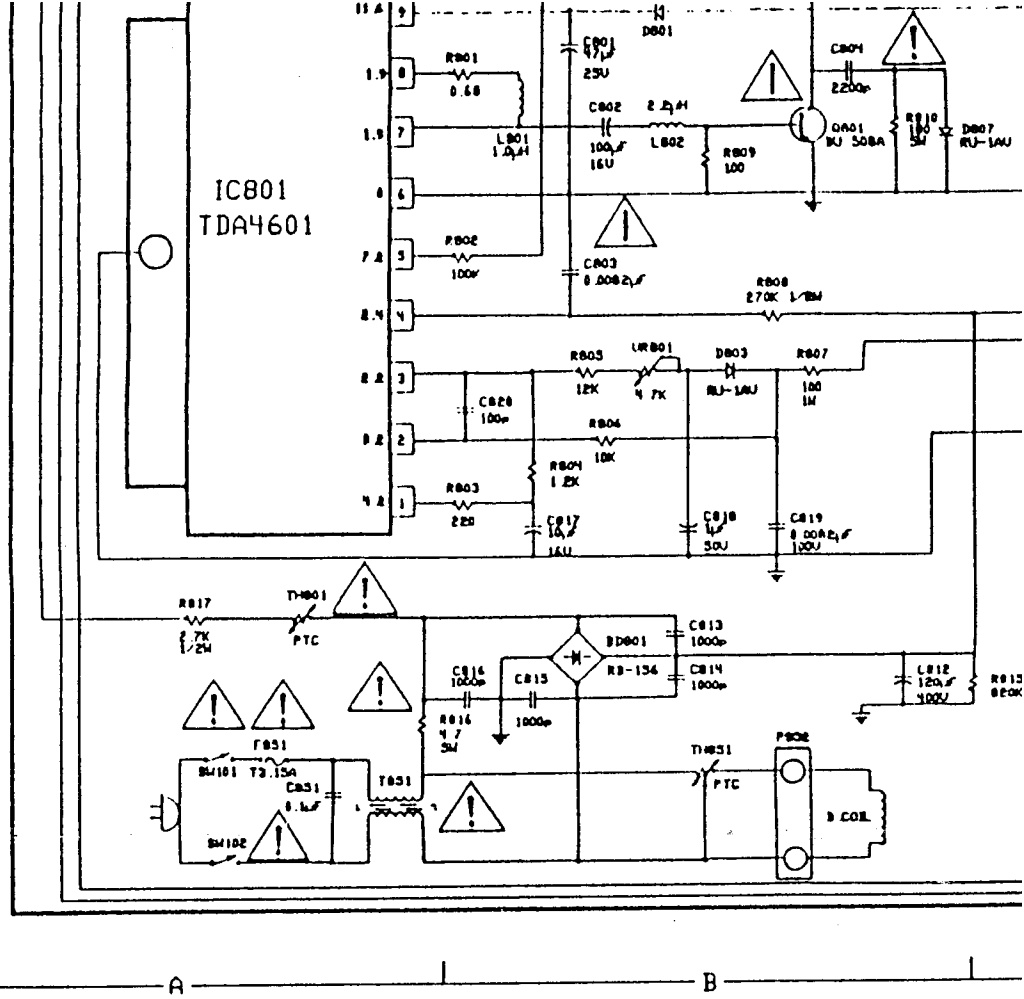
PT 01-P

DIAGRAM
IE

MODEL 2020 AND 2114



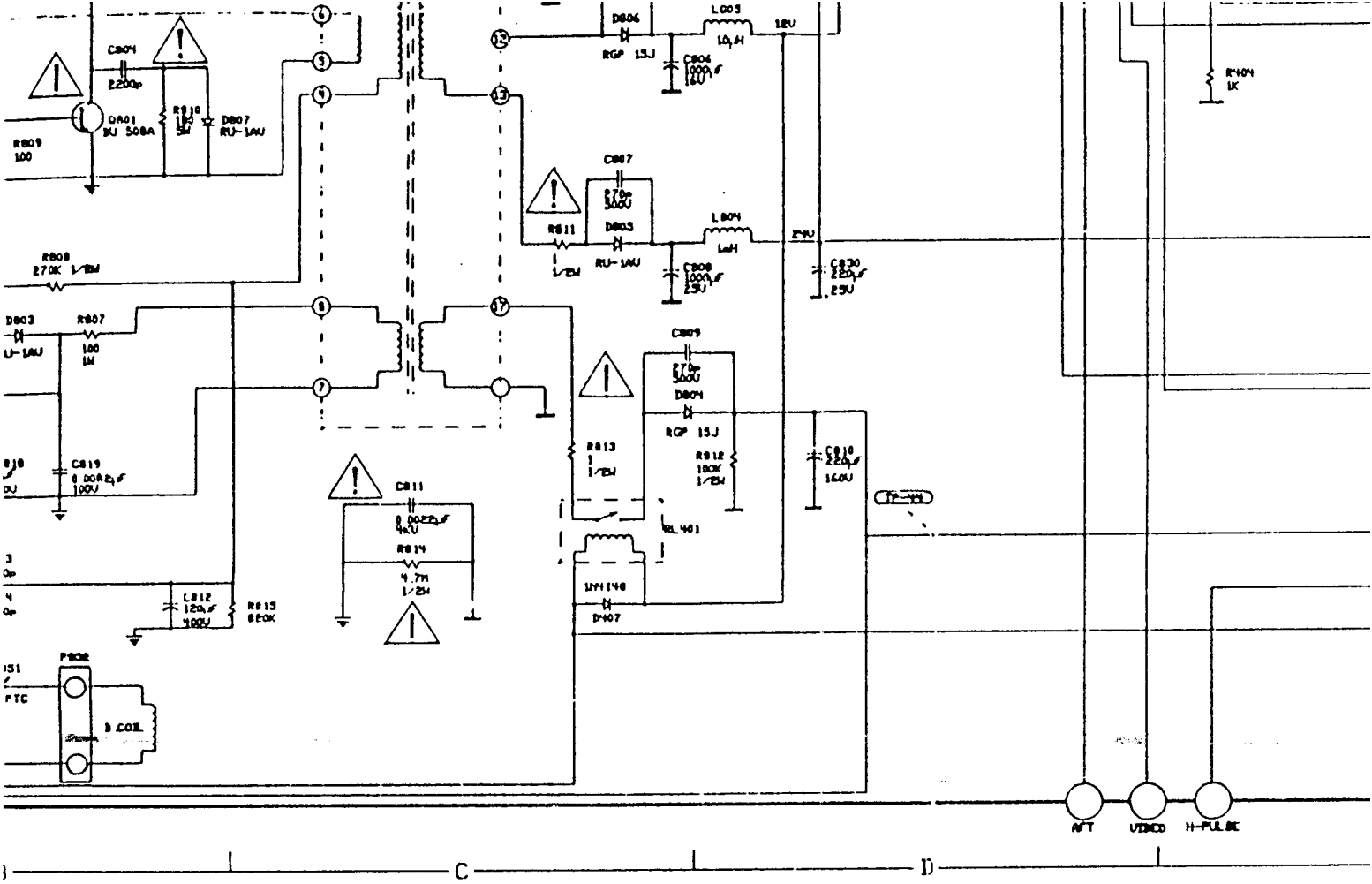
11 TK 01
COMPONENT LAYOUT DIAGRAM
COPPER SIDE



GRID REFERENCES OF COMPONENTS ON MAINBOARD

11AK01-A

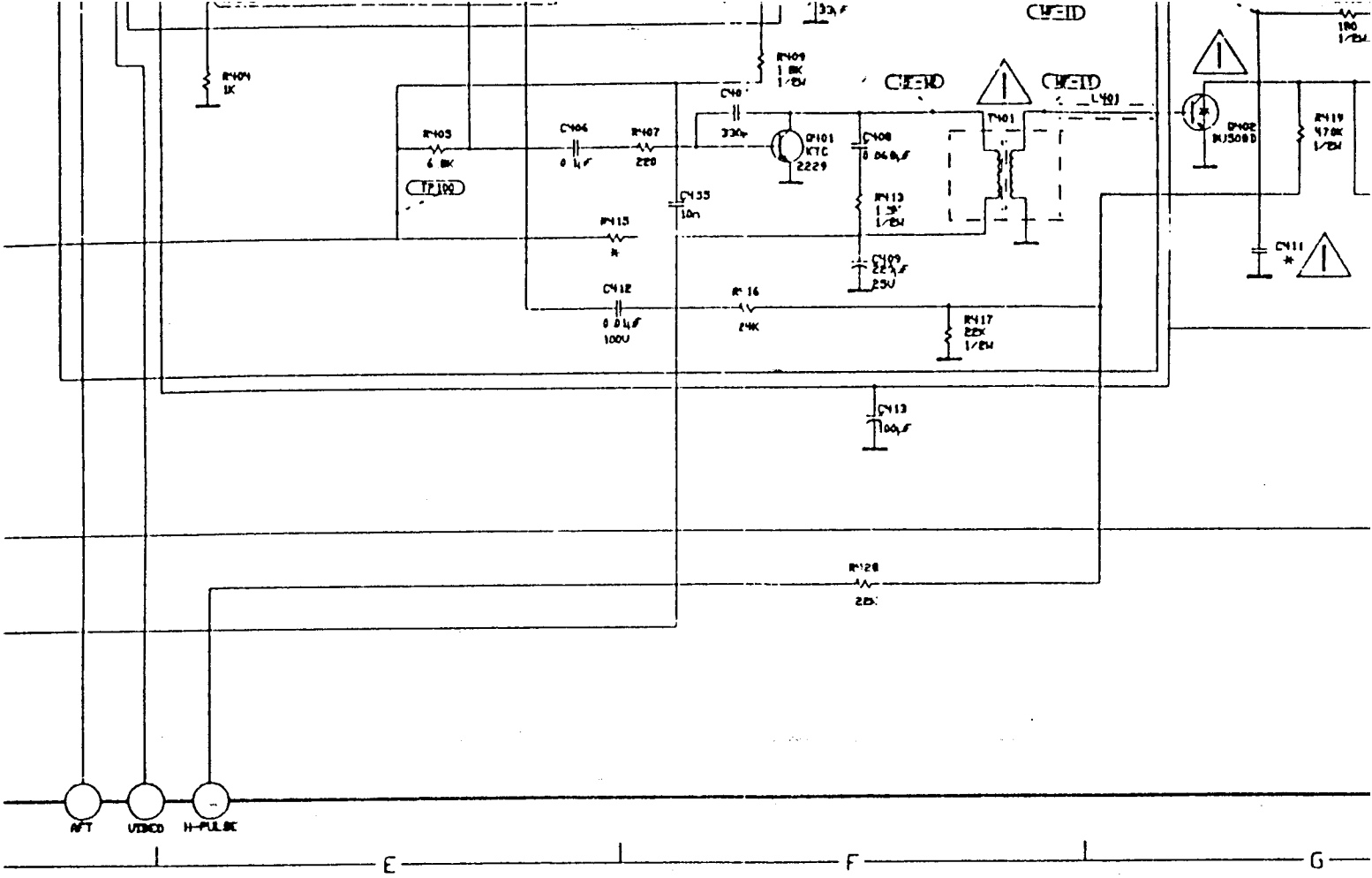
R100	B3	R160	A1	R315	E4	R419	G5	R810	B5		
R101	D1	R163	B2	R316	H5	R421	H6	R811	C6		
R102	B1	R164	B3	R317	H5	R422	H6	R812	D6		
R103	C2	R165	B3	R318	H5	R423	H7	R813	C6		
R104	D2	R167	B3	R319	H5	R424	H7	R814	C7		
R105	D2	R169	A2	R320	J5	R425	H7	R815	B7		
R106	B1	R183	F4	R321	J5	R426	H7	R816	A7		
R107	B1	R213	E2	R322	J5	R428	F7	R817	A7		
R108	B2	R251	G4	R381	H4	R602	B4				
R109	B2	R252	G4	R382	H4	R603	C4				
R111	B3	R255	F4	R383	E5	R604	C4				
R112	B3	R301	E4	R402	E5	R605	C5				
R113	B3	R302	D4	R403	E5	R606	C4				
R115	B4	R303	E4	R404	E5	R607	D4				
R116	D3	R304	E4	R405	E5	R608	C4				
R117	D3	R305	E4	R407	F6	R801	B5	C102	B2		
R119	D3	R306	F4	R409	F5	R802	B6	C103	B1		
R121	D3	R307	F4	R410	E5	R803	B6	C104	B2		
R122	D3	R308	F4	R411	F5	R804	B6	C105	B2		
R123	D2	R309	F4	R413	F5	R805	B6	C106	B2		
R124	D2	R310	F4	R415	E6	R806	B6	C107	B3		
		R311	F4	R416	F6	R807	B6	C109	B3		
		R312	G5	R417	F6	R808	B6	C111	B3		
		R313	G4	R418	G5	R809	B5	C115	D3		



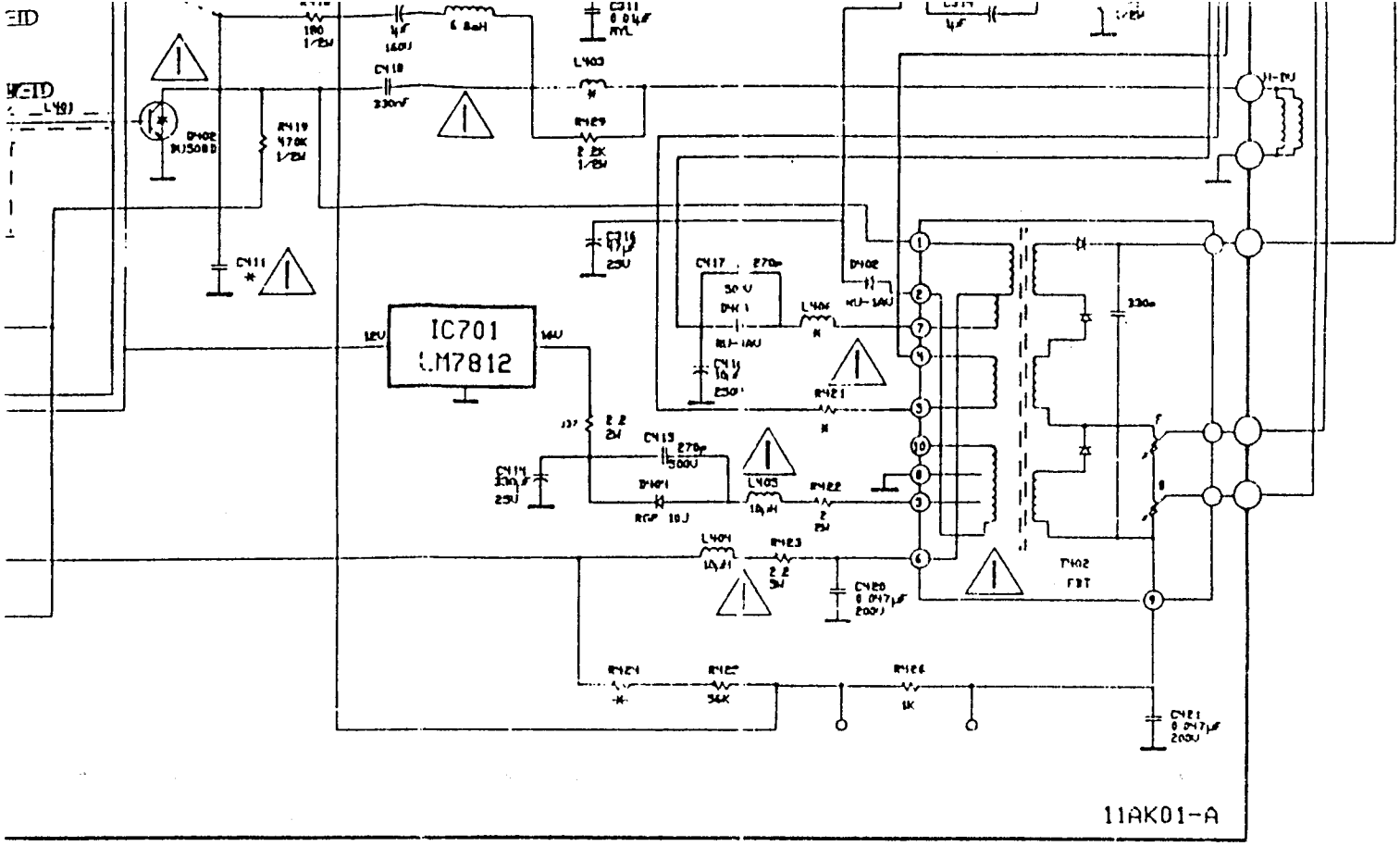
C D

ON MAINBOARD

.. G5	R810 .. B5	C120 ... D2	C304 ... E4	C412 ... E6	C808 ... C6	D402 ... H6	P105
.. H6	R811 .. C6	C121 ... D2	C305 ... E4	C413 ... F6	C809 ... C6	D403 ... H6	P251
.. H6	R812 .. D6	C122 ... D2	C306 ... F4	C414 ... H6	C810 ... D6	D404 ... H6	P451
.. H7	R813 .. C6	C123 ... D2	C307 ... F4	C415 ... H6	C811 ... C6	D406 ... E5	P501
.. H7	R814 ... C7	C124 ... D2	C308 ... G5	C416 ... H6	C812 ... B7	D407 ... C7	P504
.. H7	R815 ... B7	C125 ... C2	C309 ... H5	C417 ... H6	C813 ... B7	D801 ... B5	P505
.. H7	R816 .. A7	C126 ... D1	C310 ... H5	C418 ... G5	C814 ... B7	D803 ... B6	P601
.. F7	R817 ... A7	C127 ... B2	C311 ... H5	C419 ... G5	C815 ... B7	D804 ... C6	P852
.. B4		C160 ... B2	C312 ... H5	C420 ... H7	C816 ... B7	D805 ... C6	
.. C4		C161 ... B2	C313 ... J5	C421 ... J7	C817 ... B6	D806 ... C5	
.. C4		C162 ... A2	C314 ... H5	C601 ... B4	C818 ... B6	D807 ... B5	
C5		C163 ... A2	C315 ... J5	C602 ... B5	C819 ... B6		
.. C4		C164 ... B1	C316 ... H6	C603 ... B5	C820 ... B6		
.. D4		C165 ... B2	C401 ... E5	C604 ... C5	C830 ... D6		T401
.. C4		C166 ... A2	C402 ... F5	C605 ... C5	C851 .. A7		T402
.. B5	C102 ... B2	C168 ... B2	C403 ... F5	C606 ... C5		TH801.. A7	T801
.. B6	C103 .. B1	C183 ... F4	C404 ... F5	C607 ... A4		TH851.. B7	T851
.. B6	C104 ... B2	C204 ... E3	C405 ... F5	C801 ... B5			
.. B6	C105 ... B2	C206 ... E3	C406 ... E5	C802 ... B5			
.. B6	C106 ... B2	C207 ... D3	C407 ... F5	C803 ... B6			
.. B6	C107 ... B3	C208 ... E3	C408 ... F5	C804 ... B5		P10 ... E3	
.. B6	C109 ... B3	C301 ... E4	C409 ... F6	C805 ... C5	D102 ... D1	P11 ... F3	VR101
.. B6	C111 ... B3	C302 ... E4	C410 ... F5	C806 ... C5	D211 ... F3	P101 ... A1	VR301
.. B5	C115 ... D3	C303 ... E4	C411 ... G6	C807 ... C5	D301 ... H5	P104 ... A4	VR302



C6	D402 ... H6	P105 D1	VR380 ... J4	L402 ... G5	
C6	D403 ... H6	P251 ... H3	VR401 ... F5	L403 ... H5	
D6	D404 ... H6	P451 ... J3	VR402 ... E5	L404 ... H7	
C6	D406 ... E5	P501 ... H1	VR801 ... B6	L405 ... H6	
B7	D407 ... C7	P504 ... E3		L406 ... H6	
B7	D801 ... B5	P505 ... G3		L801 ... B5	
B7	D803 ... B6	P601 ... A4		L802 ... B5	
B7	D804 ... C6	P852 ... B7		L803 ... B5	
B7	D805 ... C6		IC101 ... C4	L804 ... D6	
B6	D806 ... C5		IC301 ... G4	L805 ... D5	
B6	D807 ... B5		IC401 ... E4		
B6			IC701 ... G6		
B6			IC801 ... A5		
D6		T401 ... F5		Q161 ... B2	
A7		T402 ... J7		Q201 ... D3	
	TH801 ... A7	T801 ... C5		Q401 ... F5	
	TH851 ... B7	T851 ... A7		Q402 ... G5	
			L102 D2	Q801 ... B5	
			L104 ... D3		
			L105 ... D3		
	P10 ... E3		L106 ... B3		
D1	P11 ... F3	VR101 ... B3	L107 ... D2	F851 ... A7	
F3	P101 ... A1	VR301 ... F4	L161 ... B2		
H5	P104 ... A4	VR302 ... F4	L401 ... G5		



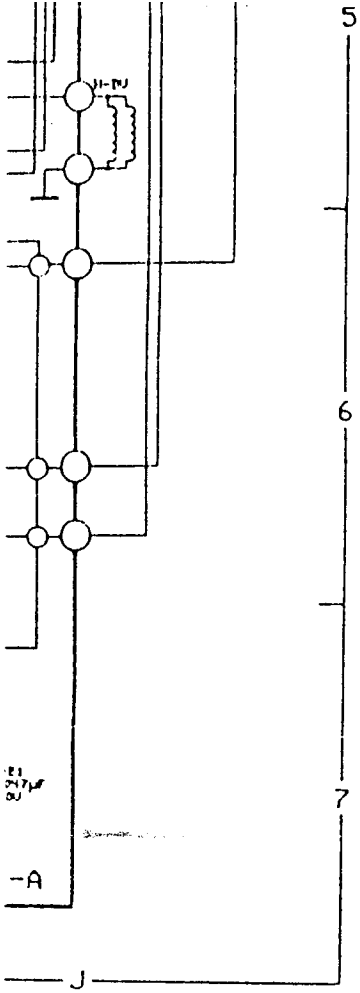
G H J

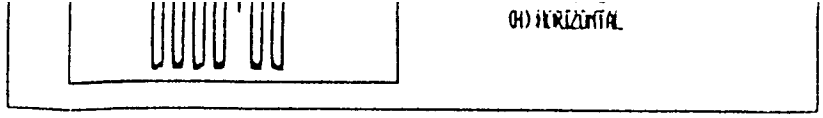
The components marked with ⚠ conform to VDE or IEC guide lines and are essential for safe operation of the set.

The components marked with ⚠ are required for correct operation. When replacing the components, use only the specified parts.

VALUES OF RESISTORS, CAPACITORS AND INDUCTORS

1--Resistances are shown in ohms; K=1000 , M=1000000
2--Unless otherwise noted in circuit diagram, all capacitor values less than 1 are expressed in μF and the values more than 1 are in pF.
3-Unless otherwise noted in circuit diagram, all inductor values more than 1 are expressed in mH and the values less than 1 are in μH.





OBSERVATIONS OF VOLTAGES AND WAVEFORMS

1-Voltages read with VTVM are taken from point shown to chasis ground. Line voltage is 180-270V.

2-Voltages reading may vary ± 20 %

3-The circuit shown is only representative

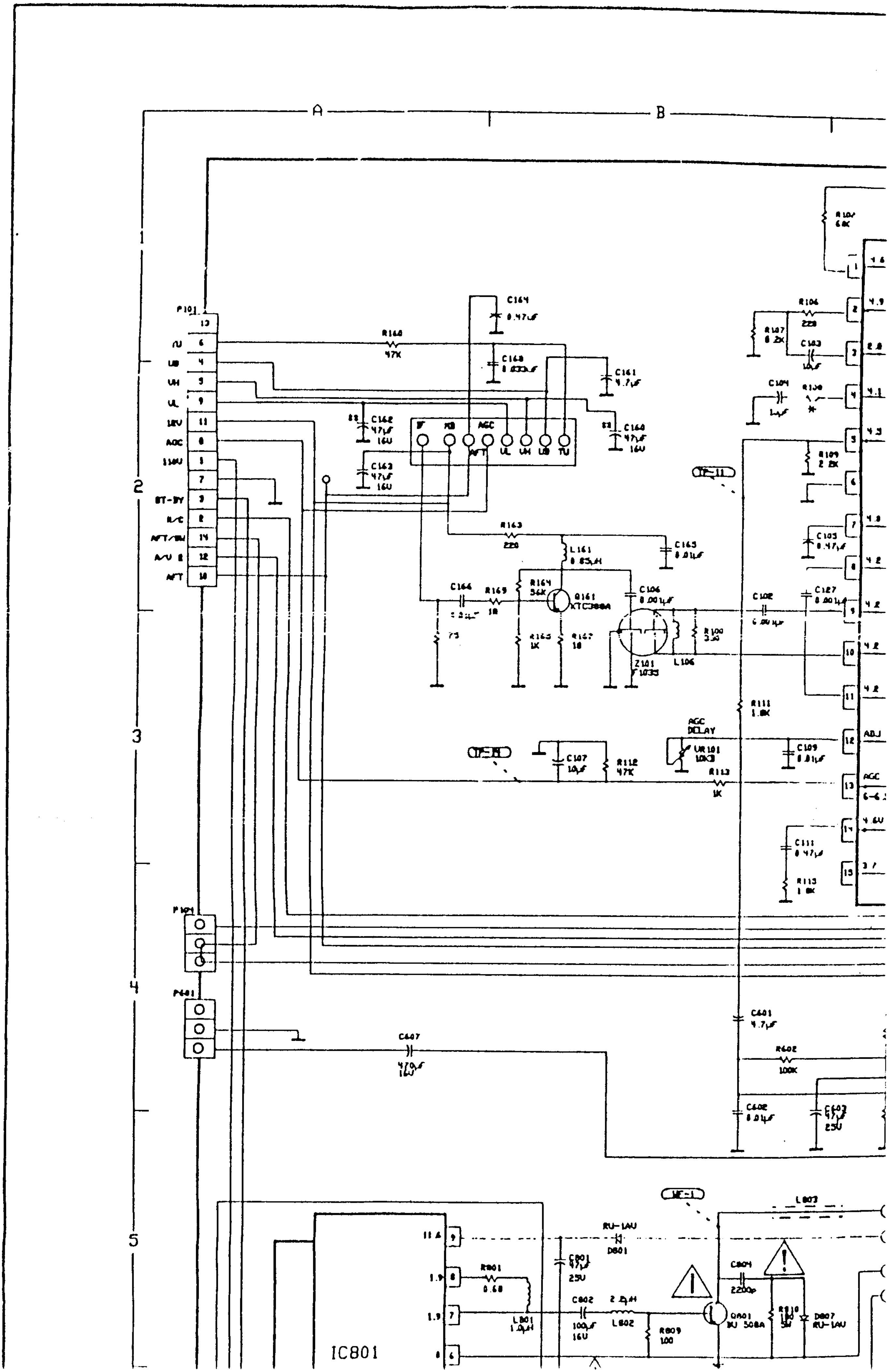
4-All waveforms are taken by using a wide band oscilloscope and a low capacity probe.

CAUTION

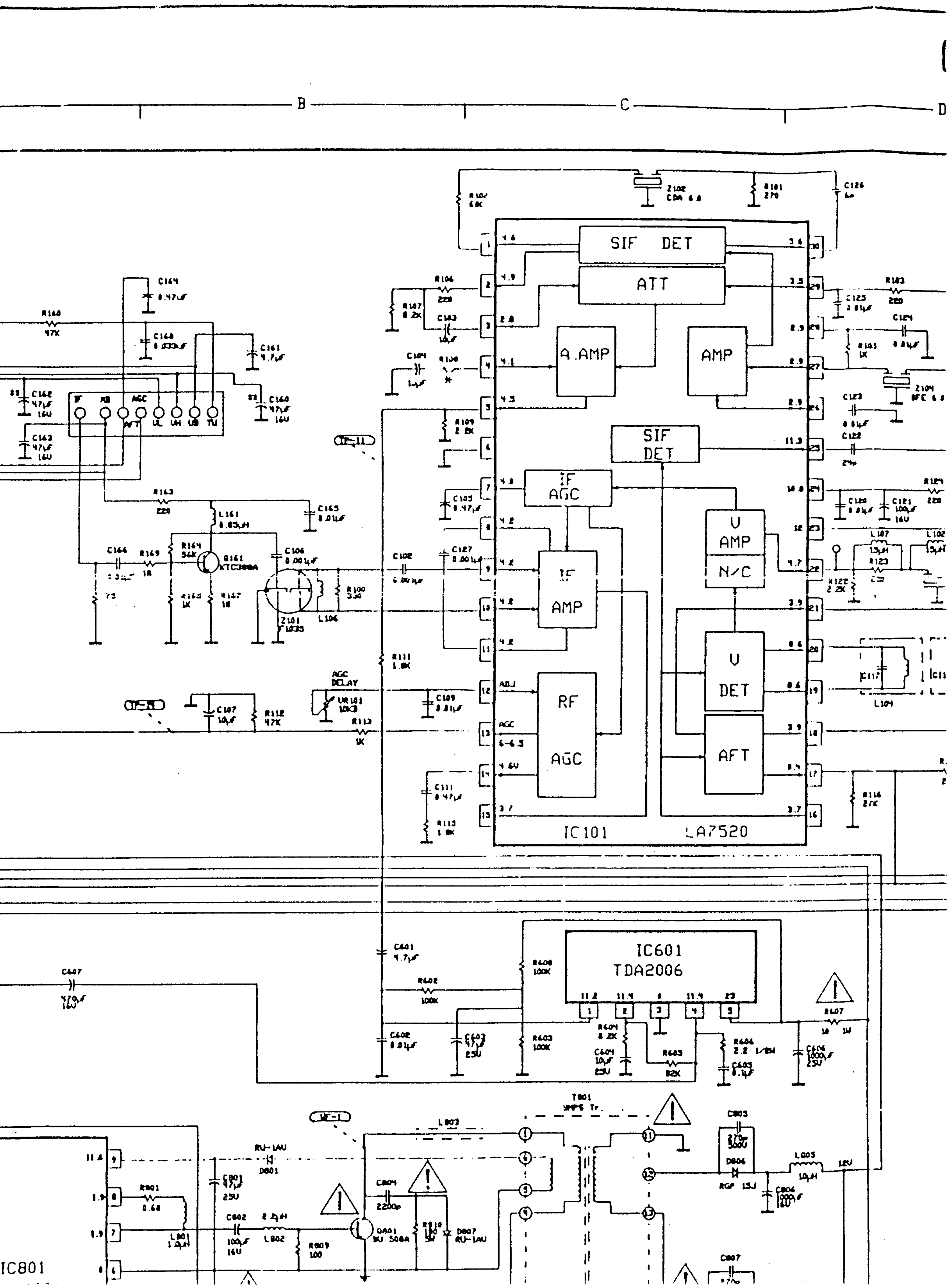
Since this is a basic circuit diagram, the values of the components and some partial connections may be changed for improvement.

BUSH BASIC CHASSIS (11AK01-A) COMPONENT DIFFERENCES			
REF NO (*)	MODEL 2114	MODEL 2020	MODEL 2321
R108	18K	12K	5.6K
R252	91K	75K	75K
R415	100R	220R	220R
R421	0.47R 1/2W	1R / 1W	1R / 1W
R424	43K	27K	27K
C411	8.2nF	6.8nF	6.8nF
L403	224L	224C	224C
L406	6.8mH	Link	Link
TUBE	370 HUB22-TC02	510 HUB22-TC02	A51JSY61X03

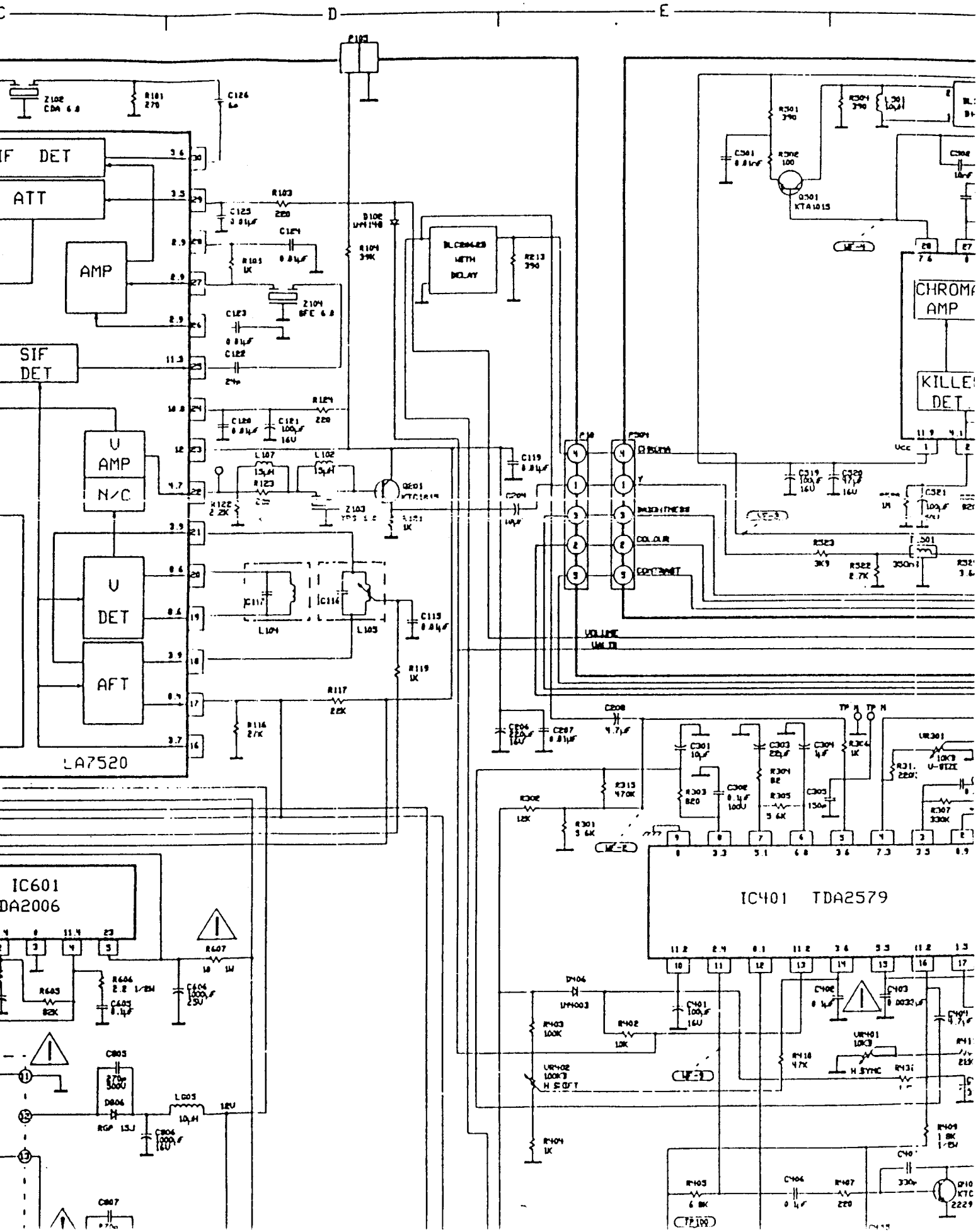
IMPORTANT: The components marked with "**", must be deleted for the "Only UHF" Tuner.



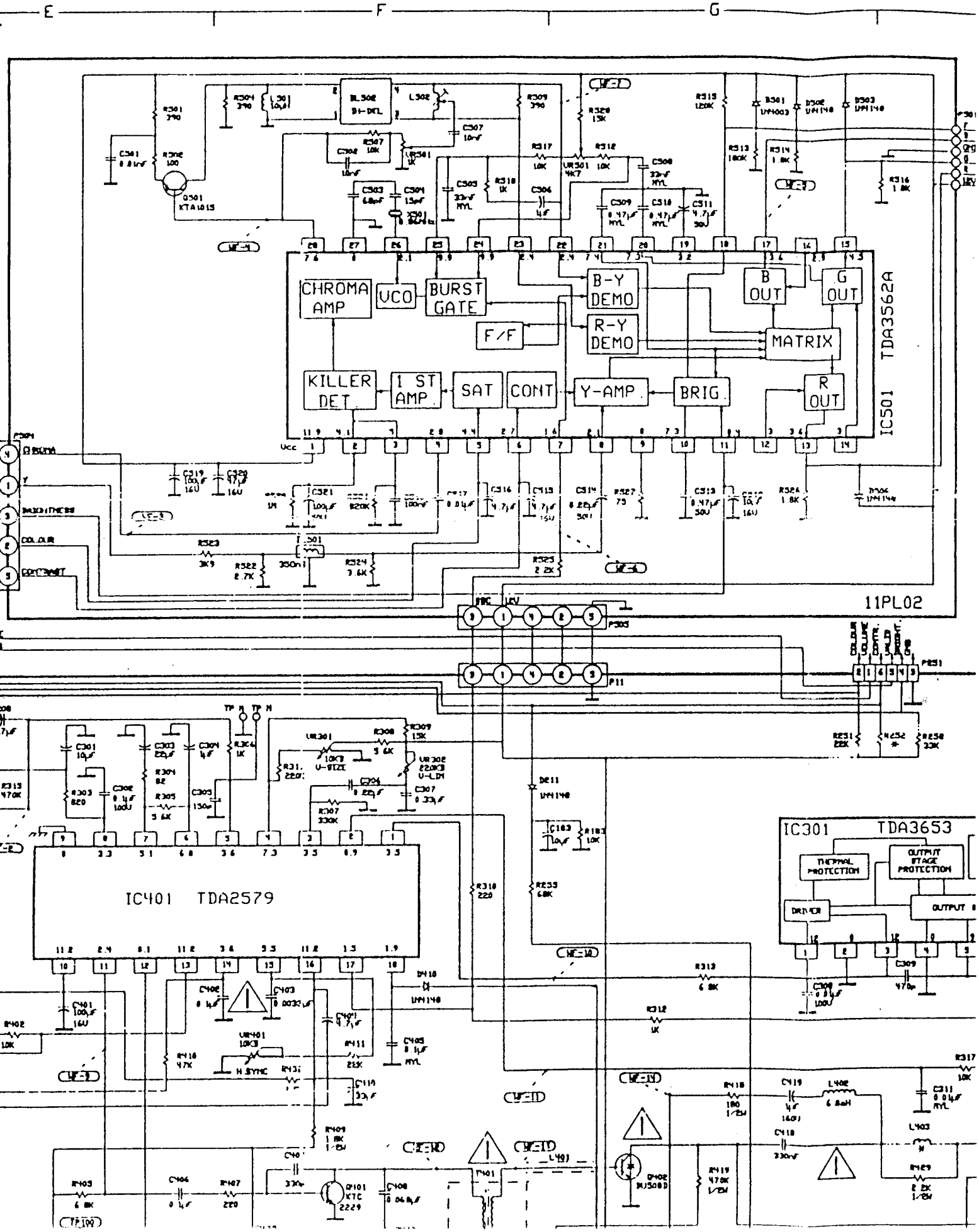
A
B
2
3
4
5
P101
P104
P401
IC801
C164 0.47μF
R160 47K
C168 0.033μF
C161 4.7μF
C162 47μF 16V
C160 47μF 16V
C163 47μF 16V
R163 220
C165 0.01μF
L161 0.85μH
R164 56K
Q161 KTC388A
C106 0.001μF
R169 18
R165 1K
R167 18
Z101
L106
R111 1.8K
AGC DELAY
VR101 10KB
C107 10μF
R112 47K
R113 1K
C109 0.01μF
C111 0.47μF
R105 2.2K
R106 220
R107 8.2K
C103 10μF
C104 1μF
C102 0.001μF
C127 0.001μF
C105 0.47μF
C401 4.7μF
R402 100K
C402 0.01μF
C407 470μF 16V
C403 47μF 25V
RU-1AV
D801
R801 0.68
C801 47μF 25V
C802 100μF 16V
L801 1.0μH
L802
R809 100
C804 2200p
Q801 BU 508A
D807 RU-1AV
L803

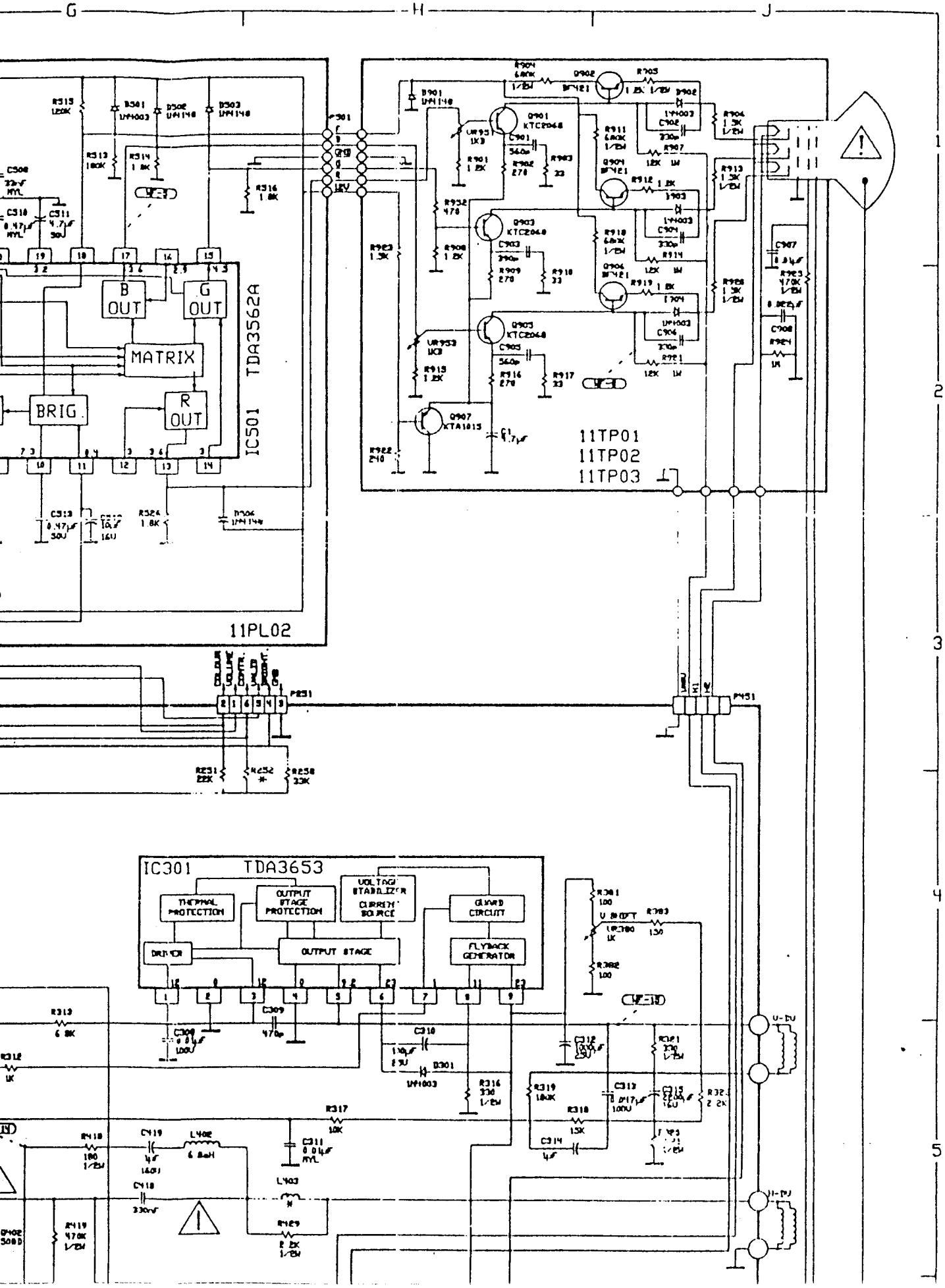

B
C
D
SIF DET
ATT
A.AMP
AMP
SIF DET
IF AGC
V AMP
N/C
IF AMP
V DET
RF AGC
AFT
IC101
LA7520
AGC DELAY
IC601
TDA2006
IC801

CIRCUIT DIAGRAM



DIAGRAM


E
F
G
IC501 TDA3562A
CHROMA AMP
VCO
BURST GATE
F/F
B-Y DEMO
R-Y DEMO
B OUT
G OUT
R OUT
MATRIX
KILLER DET
1 ST AMP
SAT
CONT
Y-AMP
BRIG
11PL02
IC401 TDA2579
IC301 TDA3653
THERMAL PROTECTION
OUTPUT STAGE PROTECTION
DRIVER
OUTPUT
H.SYNC


G
H
J
1
2
3
4
5
IC501 TDA3562A
B OUT
G OUT
R OUT
MATRIX
BRIG.
11PL02
11TP01
11TP02
11TP03
IC301 TDA3653
THERMAL PROTECTION
OUTPUT STAGE PROTECTION
VOLTAGE STABILIZER
CURRENT SOURCE
GUARD CIRCUIT
DRIVER
OUTPUT STAGE
FLYBACK GENERATOR

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