

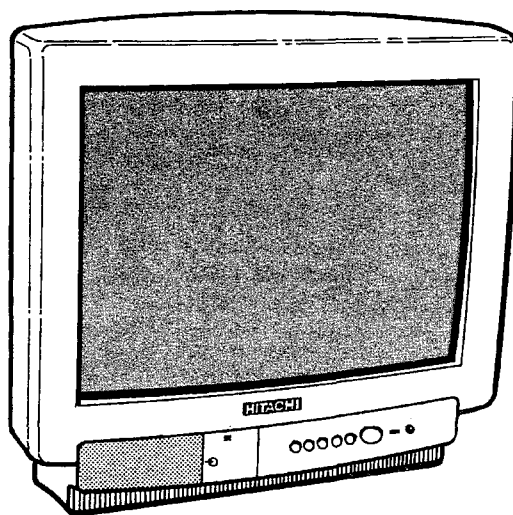


HITA-02525

SERVICE MANUAL

CAUTION:

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



TECHNICAL SPECIFICATIONS

TV Standard	625 lines	Programme Selectors.....	Channel UP/DOWN buttons with 59 programme remote control
Channel coverage	VHF, UHF and S Bands	Speaker	8 x 12 cm
Aerial Input impedance	75 ohm unbalanced	Power Consumption.....	55 W Approximately
Intermediate frequencies		Picture Tube	51 cm
I.F. Luminance	38.9 MHz	Dimensions:	
I.F. Sound	33.4 MHz	Width	507.9 mm
I.F. Chrominance	34.47 MHz	Height	478.3 mm
F.M. Sound	5.5 MHz	Depth	480.8 mm
Colour sub carrier	4.43 MHz	Weight	22 kg. Approx.
Focusing	Electro static		
Mains voltage	220-240 V 50 Hz		
Fuse	T3.15A		

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

SAFETY PRECAUTIONS

WARNING: The following precautions should be observed.

1. Do not install, remove, or handle the picture tube in any manner unless shatter proof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep the picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between the power line and the receiver before any service is performed on the chassis.
3. When replacing the chassis in the cabinet, ensure all the protective devices are put back in place, such as barriers, non-metallic knobs, adjustment or compartment covers or shields, isolation resistors/capacitors, etc.
4. When service is required, observe the original lead dressing. Extra precaution should be taken to ensure correct lead dressing in the high voltage circuitry area. Particularly note the R.G.B. lead dressing. Ensure they are dressed well away from the horizontal scan and F.B.T. circuitry.
5. Always use the manufacturer's replacement component. Always replace original spacers and maintain lead lengths. Especially critical components are indicated thus \triangle on the parts list and should not be replaced by other makes. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing.
Therefore, the following checks are recommended for the continued protection of the customers and service technicians.

INSULATION

Insulation resistance should not be less than $10M\Omega$ at 500V DC between the mains poles and any accessible metal parts.

Also, no flashover or breakdown should occur during the dielectric strength test, applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts.

HIGH VOLTAGE

High voltage should always be kept at the rated value of the chassis and no higher. Operating at higher voltages may cause a failure of the picture tube or high voltage supply, and also, under certain circumstances could produce X-radiation levels moderately in excess of design levels. The high voltage must not, under any circumstances, exceed 27kV on the chassis.

X-RADIATION

TUBES: The primary source of X-radiation in this receiver is the picture tube. The tube utilised for the above mentioned function in this chassis is specially constructed to limit X-radiation.

For continued X-radiation protection, replace tube with the same type as the original HITACHI approved type.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection, nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a \triangle on the schematics and the replacement parts list contained in this service manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list of this service manual, may create electrical shock, fire, X-radiation, or other hazards.

Product Safety is continuously under review, and new instructions are issued from time to time. For the latest information, always consult the current HITACHI service manual. A subscription to, or additional copies of HITACHI service manuals, may be obtained at a nominal charge from your HITACHI SALES CORPORATION.

TUBE DISCHARGE

The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode to chassis via a high value resistor, prior to its removal from the tube.

CIRCUIT DESCRIPTION

Tuner and I.F. Stages:

The tuner used on this chassis, is powered by the +9v supply, and covers VHF, UHF, and S bands.

When tuning is performed, the mark/space ratio output from pin 1 of IC001 changes. This is applied to the base of Q001, and the resultant voltage at the collector is filtered then applied to the VT terminal of the tuner (Pin 8).

Signal recognition is performed by IC201 in conjunction with IC001, and is explained later in the Remote Control and Tuning circuit description.

Band switching is performed by IC003 type LA7920. This IC consists basically of four switches, which are connected to the +9v supply at pin 9. Which of these switches operate is determined by IC001.

"High" or "Low" outputs are obtained from pins 6 and 7 of IC001, then applied to pins 3 and 4 of IC003. The state of these two pins determine which of the internal switches of IC003 are selected, and therefore which of the tuner terminals BU, BL, or BH has a +9v applied to it.

The I.F. output from the tuner is applied to amplifier Q201 then input to the SAW filter CP201.

Sound I.F. stages:

The sound stages consist of IC201, which is basically a demodulator, and IC401, which is the output amplifier.

The I.F. signal at the collector of Q201, is fed via filter CP201, and input to IC201 at pins 45 and 46.

The composite signal output from pin 7 of IC201 is applied to the 5.5MHz filter MF422. The audio component is then input to pin 5 of IC201 via Q421 and C422.

Demodulation is then performed by the IC, with the sound output being obtained from pin 50. It is then input to pin 3 of IC401 via Q401, C421, and R413 for further amplification, then output to the speaker from pin 7.

Volume control is performed by the DC voltage applied to pin 5 of IC201.

This is obtained from pin 5 of IC001 via R017, R028, R020 and R427.

Should a short circuit condition exist on pin 8 of IC401, the voltage to the base of Q440 will drop, and the transistor will conduct.

A voltage is then applied to the gate of Q703 turning it on, and applying a "Low" to the base of Q952, which then turns off. This effectively removes the chassis +9v supply, therefore protecting IC401.

Under no signal conditions, or when the "SEARCH" routine is initiated, pin 4 of IC201 (Ident) will go "Low". When this happens, internal circuits in IC201 prevent any sound output from being obtained.

External Audio Input/Output:

Sound demodulation output at pin 1 of IC201, is applied to pin 3 of IC451 via Q451. It is output from pin 4, then input to pins 1 and 3 of the 21 pin scart socket, via Q453, Q454. From the 21 pin scart socket, the audio signal can be output to external equipment if so desired.

Audio signals from external equipment can be applied to the 21 pin scart socket at pins 2 and 6. They are then input to IC451 at pin 1.

When connecting audio signals this way, a "High" is applied to pins 11 and 10 of IC451 from IC001, thereby changing the internal switching circuitry of the IC. The audio input to pin 1 is then output at pin 15, and applied to pin 6 of IC201 for further processing. Volume control of the external audio signal is then obtained in the same way as for internal sound, i.e. by the voltage at pin 5 of IC201.

(How the "High" switching voltage is obtained, will be explained in the Remote control and Tuning circuit description).

Vision I.F. Stages:

The I.F. signal from CP201 is input to pins 45 and 46 of IC201. These pins supply an internal amplifier consisting of three stages whose gain is controlled by the AGC circuit. The response speed of this internal AGC stage is determined by the value of C205, connected to pin 48.

The output from the I.F. amplifier is then fed to the video detector circuitry. The picture carrier is limited and phase shifted by the tank circuitry of L202 etc., connected between pins 2 and 3 of the IC. This produces a reference frequency which is utilised for synchronous video detection.

An RF AGC voltage is made available at pin 47 of IC201, the starting level of which is determined by the voltage applied to pin 49, which in turn is fixed by the setting of VR202. This AGC voltage is then fed to the tuner via R208 to control its gain accordingly.

The composite video finally emerges at pin 7 of IC201.

Luminance Circuitry

The composite video signal output from pin 7 of IC201 is applied to the sound rejection filter MF501 via the buffer transistor Q501. The resulting luminance signal is applied to pin 12 of IC451 via Q502. It is also input to pin 19 of the 21 pin connector, for output to external equipment if so desired. The internal switching of IC451 will output the luminance at pin 14.

It is then returned to pins 13 and 15 of IC201 via Q455, the teletext panel (CP2114T models only), and Q301 buffer.

The luminance signal is added internally to the RGB matrix circuits of IC201, and will be controlled by the brightness, contrast, and blanking stages of the IC.

The voltages to control the contrast and brightness levels are output from pins 2 and 3 of IC001, then applied to pins 25 and 17 of IC201.

The luminance signal finally emerges with the RGB signals from pins 18, 19 and 20 of IC201.

An automatic beam current circuit is employed on this chassis. Should the beam current start to rise, the voltage at pin 4 of the flyback transformer will fall. This fall is applied to the cathode of D706, then via R720 to pin 25 of IC201, thereby reducing the contrast level and hence the beam current.

Video inputs from external equipment connected to the 21 pin scart socket, are fed from pin 20 to IC451 pin 13 via Q460 and Q461 stages.

When the external mode is selected, a "High" is applied to pins 10 and 11 of IC451. This "High" cause the switching circuits to output the external signal from pin 14. This signal is then fed to pins 13 and 15 of IC201 as previously described.

Chrominance Circuitry:

The demodulated colour signals are output from IC201 pins 30 and 31 as the R-y and B-y signals, then fed to pins 14 and 16 of IC501 which is a switch capacitor delay line. The inputs at pins 14 and 16 are clamped, then fed via a buffer stage to internal delay lines, which are driven by a clock signal of 3MHz to obtain a delay period of 64µ Seconds. This internal clock is generated from a 6MHz voltage controlled oscillator, and line locked by the sandcastle pulse input at pin 5. Low pass filters after the delay line stages suppress the clock signals.

The undelayed and the delayed signals are then added, with the resulting R-y and B-y signals being output from pins 11 and 12 via an internal buffer stage.

These outputs are then fed to IC201 at pins 28 and 29. This IC contains clamping circuits, and a DC colour saturation control, the level of which is set by the voltage applied to pin 26 from pin 4 of IC001. The signals are then applied to a MATRIX circuit, and finally emerge from pins 18, 19 and 20 as the blue, green, and red signals.

Deflection Circuits:

The deflection circuitry of IC201 contains a sync. separator stage, horizontal oscillator and output stages, a vertical count-down and output stage.

Horizontal Stage

The composite video signal from pin 7 of IC201 is eventually returned to pin 13 as previously explained. This input is applied to the internal sync. separator stages of the IC.

A internal phase detector stage is provided with a sawtooth waveform, generated from the line pulse input to pin 38. The phase detector will then compare this sawtooth waveform to the sync. pulse. Any frequency drift will cause a corrective output to be applied to the horizontal oscillator, thereby maintaining the desired phase relationship.

The components connected to pin 40 form a filter network for the phase detector, and VR701 connected to pin 39 provides manual phase control. The horizontal output emerges at pin 37 and is then applied to the base of line drive transistor Q701. T701 couples the output of Q701 to the line output transistor Q702. Both these transistors are powered by the 112v supply.

A line pulse available at pin 1 of the flyback transformer is rectified by D701, smoothed by C716, and provides approximately 180v to drive the output transistors Q801, Q802, Q803.

Under certain fault conditions, i.e. increased H.T. supply, low line oscillator frequency, or reduced value of the tuning capacitor C725, an excess of E.H.T. could be developed. To prevent this happening, the rectified voltage of D701 is fed via potential divider R715, R716, and applied to ZD701. Should the E.H.T. rise excessively, the threshold of the zener will be exceeded, and a voltage will be applied to the gate of Q703 via R718, turning it on. This effectively applies a "Low" to Q952 base, turning the transistor off. Consequently, Q953 will be turned off, and the +9v supply to IC201 is then removed, thereby shutting down the deflection stages of the IC, and preventing further E.H.T. generation.

Excessive beam current can also occur under certain fault conditions, so this is prevented in the following manner.

The H.T. current to the horizontal output stages is measured by R727.

Should the current rise, the voltage drop across R727 will cause Q704 to be turned on, and a voltage will be applied to the gate of Q703. This will then prevent further E.H.T. generation as described earlier.

A supply of +25v is required for IC601. This is obtained from pin 6 of the flyback transformer, rectified by D702 and smoothed by C719.

Vertical Stages:

The internal vertical sync. of IC201 is fed to a triggered vertical divider stage, which counts down the horizontal frequency to obtain the vertical frequency, thereby eliminating the need for a conventional oscillator circuit. This also has the advantage that no external frequency control is required.

C601 at pin 42 of the IC is used for ramp generation, and produces the required sawtooth output.

The vertical output from pin 43 of IC201 is applied to pin 4 of IC601 via R604. The components D601 and C605 determine the flyback generation time, and the vertical output to drive the deflection coils is made available from pin 2.

The deflection current that occurs at the junction of R609/R610, is added to the feedback from R607/C608 etc, and the result is applied to pin 41 of IC201. The values of R607 and C608 determine the linearity, whilst VR601 sets the vertical height.

Power Supply Circuit:

The AC input is rectified by D901 - 04 and produces approximately 300v to Q903.

Current flowing through R901, causes Q903 to initially turn on.

Secondary voltages are then induced in T901, and a feedback voltage is obtained via D905, L903 etc. and applied to Q903 base, thereby maintaining the transistors operation.

This circuitry self oscillates at a frequency determined by the inductance of the transformer, the AC mains voltage and load conditions etc.

The secondary voltage in the S1 - S2 winding is rectified by D951 to produce the H.T. of 112v which is smoothed by C952.

The S3 - S4 winding produces approximately 12v from D952, which is smoothed by C954. This is then applied to Q953, and in conjunction with IC951, produces the chassis +9v supply.

Should the +12v supply to Q953 rise dramatically, the threshold of ZD960 will be exceeded and it will conduct, applying a voltage to Q960. The transistor then turns on, and pulls "Low" the base of Q952, turning it off. As a result Q953 turns off, and the excessive voltage will be removed from the junction of Q953/IC951.

Q951 stage controls H.T. regulation. The base of Q951 is set to a pre-determined level by the resistor network R952, VR951, and R951. Should the H.T. rise, the emitter voltage of Q951 will become more positive, and this difference is amplified by the transistor and applied to opto-coupler IC901. An output is then produced from pin 5 of this opto-coupler, which is applied to transistor network Q901, Q902. These transistors control the on time of the power transistor Q903, therefore in this manner a constant and regulated H.T. level is maintained.

ZD952 offers protection should the H.T. voltage rise excessively.

When the standby mode is selected, pins 6 and 7 of IC001 will go "Low", removing the drive to Q952. As a result, Q953 is turned off, and the +9v to IC201 disappears, therefore shutting down the deflection stages of the IC.

E.H.T. generation will then cease for as long as the standby condition exists.

Remote Control and Tuning Circuitry:

The remote control receiving unit U001, contains an infra red amplifier type GP1U721Q. This is powered by the +5v supply, which is obtained from the +12v supply via R957, R907, and stabilized by ZD001. The output from pin 1 of the infra red amplifier is applied to pin 35 of IC001.

This IC type TMP47C634N-R137, performs channel selection, UP/DOWN analogue control, on-screen display, search tuning, teletext control, and controls inputs and outputs to and from the 21 pin scart socket.

IC002 is the memory IC, which stores the data relating to the above functions, then transfers that information to IC001 when required. Both these ICs are powered by the +5v supply.

X001, C026 and C027 supplies IC001 with a basic clock frequency which controls all operating mode requirements.

When the TV is first switched on, IC001 must be initially reset, and this is achieved by IC011 stage. As the +5v supply begins to rise from switch on, pin 3 of IC011 is held "Low". This is applied to pin 33 of IC001 thus resetting the IC. Once pin 1 of IC011 has almost reached its +5v potential, the "Low" is removed from pin 3, and pin 33 of IC001

will become "High" via R075, thus releasing the reset condition.

When the "SEARCH" routine has been initiated and a signal has been located, pin 4 of IC201 will become "High". This is applied to pin 36 of IC001, and informs the IC that a signal is present. The search routine then stops, and the IC will monitor the AFC signal present at pin 9 to obtain the optimum signal.

Contrast, colour, brightness, and volume are all controlled from the remote control handset (the volume can also be adjusted by + and - buttons on the front of the TV), and will produce DC level changes from pins 2 - 5 of IC001, which are then fed to the relevant pins of IC201.

Pins 11 - 15 form the in and out matrix for the front control operations.

Pins 8 and 12 are the clock and data output pins. These signals are supplied to the Teletext module (on CP2114T models), with the data signal also being supplied to the memory IC002.

When external equipment connected to the 21 pin scart socket is turned on, approximately +12v is applied from pin 8 of the socket to D006. The diode then becomes forward biased, and applies this voltage to pin 34 of IC001 via potential divider network R035/R036.

A "High" is then output from pin 37 of IC001, and this is applied to pins 10 and 11 of IC451 changing the internal switching of IC451 to output the external audio/video signals.

The "High" output from pin 37 is also applied to the base of Q007, turning it hard on, and pulling its collector "Low". As a result Q005 will turn off, and Q004 will turn on, thereby supplying approximately 7v5 to pin 16 of IC201 via R024, R522. This ensures IC201 will process only the external inputs applied to pin 15.

If the external equipment does not have an equivalent 21 pin Euro connector, or if the external inputs are applied via the phono sockets on the front of the T.V., then the TV/AV button on the remote control handset has to be pressed to select the external mode. This will then produce the required "High" from pin 37 to achieve the necessary switching voltages.

When S-VHS inputs are applied via the S-VHS socket, approximately 5v will be supplied to pin 34 of IC001 via R361, D351/R036.

This results in a "High" output from pin 37 of IC001, which turns on Q007 and Q004 as previously explained. Approximately 7v5 is then made available at the collector of Q004.

When S-VHS equipment is connected, Q006 will be turned hard on by the voltage applied via R361, R005. This effectively adds R006 to R024, forming a potential divider to the voltage at the collector of Q004. As a result, approximately 3v5 will be applied to pin 16 of IC201.

When this level of voltage is applied to pin 16, IC201 is set to process the separate luminance and chrominance external signals which are applied to pins 15 and 16 of IC201 respectively.

The red, green and blue on-screen display signals are output from pins 22, 23, and 24 of IC001. The components

L016, C024, and C025, on pins 28 and 29, determine the display oscillator frequency. The horizontal and vertical inputs at pins 26 and 27 determine the actual position of the on-screen display.

When a command requiring an on-screen display is received by IC001, a "High" will be output from pin 25. This is applied to pin 21 of IC201 via Q008, and blanks out a portion of the picture. The on-screen display information is then inserted into this portion, thus resulting in a clear display.

When the ALARM mode has been set, and the time input has elapsed, an output is obtained from pin 38 of IC001. This is applied via C001, R419, and R421, to pin 3 of IC401, thus causing a "Bleep" sound to be heard.

When the "OFF" timer mode has been programmed in, and the time input has elapsed, pins 6 and 7 of IC001 output a "Low". This removes the supply to the base of Q952, and as a result the +9v output of IC903 disappears. This places the TV into its standby mode of operation by removing E.H.T. generation as previously explained.

When the "ON" time has been estimated and programmed in, the standby mode must be accessed. As an indication that the standby mode is only temporary, pin 18 of IC001 is taken "High" and "Low" alternately, causing D001 to flash on and off.

When the entered time has elapsed, the "Low" output from pins 6 and 7 of IC001 are removed, and the TV will return to normal operation.

Teletext Circuit (A003 Module):

The two main ICs which control the teletext operations are IC2201 type CF72306, and IC2202 type CF70200.

IC2201 is the data slicer, whilst IC2202 is the decoder, character generator and controller, which also contains a 1k bite RAM.

The data from IC001 is applied to pin 18 of IC2202, and RGB text signals are output from pins 20, 22, and 23 of IC2002, then input to IC201 at pins 22, 23, and 24.

During teletext mode a "High" is output from pin 19 of IC2002. This is applied to IC201 at pin 21, therefore allowing only the teletext red, green and blue inputs at pins 22, 23, and 24 of IC201, to be output from pins 18, 19, and 20.

The 13.875MHz crystal X2201, is utilised to control the operation of IC2201. A signal is then output from pin 15 of IC2201, which is used as a clock signal for IC2202 operation.

IC2201 has two main functions. The first is to acquire the teletext information.

The video signal is applied to pin 3 of IC2201. Teletext CLOCK and DATA outputs are then obtained from pins 12 and 13 of the IC.

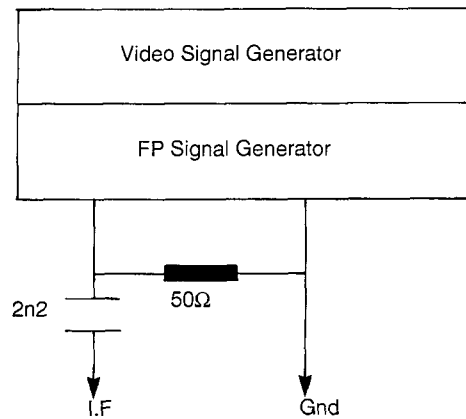
Secondly, a composite sync. signal is required.

The video input is also applied to pin 2 of IC2201 via C2205 and R2211. A composite sync. signal is then made available from pin 19 of IC2201.

The DATA, CLOCK, and SYNC. signals are then applied to pins 10, 11, and 12 of IC2202 for further processing.

I.F. ALIGNMENT PROCEDURE

1. Input the signal shown below to the I.F. and Ground terminals of tuner.



Signal = Philips Pattern
Signal Level = -10 ± 0 dBm

FP 39.5MHz
Modulation 87.5%

2. Connect a voltmeter to pin 44 of IC201.
3. Adjust L202 until a fast change is observed on the voltmeter, then adjust L202 slowly until the meter reads $4\text{v}0 \pm 0\text{v}2$ on this fast change scale.

A.G.C. ADJUSTMENT

1. Receive a signal with a level of -47 dBm and leave T.V. to warm up for a period of approximately 3 - 5 minutes.
2. Connect a voltmeter of at least $100\text{K}\Omega$ impedance to the A.G.C. terminal of tuner.
3. Adjust VR202 until meter reads $5\text{v}5 \pm 0\text{v}2$.

PICTURE AND CONTROL ADJUSTMENTS

H.T. Adjustment:

1. Adjust VR951 to its center position, then switch TV on.
2. Connect a voltmeter between the +ve side of C952 and ground.
3. Receive Philips test pattern and set brightness and contrast to maximum.
4. Allow approximately 1 minute for the TV to warm up thoroughly, then gradually turn VR951 clockwise until voltmeter reads $112v \pm 0v2$.

Horizontal Phase and Amplitude:

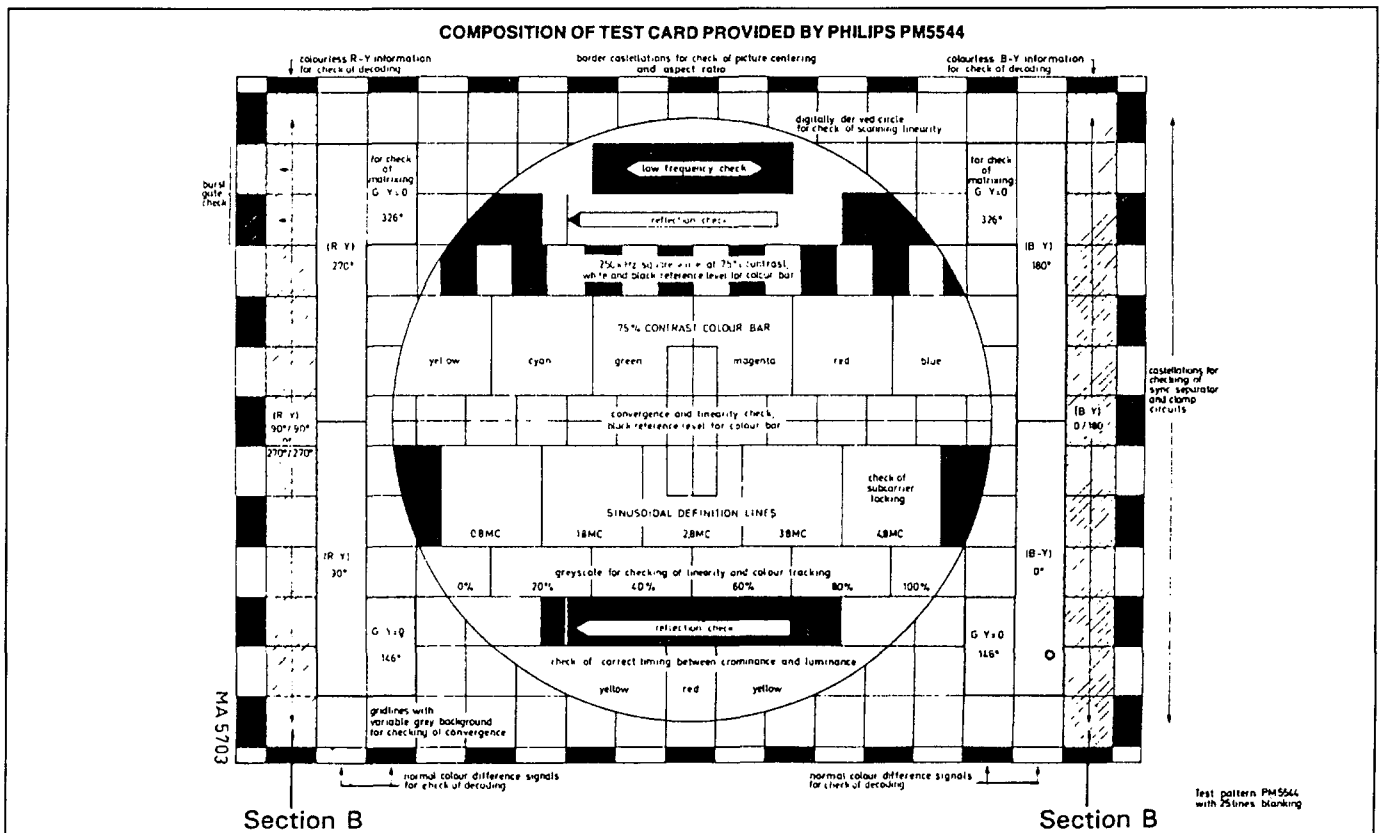
1. Switch TV on, and receive Philips test pattern.
2. Set the brightness and contrast to their maximum settings.
3. Adjust VR701 if picture is not centralised.

Vertical Center and Height Adjustment:

1. Switch TV on, receive Philips test pattern, and wait 5 minutes.
2. Adjust contrast and brightness levels to their maximum setting.
3. If picture is not centred vertically, change position of shorting link on v. centre plug (see adjustment position drawing) till desired result is obtained.
4. Adjust VR601 to obtain the desired height.

Focus Adjustment:

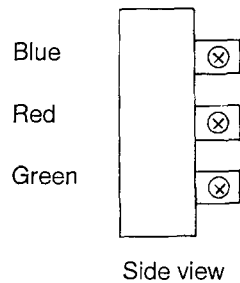
1. Switch TV on and receive Philips test pattern.
2. Set the colour level to minimum, and the brightness and contrast to their maximum levels.
3. Adjust contrast so that the first two bars of the colour bar display are the same colour black, then adjust brightness to make the first two bars of the grey scale bar pattern the same colour black.
4. Adjust focus control knob on the flyback transformer for the best overall focus.



CUT OFF AND SCREEN ADJUSTMENT

PREPARATION:

(i) Preset the red, green and blue background controls on the C.R.T. base to the positions shown.

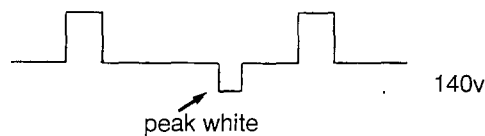


(ii) Set the customer controls as follows:- Contrast = 0
Colour = 0
Brightness = 30

(iii) Receive horizontal white line, or red raster pattern from a Philips pattern generator.

METHOD:

1. Adjust screen control on the flyback transformer until the horizontal line is just visible and its colour can be seen.
2. Do not touch the background control of the colour that is most prominent on the screen, but adjust the other two background controls until a reasonable white line is obtained.
3. Connect an oscilloscope probe to each of the R.G.B. cathodes in turn and leave connected to the one with the highest level.
4. Set customer brightness so that the cathode value is no greater than 140v as shown below.



5. Disconnect oscilloscope, and set screen control so that the white horizontal line is just visible once more.

WHITE BALANCE

PREPARATION:

- (i) Set the customer controls as follows:- Contrast = 0
Colour = 0
- (ii) Receive the white raster pattern.
- (iii) Obtain and set up a combined colour analyser and light meter, e.g. MINOLTA CA100.

METHOD:

1. Adjust brightness customer control so that the light output from the white raster reads $Y = 1 \rightarrow 2 \text{ cdm}^{-2}$ on the light meter.
2. Next adjust the red and blue background controls to obtain the colour chromaticity co-ordinates of
 $x = 304 \quad y = 320$.

The above co-ordinates represent a colour temperature of 7400k

N.B. For Spanish models $x = 283, y = 299$, temperature = 9300k.

PROTECTION CHECKS

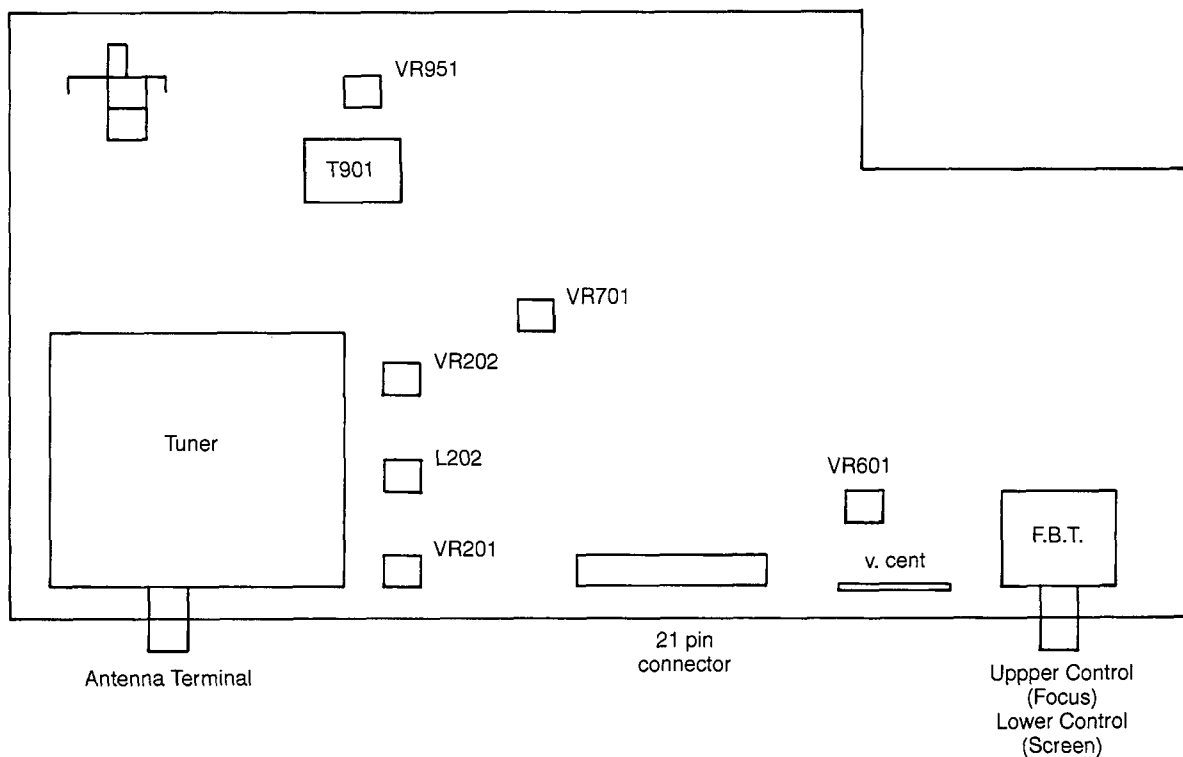
High Voltage Limit Check:

1. Switch TV on, receive Philips test pattern, and set contrast and brightness to their maximum levels.
2. Connect a 390K resistor in parallel with R715, and ensure that the sound and picture disappear instantly.
3. Switch TV off, remove resistor, and wait 10 - 15 seconds.
4. Switch TV on again to ensure normal operation, then return contrast and brightness to their previous levels.

Anode/Focus s/c Check:

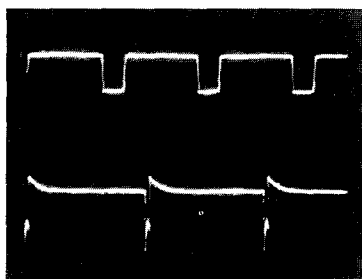
1. Switch TV on, receive Philips test pattern, and set the contrast and brightness levels to maximum.
2. Connect a 470R resistor from pin 9 of the flyback transformer to ground.
3. Check that sound and picture disappear instantly.
4. Switch TV off, remove resistor, and wait 10 - 15 seconds.
5. Switch TV on again to ensure normal operation, then return contrast and brightness to their previous levels.

POSITION OF ADJUSTMENT CONTROLS

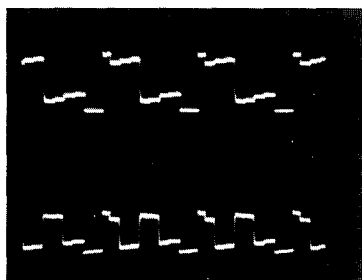


THESE WAVEFORMS WERE TAKEN USING A 10:1 PROBE ON A COLOUR BAR SIGNAL, WITH THE CUSTOMER CONTROLS SET TO GIVE NORMAL VIEWING LEVELS. OSCILLOSCOPE WAS SET TO 20μ SECS/CM UNLESS STATED OTHERWISE.

IC001
pin 26
6v p p

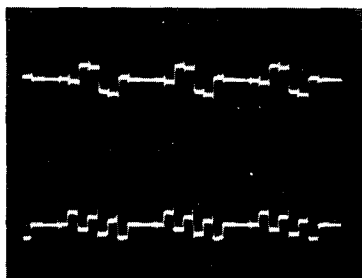


IC001
pin 27
5v p p. at
5m secs/cm.



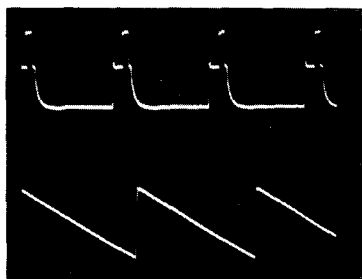
IC201
pin 19
3v5 p.p.

IC201
pin 20
4v p.p.



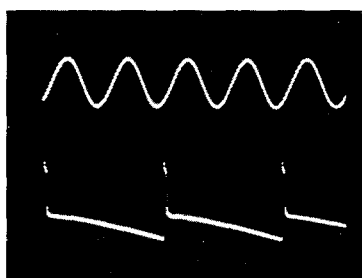
IC201
pin 30
0v8 p.p

IC201
pin 31
0v8 p.p.



IC201
pin 38
6v0 p.p.

IC201
pin 41
1v0 p.p. at
5m secs/cm.



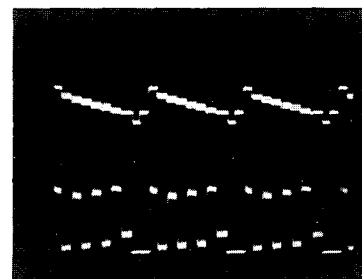
IC201
pin 50
2v0 p.p. at
0.5m secs/cm.
at max. volume
with speaker
disconnected.

IC601
pin 2
55v p.p. at
5m secs/cm



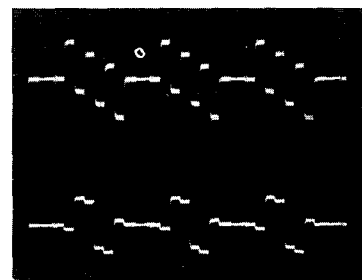
IC201
pins 7, 13, 15
2v p.p.

IC201
pins 18
3v8 p p

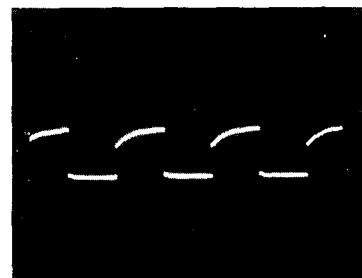


IC201
pin 28
1v5 p p.

IC201
pin 29
1v2 p p

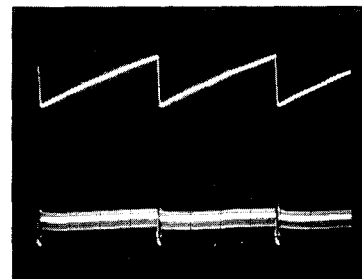


IC201
pin 37
3v8 p.p



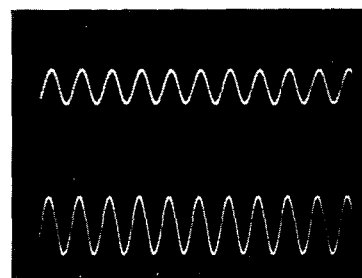
IC201
pin 42
2v p.p. at
5m secs/cm

IC201
pin 43
1v8 p p at
5m secs/cm

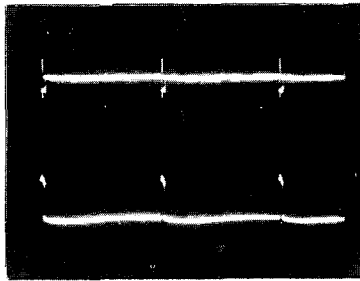


IC401
pin 3
0v25 p.p at
1m sec/cm
at max vol.
with speaker
disconnected

IC401
pin 7
10v p.p. at
1m sec/cm
at max. volume
with speaker
disconnected

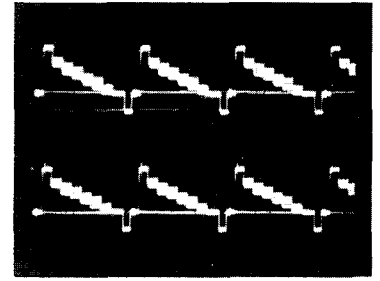


IC601
pin 4
3v0 p p. at
5m secs/cm



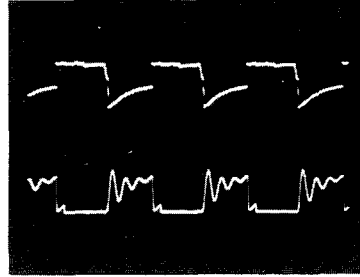
1C601
pin 3
25v p p. at
5m secs/cm

Q501
Base
3v p p.



Q502
Emitter
2v8 p.p

Q701
Base
1v5 p.p.



Q701
Collector
60v p p

VOLTAGE MEASUREMENTS

The following voltages were taken using a 20K Ω /volt meter, with brightness, colour and contrast set to give normal viewing levels.

These T.Vs can be operated in VHFL, VHFH, and UHF bands.

Therefore, in these voltage tables, the differences for each band can be identified as follows..

(D) = UHF

(E) = VHFH

(F) = VHFL

IC001			
PIN	VOLTS	PIN	VOLTS
1	depends on tuning	22	—
2	0V1 to 5V0 (contrast)	23	—
3	0V1 to 5V1 (brightness)	24	—
4	0V1 to 5V1 colour	25	—
5	0V1 to 5V1 (volume)	26	3V8
6	5V1 (0V standby or (F))	27	4V0
7	5V1 (0V standby or (E))	28	3V2
8	—	29	3V2
9	3V1	30	0V
10	2V3	31	0V5 (10V range)
11	2V3	32	2V6
12	2V4	33	5V0
13	1V1	34	* 0V
14	1V1	35	4V5
15	1V1	36	4V2 (0V2 no signals)
16	5V0	37	0V1 (9V0 VTR mode)
17	—	38	0V1
18	0V7	39	Not Used
19	4V9	40	Not Used
20	4V9	41	Not Used
21	0V	42	5V1

IC002			
PIN	VOLTS	PIN	VOLTS
1	—	5	0V
2	2V4	6	—
3	2V8	7	0v
4	5V0	8	5V0

IC003	
PIN	VOLTS
1	8V4 (E)
2	Not Used
3	4V1 (D, E) 0V (F)
4	4V2 (D, F) 0V (E)
5	0V
6	8V4 (D) 0V (E, F)
7	8V5 (F) 0V (D, E)
8	Not Used
9	8V5

* Pin 34 will be 3V0 with equipment connected via the S-VHS socket, and 6V0 with equipment connected via the 21 pin scart connector.

IC201			
PIN	VOLTS	PIN	VOLTS
1	3V0	27	5V6
2	6V0	28	3V5
3	6V0	29	2V9
4	6V5 (0V no signals)	30	1V5 (D) 3V0 (E, F)
5	1V7 (0V5 no signals)	31	1V5 (D) 3V0 (E, F)
6	3V5	32	Not Used
7	3V2	33	3V8
8	1V8	34	3V0
9	0V	35	2V0
10	8V0	36	8V4
11	0V	37	1V4
12	0V8	38	1V1
13	3V7	39	2V7
14	2V6	40	2V6
15	3V8	41	2V3
16	0V5	42	2V0
17	2V1 - 5V1 (brightness)	43	0V9
18	1V9	44	7V0
19	1V9	45	4V0
20	1V9	46	3V9
21	0V2	47	4V8
22	0V5	48	3V9
23	0V5	49	1V6
24	0V5	50	3V5
25	0V - 2V2 (contrast)	51	4V5
26	0V2 - 3V2 (colour)	52	6V5

IC011	
Pin	Volts
1	5V3
2	0V
3	5V0

IC401	
PIN	VOLTS
1	0V5
2	0V
3	—
4	1V3
5	0V5
6	0V
7	5V8
8	12V8
9	5V8

IC501			
PIN	VOLTS	PIN	VOLTS
1	5V7	9	5V7
2	Not Used	10	0V
3	0V	11	3V1
4	0V	12	3V1
5	1V1	13	Not Used
6	Not Used	14	—
7	Not Used	15	Not Used
8	0V	16	—

IC901			
PIN	VOLTS	PIN	VOLTS
1	14V	4	-5V
2	13V	5	0V3
3	Not Used	6	Not Used

IC601	
PIN	VOLTS
1	0V
2	13V5
3	26V
4	—
5	—
6	26V
7	1V0

IC951	
PIN	VOLTS
1	12V
2	0V
3	9V0

	Q001	Q003	Q004	Q005	Q006
C	Varies with tuning	4V0	— (8V8)	— (8V6)	— (8V5)
B	0v	0V3	8V2	0V6 (- 0V2)	—
E	0v	0V	9V0	0V	0V

() = VTR and S-VHS mode

() = VTR mode
In S-VHS mode
collector = 4V0

() = VTR mode
In S-VHS mode
base = 0V7

	Q007	Q008	Q201
C	8V5 (—)	9V0	7V0
B	0V1 (0V7)	—	1V0
E	0V	0V1	0V4

() = VTR and S - VHS mode

	Q301	Q421	Q440	Q451	Q453	Q454	Q455
C	7V0	7V5	—	8V8	3V5	9V0	8V8
B	2V4	3V1	12V	3V0	2V0	3V5	3V0
E	1V7	2V3	11V6	82V3	1V3	3V0	2V4

	Q460	Q461	Q501	Q502	Q701	Q702	Q703	
C	4V5	3V2	0V	8V1	24V	112V	A	4V0
B	2V5	4V5	2V9	3V6	0V4	—	G	0V1
E	2V0	5V0	3V8	2V9	0V	0V	K	0V

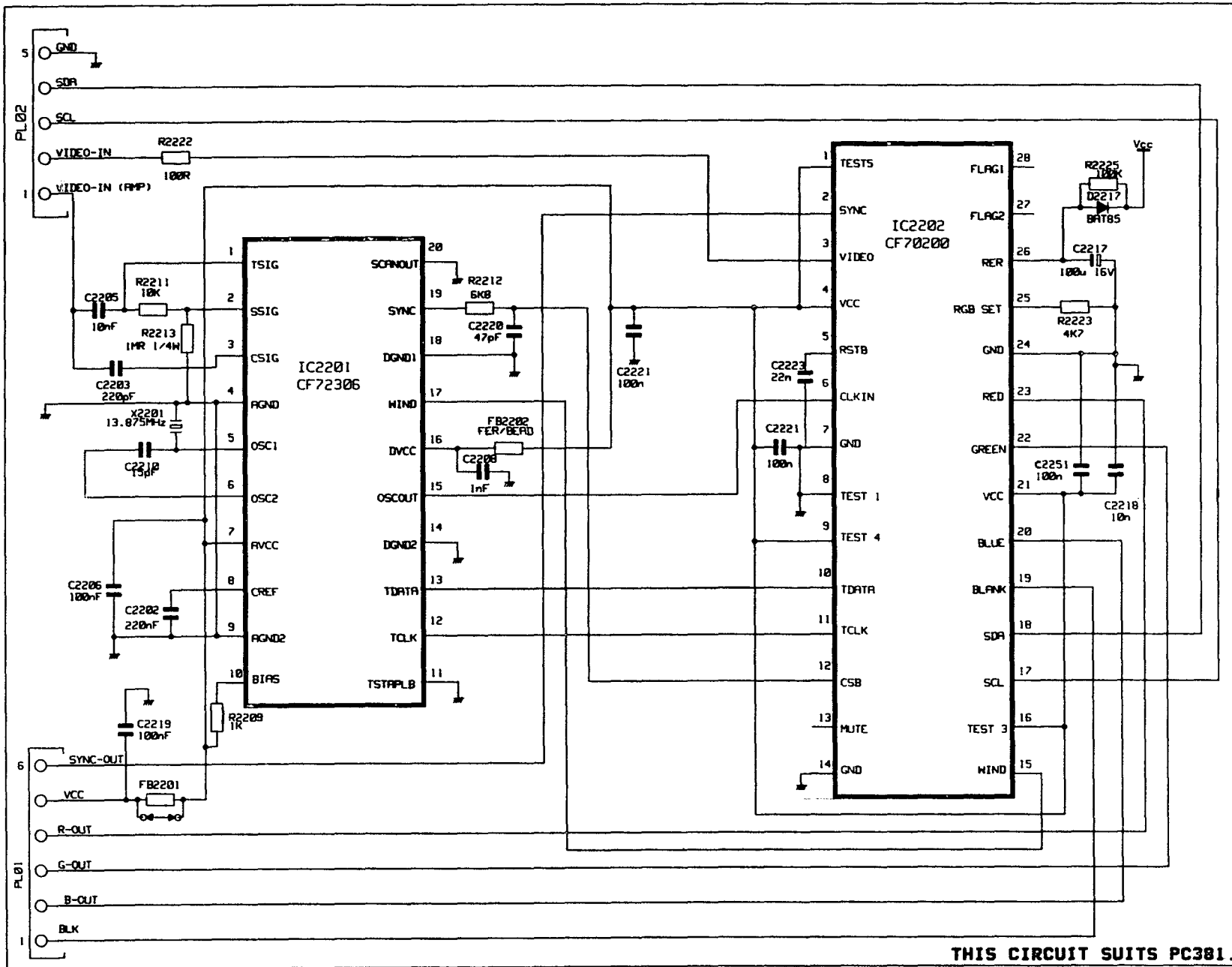
	Q704	Q801	Q802	Q803	Q804	Q805	Q806
C	—	96V	96V	100V	—	0V	0V
B	112V	3V2	3V2	3V1	8V4	2V6	2V6
E	112V	2V7	2V7	2V6	8V3	3V2	3V2

	Q807	Q901	Q902	Q903	Q951	Q952
C	0V	-2V2	-3V1	340V	14V	0V2 *12V
B	2V5	0V3	-4V5	-3V0	14V5 *28V	0V8 *0v
E	3V1	0V	-5V0	0V	14V	0v

* = standby

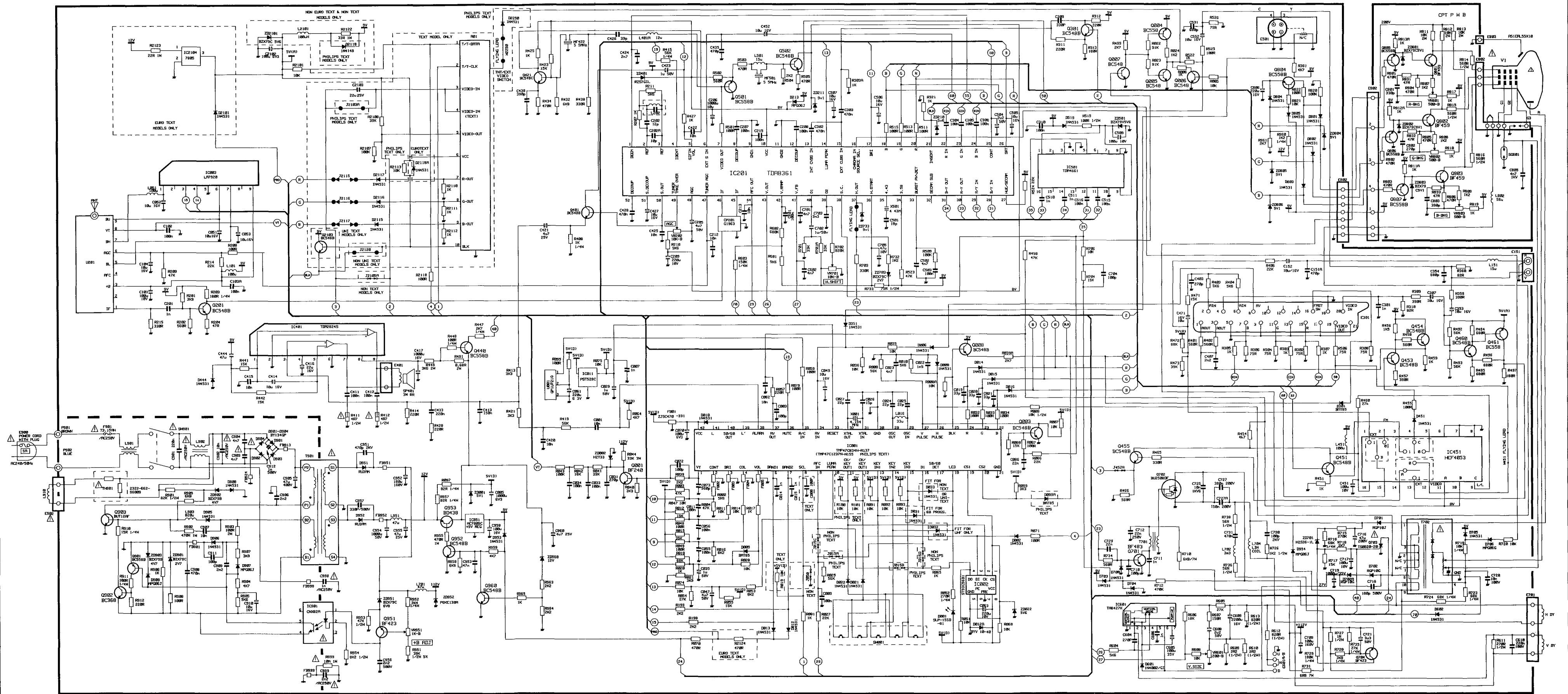
	Q953	Q960	Q2103
C	12V *0V8	0V8	9V0
B	12V	—	—
E	13V	0V	0V2

* = standby



THIS CIRCUIT SUITS PC381.

TELETEXT CIRCUIT



NOTES:
 ALL RESISTORS ARE IN OHM AND ARE RATED
 1/16 WATT, (UNLESS SPECIFIED OTHERWISE).
 ALL CAPACITORS ARE IN FARAD.
 ALL INDUCTORS ARE IN HENRY.

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 ALL RESISTORS ARE IN OHM AND ARE RATED
 1/16 WATT, (UNLESS SPECIFIED OTHERWISE).
 ALL CAPACITORS ARE IN FARAD.
 ALL INDUCTORS ARE IN HENRY.

MAIN CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a \triangle 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 this receiver through improper servicing.

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

Capacitor Abbreviation	Type
C	Ceramic
PF	Plastic Film
FT	Feed Through
MPO	Met. Polyester
MPS	Mica/Polystyrene
MP	Metallised paper
TA	Tantalum

N.B. The parts marked * in the following parts list are unique to CP2114T models only

Ref No.	Part No.	Value	Type	%Tol	Wattage
R002	0700051M	5K6	CF	5	1/16
R003	0700063M	47K	CF	5	1/16
R004	0700063M	47K	CF	5	1/16
R005	0700054M	10K	CF	5	1/16
R006	0700041M	1K0	CF	5	1/16
R007	0700054M	10K	CF	5	1/16
R008	0700064M	56K	CF	5	1/16
R008A	0700054M	10K	CF	5	1/16
R009	R140319	10K	CF	5	1/2
R010	0700051M	5K6	CF	5	1/16
R011	0700054M	10K	CF	5	1/16
R012	0700056M	15K	CF	5	1/16
R014	0700054M	10K	CF	5	1/16
R015	0700062M	39K	CF	5	1/16
R016	0700053M	8K2	CF	5	1/16
R017	0700041M	1K0	CF	5	1/16
R018	0700065M	68K	CF	5	1/16
R019	0700054M	10K	CF	5	1/16
R020	0700041M	1K0	CF	5	1/16
R021	0700048M	3K9	CF	5	1/16
R022	0187112M	91K	CF	5	1/16
R023	0187112M	91K	CF	5	1/16
R024	0700042M	1K2	CF	5	1/16
R025	0700064M	56K	CF	5	1/16
R027	0700058M	22K	CF	5	1/16
R028	0700054M	10K	CF	5	1/16
R032	0700027M	100R	CF	5	1/16
R033	0700027M	100R	CF	5	1/16
R034	0700027M	100R	CF	5	1/16
R035	0700054M	10K	CF	5	1/16
R036	0700054M	10K	CF	5	1/16
R039	0700045M	2K2	CF	5	1/16
R039A	0700046M	2K7	CF	5	1/16
R040	0700047M	3K3	CF	5	1/16
R041	0700062M	39K	CF	5	1/16
R042	0700057M	18K	CF	5	1/16
R043	0700067M	100K	CF	5	1/16
R044	0110281M	33K	MO	5	2
R047	0700054M	10K	CF	5	1/16
R048	0700027M	100R	CF	5	1/16
R049	0700027M	100R	CF	5	1/16
R051	0700054M	10K	CF	5	1/16
R052	R128330	180R	CF	5	1/4
R053	0700053M	8K2	CF	5	1/16
R054	0700059M	27K	CF	5	1/16
R055	0700056M	15K	CF	5	1/16
R057	0700032M	220R	CF	5	1/16
R058	0700027M	100R	CF	5	1/16
R064	0700049M	4K7	CF	5	1/16
R065	0700041M	1K0	CF	5	1/16
R068	0700054M	10K	CF	5	1/16
R070	0700036M	470R	CF	5	1/16
R071	0700027M	100R	CF	5	1/16
R074	0700054M	10K	CF	5	1/16
R075	0700054M	10K	CF	5	1/16
R079	0700027M	100R	CF	5	1/16
R081	0700041M	1K0	CF	5	1/16
R086	0700058M	22K	CF	5	1/16
R087	0700027M	100R	CF	5	1/16
R088	0700056M	15K	CF	5	1/16
R091	0700054M	10K	CF	5	1/16
R092	0700054M	10K	CF	5	1/16

Ref No.	Part No.	Value	Type	%Tol	Wattage
R093	0700054M	10K	CF	5	1/16
R095	0700027M	100R	CF	5	1/16
R097	R812330	82R	CF	5	1/4
R099	0700047M	3K3	CF	5	1/16
R198	0700045M	2K2	CF	5	1/16
R101	0700045M	2K2	CF	5	1/16
R201	0700048M	3K9	CF	5	1/16
R202	0700037M	560R	CF	5	1/16
VR202	0160215R	10K	VR	AGC	ADJUST
R203	R128330	180R	CF	5	1/4
R204	0700023M	47R	CF	5	1/16
R207	0700041M	1K0	CF	5	1/16
R208	0700027M	100R	CF	5	1/16
R209	0700063M	47K	CF	5	1/16
R210	0700051M	5K6	CF	5	1/16
R211	0700051M	5K6	CF	5	1/16
R212	0700054M	10K	CF	5	1/16
R214	0700058M	22K	CF	5	1/16
R215	0700034M	180R	CF	5	1/16
R302	0187038M	75R	CF	5	1/16
R303	0700041M	1K0	CF	5	1/16
R303A	0700041M	1K0	CF	5	1/16
R304	0187038M	75R	CF	5	1/16
R305	0700041M	1K0	CF	5	1/16
R306	0187038M	75R	CF	5	1/16
R307	0700041M	1K0	CF	5	1/16
R308	0187038M	75R	CF	5	1/16
R309	0700035M	390R	CF	5	1/16
R310	0700026M	82R	CF	5	1/16
R311	0700032M	220R	CF	5	1/16
R312	0700032M	220R	CF	5	1/16
R313	0700031M	180R	CF	5	1/16
R321	0700041M	1K0	CF	5	1/16
R359	0700035M	390R	CF	5	1/16
R360	0700026M	82R	CF	5	1/16
R361	0700049M	4K7	CF	5	1/16
R401	0700037M	560R	CF	5	1/16
R402	0700037M	560R	CF	5	1/16
R403	0700051M	5K6	CF	5	1/16
R404	0700051M	5K6	CF	5	1/16
R406	0700058M	22K	CF	5	1/16
R408	0700041M	1K0	CF	5	1/16
R411	R407551	4R7	FF	5	1/2
R412	R407551	4R7	FF	5	1/2
R413	0700047M	3K3	CF	5	1/16
R414	0700032M	220R	CF	5	1/16
R415	R546330	56K	CF	5	1/4
R419	0700064M	56K	CF	5	1/16
R421	0700054M	10K	CF	5	1/16
R423	0700056M	15K	CF	5	1/16
R425	0700041M	1K0	CF	5	1/16
R427	0700041M	1K0	CF	5	1/16
R428	0700032M	220R	CF	5	1/16
R432	0700052M	6K8	CF	5	1/16
R434	0700036M	470R	CF	5	1/16
R438	0700034M	330R	CF	5	1/16
R441	0700056M	15K	CF	5	1/16
R442	0700056M	15K	CF	5	1/16
R447	R237330	2K7	CF	5	1/4
R448	R120330	100R	CF	5	1/4
R449	0147037AF	3R6	WW	10	2
R451	0700041M	1K0	CF	5	1/16

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Ref No.	Part No.	Value	Type	%Tol	Wattage
R454	0700049M	4K7	CF	5	1/16
R455	0700027M	100R	CF	5	1/16
R456	0700043M	1K5	CF	5	1/16
R457	0700035M	390R	CF	5	1/16
R458	0700037M	560R	CF	5	1/16
R459	0700041M	1K0	CF	5	1/16
R460	0700059M	27K	CF	5	1/16
R465	0700034M	330R	CF	5	1/16
R466	0700037M	560R	CF	5	1/16
R471	0700056M	15K	CF	5	1/16
R472	0700065M	68K	CF	5	1/16
R473	0700062M	39K	CF	5	1/16
R491	0147020AF	0R68	VVV	10	2
R492	0700064M	56K	CF	5	1/16
R493	0700064M	56K	CF	5	1/16
R494	0700038M	680R	CF	5	1/16
R495	0700038M	680R	CF	5	1/16
R496	0700038M	680R	CF	5	1/16
R497	0700031M	180R	CF	5	1/16
R498	0700063M	47K	CF	5	1/16
R499	0700046M	2K7	CF	5	1/16
R501	0700027M	100R	CF	5	1/16
R502	0700037M	560R	CF	5	1/16
R503	0700036M	470R	CF	5	1/16
R504	0700045M	2K2	CF	5	1/16
R505	0700036M	470R	CF	5	1/16
R506	0187038M	75R	CF	5	1/16
R509	0700067M	100K	CF	5	1/16
R511	0700027M	100R	CF	5	1/16
R513	0700027M	100R	CF	5	1/16
R515	0700027M	100R	CF	5	1/16
R519	R120319	100R	CF	5	1/2
R522	0700041M	1K0	CF	5	1/16
R523	0700063M	47K	CF	5	1/16
R524	0700058M	22K	CF	5	1/16
R525	0700027M	100R	CF	5	1/16
R526	0187038M	75R	CF	5	1/16
R601	0700051M	5K6	CF	5	1/16
VR601	0160421R	200R	VR	VERTICAL	SIZE
R602	0179558M	820K	MF	5	1/8
R603	R155330	150K	CF	5	1/4
R604	0700051M	5K6	CF	5	1/16
R605	0700059M	27K	CF	5	1/16
R606	0700057M	18K	CF	5	1/16
R607	0700029M	150R	CF	5	1/16
R608	0700054M	10K	CF	5	1/16
R609	R202319	2R2	CF	5	1/2
R610	R202319	2R2	CF	5	1/2
R611	R227319	270R	CF	5	1/2
R612	R822319	820R	CF	5	1/2
R613	R822319	820R	CF	5	1/2
R701	0700061M	33K	CF	5	1/16
VR701	0160215R	10K	VR	HORIZ	PHASE
R701A	0700061M	33K	CF	5	1/16
R702	0179558M	820K	MF	5	1/8
R703	0700034M	330R	CF	5	1/16
R704	0700056M	15K	CF	5	1/16
R706	0700054M	10K	CF	5	1/16
R710	0145045	6K8	VVV	10	7
R712	R457714	470K	MF	5	1/2
R715	0119665M	270K	MF	1	1/8
R716	R648330	68K	CF	5	1/4
R717	0700056M	15K	CF	5	1/16
R718	0700046M	2K7	CF	5	1/16
R719	R140330	10K	CF	5	1/4
R720	0700054M	10K	CF	5	1/16
R723	R648330	68K	CF	5	1/4
R724	R648330	68K	CF	5	1/4
R726	R132319	1K2	CF	5	1/2
R727	R100542	1R0	MO	5	1
R728	R339330	3K9	CF	5	1/4
R729	R158330	180K	CF	5	1/4
R731	0147630	6R8	VVV	5	7
R732	0700042M	1K2	CF	5	1/16
R733	0113722M	75R	CF	5	1/2
R734	0700037M	560R	CF	5	1/16
R735	R247330	27K	CF	5	1/4
R736	R516319	56R	CF	5	1/2

Ref No.	Part No.	Value	Type	%Tol	Wattage
R738	R516319	56R	CF	5	1/2
R801	0700036M	470R	CF	5	1/16
VR801	0160413R	500R	VR	RED BACK	GROUND
R802	0700036M	470R	CF	5	1/16
VR802	0160413R	500R	VR	GREEN BACK	GROUND
R803	0700036M	470R	CF	5	1/16
VR803	0160413R	500R	VR	BLUE BACK	GROUND
R804	0700036M	470R	CF	5	1/16
R805	0700036M	470R	CF	5	1/16
R806	0700036M	470R	CF	5	1/16
R807	0700042M	1K2	CF	5	1/16
R808	0700042M	1K2	CF	5	1/16
R809	0700042M	1K2	CF	5	1/16
R811	0110269S	10K	MO	5	2
R811A	0700041M	1K0	CF	5	1/16
R812	0110269M	10K	MO	5	2
R812A	0700041M	1K0	CF	5	1/16
R813	0110269M	10K	MO	5	2
R813A	0700041M	1K0	CF	5	1/16
R814	R526319	560R	CF	5	1/2
R815	R526319	560R	CF	5	1/2
R816	R526319	560R	CF	5	1/2
R817	0700041M	1K0	CF	5	1/16
R818	0700041M	1K0	CF	5	1/16
R819	0700041M	1K0	CF	5	1/16
R820	0700067M	100K	CF	5	1/16
R821	0700054M	10K	CF	5	1/16
R822	0700027M	100R	CF	5	1/16
R831	0700023M	47R	CF	5	1/16
R832	0700023M	47R	CF	5	1/16
R833	0700023M	47R	CF	5	1/16
R901	R842319	82K	CF	5	1/2
R902	0110137S	470R	MO	5	1
R903	0110221S	100R	MO	5	1
R904	0700049M	4K7	CF	5	1/16
R905	0700051M	5K6	CF	5	1/16
R906	0700041M	1K0	CF	5	1/16
R907	0700048M	3K9	CF	5	1/16
R908	0700027M	100R	CF	5	1/16
R909	0700052M	6K8	CF	5	1/16
R910	R115330	15R	CF	5	1/4
R911	R120330	100R	CF	5	1/4
R912	0700032M	220R	CF	5	1/16
R951	R349319	39K	CF	5	1/2
VR951	0160211R	1K0	VR	HT	PRESET
R952	R234330	2K4	CF	5	1/4
R953	R447319	47K	CF	5	1/2
R954	R832319	8K2	CF	5	1/2
R955	0110137M	470R	MO	5	1
R957	R812330	82R	CF	5	1/4
R958	0700052M	6K8	CF	5	1/16
R959	0700049M	4K7	CF	5	1/16
R960	R132330	1K2	CF	5	1/4
R961	0700046M	2K7	CF	5	1/16
R963	0700045M	2K2	CF	5	1/16
R964	0700045M	2K2	CF	5	1/16
R965	0700041M	1K0	CF	5	1/16
R999	R170727	10M	MF	5	1
R2101	0700054M	10K	CF	5	1/16
*R2107	0700067M	100K	CF	5	1/16
*R2108	0700062M	39K	CF	5	1/16
*R2110	0700041M	1K0	CF	5	1/16
*R2111	0700041M	1K0	CF	5	1/16
*R2112	0700041M	1K0	CF	5	1/16
R2118	0700027M	100R	CF	5	1/16
*R2123	0110105S	22R	MO	5	1
*R2124	0700036M	470R	CF	5	1/16
*R2209	0700041M	1K0	CF	5	1/16
*R2211	0700054M	10K	CF	5	1/16
*R2212	0700052M	6K8	CF	5	1/16
*R2213	0700081M	1M0	CF	5	1/16
*R2217	0700041M	1K0	CF	5	1/16
*R2222	0700027M	100R	CF	5	1/16
*R2223	0700049M	4K7	CF	5	1/16
*R2225	0700067M	100K	CF	5	1/16

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Ref No.	Part No.	Value	Type	%Tol	Voltage
C001	0890101R	10n	C	-	50
C003	0890074R	100p	C	5	50
C005	0800079	1000u	EL	-	6 3
C007	C130877	1n0	C	10	25
*C008	0890074R	100p	C	5	50
C009	0880057R	100n	PF	10	50
C011	0880057R	100n	PF	10	50
C014	0890087R	1n0	C	-	50
C015	0890087R	1n0	C	-	50
C019	0890067M	33p	C	5	50
C020	0890067M	33p	C	5	50
C021	0890067M	33p	C	5	50
C022	0890089R	1n5	C	10	50
C023	0880039R	4n7	PF	10	50
C024	0890065R	22p	C	5	50
C025	0890065R	22p	C	5	50
C026	0890116R	15p	C	5	50
C027	0890118R	22p	C	5	50
C029	0800003R	1u0	EL	-	50
C031	0890079R	270p	C	10	50
C033	0880057R	100n	PF	10	50
C034	0880057R	100n	PF	10	50
C035	0800003R	1u0	EL	-	50
C047	0800012R	4u7	EL	-	50
C049	0800015R	10u	EL	-	16
C051	0800015R	10u	EL	-	16
C052	0800015R	10u	EL	-	16
C053	0800015R	10u	EL	-	16
C055	0880057R	100n	PF	10	50
C056	0880057R	100n	PF	10	50
C061	0800056R	220u	EL	-	6.3
C062	0890101R	10n	C	10	50
C063	0800057R	220u	EL	-	10
C070	0800047R	100u	EL	-	6 3
C072	0890074R	100p	C	5	50
C073	0890084R	560p	C	10	50
C086	0880048R	22n	PF	10	50
C101	0800048R	100u	EL	-	10
C102	0880057R	100n	PF	10	50
C103A	0880057R	100n	PF	10	50
C104	0800015R	10u	EL	-	16
C151A	0890083R	470p	C	10	50
C152	0800015R	10u	EL	-	16
C201	0890087R	1n0	C	-	50
C202	0890115R	12p	C	5	50
C202A	C110182	10p	C	2	50
C205	0800012R	4u7	EL	-	50
C206	0254509	1000u	EL	-	50
C207	0800057R	220u	EL	-	10
C208	0800057R	220u	EL	-	10
C209	0800057R	220u	EL	-	10
C212	0890101R	10n	C	-	50
C213	0890101R	10n	C	-	50
C215	0880057R	100n	PF	10	50
C301	0890087R	1n0	C	-	50
C302	C457715	470n	MPO	10	63
C303	C457715	470n	MPO	10	63
C304	0880057R	100n	PF	10	50
C305	0880057R	100n	PF	10	50
C306	0880057R	100n	PF	10	50
C307	0800015R	10u	EL	-	16
C309	0890081R	330p	C	10	50
C310	0880057R	100n	PF	10	50
C353	0800015R	10u	EL	-	16
C354	0890085R	680p	C	-	50
C403	0890079R	270p	C	10	50
C407	0890092R	2n2	C	10	50
C411	0880057R	100n	PF	10	50
C412	0880057R	100n	PF	10	50
C413	0880059R	150n	PF	10	50
C414	0800015R	10u	EL	-	16
C415	0880044R	10n	PF	10	50
C416	0800023R	22u	EL	-	16
C417	0800082N	1000u	EL	-	16
C420	0880044R	10n	PF	10	50
C421	0800009R	4u7	EL	-	25
C422	0880044R	10n	PF	10	50
C423	0800003R	1u0	EL	-	50

Ref No.	Part No.	Value	Type	%Tol	Voltage
C424	0880036R	2n7	PF	10	50
C425	0880044R	10n	PF	10	50
C426	0890122R	39p	C	5	50
C427	0800015R	10u	EL	-	16
C428	C457715	47n	MPO	10	63
C433	0880062R	220n	PF	10	50
C435	0890083R	470p	C	10	50
C438	0890082R	390p	C	-	50
C444	0800041R	47u	EL	-	16
C451	0800048R	100u	EL	-	10
C452	0800015R	10u	EL	-	16
C471	0800015R	10u	EL	-	16
C501	0890117R	18p	C	5	50
C502	0880039R	4n7	PF	10	50
C503	0880057R	100n	PF	10	50
C504	0800005R	2u2	EL	-	50
C505-07	0800015R	10u	EL	-	16
C509	0800048R	100u	EL	-	10
C510	0890087R	1n0	C	-	50
C511	0890087R	1n0	C	-	50
C515	0880057R	100n	PF	10	50
C516	0880057R	100n	PF	10	50
C531	0890085R	680p	C	-	50
C552	0800015R	10u	EL	-	16
C601	0278331	100n	PF	5	50
C602	0880039R	4n7	PF	10	50
C604	0890079R	270p	C	10	50
C605	0800328R	100u	EL	-	35
C606	0890087R	1n0	C	-	50
C608	0800005R	2u2	EL	-	50
C609	0252969	2200u	EL	-	25
C610	0276345R	220n	PF	10	100
C701	0880039R	4n7	PF	10	50
C702	0800003R	1u0	EL	-	50
C703	0244107R	3n3	C	10	50
C704	0890074R	100p	C	5	50
C705	0800039R	47u	EL	-	10
C709	0259152	100u	EL	-	160
C710	0890074R	100p	C	5	50
C711	0244501R	1n0	C	10	500
C712	0250511R	22n	PF	10	250
C716	0255031N	47u	EL	-	200
C717	0800048R	100u	EL	-	10
C718	0243504R	180p	C	10	500
C719	0800084	1000u	EL	-	31.5
C720	0279687R	10n	PF	10	100
C721	0800007R	3u3	EL	-	50
C725	0262441	10n	PF	2	1600
C727	0299933	390n	PF	10	200
C727A	0299928	150n	PF	10	200
C729	0880048R	22n	PF	10	50
C731	C457715	47n	MPO	10	63
C790	0246344	100p	C	10	2000
C801	0890081R	330p	C	10	50
C802	0890079R	270p	C	10	50
C803	0890082R	390p	C	10	50
C805	0245612	4n7	C	10	1000
C806	0800057R	220u	EL	-	10
C901	0279698	220n	C	10	250AC
C902	0249396R	10n	C	10	250AC
C903	0249395	4n7	C	10	250AC
C904	0249395	4n7	C	10	250AC
C905	0253873	47u	EL	-	400
C906	0244215R	2n2	C	10	2000
C907	0880044R	10n	PF	10	50
C908	C457715	470n	MPO	10	63
C909	0880031R	1n0	PF	10	50
C910	0800015R	10u	EL	-	16
C911	0890074R	100p	C	5	50
C912	0244501R	1n0	C	10	500
C951	0246353	470p	C	10	2000
C952	0259402	180u	EL	-	160
C953	0880053R	47n	PF	10	50
C954	0800084	1000u	EL	-	31.5
C955	0254518R	47u	EL	-	25
C956	0244505R	2n2	C	10	500
C957	0243507R	330p	C	10	500
C958	0800048R	100u	EL	-	10



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Ref No.	Part No.	Value	Type	%Tol	Voltage
\triangle C960	0800009R	4u7	EL	-	25
\triangle C998	0249498	1n0	C	10	250AC
\triangle C999	0247974	2n2	C	10	250AC
*C2103	0800024R	22u	EL	-	25
*C2202	0890026M	220p	C	10	50
*C2203	0890026M	220p	C	10	50
*C2205	0880044R	10n	PF	10	50
*C2206	0880057R	100n	PF	10	50
*C2208	0890035M	1n0	PF	10	50
*C2210	0890011M	15p	C	5	50
*C2217	0800049R	100u	EL	-	16
*C2218	0880044R	10n	PF	10	50
*C2219	0880057R	100n	PF	10	50
*C2220	0890017M	47p	C	5	50
*C2221	0880044R	10n	PF	10	50
*C2223	0880048R	22n	PF	10	50
*C2251	0880057R	100n	PF	10	50

Ref No.	Part No.	Description
IC001	2001558	TMP47C834N-R137
IC001	E730033	TMP47P834N (Austria only)
IC002	2007653	ST93CS56B1
IC003	2004801	LA7920
IC011	2009401R	PST529C
IC201	T900567	TDA8361-N3
IC401	2004451	TDA2824S
IC451	2004471	HEF4053
IC501	2003652	TDA4661
IC601	2003951	TA8427K
\triangle IC901	2917781	CNX82A
IC951	2000252	MC7809CT
*IC2104	T900345	5V REGULATOR
*IC2201	2004441	CF72306
*IC2202	T900570	CF70200
*IC2203	2009401R	5V REGULATOR
Q001	T633134	BF240
Q003	T631275	BC548B
Q004	T631276	BC558B
Q005-08	T631275	BC548B
Q201	T631275	BC548B
Q301	T631275	BC548B
Q401	T631275	BC548B
Q421	T631286	BC548C
Q440	T631276	BC558B
Q451	T631275	BC548B
Q453-55	T631275	BC548B
Q460	T631275	BC548B
Q461	T631276	BC558B
Q501	T631276	BC558B
Q502	T631275	BC548B
Q701	T633140	BF483
Q702	2315161	BU2508DF
Q703	T732013	TS0820-20
Q704	T633138	BF423
Q801	T633137	BF459
Q802	T633137	BF459
Q803	T633137	BF459
Q804-07	T631276	BC558B
Q901	T631276	BC558B
Q902	T631291	BC368
Q903	2314791	BUT12AF
Q951	T633138	BF423
Q952	T631275	BC548B
Q953	T632084	BD438
Q960	T631275	BC548B
*Q2103	T631275	BC548B
D001	T547041	TLSH2101
D002	2348921M	IN4531
D006	2348921M	IN4531
D008	2348921M	IN4531
D009	T531055	BAT85
D010	2348921M	IN4531
D012	2348921M	IN4531
D012A	T531056	BYV10-40
D013-16	2348921M	IN4531
D021	2348921M	IN4531
D022	2348921M	IN4531
D031	2348921M	IN4531
D213	2343963M	MPG06J
D301	T531055	BAT85
D351	2348921M	IN4531
D444	2348921M	IN4531
D451	2348921M	IN4531
D519	2348921M	IN4531
D601	T531063	IN4002
D601	2348921M	IN4531
D602	2348921M	IN4531
D701	2343942M	RGP10J
D702	2343941M	RGP10G
D702A	2343941M	RGP10G
D703	2348921M	IN4531
D704	2348921M	IN4531
D705	2348921M	IN4531
D706	2343962M	MPG06G
D708	2348921M	IN4531
D801-05	2348921M	IN4531
D901-04	2344111M	BY134GP

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