



HITACHI

CPT-1444

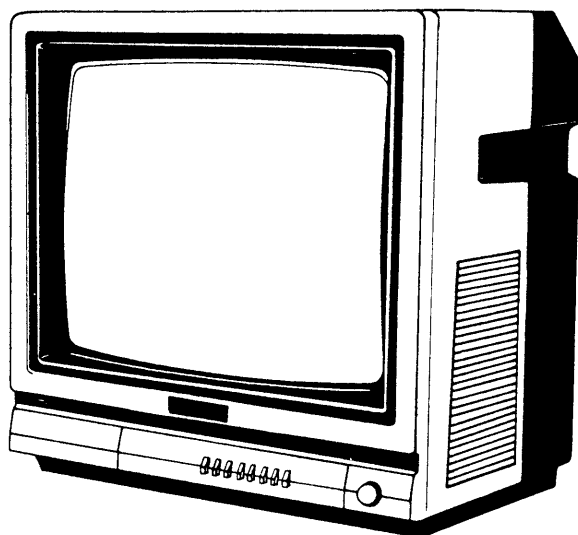
SERVICE MANUAL

PAL-SYSTEM
NP84CQ CHASSIS

= CPT 1446

CAUTION:

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



For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
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TECHNICAL SPECIFICATIONS

TV Standard 625-line single standard
Channel coverage UHF channels 21 - 68
Aerial input impedance 75 ohm unbalanced
Intermediate frequencies
I.F. Luminance 39.5MHz
I.F. Sound 33.5MHz
I.F. Chrominance 35.07MHz
F.M. Sound 6.0MHz
Colour subcarrier 4.43MHz
Convergence Self convergence
Focusing Electro static
Mains voltage 240V 50Hz
RGB Input 0V7 p.p. 75 ohms

Auxiliary sound input 500mW/22k for 0.5w output
Fuses F800mA T1A, T1.25A
Picture tube 14" Type A37-590X
Programme Selectors 8 light action buttons
Speaker 8 ohms
Sound output approx. 2 watt
Power consumption ... approx. 74W (controls at maximum)

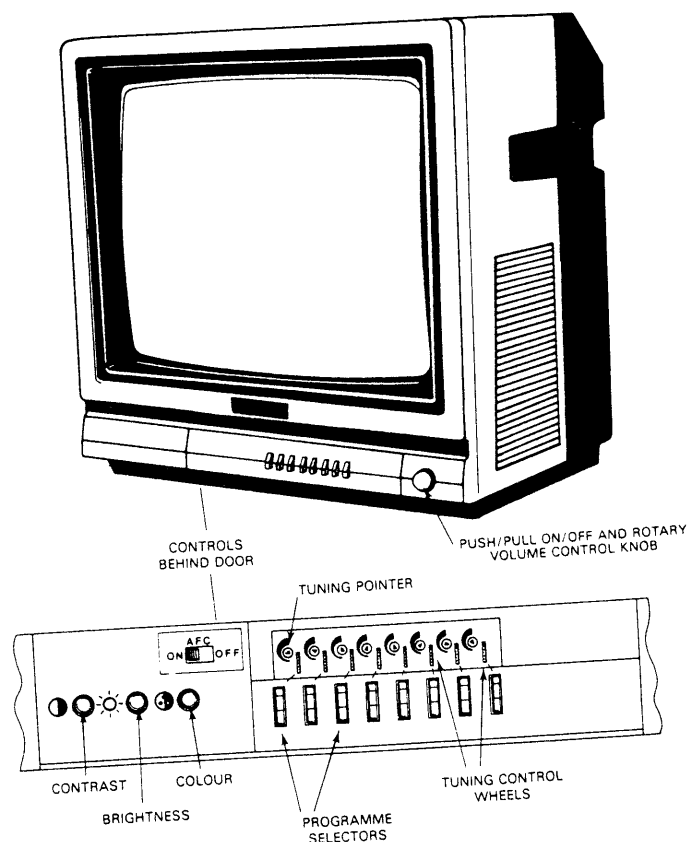
Dimensions
Width 36cm
Height 34.8cm
Depth 37.9cm
Weight approx. 10kg

- Since this is a basic circuit, the value of the parts and specifications are subject to be altered for improvement.

SOLID STATE COLOUR TELEVISION

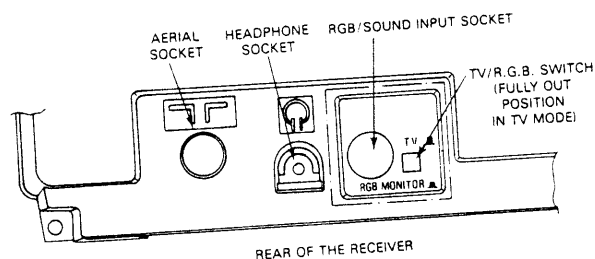
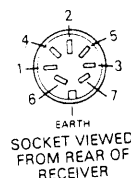
OCTOBER 1984

CONTROLS



RGB SOCKET

Pin No.	Function
1.	Red input
2.	Green input
3.	Blue input
4.	Sync. input
5.	Earth
6.	Sound input
7.	Not used



CIRCUIT DESCRIPTION

Tuner and I.F. Stages

Tuner type U343 covers a frequency range of 470 - 860 MHz. It consists basically of an A.G.C. controlled F.E.T. RF amplifier, a discrete mixer and oscillator stage plus an I.F. amplifier. This amplifier provides the extra gain required to compensate for the insertion loss of the saw filter CP201. The I.F. signal from the tuner is tailored to the desired response by the saw filter, then passed into IC203 at pins 8 and 9. This I.C. type TDA4503 incorporates a vision demodulator, video amplifier, sound demodulator, sound amplifier and also provides A.G.C. and A.F.C. outputs. L205/C212 form the resonant circuit for the synchronous detector switching signal. C211 provides decoupling for the internal I.F. amplifier and an A.F.C. output is available at pin 16. A.G.C. is controlled by VR201 and the time constant components R706/C705 on pin 24, with A.G.C. output being fed to the tuner from pin 6. The I.C. is driven by a 12V supply which is obtained from the flyback transformer and applied to pin 7. A voltage supply at pin 22 serves to operate the internal horizontal circuitry of IC203.

Sound Circuitry

The composite video/inter carrier signal at pin 17 of I.C.203 is fed via C414 and the 6MHz filter MF401 to pin 15. Internal circuits provide demodulation, a volume control stage and an A.F. output which is available from pin 12. The discriminator circuit consists of L401/C408 and R406 with C412 on pin 14 providing decoupling for the sound I.F. stages. D.C. volume control is determined by the voltage variation at pin 11 and is adjusted by VR401. From pin 12 the audio is applied to pin 3 of IC401 via C411. This I.C. type TBA820M is powered by a +12V supply at pin

6, which is obtained from the bridge rectifier D905-D908 and smoothed by C903. The output at pin 5 is applied to the speaker via C407 and SK401. During no signal conditions, a coincidence detector circuit in IC203 will give a voltage output which is applied to the internal volume control stage; this suppresses sound output whilst programmes are being tuned in or should an interruption in transmission occur.

Luminance and Chrominance

IC501 type TDA3562A operates as a video amplifier and colour signal processor, with additional inputs for data insertion.

Luminance

The composite video from pin 17 of IC203 is fed to emitter follower Q201 via the 6MHz trap MF201. It then passes through DL501, with chroma sub carrier rejection being obtained by CP501, and is input via C505 to pin 8. Black level clamping and amplification of the video signal is carried out in IC501.

Chrominance Signal

The composite video from Q201 emitter passes into the band pass filter circuit consisting of L501/C509. The chrominance component is extracted and fed to IC501 pin 4 via C506. Its amplitude is controlled by the burst control signal the operation of which depends on the burst control signal and the saturation control at pin 5. Burst gating and clamping circuits are operated by the sandcastle pulse input at pin 7 which is obtained in the following manner:- A portion of the delayed line sawtooth available at pin 5 of

IC203, is taken to the base of Q704 via C724 to make it conduct. This turns Q705 on, the conducting period being determined by the time constant of C726, R733/R734, thereby ensuring that the required pulse for the burst gate appears at the correct moment in time. This signal at Q705 collector is then added to the line pulse obtained via R725/R726 and the complete sandcastle pulse is fed to pin 7 of IC501 via D705.

If the phase control VR702 is altered, then the portion of line pulse used to drive Q704 also alters, therefore ensuring that the burst gate pulse still appears in correct phase with the burst signal.

After further amplification the chrominance is passed to the delay line from pin 28 where it is separated into the B-Y and R-Y signals. The B-Y signal enters pin 22 to be demodulated and the R-Y enters pin 23 for demodulation.

A sub carrier oscillator operates at 8.8MHz, and is connected internally to a $\pm 2,90^\circ$ phase shift circuit. This eliminates the need for external phase adjustment but is dependent to a certain degree on the component values between pins 24 and 25.

After internal demodulation, matrixing, and clamping etc., red, green and blue signals are obtained from pins 13, 15 and 17 respectively. The capacitors on pins 10, 20 and 21 are decoupling capacitors for the black level clamping circuits of the internal R.G.B. output stages.

A facility for data insertion of R.G.B. signals exists on IC501. These signals are fed via SK501 to pins 12, 14 and 16 of IC501.

Under TV conditions pin 9 is held low by SW501. When R.G.B. insertion is required SW501 is operated and pin 9 goes high via R527. This will cause all input data to be blanked, thus allowing only R.G.B. data insertion fed in at pins 12, 14 and 16 to be passed to the C.R.T. base for further amplification. During R.G.B. selection external sync is inverted by Q501 and then applied to pin 26 IC203 via C702. Also during R.G.B. insertion pin 24 of IC203 is pulled low by R226 and disables the tuner and IF stages. During normal TV operation C702 is grounded by SW501.

Line and field blanking are processed internally. Line blanking is taken from the sandcastle pulse at pin 7 IC501, with field blanking also applied at pin 7 via the inverter circuit of Q604.

An automatic beam limit circuit is employed on this chassis. Beam current sampled at pin 4 of the flyback transformer is taken to the 103V line via R715/R716, and also to D702 anode via R717. Under low beam current the voltage supplied to D702 anode is above 12V. This will cause D702 to conduct and thus clamps the beam current voltage to the 12V line. When high beam current exists, the voltage at D702 anode will go low causing D703 to conduct, thereby pulling pin 6 low, reducing the contrast level and hence the beam current.

Deflection Circuits

IC203 incorporates a sync separator, field oscillator and output, line oscillator and output plus a phase detector/frequency control.

Line Stage

Video signals are fed to the internal sync separator circuit and a line sync pulse is produced. This sync pulse and a portion of the line pulse fed in at pin 5 are compared in the phase detector/frequency control stage. A D.C. voltage corresponding to the phase difference is output from this stage and applied to the internal line oscillator. R707/VR701 and C707 connected to pin 23 are the external components which control the line oscillator, with VR701 adjusting the frequency.

R703/R704 and C702 control the action of the internal sync separator, with R702/C701 on pin 28 controlling the time constant of the internal phase detector stage to suit V.C.R. operation. The oscillator output appears as a square wave on pin 27 and is fed to the line driver Q702 via Q701. T701 couples the line driver to the line output transistor Q703.

The line driver stage, the line output transistor, and the line oscillator stage in IC203 are all supplied by the 103V line. The voltage on pin 22 of IC203 is reduced to approx 12V by R701 and C706.

Line Output and Protection Circuits

T702 supplies approx 12V from pin 2. Rectified by D701, it is fused by R714 and smoothed by C717. The scan output waveform available from pin 7 of the flyback transformer is rectified by D704 to supply 200V for the R.G.B. output transistors on the C.R.T. base. It is fused by R719 and smoothed by C719.

The controls for focus and screen adjustment are built into the flyback transformer assembly. Excessive E.H.T. could be generated by increased H.T. supply, low line osc frequency, or reduced value of the output stage tuning capacitors C711/2/3. To prevent this happening a portion of the 200V scan voltage is taken to the junction of ZD903/R901. If this voltage exceeds the threshold value of ZD903 it will conduct and apply a voltage to Q901 gate turning it on. This will put a short circuit on the 12V supply to pin 22 of IC203, which also serves to drive Q702, thereby shutting down the line oscillator and line output stages, thus preventing further E.H.T. generation.

Field Time Base

Vertical sync generation is carried out internally in IC203 and fed to the oscillator stage. This oscillator is controlled by the external components VR601 and R601/C601 with VR601 being the variable frequency control. A vertical output is obtained from pin 2 and passed on to the driver and output transistors Q603, Q601/2. A deflection current occurs at R608; this is fed through VR602/C602, mixed with feedback from the output stage via R605 and applied to pin 3 of IC203. Linearity and vertical height are controlled in this way with VR602 being the vertical size control.

The output transistors are powered by the 103V supply with TF601 giving thermal protection should a short circuit occur.

Power Supply Stage

The rectified output of the bridge rectifier (D901-4) at nominal input mains (240V A.C.) is approximately 130V, and is passed to the pre-regulator Q902/Q903, which operates as an emitter follower stage. Effectively, the pre-regulator is shunted by resistors R911/12 and at high mains input, these resistors act as the normal "Series Resistor" in a series regulator circuit, with IC901 as the main regulator. At low mains input, R911/12 are progressively shunted by Q902/Q903 and in fact pass little current at 220V AC input, which is the lower limit of operation.

The output of the pre-regulator varies from approximately 111V at low and nominal input mains, to approximately 120V at high input mains at normal beam currents.

The output voltage of IC901, the main regulator, is set by the network R905-08 and VR901. ZD901 and ZD904 (fitted in earlier receivers) help to protect the regulators under fault conditions.

Diodes D905/8 and C903 provide an unregulated D.C. supply of approximately 12V for the sound output stage IC401.

IMPORTANT SERVICE NOTE

When servicing the receiver take care not to accidentally short out the H.T. (103V) line as the Zener diodes, ZD901/04 and/or the regulators may go short circuit under severe overload conditions. If service work is carried out on the power supply and particularly if there has been a known or suspected short circuit on the H.T. line due to a fault condition, always check that under load conditions (normal picture) the output voltage is set to 103V (see page 6), and that the input voltage to the main regulator IC901 is approx. 111V — 120V for nominal mains input (240V A.C.).

Important Service Note (continued)

It is important to carry out this check to ascertain that both regulators are operating correctly. Even though the receiver may appear to work normally, a high voltage at this point will indicate a fault in the pre-regulator circuit which must be corrected. (See also note on line output and protection circuit).

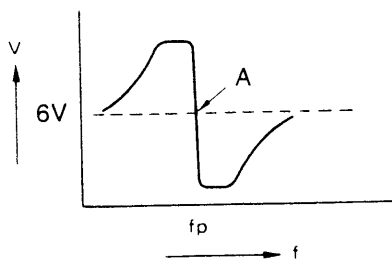
ALIGNMENT PROCEDURE

Power Supply H.T. Adjustment

1. Connect a D.C. voltmeter to the output of IC901 and ground.
2. Switch on and adjust VR901 so the voltmeter reads $103V \pm 0V5$.

Vision I.F. Alignment

1. Connect 39.5MHz multiburst signal to the tuner test point.
2. Connect an oscilloscope and D.C. voltmeter to pin 17 of IC203.
3. Check scope to ensure signal tuned to maximum strength.
4. Adjust L205 until a "fast rate of change" is seen on the D.C. voltmeter. Then adjust L205 so the voltmeter reads $6V0 \pm 0V1$ on this fast change slope. (See "A" on diagram below).



Note: The characteristics of AFC is as shown in this diagram, and the 6V point of this adjustment means the voltage at point A on "S" curve. (i.e. the rapidly changing voltage).

Sound I.F. Alignment

1. Connect an F.M. signal generator with a 6MHz sound carrier and a 1KHz modulated tone to the junction of C414/L208.
2. Connect a distortion meter and sound output meter to the speaker output leads.
3. Adjust L401 for maximum output with minimum distortion.

A.G.C. Adjustment

1. Connect a digital voltmeter to the tuner A.G.C. pin.
2. Supply a 1mV. R.F. signal to the aerial socket.
3. Turn VR201 fully clockwise, then adjust slowly anti-clockwise till voltmeter reads $8V \pm 0V5$. Take care not to overstep the 8V level peak or a false 8V reading may be obtained.

Deflection Adjustments

Horizontal Oscillator:-

1. Connect pin 28 of IC203 to ground.
2. Connect a D.C. power supply of 6V5 to pin 26 and a 10μ capacitor between pin 25 and ground.
3. Adjust VR701 so picture is as close to locking as possible.
4. Remove test connections and ensure picture locks normally.

Vertical Oscillator

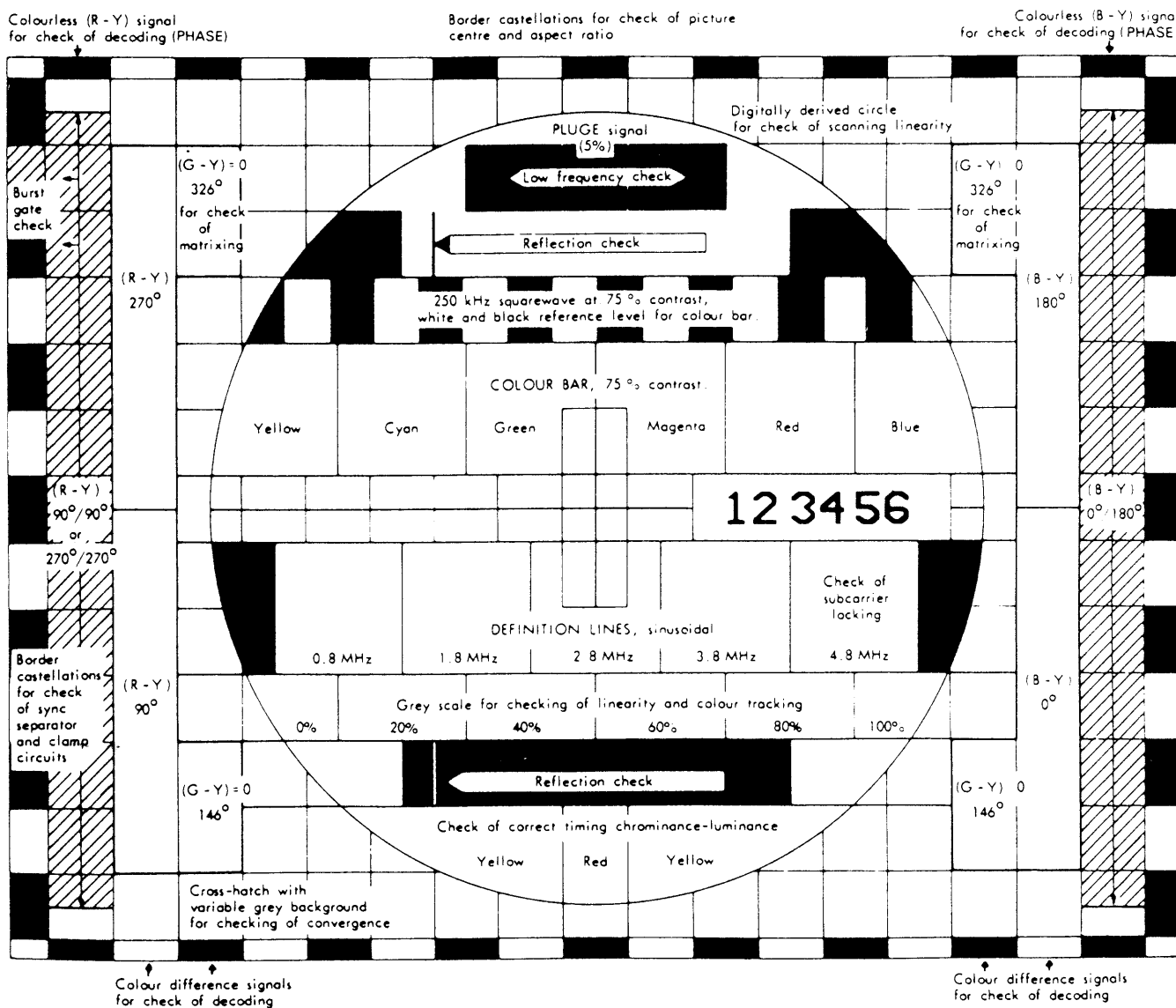
1. Connect pin 28 of IC203 to ground.
2. Adjust VR601 so that picture just starts to roll from bottom to top.
3. Remove earth from pin 28 and ensure that picture is locked correctly.

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Delay Line Balance and Phase

1. Receive the Philips circle pattern signal or other suitable test pattern.
2. Observe the picture and adjust L504 for minimum Hanover blind effect on colour bar section at the centre of the picture.
3. Adjust VR501 for minimum Hanover blind effect on B-Y and R-Y areas at the sides of the picture.

COMPOSITION OF TEST CARD PROVIDED BY PHILIPS PM5544



Overvoltage Protection Test

1. Connect a 10K variable resistor at maximum setting across R905.
2. Switch on and set brilliance, contrast and colour controls to maximum.
3. Gradually decrease the resistance of the variable resistor until the sound and raster disappear.
4. Switch set off, remove 10K variable resistor and short circuit gate of thyristor Q901 to ground.
5. Switch set on again to ensure it functions correctly.

Focus Adjustment

1. Receive the Philips test pattern or other suitable test pattern.
2. Adjust the brightness, contrast and colour controls to normal viewing levels.
3. Adjust focus control to achieve the best result overall.

Picture Geometry

Height

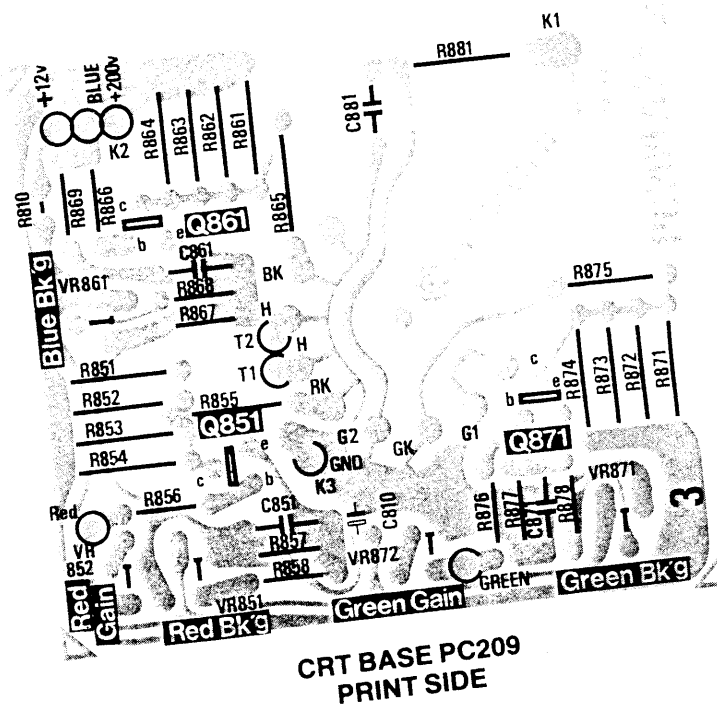
1. Receive the Philips circle test pattern.
2. Adjust VR602 so the castellations are just visible at the top and bottom of the screen.

Horizontal Shift

1. Receive the Philips test pattern or other suitable test pattern.
2. Adjust VR702 to centralise the picture.

GREY SCALE ADJUSTMENT PROCEDURE

1. Receive the Philips test pattern or appropriate pattern.
2. Set the screen control to minimum and VR851, VR861, VR871 to their mid positions.
3. Connect an oscilloscope to the green cathode.
4. Set the contrast control to the minimum and adjust the brightness control for 20V peak to peak on the oscilloscope.
5. Collapse the vertical deflection by removing the vertical scan plug. This is the smaller of the two plugs on PL701.
Note: Be especially careful to remove the correct plug.
6. Adjust the screen control so that a single coloured line is just visible.
7. Adjust the background controls corresponding to the other two colours until a single white line appears.
8. Adjust the screen control so that the single white line just disappears.
9. Replace vertical scan and adjust brightness and contrast controls for normal viewing.
10. Visually assess the overall grey scale and correct if necessary with small adjustments of the background controls.



VOLTAGE TABLES

Taken on colour bars with brilliance, contrast and colour at maximum using a 20,000 Ω /Volt meter. A.C. input 240V.

IC203			
Pin	Volts	Pin	Volts
1	2V8	15	2V1
2	1V1	16	5V8
3	4V6	17	3V0
4	6V0	18	2V8
5	0V4	19	0V
6	6V5	20	7V0
7	12V0	21	7V0
8	3V5	22	11V5
9	3V5	23	2V6
10	0V	24	4V0
11	*	25	1V4
12	2V6	26	2V8
13	3V0	27	5V5
14	1V5	28	2V2

Note: Some of these voltages will vary with signal strength.
*Varies with volume.

IC501			
Pin	Volts	Pin	Volts
1	12V	15	3V5
2	4V0	16	3V0
3	4V2	17	3V5
4	2V8	18	3V0
5	3V0	19	2V0
6	2V8	20	1V6
7	1V6	21	1V6
8	1V0	22	2V4
9	0V	23	2V4
10	1V6	24	10V5
11	2V6	25	10V5
12	3V2	26	2V0
13	3V5	27	0V
14	3V0	28	7V8

NB Pin 9 rises to 8V when SW501 operates

IC401			
Pin	Volts	Pin	Volts
1	0V7	5	5V2
2	0V6	6	10V5
3	0V	7	10V5
4	0V	8	6V6

IC901	
In	111V
Out	103V
Adjust	100V

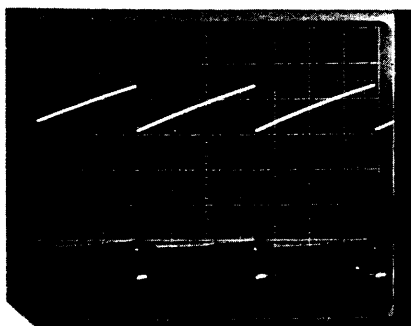
	Q201	Q501	Q601	Q602	Q603	Q604	Q701	Q702
E	2V4	5V3	0V	44V	0V5	0V	0V	0V
B	3V0	6V0	0V5	45V	1V0	0V5	0V5	0V3
C	12V0	6V5	41V	75V	41V	0V4	0V3	36V

	Q703	Q704	Q705	Q851	Q861	Q871	Q901	Q902	Q903
E	0V	0V	12V	3V2	3V2	3V2	K 0V	112V	113V
B	—	-1V5	12V	3V5	3V5	3V5	G 0V	113V	114V
C	102V	9V5	1V2	115V	115V	115V	A 11V5	118V	118V

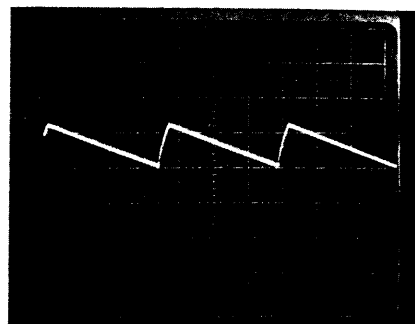
WAVEFORMS FOR IC203 AND IC501 TYPES TDA 4503, TDA 3562A. TAKEN USING A 10:1 PROBE ON COLOUR BARS, WITH BRILLIANCE, COLOUR AND CONTRAST AT MAXIMUM. SCOPE SET TO 20μ SECS/CM UNLESS OTHERWISE STATED

IC203

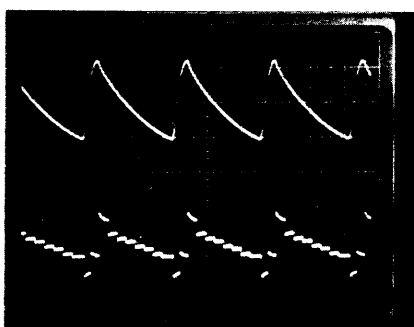
Pin 1.
1V5 p.p. at 5m secs/cm



Pin 3
1V5 p.p. at 5m secs/cm

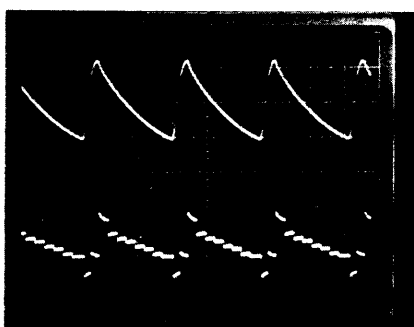


Pin 2
3V p.p. at 5m secs/cm

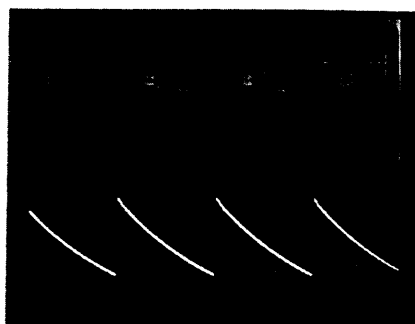


Pin 5
4V4 p.p.

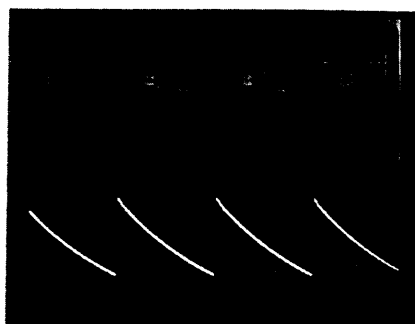
Pin 17
4V p.p.



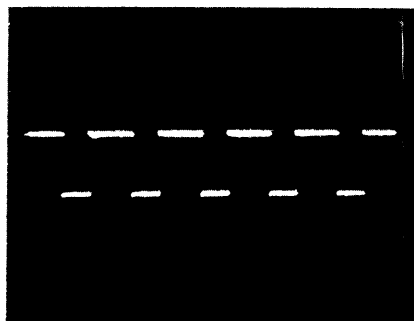
Pin 20/21
0V2 p.p.



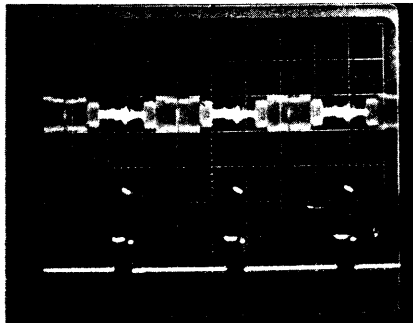
Pin 23
2V p.p.



Pin 27
10V p.p.



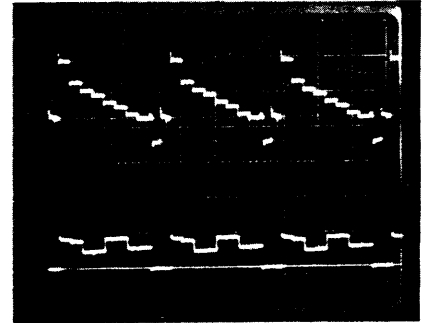
Pin 4
0V1 p.p.



Pin 7
13V p.p.



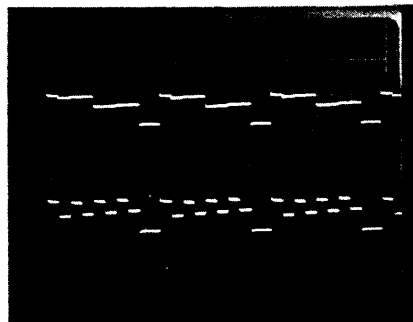
Pin 8
2V5 p.p.



Pin 13
5V p.p.



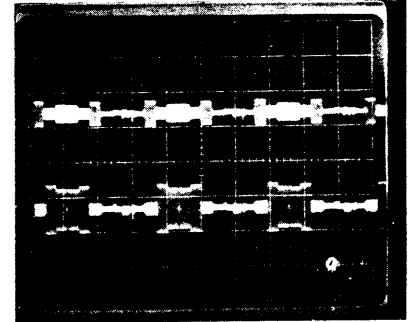
Pin 15
5V p.p.



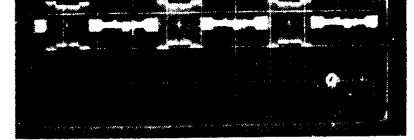
Pin 17
5V p.p.



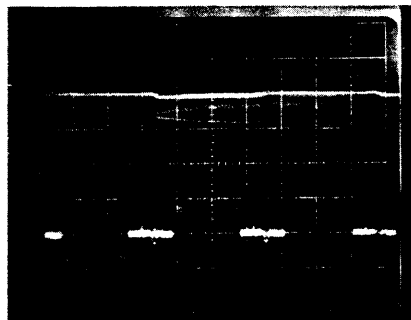
Pin 22
0V4 p.p.



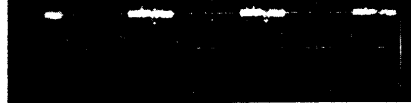
Pin 23
0V7 p.p.



Pin 26
0V6 p.p.

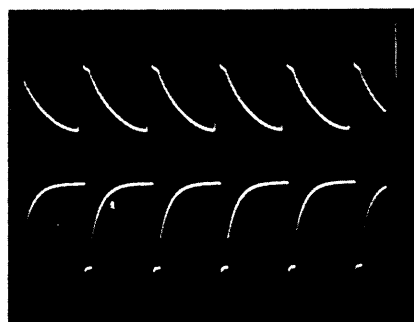


Pin 28
4V p.p.



SANDCASTLE PULSE GENERATION WAVEFORMS. TAKEN USING 10:1 PROBE, SCOPE SET TO 20 μ SECS/CM

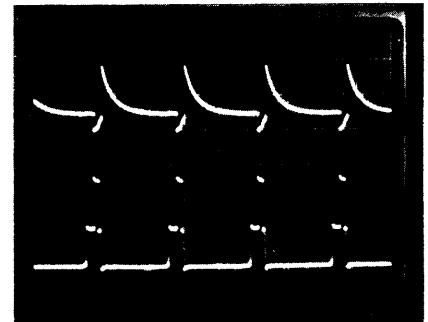
Q704 BASE
4V p.p.



Q704 COLLECTOR
13V p.p.

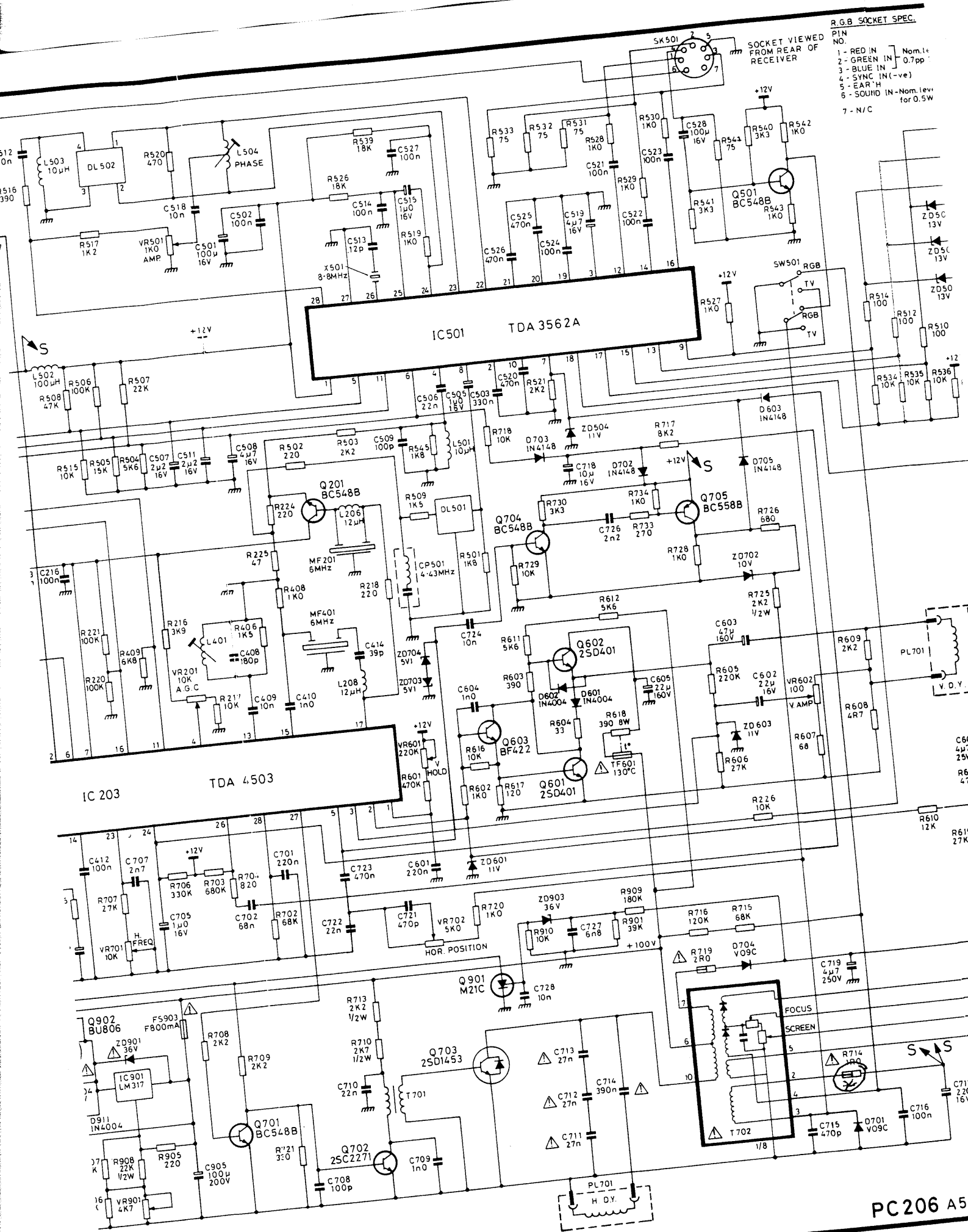


Q705 BASE
4V p.p.

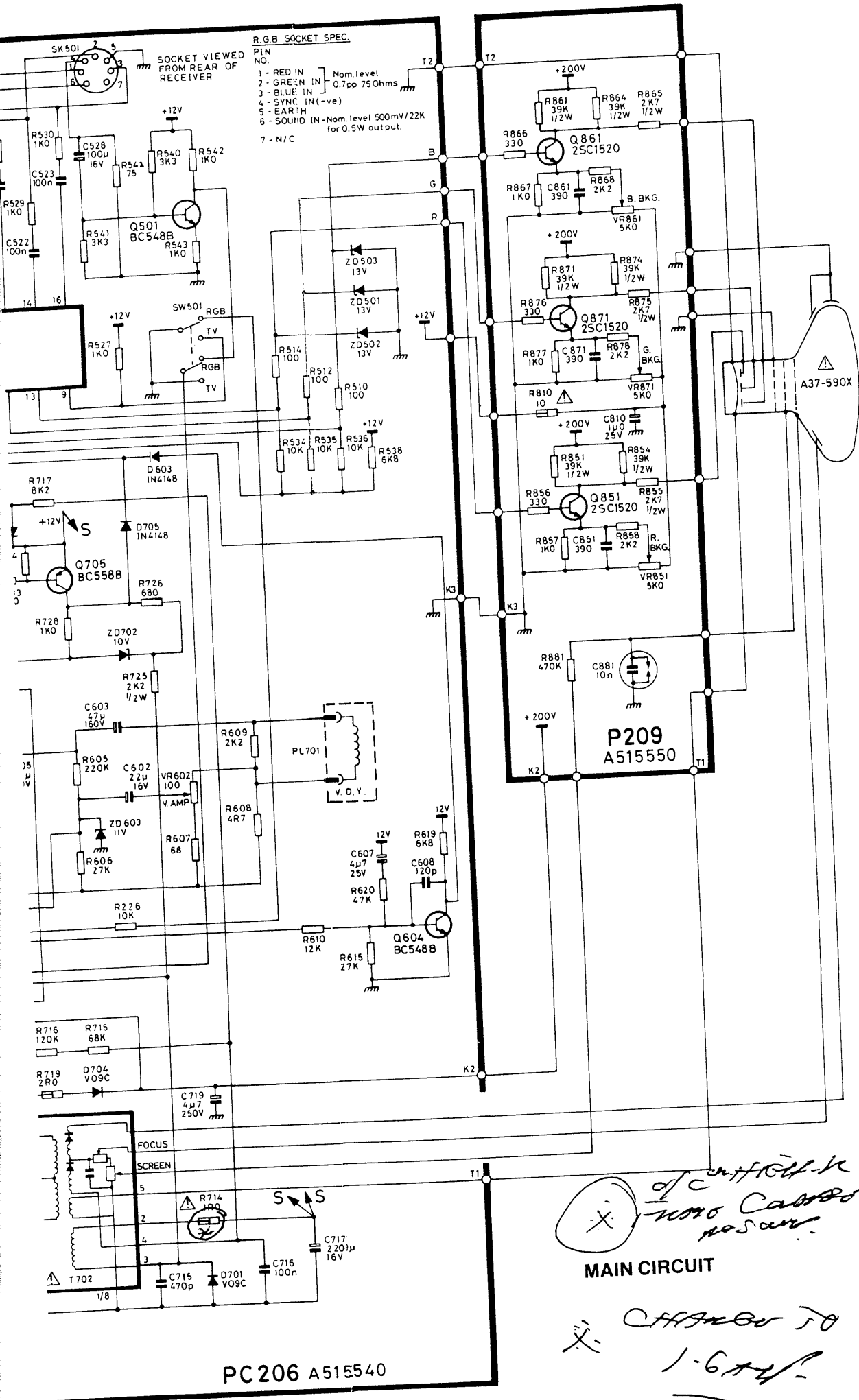


Q705 COLLECTOR
14V p.p.

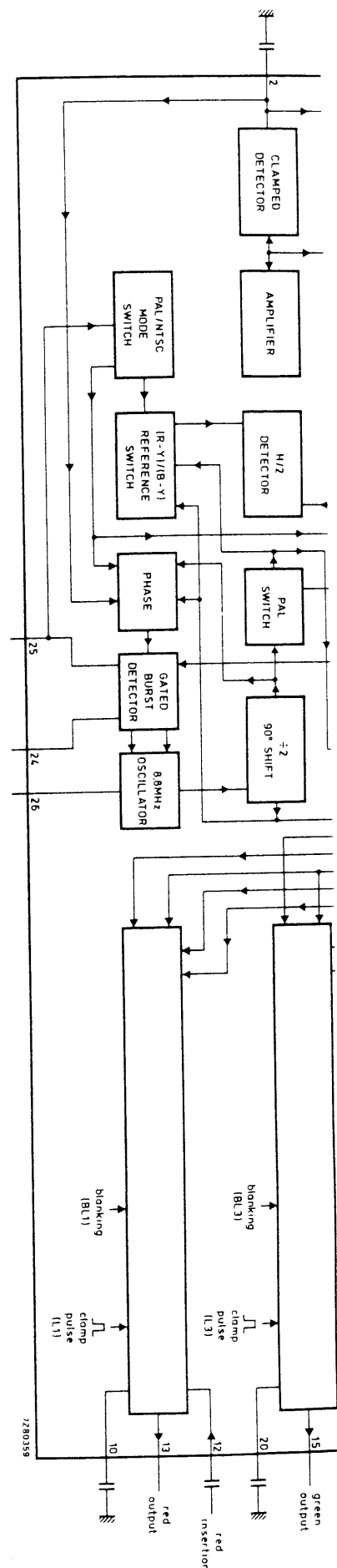
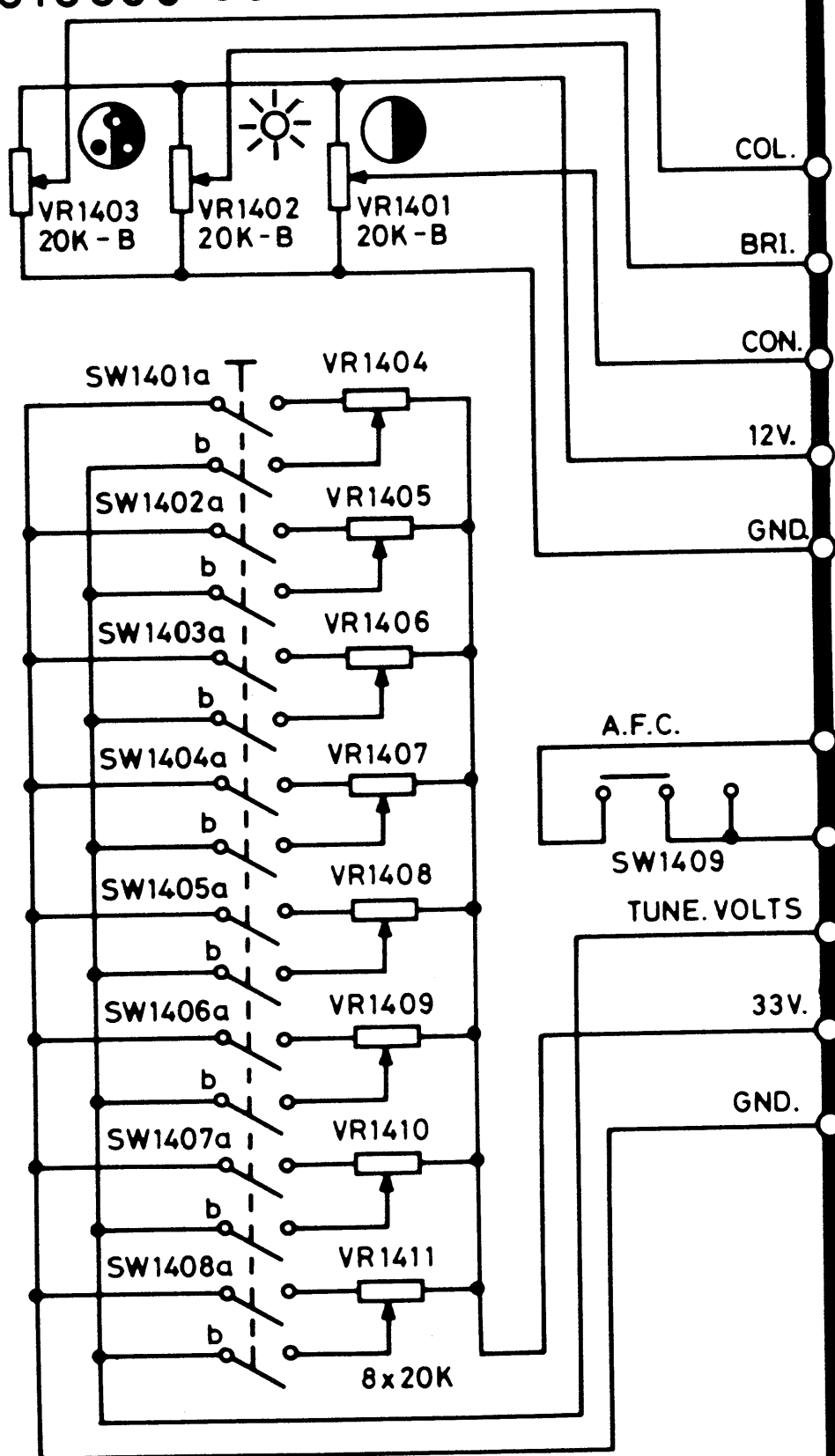




PC206 A5

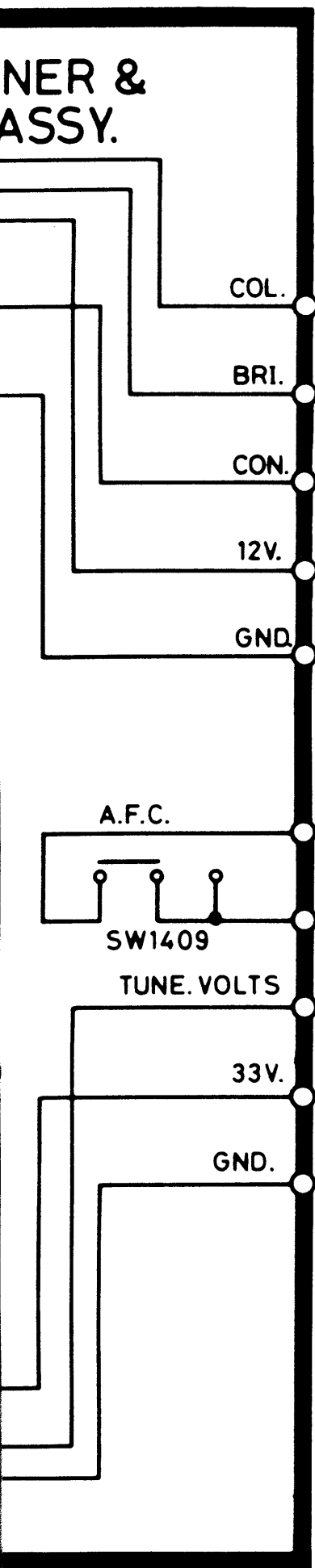


PC210 MANUAL TUNER & A515590 CONTROL ASSY.

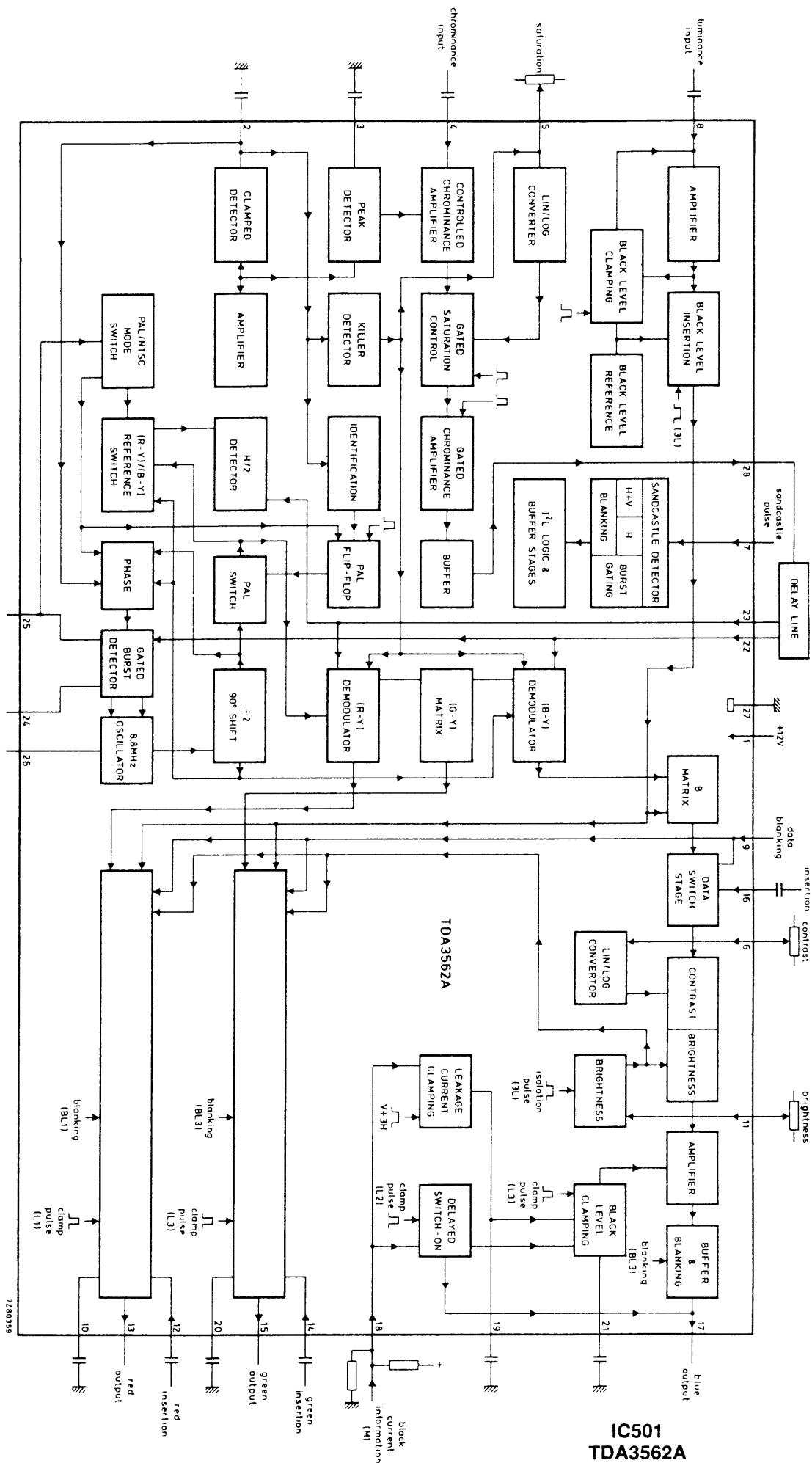


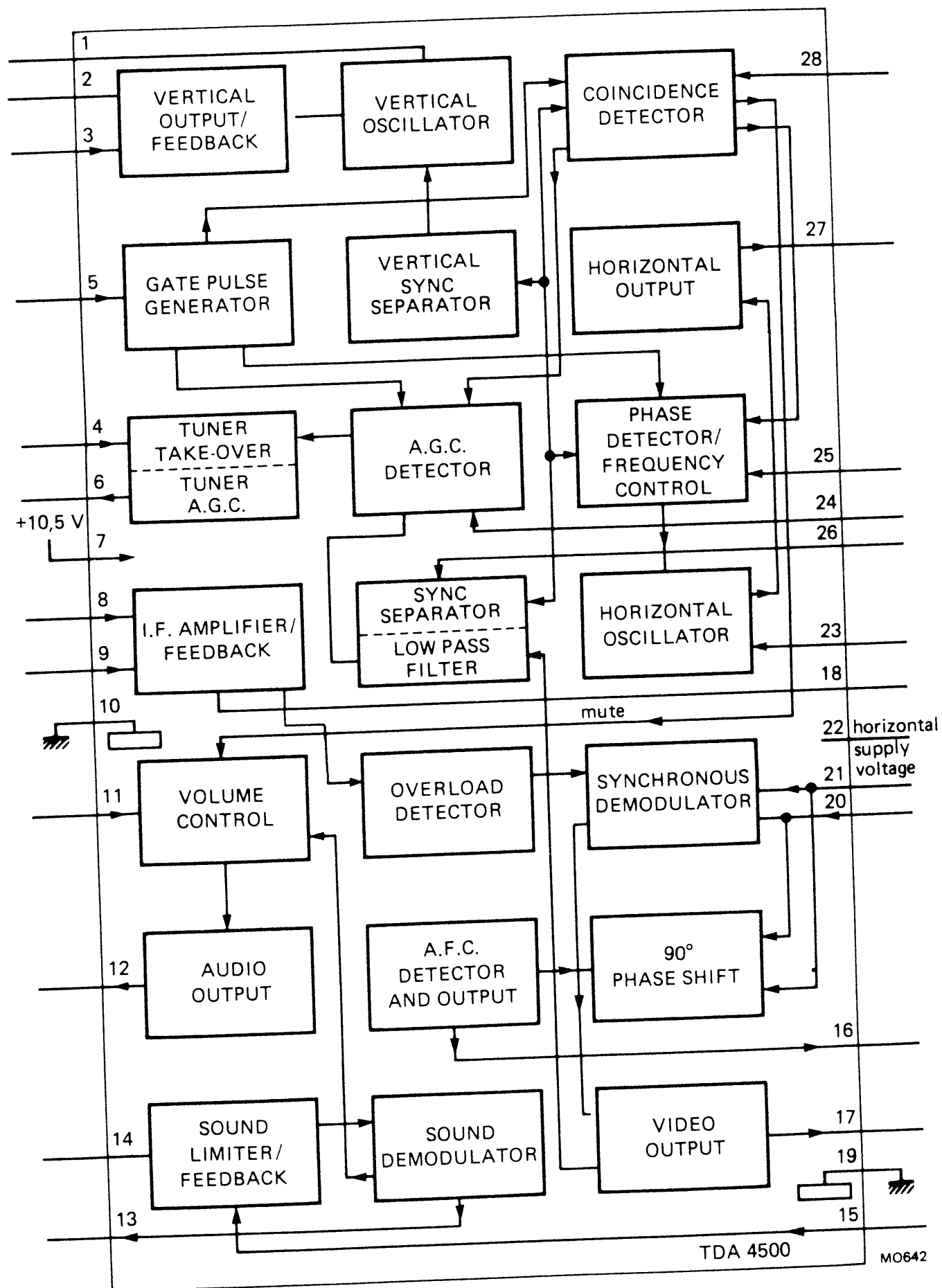
PC210 MAIN TUNER CONTROL

NER &
ASSY.



TROL





IC203
TDA4503

REPLACEMENT PARTS LIST

PRODUCTS SAFETY NOTE: Components marked with a Δ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

Resistor Abbreviations

CF	Carbon Film
MO	Metal Oxide
FF	Fusible Film
VR	Variable Control
MF	Metal Film
WW	Wire Wound

Symbol No.	Stock No.	Value	Type	% Tol	Wattage	Symbol No.	Stock No.	Value	Type	% Tol	Wattage
R201	R638319	6K8	CF	5	1/2	R541	R333358C	3K3	CF	5	1/4
VR201	E311033	10K	VR	A.G.C. Control		R542	R130358C	1K0	CF	5	1/4
R202	R323358C	330	CF	5	1/4	R543	R130358C	1K0	CF	5	1/4
R204	R638319	6K8	CF	5	1/2	R544	R715358C	75	CF	5	1/4
R212	R447330	47K	CF	5	1/4	R545	R138358C	1K8	CF	5	1/4
R213	R267716	2M7	MF	5	1/4	R601	R457330	470K	CF	5	1/4
R214	R247358C	27K	CF	5	1/4	VR601	E311039	220K	VR	Vertical hold	
R215	R536358C	5K6	CF	5	1/4	VR602	E311044	100	VR	Vertical height	
R216	R339358C	3K9	CF	5	1/4	R602	R130330	1K0	CF	5	1/4
R217	R140330	10K	CF	5	1/4	R603	R329330	390	CF	5	1/4
R218	R222330	220	CF	5	1/4	R604	R313330	33	CF	5	1/4
R220	R150330	100K	CF	5	1/4	R605	R252330	220K	CF	5	1/4
R221	R150330	100K	CF	5	1/4	R606	R247330	27K	CF	5	1/4
R222	R130330	1K0	CF	5	1/4	R607	R812330	82	CF	5	1/4
R223	R130330	1K0	CF	5	1/4	R608	R407330	4R7	CF	5	1/4
R224	R222330	220	CF	5	1/4	R609	R232330	2K2	CF	5	1/4
R225	R417330	47	CF	5	1/4	R610	R142330C1	12K	CF	5	1/4
R226	R140358C	10K	CF	5	1/4	R611	R536330	5K6	CF	5	1/4
R227	R227330	270	CF	5	1/4	R612	R536330	5K6	CF	5	1/4
Δ R228	R407551C	4R7	FF	5	1/2	R615	R247358C	27K	CF	5	1/4
Δ R401	R100551C	1R0	FF	5	1/2	R616	R140330	10K	CF	5	1/4
R402	R120358C	100	CF	5	1/4	R617	R122330	120	CF	5	1/4
R403	R140330	10K	CF	5	1/4	R618	R329538	390	MO	5	8w2
R404	R227330	270	CF	5	1/4	R619	R638330	6K8	CF	5	1/4
R405	R516549	56	MO	5	2	R620	R447330	47K	CF	5	1/4
R406	R135330	1K5	CF	5	1/4	VR701	E311033	10K	VR	Horizontal hold	
R408	R130330	1K0	CF	5	1/4	VR702	O151338	5K0	VR	Phase control	
R409	R638358C	6K8	CF	5	1/4	R701	R832549	8K2	MO	5	2
R411	R138330	1K8	CF	5	1/4	R702	R648330	68K	CF	5	1/4
R413	R140330	10K	CF	5	1/4	R703	R658330	680K	CF	5	1/4
VR501	E311029	1K0	VR	Colour balance		R704	R822330	820	CF	5	1/4
R501	R138358C	1K8	CF	5	1/4	R705	R138330	1K8	CF	5	1/4
R502	R222330	220	CF	5	1/4	R706	R353330	330K	CF	5	1/4
R503	R232330	2K2	CF	5	1/4	R707	R247330	27K	CF	5	1/4
R504	R536330	5K6	CF	5	1/4	R708	R232330	2K2	CF	5	1/4
R505	R145330	15K	CF	5	1/4	R709	R232330	2K2	CF	5	1/4
R506	R150330	100K	CF	5	1/4	R710	R237319	2K7	CF	5	1/2
R507	R242330	22K	CF	5	1/4	R713	R232319	2K2	CF	5	1/2
R508	R447330	47K	CF	5	1/4	Δ R714	R100551C	1R0	FF	5	1/2
R509	R135330	1K5	CF	5	1/4	R715	R648330	68K	CF	5	1/4
R510	R120330	100	CF	5	1/4	R716	R152330	120K	CF	5	1/4
R512	R120330C3	100	CF	5	1/4	R717	R832330	8K2	CF	5	1/4
R514	R120330C3	100	CF	5	1/4	R718	R140330	10K	CF	5	1/4
R515	R140330	10K	CF	5	1/4	Δ R719	R200551C	2R0	FF	5	1/2
R516	R329330	390	CF	5	1/4	R720	R130330	1K0	CF	5	1/4
R517	R132330	1K2	CF	5	1/4	R721	R323330	330	CF	5	1/4
R519	R130330C4	1K0	CF	5	1/4	R725	R232319	2K2	CF	5	1/2
R520	R427330	470	CF	5	1/4	R726	R628330	680	CF	5	1/4
R521	R232358C	2K2	CF	5	1/4	R728	R130330	1K0	CF	5	1/4
R522	R842330	82K	CF	5	1/4	R729	R140358C	10K	CF	5	1/4
R523	R150330	100K	CF	5	1/4	R730	R333330	3K3	CF	5	1/4
R524	R242330	22K	CF	5	1/4	R733	R227330	270	CF	5	1/4
R526	R148330	18K	CF	5	1/4	R734	R130330	1K0	CF	5	1/4
R527	R130358C	1K0	CF	5	1/4	Δ R810	R110551C	10	FF	5	1/2
R528	R130358C	1K0	CF	5	1/4	VR851	O151716	5K0	VR	Red background	
R529	R130358C	1K0	CF	5	1/4	R851	R349319C	39K	CF	5	1/2
R530	R130358C	1K0	CF	5	1/4	R854	R349319C	39K	CF	5	1/2
R531	R715358C	75	CF	5	1/4	R855	R237319	2K7	CF	5	1/2
R532	R715358C	75	CF	5	1/4	R856	R323330	330	CF	5	1/4
R533	R715358C	75	CF	5	1/4						
R534	R140330	10K	CF	5	1/4						
R535	R140358C	10K	CF	5	1/4						
R536	R140358C	10K	CF	5	1/4						
R538	R638358C	6K8	CF	5	1/4						
R539	R148330	18K	CF	5	1/4						
R540	R333358C	3K3	CF	5	1/4						

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Symbol No.	Stock No.	Value	Type	% Tol	Wattage
R857	R130330	1K0	CF	5	1/4
R858	R232330	2K2	CF	5	1/4
VR861	O151716	5K0	VR	Blue background	
R861	R349319C	39K	CF	5	1/2
R864	R349319C	39K	CF	5	1/2
R865	R237319	2K7	CF	5	1/2
R866	R323330	330	CF	5	1/4
R867	R130330	1K0	CF	5	1/4
R868	R232330	2K2	CF	5	1/4
VR871	O151716	5K0	VR	Green background	
R871	R349319C	39K	CF	5	1/2
R874	R349319C	39K	CF	5	1/2
R875	R237319	2K7	CF	5	1/2
R876	R323330	330	CF	5	1/4
R877	R130330	1K0	CF	5	1/4
R878	R232330	2K2	CF	5	1/4
R881	R457714	470K	MF	5	1/2
VR901	E311028	4K7	VR	H.T. preset	
R901	R349330	39K	CF	5	1/4
R904	R140546	10K	MO	5	1
R905	R222330	220	CF	5	1/4
R906	R148330C	18K	CF	5	1/4
R907	R648330	68K	CF	5	1/4
R908	R242319C	22K	CF	5	1/2
R909	R158330	180K	CF	5	1/4
R910	R140330	10K	CF	5	1/4
R911	R122538	120	MO	5	8w2
R912	R122538	120	MO	5	8w2

CUSTOMER CONTROLS			
VR1401	E311038	20K	Contrast control
VR1402	E311038	20K	Brilliance control
VR1403	E311038	20K	Colour control
VR1404-11	E361401	20K	Tuning potentiometers

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Capacitor Abbreviations

C	Ceramic
EL	Electrolytic
PF	Plastic Film
MP	Metalised Paper
MPO	Metalised Polyester

Symbol No.	Stock No.	Value	Type	% Tol	Voltage
C201	C150715C	100n	MPO	10	63
C202	C140715C	10n	MPO	10	63
C207	Q253065R	4 μ 7	EL		25
C208	C150715	100n	MPO	10	63
C209	Q253083R	2 μ 2	EL		50
C210	Q253047R	22 μ	EL		16
C211	C140715	10n	MPO	10	63
C212	C120182	100p	C	2	100
C213	C150715	100n	MPO	10	63
C214	Q253054	1000 μ	EL		16
C215	C112182	12p	C	2	100
C216	C150715	100n	MPO	10	63
C401	C150715	100n	MPO	10	63
C402	C252715	220n	MPO	10	63
C403	C140715	10n	MPO	10	63
C404	Q253049R	47 μ	EL		16
C405	Q253049RC	47 μ	EL		16
C406	Q253050R	100 μ	EL		16
C407	Q253051F	220 μ	EL		16
C408	C128145	180p	C	2	100
C409	C140715	10n	MPO	10	63
C410	Q244501R	1n0	C	10	500
C411	Q253086R	10 μ	EL		50
C412	C150715	100n	MPO	10	63
C414	Q248674R	39p	C	5	50
C415	Q253086R	10 μ	EL		50
C417	C140715	10n	MPO	10	63
C501	Q253050R	100 μ	EL		16
C502	C150715	100n	MPO	10	63
C503	C353715	330n	MPO	10	63
C505	Q253082R	1 μ 0	EL		50
C506	C242715	22n	MPO	10	63
C507	Q253083R	2 μ 2	EL		50
C508	Q253065R	4 μ 7	EL		25
C509	C120182	100p	C	2	100
C511	Q253083R	2 μ 2	EL		50
C512	C140715	10n	MPO	10	63
C513	C112182	12p	C	2	100
C514	C150715	100n	MPO	10	63
C515	Q253082R	1 μ 0	EL		50
C518	C140715	10n	MPO	10	63
C519	Q253065RC	4 μ 7	EL		25
C520	C457715	470n	MPO	10	63
C521	C150715	100n	MPO	10	63
C522	C150715	100n	MPO	10	63
C523	C150437	100n	C		50
C524	C150711	100n	MPO	10	100
C525	C457715	470n	MPO	10	63
C526	C457715	470n	MPO	10	63
C527	C150715	100n	MPO	10	63
C528	Q253050RC	100 μ	EL		16
C601	C252715	220n	MPO	10	63
C602	Q253047R	22 μ	EL		16
C603	Q001532	47 μ	EL		160
C604	Q244501R	1n0	C	10	500
C605	Q258590	22 μ	EL		160
C607	Q253065R	4 μ 7	EL		25V
C608	C122182	120p	C	2	100
C701	C252715	220n	MPO	10	63
C702	C648715	68n	MPO	10	63

Symbol No.	Stock No.	Value	Type	% Tol	Voltage
C703	C648715	68n	MPO	10	63
C704	Q253086R	10 μ	EL		50
C705	Q253082R	1 μ 0	EL		50
C706	Q253086R	10 μ	EL		50
C707	C237718	2n7	PF	5	100
C708	C120182	100p	C	2	100
C709	Q244501R	1n0	C	10	500
C710	C242710	22n	MPO	10	250
Δ C711	Q299995F	27n	PF	5	630
Δ C712	Q299995F	27n	PF	5	630
Δ C713	Q299995F	27n	PF	5	630
Δ C714	Q299933F	390n	PF	10	200
C715	Q243509R	470p	C	10	500
C716	C150711	100n	MPO	10	100
C717	Q253055F	2,200 μ	EL		16
C718	Q253086R	10 μ	EL		50
C719	Q257540F	4 μ 7	EL		250
C721	Q244118R	470p	C	10	50
C722	C242715	22n	MPO	10	63
C723	C457715	470n	MPO	10	63
C724	C140715	10n	MPO	10	63
C726	C232715C	2n2	MPO	10	63
C727	C638715	6n8	MPO	10	63
C728	C140715	10n	MPO	10	63
C810	Q253082R	1 μ 0	EL		50
C851	C329256	390p	C	10	50
C861	C329256	390p	C	10	50
C871	C329256	390p	C	10	50
C881	E884103C	10n	Spark Gap		1 - 2kV
Δ C901	C160708	1 μ 0	MPO	10	250
C903	Q253055	2,200 μ	EL		16
C904	Q259976	470 μ	EL		200
C905	Q259921	100 μ	EL		200
C906	C140715	10n	MPO	10	63
C907	C140715	10n	MPO	10	63
Δ C908-15	Q249159	4n7	C		400VAC

*C908-15 deleted in later receivers.

Symbol No.	Stock No.	Type
I.C's TRANSISTORS AND DIODES		
IC201	T536193	ZTK33B
IC203	T900418	TDA4503
IC401	T900402	TBA820M
IC501	T900421	TDA3562A
IC901	T900406	LM317T
Q201	T631275	BC548B
Q501	T631275	BC548B
Q601	2321306	2SD401A
Q602	2321306	2SD401A
Q603	T633133	BF422
Q604	T613275C	BC548B
Q701	T631275C	BC548B
Q702	2321992C	2SC2271MN
Q703	2324411	2SD1453
Q704	T631275	BC548B
Q705	T631276	BC558B
Q851	T632075	2SC1520-1
Q861	T632075	2SC1520-1
Q871	T632075	2SC1520-1
Q901	2390022	M21C(Y)
Q902	T636033	BU806
Q903	T633133	BF422
D601	T431050	IN4004
D602	T431050	IN4004
D603	T531053	IN4148
D701	2330551M	V09C
D702	T531053	IN4148
D703	T531053	IN4148
D704	2330551M	V09C
D705	T531053	IN4148
△ D901-08	T431050C2	IN4004
D910	T431050	IN4004
D911	T431050	IN4004
ZD501	T536181	13V Zener 500 mW
ZD502	T536181	13V Zener 500 mW
ZD503	T536181	13V Zener 500 mW
ZD504	T536183C	11V Zener 500 mW
ZD601	T536183C	11V Zener 500 mW
ZD603	T536183C	11V Zener 500 mW
ZD702	T536176	10V Zener 500 mW
ZD703	T536174	5V1 Zener 500 mW
ZD704	T536174C2	5V1 Zener 500 mW
△ ZD901*	T536197	36V 6W BZW03-C36
ZD902	T536176	10V Zener 500mW
ZD903	T536171	36V Zener 500mW
△ ZD904*	T536171C	36V Zener 500mV

*If diode is fitted to main PCB and replacement is required use 500mW type. Some receivers will already have this type fitted.
ZD904 may be deleted in later models.

Symbol No.	Stock No.	Type
COILS AND TRANSFORMERS		
L204	2120482F	100μH Filter
L205	2142019	A.F.C. Coil
L206	L420133	12μH Axial Coil
L208	L420134	12μH Axial Coil
L401	L380073	F.M. Discriminator
L501	L420135	10μH Axial Coil
L502	2120482F	100μH Filter
L503	L420130	10μH Peaking Coil
L504	L380073	Delay Balance
T701	2260021	Horiz. Drive Transformer
△ T702	2432981	Flyback Transformer
△ T901	A515520	Mains Transformer Assembly
CRYSTALS, DELAY LINES ETC.		
X501	E516021	8.8mHz Crystal
DL501	L410139	Luminance Delay
DL502	L410134	Chroma Delay
MF201	2142244	6mHz Trap
MF401	2142603F	6mHz Filter
CP201	2300131	S.A.W. Filter
CP501	2161513	Chroma Sub Carrier Trap