NATIONAL
Service Manual

PORTABLE TELEVISION

MODEL TP – 120

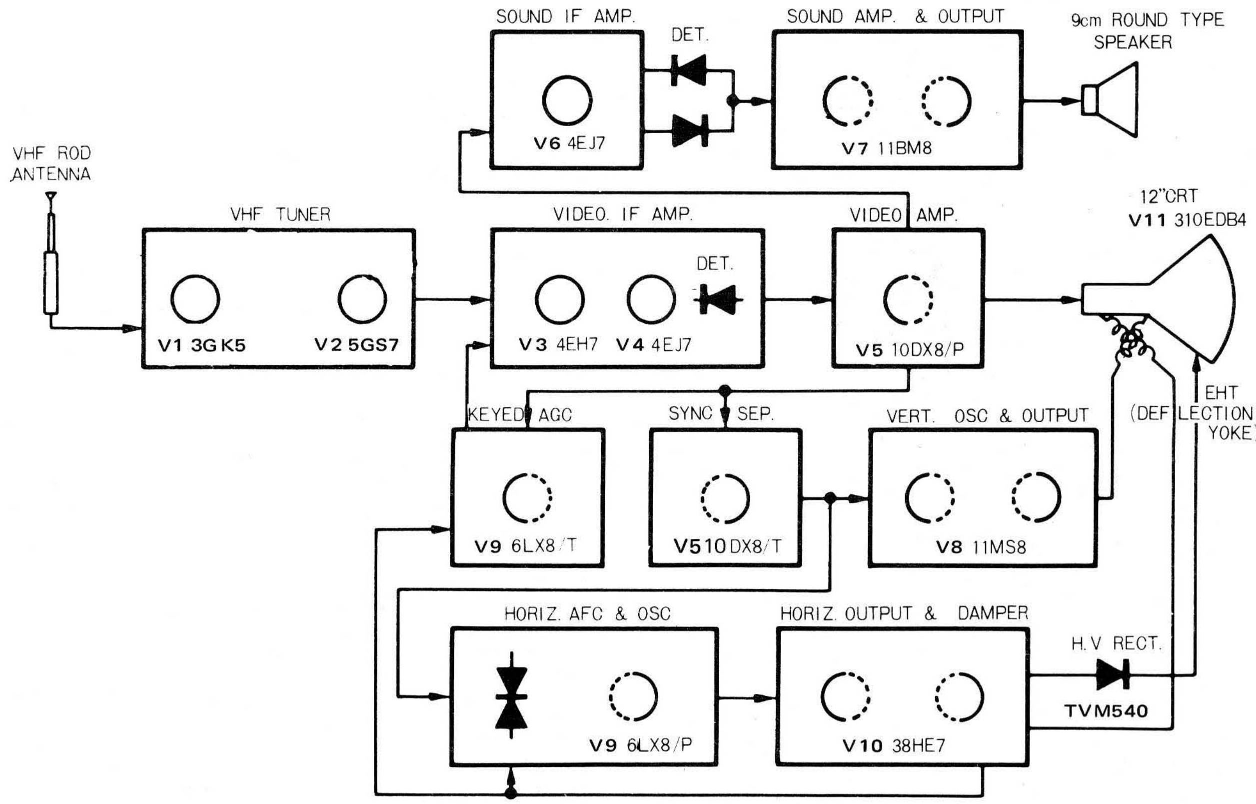
SPECIFICATIONS

Power Input Rating:	AC 240V50Hz
Power Consumption:	110 Watts
Antenna Impedance:	300 Ohm Balanced Type Both VHF
Receiving Channels:	0 – 11 Australian
IF Frequency:	Video: 36.0 MHz Sound: 30.5 MHz
Tubes:	11 (1 Compactron Tube and Picture Tube Included)
Picture Tube:	12″ 110° Deflection, Bonded Frame Type Aluminized.
Speaker:	9 cm round type Voice Coil 8 Ohm.

Semiconductors:	3 Germanium Diodes 4 Silicon Power Diode 1 Selenium Discriminator 1 Selenium High Voltage Rectifier 1 Thermistor
Audio Output:	1.0W, 1.5 Maximum
Automatic Circuits:	Keyed Type AGC, Saw - Tooth Wave AFC.
Dimensions:	Height: 30.2 cm Width: 42.8 cm Depth: 28.2 cm
Weight:	9.9 Kg

MATSUSHITA ELECTRIC CO. (AUSTRALIA) PTY., LTD.
STATION STREET, PENRITH, N.S.W.
P.O. Box 326, PENRITH, 2750.

BLOCK DIAGRAM



CAUTION:

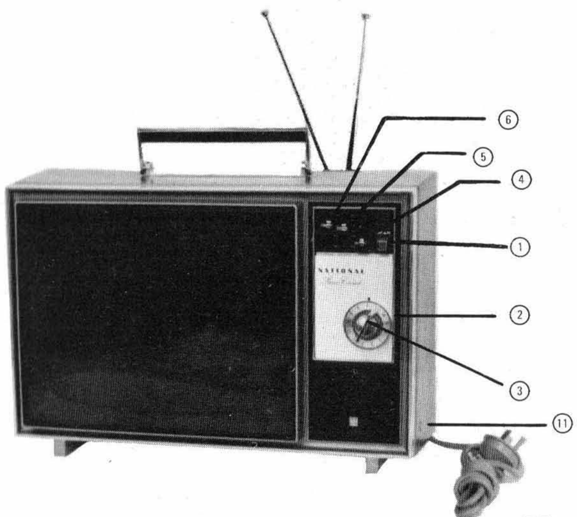
The high voltage supply at the picture tube anode will give an unpleasant shock, but does not supply enough current to give a fatal burn or shock. However, secondary human reaction to otherwise harmless shocks have been known to cause injury. Always discharge the picture tube-anode to the receiver chassis before handling the tube.

Certain portions of the high voltage generating circuit are dangerous and extreme caution should be observed. The picture tube is highly evacuated and, if broken, glass fragments will be violently expelled.

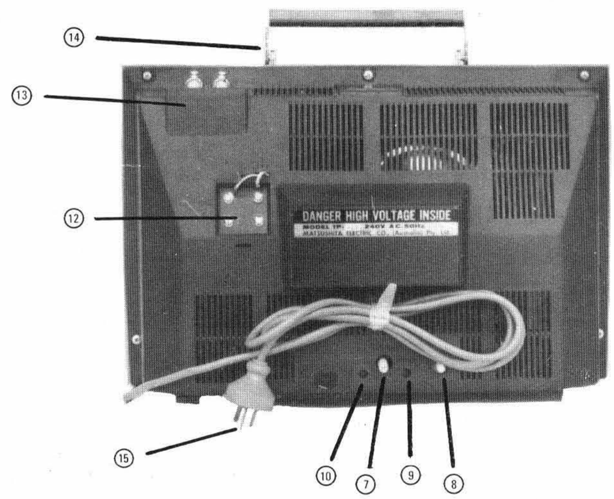
WHEN HANDLING THE PICTURE TUBE ALWAYS WEAR GOGGLES AND PROTECTIVE CLOTHING.

SERVICE ADJUSTMENTS

LOCATION OF ADJUSTMENTS



TP – 120



1. ON–OFF SWITCH
2. CHANNEL SELECTOR
3. FINE TUNING
4. VOLUME
5. BRIGHTNESS
6. CONTRAST
7. VERTICAL HOLD
8. HORIZONTAL HOLD
9. VERTICAL LINEARITY
10. HEIGHT
11. EARPHONE SOCKET
12. ANTENNA TERMINAL
13. DIPOLE ANTENNA
14. HANDLE
15. POWER PLUG

ANTENNAS

This set is specially designed to receive VHF programs and is equipped with built-in antennas. In normal signal areas, the built-in antenna will deliver a sharp and clear picture.

AGC ADJUSTMENT

The adjustment of the AGC control effectively changes the operating point of the AGC amplifier. Turned fully clockwise, the AGC control is set for maximum gain. In some areas this may cause clipping of the sync pulses resulting in a "wiggle" in the picture and unstable sync.
Turning the AGC control in a counter-clockwise direction will decrease the gain of the receiver.

VERTICAL HEIGHTS AND VERTICAL LINEARITY ADJUSTMENTS

Adjust the vertical height and vertical linearity controls alternately to fill the screen 1/5 inch beyond the mask with good linearity. (Adjust centreing device if necessary). This can be determined by causing the picture to roll slowly by turning the vertical hold control and watching for a change in the height of the vertical blanking bar.

DEFLECTION YOKE ADJUSTMENT

If the lines of the raster are not horizontal or corner shadows are evident, loosen the yoke clamp screw and rotate deflection yoke, pushing yoke hard up against cone of picture tube.

RASTER CENTREING

The centreing device is the two levers fastened to rear of the yoke. By alternately rotating those two levers, the picture can be properly centred on the screen.

GENERAL ALIGNMENT INSTRUCTIONS

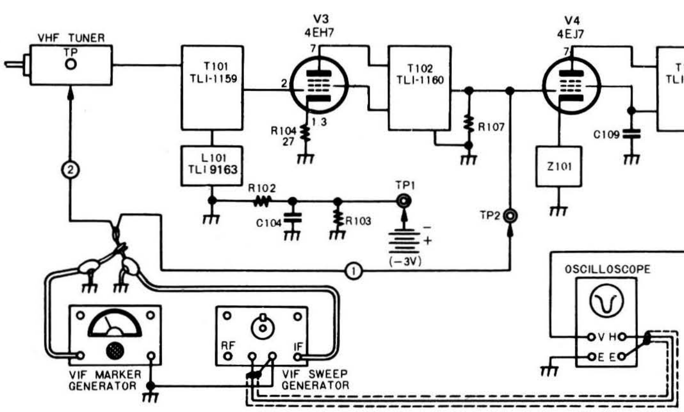
VIDEO IF ALIGNMENT

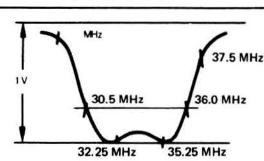
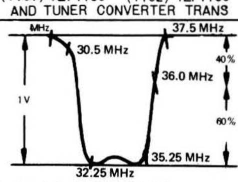
TEST EQUIPMENT CONNECTIONS

1) Connect the VIF sweep with the vertical and horizontal input terminals of the oscilloscope. Adjust the vertical gain of the oscilloscope so that oscilloscope sensitivity is 0.2 V/cm.
2) Connect the VIF sweep output with the TP-2 grid of V4 (4EJ7).
3) Connect the VIF sweep output with TP of the tuner.
4) Connect the VIF sweep input terminal (from the receiver) with TP-3 10DX8 grid by using a 15KΩ resistor for the immediate connection.
5) Apply a –3V bias voltage (as to the chassis) to VIF AGC circuit (TP-1).

ALIGNMENT

1) Set the tuner to a high channel.
2) Connect the sweep output with the TP-2 grid of V4 (4EJ7) and adjust the wave detection transformer (TL1 - 5159) so that the wave form is as shown in the figure.
3) Then connect the sweep output terminal with the TP of the tuner and adjust the main wave frequencies of the VIF transformer substantially as follows:
   TL1-1159 . . . . 31~32 MHz
   TL1-1160 . . . . 33~34 MHz
   Tuner Converter transformer 34~35 MHz
4) Carefully adjust the transformers, except the detection transformer, so that the wave form is as shown in the figure.



STEP	①	②
INJECTION POINT	TP2	TUNER TEST POINT
ALIGNMENT	(T103) TLI-5159	(T101) TLI-1159 (T102) TLI-1160 AND TUNER CONVERTER TRANS
RESPONSE CURVE	 The height of the 36.0 MHz marker and the height of the 30.5 MHz marker should be the same.	 Be careful of the levels of the 30.5 MHz sound carrier and the 36.0 MHz video carrier.

SOUND IF ALIGNMENT

TEST EQUIPMENT CONNECTIONS

1) Connect the SIF sweep with the vertical, horizontal and brightness modulation input terminals, and be sure that the vertical gain of the oscilloscope is 70 mV/cm.
2) Be sure that the output circuit of the SIF sweep is as shown in figure 1-1, and that the output voltage is 0.03V.
3) Connect the SIF sweep output terminal with the TP-3 grid of V4 (4EJ7).
4) Connect the input terminal of the oscilloscope with TP-4 (for V-curve adjustment), or with the location indicated be an asterisk (*) (for S-curve adjustment).
5) Ground the TP-2 grid of V4 (4EJ7).

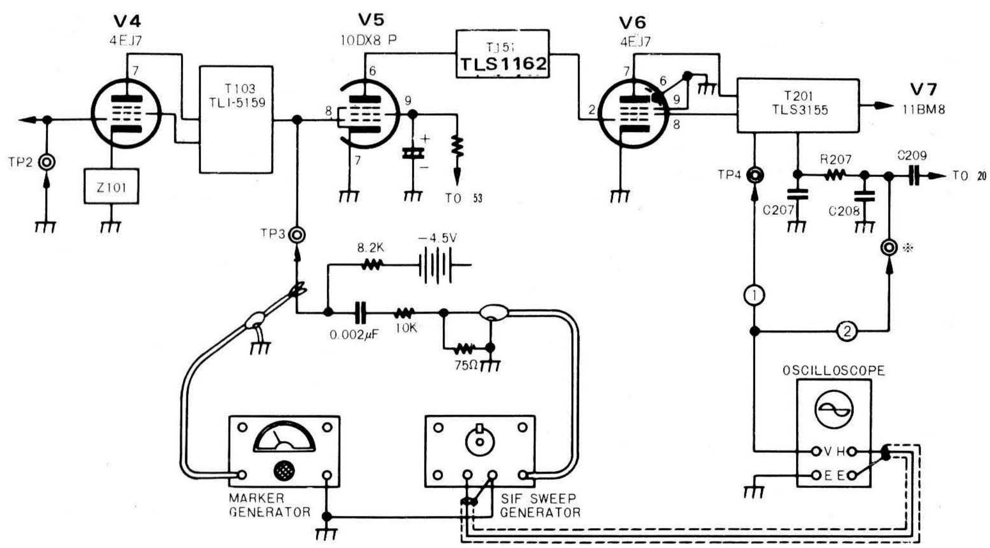
ALIGNMENT

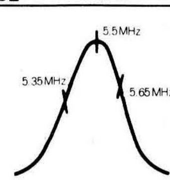
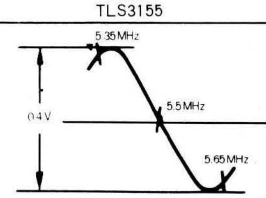
V-curve adjustment

Connect the input terminal of the oscilloscope with TP-4, and adjust TLS1162 and TLS3155 so that the response is maximum.

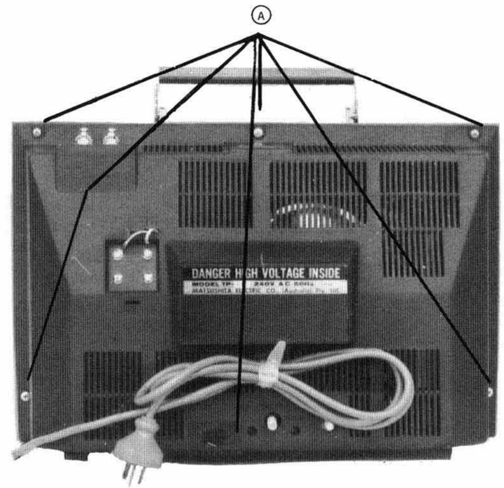
S-curve adjustment

After the V-curve adjustment, adjust TLS3155 so the 5.5 MHz marker is correctly located in the centre of the curve and so that, at the same time, its amplitude is maximum.



STEP	1	2
INJECTION POINT	TP4	BETWEEN C208 AND C209 (※)
ALIGNMENT	T151 **TLS1162** & T201 TLS3155	T201 TLS3155
RESPONSE CURVE		

DISASSEMBLY INSTRUCTIONS



REAR COVER REMOVAL

1) Remove the six rear cover screws (A)
2) Disconnect leads from the UHF & VHF antenna.
3) Remove the back cover by pulling it straight away from cabinet.

CHASSIS REMOVAL

1) Disconnect the CRT anode (B) CRT socket (C) and deflection coil (D)
2) Remove the three chassis holder screws (E)
3) The chassis assembly can be removed from the cabinet.

TUNER AND CONTROL ASSEMBLY REMOVAL

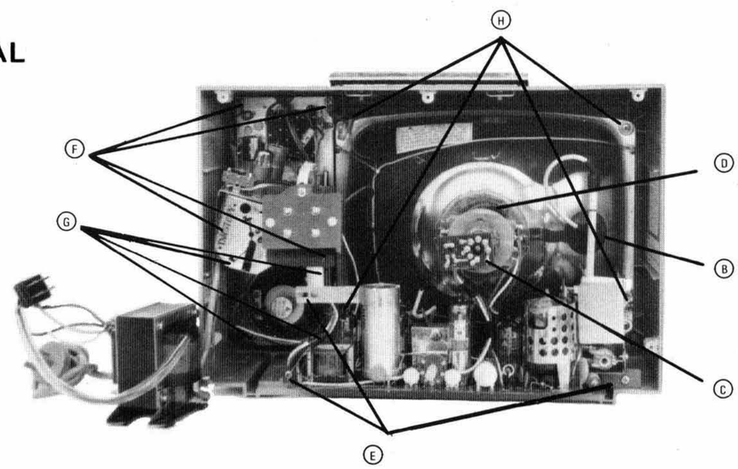
1) Remove the four tuner bracket holder screws (F)

SPEAKER REMOVAL

1) Remove the four speaker holder screws (G)

PICTURE TUBE REMOVAL

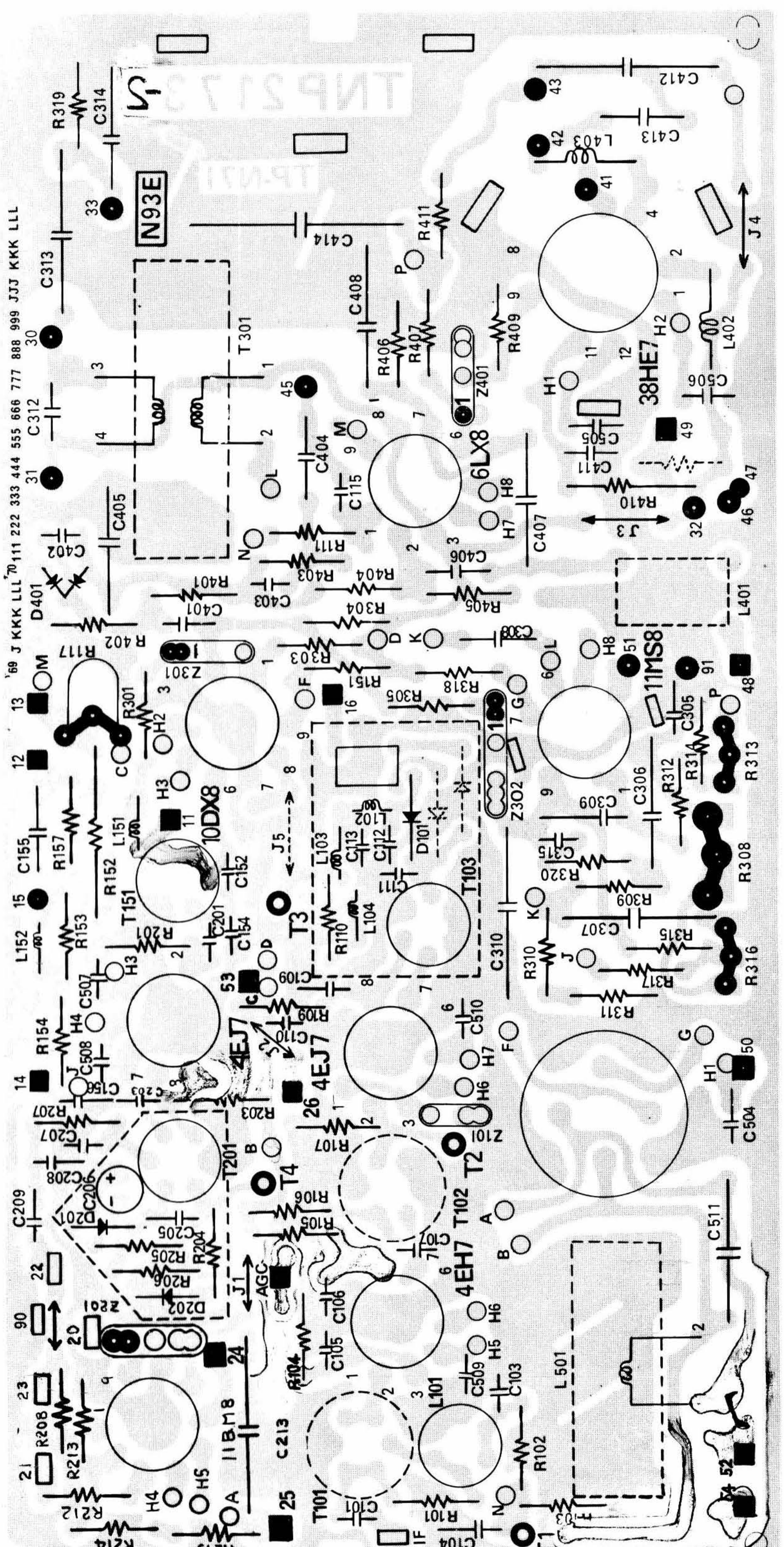
1) Remove the picture tube mounting screws (H)
2) Remove the picture tube carefully.



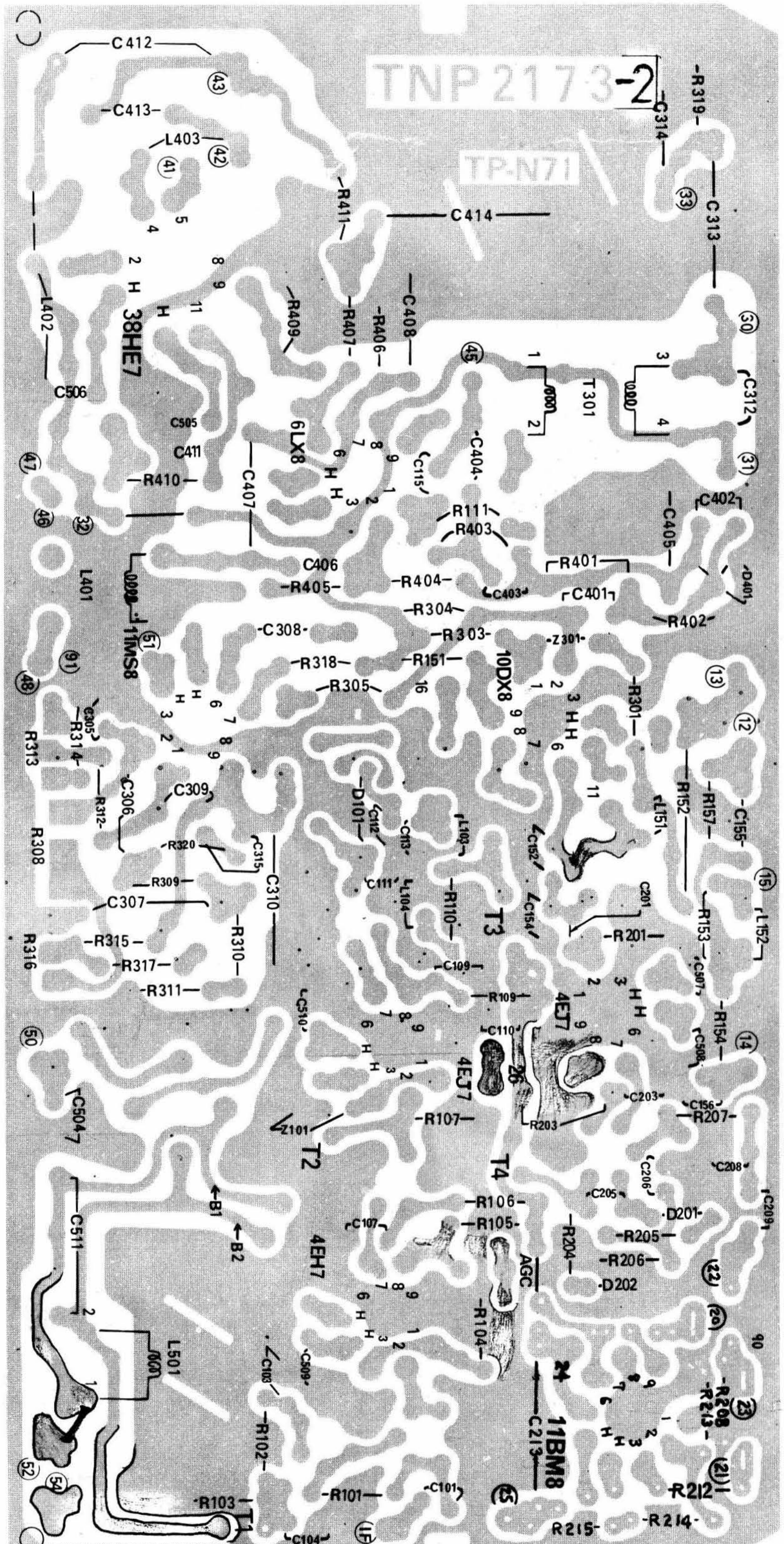
PARTS IDENTIFICATIONS

PARTS IDENTIFICATION

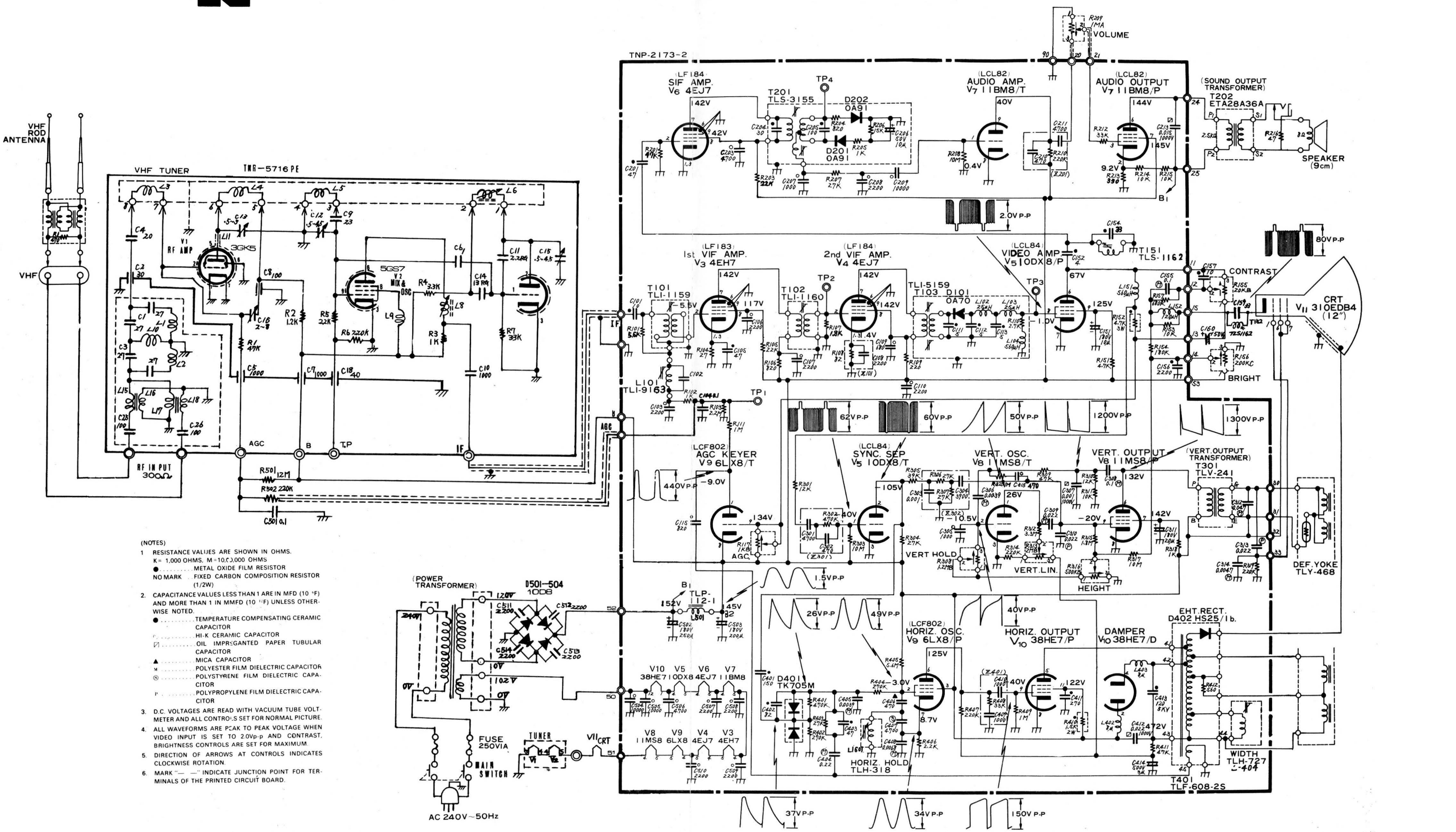
CONDUCTOR VIEW



COMPONENT VIEW



SCHEMATIC DIAGRAM OF MODEL TP-120



(NOTES)

1 RESISTANCE VALUES ARE SHOWN IN OHMS.
K = 1,000 OHMS, M = 10,00,000 OHMS
●.......... METAL OXIDE FILM RESISTOR
NO MARK .. FIXED CARBON COMPOSITION RESISTOR (1/2W)

2. CAPACITANCE VALUES LESS THAN 1 ARE IN MFD (10 ⁻⁶F) AND MORE THAN 1 IN MMFD (10 ⁻¹²F) UNLESS OTHERWISE NOTED.
●.......... TEMPERATURE COMPENSATING CERAMIC CAPACITOR
.... HI-K CERAMIC CAPACITOR
◩.......... OIL IMPREGANTED PAPER TUBULAR CAPACITOR
▲.......... MICA CAPACITOR
M.......... POLYESTER FILM DIELECTRIC CAPACITOR
Ⓢ.......... POLYSTYRENE FILM DIELECTRIC CAPACITOR
P.......... POLYPROPYLENE FILM DIELECTRIC CAPACITOR

3. D.C. VOLTAGES ARE READ WITH VACUUM TUBE VOLTMETER AND ALL CONTROLS SET FOR NORMAL PICTURE.

4. ALL WAVEFORMS ARE PEAK TO PEAK VOLTAGE WHEN VIDEO INPUT IS SET TO 2.0Vp-p AND CONTRAST, BRIGHTNESS CONTROLS ARE SET FOR MAXIMUM.

5. DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.

6. MARK "— —" INDICATE JUNCTION POINT FOR TERMINALS OF THE PRINTED CIRCUIT BOARD.

REPLACEMENT PARTS LIST

Symbol No.	Description	Part No.	Q'ty Per Set
	TUNER & CIRCUIT BOARD		
	VHF Tuner	TNR5716PE	1
	Printed Circuit board	TNP2173–2	1
	TUBES		
V1	RF AMP	3GK5	1
V2	MIX. & VHF. OSC.	5GS7	
V11	12" CRT	310EDB4	1
V3	1st VIF amp & SIF amp	4EH7 (E)	1
V4 V6	2nd VIF amp & SIF amp	4EJ7 (E)	2
V5	Video amp & Output	10DX8 (E)	1
V7	Audio amp & Output	11BM8 (E)	1
V8	Vert. osc & Output	11MS8 (E)	1
V9	AGC Keyer & Horiz: osc	6LX8 (E)	1
V10	Horiz. output & Damper	38HE7 (EF)	1
	TRANSFORMER & COILS		
T501	Power Trans.	ALP204	1
	Deflection Yoke Coil	TLY468	1
T202	Audio Output Trans.	ETA28A36A	1
	Balum (Tuner Block)	TLR9317	1
	Balum (VHF Antenna)	TLR9317–1	1
	RESISTORS & CAPACITORS		
VR1	Volume	EVAG2A01A16	1
	ON-OFF Switch	TSE440AS	1
VR3	Contrast	EVAG2A01AB24	1
VR2	Brightness	EVAG2A01AC25	1
R216	Solid 47Ω ± 10% 1/2W	ERC12GK470	1
	Solid 470 Ω ± 10% 1/2W	ERC12GK471	1
C157	Ceramic 10PF 500V	ECCC5100F	1
C511 ~ 514	Ceramic Capacitor	ECKD5222PU	4
	MISCELLANEOUS		
	Speaker	EAS9P63SA	1
	VHF Antenna	TSA965–5	1
	Power Cord	ASX100–1	1
	Fuse	TSF22102–0	2
	Cabinet (complete)	TKY2620–1	1
	Rear Cover	TKU24303–1	1
	Mold Panel	TKP21251–1	1
	Metal Panel	TKP98901–1	1

REPLACEMENT PARTS LIST

Symbol No.	Description	Part No.	Q'ty Per Set
	Panel (Speaker)	TKP21290–2	1
	Handle (complete)	TKK235–1	1
	Handle Holder	TKK9272–1	1
	Front Glass	TKG632–2	1
	VHF Knob Complete	TBX1715–2	1
	VHF Fine Tuning	TBX448–1	1
	ON-OFF Knob	TBX1519–1	1
	Contrast/Bright/Volume Knob	TBX1518–1	2
	Packing Case	APCD108	1
	Earphone Jack	EAE3YD	1
	6 Pin Socket	TJS29320	1
	6 Pin Plug	TJS68020	1
	Earphone Socket	TJS27180	1
	1 P Plug	TJS59030	1
	2 P Plug	TJS69380	1
	Fuse Holder	TJB153	1
	Antenna Terminal Board	TJB234S	1

TNP 2173

DIODES

Symbol No.	Description	Part No.	Q'ty Per Set
D402	EHT. Rect.	TVM540	1
D101		OA70	1
D201, 202		OA91	2
D501~504		TVS10D8	4
D401		TVMTK705M	1

TRANSFORMERS & COILS

Symbol No.	Description	Part No.	Q'ty Per Set
L401	H. Osc. Coil	TLH318	1
L404	Width Coil	TLH727	1
T301	V. Output	TLV241	1
L501	Choke Coil	TLP112–1	1
T401	F.B.T.	TLF608–2S	1
L402, 403	Peaking Coil	TLM080–999	2
L102, 103	Peaking Coil	TLM250–999	2
L152	Peaking Coil	TLT121–999	1
L104, 151	Peaking Coil	TLM561–999	1
T101	1st VIF Trans.	TLI1159	1
T102	2dn VIF Trans.	TLI1160	1
T103	Detector Trans.	TLI5159	1

REPLACEMENT PARTS LIST

Symbol No.	Description	Part No.	Q'ty Per Set
L101	Trap Coil	TL19163	1
T151	5.5M Trap Coil	TLS1162	1
T201	SIF Detector Trans.	TLS3155	1
	RESISTORS		
R104	Solid 27Ω ± 10% 1/2W	ERC12GK270	1
R109	Solid 200Ω ± 10% 1/2W	ERC12GK221	1
R213	Solid 330Ω ± 10% 1/2W	ERC12GK331	1
R204,106	Solid 820Ω ± 10% 1/2W	ERC12GK821	2
R203	Solid 22KΩ ± 10% 1/2W	ERC12GK223	1
R102,205 318	Solid 1KΩ ± 10% 1/2W	ERC12GK102	3
R406	Solid 2.2KΩ ± 10% 1/2W	ERC12GK222	1
R110	Solid 2.7KΩ ± 10% 1/2W	ERC12GK272	1
R101	Solid 5.6KΩ ± 10% 1/2W	ERC12GK562	1
R151	Solid 4.7KΩ ± 10% 1/2W	ERC12GK472	1
R107	Solid 1.8KΩ ± 10% 1/2W	ERC12GK182	1
R153,214 215,311	Solid 10KΩ ± 10% 1/2W	ERC12GK103	4
R310,301	Solid 12KΩ ± 10% 1/2W	ERC12GK123	2
R206	Solid 15KΩ ± 10% 1/2W	ERC12GK153	1
R105	Solid 22KΩ ± 10% 1/2W	ERC12GK223	1
R207,304 403	Solid 27KΩ ± 10% 1/2W	ERC12GK273	3
R212	Solid 33KΩ ± 10% 1/2W	ERC12GK333	1
R305	Solid 39KΩ ± 10% 1/2W	ERC12GK393	1
R309,411	Solid 47KΩ ± 10% 1/2W	ERC12GK473	2
R201	Solid 47KΩ ± 10% 1/2W	ERC12GK473	1
R154	Solid 180KΩ ± 10% 1/2W	ERC12GK184	1
R314,319 407	Solid 220KΩ ± 10% 1/2W	ERC12GK224	3
R402,404	Solid 270KΩ ± 10% 1/2W	ERC12GK274	2
R401	Solid 470KΩ ± 10% 1/2W	ERC12GK474	1
R157	Solid 680KΩ ± 10% 1/2W	ERC12GK684	1
R320,111 409	Solid 1MΩ ± 10% 1/2W	ERC12GK105	3
R315	Solid 1.8MΩ ± 10% 1/2W	ERC12GK185	1
R103	Solid 2.2MΩ ± 10% 1/2W	ERC12GK225	1
R312	Solid 3.3MΩ ± 10% 1/2W	ERC12GK335	1
R405	Solid 5.6MΩ ± 10% 1/2W	ERC12GK565	1
R303,317	Solid 10MΩ ± 10% 1/2W	ERC12GK106	2
R410	Metal Oxide 1.5KΩ 2W	ERG2PSK152	1
R152	Metal Oxide 4.7KΩ 3W	ERG3PSK472	1

REPLACEMENT PARTS LIST

Symbol No.	Description.	Part No.	Q'ty Per Set
R316	Volume (Height)	EVL32A00MB55	1
R313	Volume (V. Lin.)	EVTV8A00MB26	1
R117	Volume (AGC)	EVT38AA00B13	1
	CAPACITORS		
C152	Ceramic 4pF 500V	ECCC5040	1
C111,112,113	Ceramic 5pF 500V	ECCC5050	3
C101	Ceramic 10pF 500V	ECCC5100F	1
C154	Ceramic 33pF 500V	ECCC5330K	1
C105,201,403	Ceramic 47pF 500V	ECCC5470K	3
C402	Ceramic 82pF 500V	ECCC5820K	1
C205	Ceramic 100pF 500V	ECCC5101K	1
C401	Ceramic 150pF 500V	ECCC5151K	1
C411	Ceramic 270pF 500V	ECCC5271K	1
C413	Ceramic 120pF 5KV	ECCC50121K	1
C209	Ceramic 0.01μF 500V	ECKCO5103M	1
C109	Ceramic 680pF 500V	ECKC5681K	1
C315	Ceramic 470pF 500V	ECKC5471K	1
C115	Ceramic 820pF 500V	ECKC5821K	1
C207,305	Ceramic 1000pF 500V	ECKC5102K	2
C106,107,103 208,110,156 507,508,509 510	Ceramic 2200pF 500V	ECKC5222PU	10
C506,203	Ceramic 4700pF 500V	ECKC5472PU	2
C504,505	Ceramic 0.01μF 500V	ECKC5103PU	2
C104	Mylar 0.1μF 50V	ECQM05104M	1
C404	Mylar 0.22μF 50V	ECQM05224M	1
C309	Mylar 0.22μF 400V	ECQM4223K	1
C312	Mylar 0.047μF 400V	ECQM4473K	1
C155,308	Mylar 0.1μF 400V	ECQM4104K	2
C306,405	Mylar 0.0039μF 400V	ECQM4392K	2
C314	Mylar 0.0047μF 400V	ECQM4472K	1
C408	Mylar 0.0068μF 400V	ECQM4682K	1
C407	Mylar 0.0047μF 400V	ECQS5472K	1
C307	Oil 0.001μF 1KV	ECNX10102K	1
C213	Oil 0.015μF 1KV	ECNX10153M	1
C412	Oil 0.022μF 1KV	ECNX10223K	1
C310	Mylar 0.022μF 400V	ECQF4223K	2
C406	Mylar 470pF 500V	TCMS5471KA-S	1
C206	Electrolytic 10μF 50V	ECEA50V10NC	1
C414	Electrolytic 3μF 500V	ECEB500V3R3	1

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