

# HITACHI

# C2514T

## SERVICE MANUAL

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### CAUTION:

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

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### TECHNICAL SPECIFICATIONS

TV standard	625 lines	Programme selectors	Channel UP/DOWN buttons with 59 programme remote control
Channel coverage	UHF channels 21-68 and PAL 60	Speakers	8 × 12 cm
Aerial input impedance	75 ohm unbalanced	Power consumption	Approx. 70 W
Intermediate frequencies		Picture tube	59 cm Type
I.F. Luminance	39.5 MHz	Dimensions:	
I.F. Sound	33.5 MHz	Width	590 mm
I.F. Chrominance	35.07 MHz	Height	535 mm
F.M. Sound	6.0 MHz	Depth	452 mm
Colour sub carrier	4.43 MHz	Weight	25 kg
Focusing	Electro static		
Mains voltage	240 V 50 Hz		
Fuses	T3.15A		

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## 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 assure 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 in this Service Manual, may create electrical shock, fire, X-radiation, or other hazards.

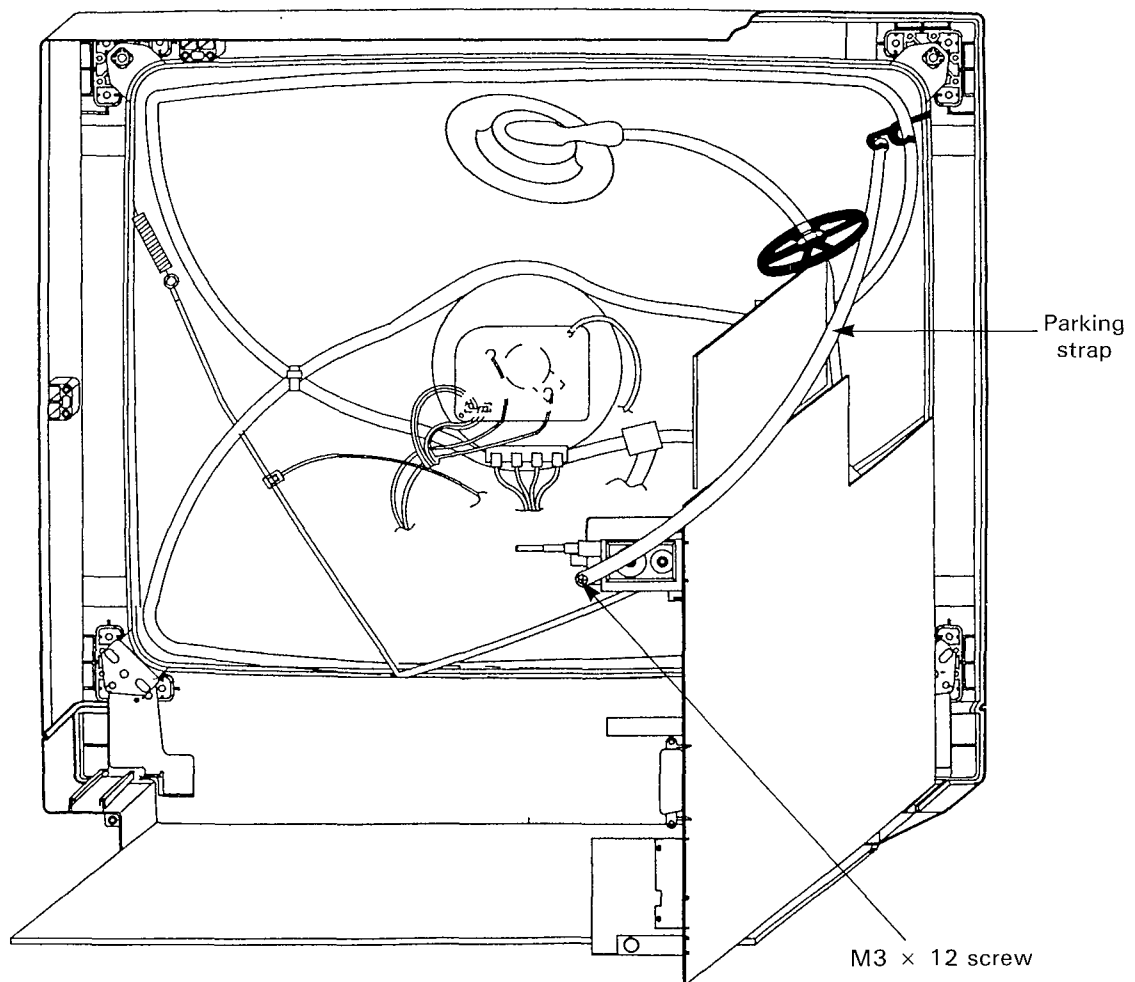
Product Safety is continuously under review, and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of HITACHI Service Manuals, may be obtained at a nominal charge from your HITACHI SALES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

## CHASSIS PARKING POSITION

- 1 Switch T.V. off at mains supply
- 2 Remove back cover
- 3 Undo purse locks, and release all leads.
- 4 Carefully remove chassis from runners, then lift and raise chassis through 90°.
- 5 Attach parking strap (part No. N936072) to the top right degaussing coil clip as shown in diagram below.
- 6 Attach other end of parking strap to the Flyback Transformer boss via a M3 x 12 screw as shown.
- 7 Once service has been carried out, reverse the procedure to replace chassis in its cabinet. Ensure lead dressing is returned to its original condition.



## CIRCUIT DESCRIPTION

### Tuner and I.F. Stages:

The tuner used on this chassis, is powered by the +9v supply, and covers UHF channels 21 - 69

When tuning procedure is operated, 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.

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

The I.F. output from the tuner, is applied to amplifier Q201 then input to IC201 via the SAW filter CP201

### Sound I.F. stages:

The sound stages consist of IC201, which basically performs the required demodulation, 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 6MHz filter network of MF422, L401 etc, then input to pin 5 of IC201 via C422.

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

Should C417 on pin 8 of IC401 go short circuit, the base of Q440 will become "Low", and it will turn on. A voltage will then be applied to the gate of Q703, and as a result the supply for the +9v is removed, preventing damage occurring to IC401

How the +9v is removed will be described in more detail later during the horizontal circuit description.

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

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

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.

Sound demodulation is also output at pin 1 of IC201. It is then applied to pin 3 of IC451 via Q451, output from pin 4, then input to pins 1 and 3 of the 21 pin connecting socket, via Q453, Q454

If desired, this output can then be applied to external equipment via the appropriate connecting plug.

Audio signals from external equipment can be input to the 21 pin connecting socket at pins 2 and 6, then applied to IC451 at pin 1 via R403/R404, R471 and C471

Audio signals from the front phono sockets can also be applied to pin 1 of IC451 via L151, C152 and R406.

When connecting external signals this way, a "High" is applied to pins 11 and 10 of IC451 from pin 37 of IC001, thereby changing the internal switching circuitry of the IC. The audio applied to pin 1 is then output at pin 15, and applied to pin 6 of IC201.

A switching voltage is also applied to pin 16 of IC201 when external equipment is connected, causing the external sound input at pin 6 to be output from pin 50 of IC201 for further amplification by IC401, as previously described

Volume control of the external audio signal is 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 Tuning and Control 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 C205, connected to pin 48.

The output from the internal 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 is governed by the setting of VR202

This AGC output 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 6MHz sound rejection filter MF501, via the buffer transistor Q501. The resulting luminance signal is then applied to pin 12 of IC451 via Q502. It is also input to pin 19 of the 21 pin connecting socket, for output to external equipment if desired.

The internal switching of IC451 will output the luminance at pin 14.

It is then input to the teletext module via Q455, Q2102 and Q2101

The luminance output from the teletext module, is then applied to pins 13 and 15 of IC201 via Q301 buffer, for colour decoding and deflection synchronisation.

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

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

An automatic beam current circuit is also 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 via R719, to the cathode of D706, then via R720 to pin 25 of IC201, effectively reducing the contrast level, and hence the beam current.

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

External video signals from the front phono socket, or luminance signals from the S-VHS socket can also be applied to IC451 for further processing. These signals will be fed from the relevant socket, then via R359, C353, Q460 and Q461 to pin 13 of IC451.

When the external mode is selected, the "High" applied to pins 10 and 11 of IC451 causes the switching circuits to output the external signals from pin 14. These signals are then fed via the teletext module to pins 13 and 15 of IC201, as previously described.

The switching voltage at pin 16 ensures that only the external signals are processed by IC201.

### Chrominance Circuitry:

Although IC201 is designed to demodulate both PAL and SECAM systems, only the PAL process is utilised

The chrominance component is extracted internally from the composite video, and the demodulated colour signals are then output from IC201 pins 30 and 31, as the R-y and B-y signals. These signals are input to pins 14 and 16 of IC501, which is a switch capacitor delay line. The inputs 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, and the resulting R-y and B-y signals are output from pins 11 and 12 via an internal buffer stage.

These signals are then input to IC201 at pins 28 and 29.

IC201 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 R-y, G-y signals are then applied to a MATRIX circuit, and finally emerge from pins 18, 19 and 20 as the blue, green, and red signals.

When external inputs are fed via the S-VHS socket, the chrominance signal is applied to pin 16. The switching voltage at pin 16 ensures that only the external chrominance will be processed by the output stages of IC201, and output from pins 18, 19 and 20.

Colour saturation can still be controlled by the voltage at pin 26 of IC201 whilst the external chrominance signal is being processed.

#### **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 finally returned to pin 13 via C302 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 then compares this sawtooth waveform to the sync. pulse. Should any frequency drift occur, a corrective output will 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 Q781 on the pin cushion and horiz output assembly. Both these transistors are powered by the 150v 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 and Q803 on the C.R.T. base.

Under certain fault conditions, i.e. increased H.T. supply, low line oscillator frequency, or reduced value of the tuning capacitor C793, 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, 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 increased voltage drop across R727 will cause Q704 to be turned on, and a voltage will be applied to the gate of Q703 via R729, R718. This will then prevent further E.H.T. generation as described earlier. Q750/Q751 stage ensures the E.H.T. remains stabilized with changes in brightness etc.

The voltage at pin 4 of the flyback transformer is smoothed by R751/C751, and applied to the base of Q750. The emitter voltage of Q750 is then used as the base drive for Q751. The resulting drive current at the collector of Q751 controls the inductance of L703 secondary, which in turn controls the voltage value at pin 9 of the flyback transformer. Therefore, when a change of brightness takes place on the screen, the voltage at pin 4 of the flyback transformer will vary, altering the inductance of L703, and maintaining a constant voltage level at pin 9 of the transformer. As this voltage supplies the E.H.T. stages, a stabilized output is maintained.

#### **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. This eliminates the need for a conventional oscillator circuit, and has the added advantage that no external frequency control is required.

C601 at pin 42 of the IC is used for ramp generation, producing the required sawtooth

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.

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.

The deflection current that occurs at the junction of C609/R609 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.

#### **Pin Cushion Correction Circuit**

The sawtooth signal at the junction of C608/VR601 is applied to Q751 base via R753. A parabola signal is then made available at the collector of Q751.

Pin cushion amplitude, i.e. gain control, is performed by VR751, with VR752 controlling horizontal size.

Q752, Q753 and Q754, provide further amplification of the signal

The output is finally applied via L781 to the modulation circuitry of D781, D782, C783, and C792, correcting the EAST-WEST scan

The voltage at pin 4 of the flyback transformer is applied to the base of Q756. This provides geometric correction when any beam current changes occur.

Whenever PAL 60 broadcasts are received, the amplitude of the parabola signal at Q751 collector has to be changed. This is achieved by Q755 and Q757 stage.

When a PAL 60 broadcast is received, IC001 pin 40 outputs a "High". This is applied to Q757 base, turning it on. As a result, the base of Q755 is pulled "Low", turning the transistor off. This effectively takes R772/C761 out of circuit, and as a result, the amplitude of the parabola signal at Q751 collector will increase

### Power Supply Circuit:

The AC input is rectified by D901 - 04, and produces approximately 300v at the collector of 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, 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 induced in the S1 - S2 winding is rectified by D951 to produce the H.T. of 150v, which is smoothed by C952.

The S3 - S4 windings produce 12v via D952, and this is smoothed by C954

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 the opto-coupler, which is applied to transistor network Q901, Q902. These transistors control the on time of the power transistor Q903, thereby maintaining a constant and regulated H.T. level.

ZD952 offers protection to the H.T. circuits should the voltage level rise excessively.

When the standby mode is selected, pins 6 and 7 of IC001 will go "Low". As these outputs supply the drive to Q952, that transistor will now turn off. Consequently, Q953 is turned off, and the +9v to IC201 disappears, thereby 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, R097, and stabilized by ZD001. The output from pin 2 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 external input sockets

IC002 is the memory IC, which stores all data relating to the above functions, then transfers that information to IC001 when required.

IC001 and IC002 are also powered by the +5v supply.

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

IC001 must be initially reset from switch on, and this is achieved by IC011. 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, thus 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.

When PAL 60 broadcasts are received, the vertical pulse at pin 17 of IC001 will change. As a result pins 40 will output a "High". This is used to change the EAST/WEST scan on the pin cushion and horiz output panel, as previously described.

Contrast, colour, brightness, sharpness 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 and 10 of IC001. These changes are then applied 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 required for the Teletext module, with the data signal also being supplied to the memory IC002.

When external equipment connected to the 21 pin connecting socket is turned on, 12v is output from pin 8 of the socket to D006. The diode then becomes forward biased, and applies approximately 5v to IC001 pin 34.

A "High" is then output from pin 37 of IC001, and approximately 9v is applied via R454 to pins 10 and 11 of IC451, changing the internal switching to output the external 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 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 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" from pin 37 of IC001, which turns on Q007 and Q004 as previously explained. Approximately 9v is then made available at the collector of Q004.

Also, 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 9v at the collector of Q004, and 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 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, 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 then applied via R001, R085, C001, R419 and R421, to pin 3 of IC401, thus causing a "Bleep" sound to be heard.

If the "OFF" timer mode has been set, and the time input has elapsed, pins 6 and 7 of IC001 output a "Low". This removes the drive supplied to the base of Q952, and as a result the +9v output of IC951 disappears. This places the TV into its standby mode of operation by removing the E.H.T. generation as explained previously

When the "ON" time has been calculated and input, the standby command must be transmitted by the handset, to place the TV into its standby mode. 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" outputs from pins 6 and 7 of IC001 are removed, and the TV will return to normal operation.

#### **Teletext Circuit (Unitext Module):**

The two main ICs which control the teletext operations are IC2201 type CF72306, and IC2202 type CF70095

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

The clock and data control signals from IC001 are applied to pins 17 and 18 of IC2202, and RGB text signals will be output from pins 22, 23, and 20 of IC2202. They are then applied to the C.R.T. base transistors via buffer transistors Q2211, Q2212, Q2213.

During teletext mode a "High" is output from pin 19 of IC2002. This is applied via Q2103 to IC201 at pin 21, therefore allowing only the teletext RGB data to be supplied to the output transistors of the C.R.T. base.

IC2203, type PST529C, performs the reset operation for IC2202 when the T.V. is first switched on, or brought out of standby.

Until the voltage at pin 1 of IC2203 reaches 4v5, pin 3 remains "Low". This "Low" is applied to pin 5 of IC2002 and initiates the reset condition. Once pin 1 of IC2003 exceeds 4v5, then pin 3 becomes "High" via R2214, and the reset is released.

IC2001 and IC2002 each have their own oscillator. The 13.875MHz crystal X2201, is utilised for IC2201, whilst IC2202 uses a variable capacitance diode D2219 to achieve the desired oscillating frequency of 22MHz.

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

The video signal is applied to Q2102 and Q2101, then input to pins 2 and 3 of IC2201. Teletext CLOCK and

DATA outputs are then obtained from pins 13 and 12 of the IC.

Secondly, a composite sync signal is required. The video input at pins 2 and 3 of IC2001 is processed and provides a sync. signal 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.

#### **Teletext Circuit (Eurotext Module) - A523300: (C2514TZ models only)**

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

IC2201 is the data slicer, whilst IC2202 is the decoder, character generator and controller, which also contains an 8k byte RAM (8 teletext pages).

The clock (SCL) and data (SDA) control signals from IC001 are applied to pins 17 and 18 of IC2202, and RGB text signals will be output from pins 22, 23, and 20 of IC2202.

During teletext mode a "High" is output from pin 19 of IC2002. This allows only the teletext RGB data to be supplied to the output transistors of the C.R.T. base. The level of the R.G.B. outputs is set by the values of C2217 and R2223 which are connected between ground and pins 26 and 25 of IC2202 respectively.

C2222 provides a suitable reset pulse for IC2202 when the T.V. is first switched on, or brought out of standby.

The 13.875MHz crystal X2201, is utilised for IC2201, and the oscillator signal output from pin 15 of IC2201, is fed to pin 6 of IC2202.

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

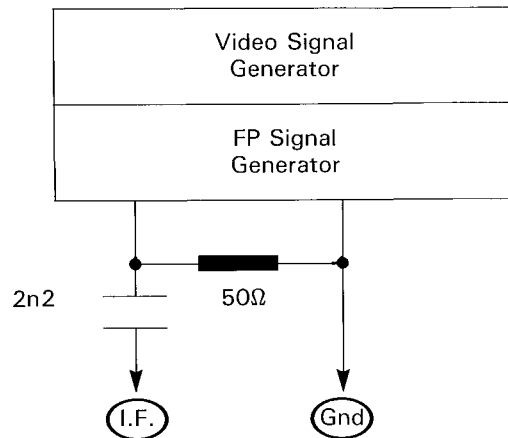
The video signal is applied to Q2102 and Q2101, then input to pins 2 and 3 of IC2201. Teletext CLOCK and DATA outputs are then obtained from pins 13 and 12 of the IC.

Secondly, a composite sync signal is required. The video input at pins 2 and 3 of IC2001 is processed and provides a sync. signal 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 =  $-10 \sim 0$  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 ADJUSTMENT

**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  $150\text{V} \pm 0\text{V}2$ .

**Horizontal Phase and Amplitude:**

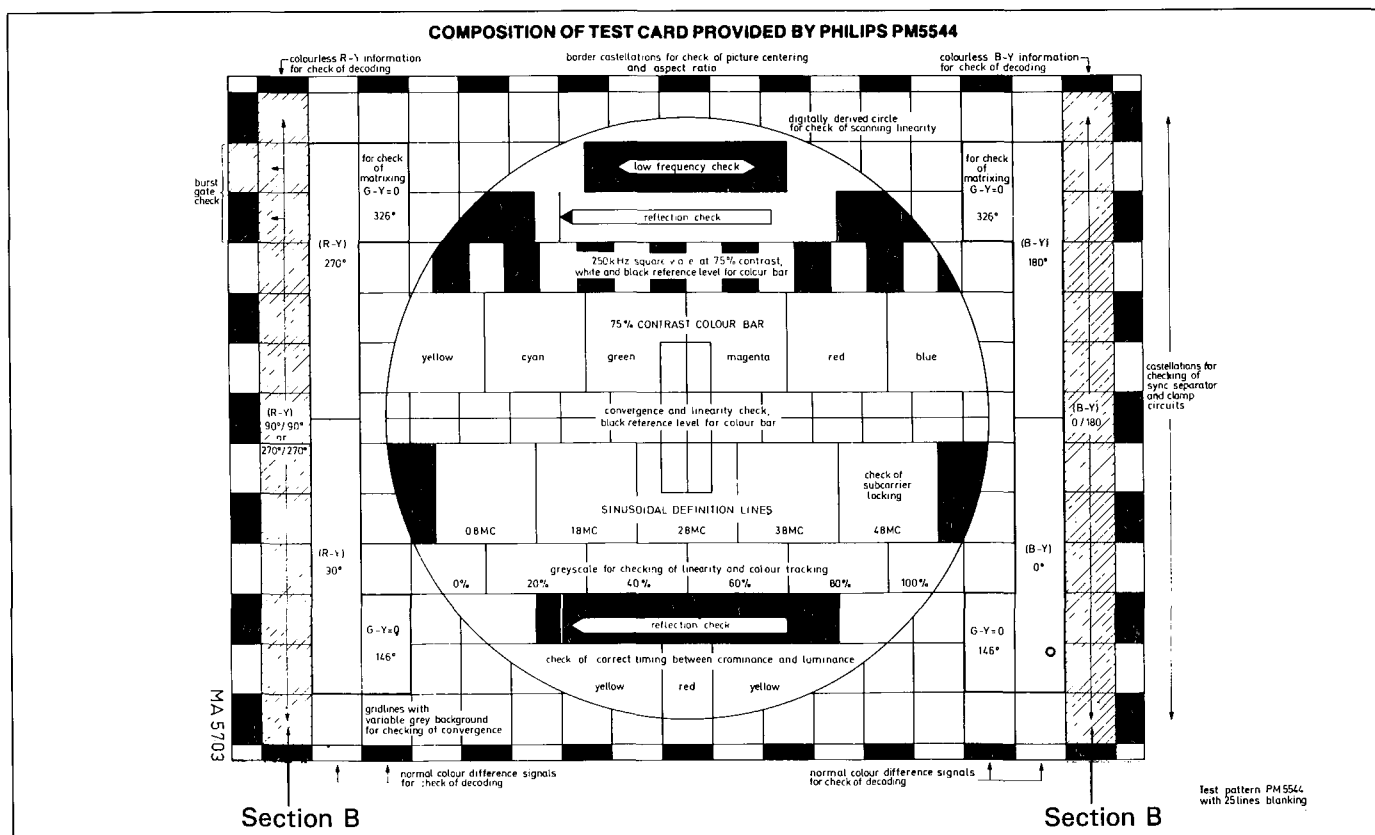
1. Switch TV on, and receive Philips test pattern.
2. Set the brightness and contrast to their maximum settings.
3. Adjust VR701 if picture is not centralised.
4. Adjust VR752 to its mechanical center.
5. Adjust VR751 to minimize distortion at sides of picture.
6. Adjust VR752 to obtain the required picture width.

### 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 "position of adjustment controls" drawing) until desired result is obtained.
4. Adjust VR601 to obtain the required height.

**Focus Adjustment:**

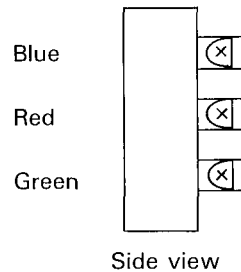
1. Switch TV on and receive Philips test pattern.
2. Set the colour level to minimum, and the brightness and contrast to their maximum levels.
3. Adjust contrast so that the first two bars of the colour bar display are the same colour black, then adjust brightness to make the first two bars of the grey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

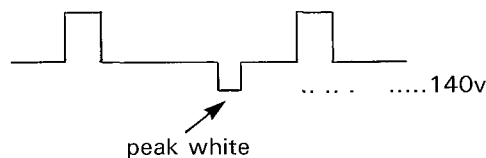


- (ii) Set the customer controls as follows:—Contrast = 0  
Colour = 0  
Brightness = 30

- (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 level is obtained.
3. Connect an oscilloscope probe to each of the R.G.B. cathodes in turn and leave on 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  
 $x = 283$        $y = 299$ .
- The above co-ordinates represent a colour temperature of 9300K with a colour difference ( $\Delta uv$ ) of approximately 8.

## PROTECTION CHECKS

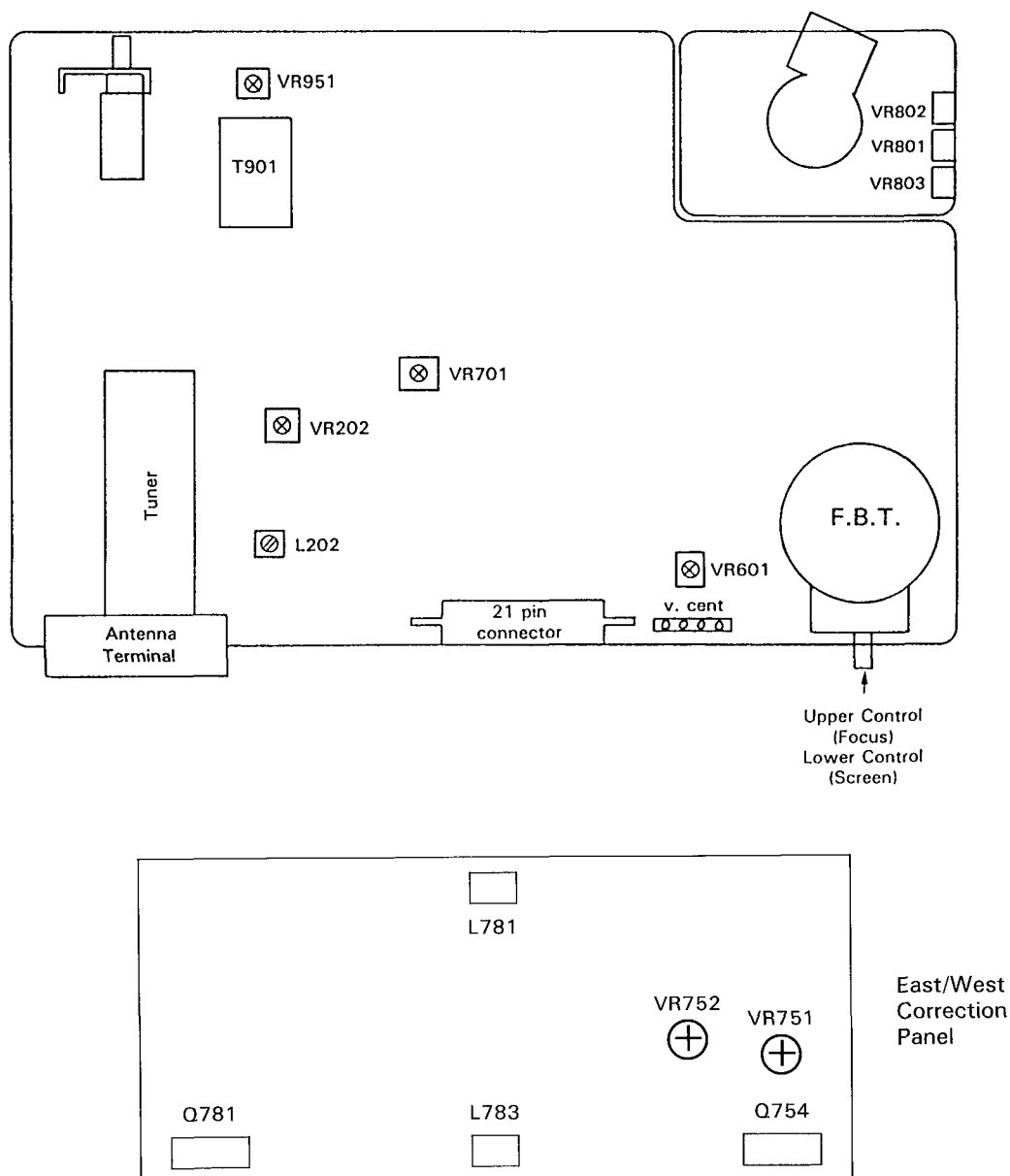
### High Voltage Limit Check:

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 and check that TV operates normally.

## POSITION OF ADJUSTMENT CONTROLS



## VOLTAGE TABLES

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

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	4V5
6	5V1 (0V standby)	27	4V0
7	5V1 (0V standby)	28	3V0
8	—	29	3V0
9	2V8	30	0V
10	4V8	31	0V5 (10V range)
11	2V3	32	2V4
12	2V5	33	5V0
13	1V2	34	* 0V
14	1V2	35	4V5
15	4V8	36	5V0 (0V1 no signals)
16	4V8	37	0V1 (8V0 VTR/S-VHS mode)
17	1V5	38	0V1
18	0V8	39	not used
19	—	40	—
20	—	41	not used
21	0V	42	5V0

IC002			
Pin	Volts	Pin	Volts
1	—	5	0V
2	2V6	6	—
3	2V5	7	0V
4	5V0	8	5V0

IC010	
Pin	Volts
1	6V0
2	0V
3	2V8

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

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

\* Pin 16 = 8V0 in VTR mode, and 3V8 when equipment is connected via the S-VHS socket

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

IC451			
Pin	Volts	Pin	Volts
1	2V9	9	7V5
2	not used	10	* 0V5
3	2V3	11	* 0V5
4	2V5	12	2V8
5	not used	13	3V0
6	0V	14	2V8
7	0V	15	** 0V
8	0V	16	8V8

IC501			
Pin	Volts	Pin	Volts
1	5V2	9	5V2
2	Not Used	10	0V
3	0V	11	2V8
4	0V	12	2V8
5	1V1	13	Not Used
6	Not Used	14	—
7	Not Used	15	Not Used
8	0V	16	—

\* = 8V0 in VTR/S – VHS mode  
 \*\* = 2V8 in VTR/S – VHS mode

IC601	
Pin	Volts
1	0V
2	13V5
3	26V
4	1V0
5	0V8
6	26V
7	2V0

IC901			
Pin	Volts	Pin	Volts
1	14V	4	– 5V
2	13V	5	0V3
3	not used	6	not used

IC951	
Pin	Volts
1	13V
2	0V
3	9V0

	Q001	Q003	Q004	Q005
C	Varies with tuning	4V1	— (8V8)	— (8V6)
B	0V	0V3	8V2	0V6 (– 0V2)
E	0V	0V	9V0	0V

() = VTR and S – VHS mode

() = VTR mode. In S – VHS mode collector will be 4V0

	Q006	Q007	Q008	Q201	Q301
C	— (8V5)	8V5 (—)	9V0	7V0	6V1
B	—	0V1 (0V7)	—	1V0	2V7
E	0V	0V	0V	0V4	2V2

() = VTR mode. In S – VHS mode base = 0V7

() = VTR and S – VHS mode

	Q440	Q451	Q453	Q454	Q455
C	0V2	8V8	3V5	9V0	8V8
B	12V5	3V0	2V0	3V5	3V0
E	12V5	2V3	1V3	3V0	2V2

	Q460	Q461	Q501	Q502	Q701	Q703		Q704
C	4V5	3V2	—	8V1	24V	A	4V0	—
B	2V3	4V5	3V2	3V6	0V4	G	0V1	145V
E	2V0	5V2	3V8	2V9	0V	K	0V	145V

	Q750	Q751	Q751	Q752	Q753	Q754
C	27V	1V2	4V0	0V5	7V5	0V
B	0V4	0V6	0V6	3V2	0V5	7V5
E	0V5	1V4	0V	4V4	0V	8V2

East/West  
Panel

	Q755	Q756	Q757	Q781	Q801	Q802	Q803
C	0V	6V8	0V	145V	145V	145V	145V
B	0V6	4V2	1V2	—	2V5	2V5	2V5
E	0V	3V8	0V	0V	1V8	1V8	1V8

	Q804	Q901	Q902	Q903	Q951	Q952
C	—	— 2V2	— 3V1	340V	143V	0V2 (12v)
B	8V4	0V3	— 4V5	— 3V0	14V5 (28V)	0V8 (0V)
E	8V3	0V	— 5V0	0V	140V	0V

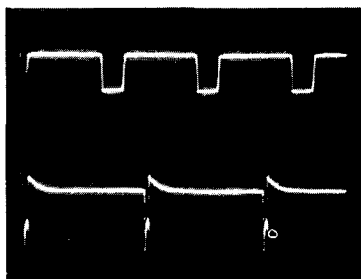
() = standby

	Q953	Q2101	Q2102	Q2103
C	12V (0V6)	2V0	4V6	9V0
B	12V	4V6	2V2	0V3
E	13V	5V2	1V9	—

() = standby

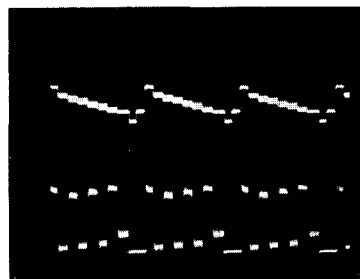
THE FOLLOWING WAVEFORMS WERE TAKEN WHILST RECEIVING A COLOUR BAR SIGNAL. THE OSCILLOSCOPE WAS SET TO  $20\mu$  SECS/CM UNLESS OTHERWISE STATED.

IC001  
pin 26  
6v p.p.



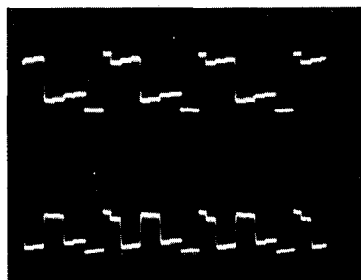
IC001  
pin 27  
5v p.p. at  
5m secs/cm.

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

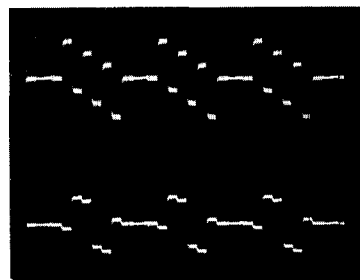


IC201  
pins 18  
3v8 p.p.

IC201  
pin 19  
3v5 p.p.



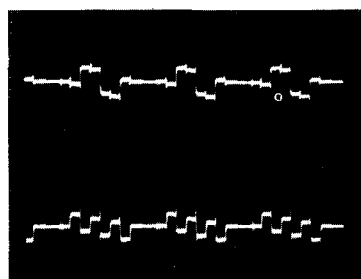
IC201  
pin 28  
1v5 p.p.



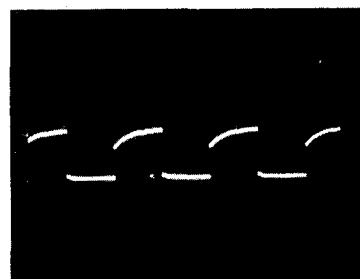
IC201  
pin 20  
4v p.p.

IC201  
pin 29  
1v2 p.p.

IC201  
pin 30  
0v8 p.p.

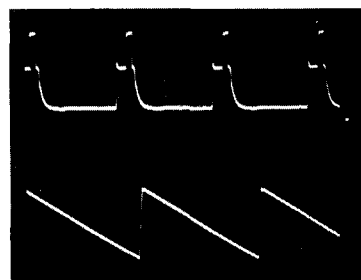


IC201  
pin 37  
3v8 p.p.

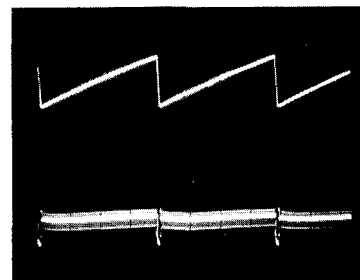


IC201  
pin 31  
0v8 p.p.

IC201  
pin 38  
6v0 p.p.



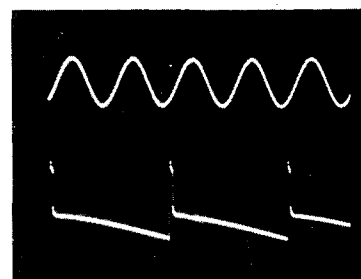
IC201  
pin 42  
2v p.p. at  
5m secs/cm.



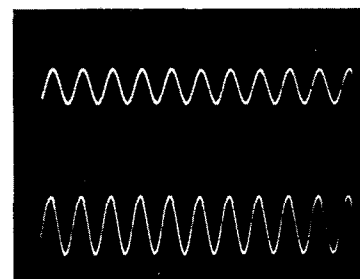
IC201  
pin 41  
1v0 p.p. at  
5m secs/cm.

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

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



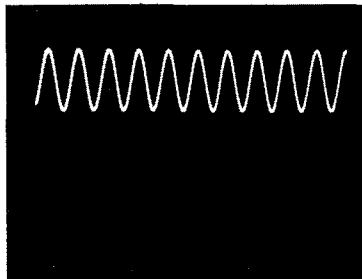
IC401  
pin 3  
0v25 p.p. at  
1m sec/cm.  
at max. vol.  
with speaker  
disconnected



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

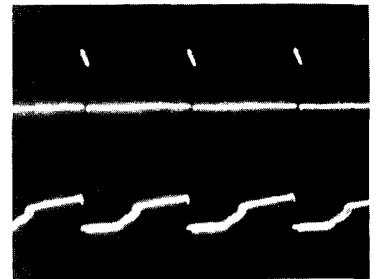
IC401  
pin 7  
10v p.p. at  
1m sec/cm.  
at max. volume  
with speaker  
disconnected

IC401  
pin 9  
10v p.p. at  
1m sec/cm.  
at max.  
volume with  
speaker  
disconnected



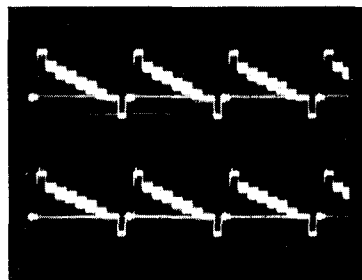
IC601  
pin 3  
26v p.p. at  
5m sec/cm.

IC601  
pin 4  
1v8 p.p. at  
5m sec/cm.



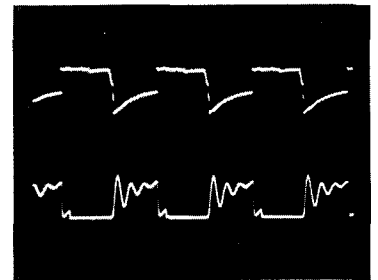
Q501  
Base  
3v p.p.

Q502  
Emitter  
2v8 p.p.



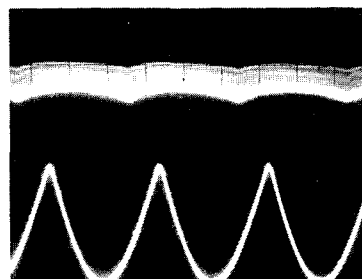
Q701  
Base  
2v0 p p

Q701  
Collector  
80v p p.



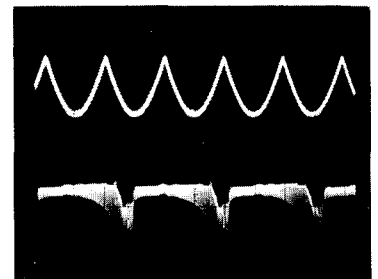
Q751  
Base  
(East/West  
Correction  
Panel)  
1v0 p.p. at  
5m sec/cm.

Q751  
Collector  
(East/West  
Correction Panel)  
4v p.p. at  
5m sec/cm.



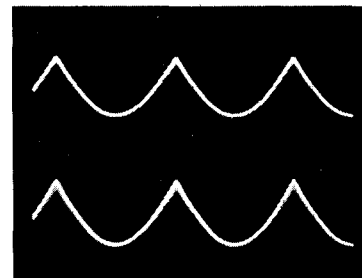
Q752  
Base  
2v0 p.p. at  
10m secs/cm.

Q752  
Collector  
1v0 p.p. at  
20μ secs/cm



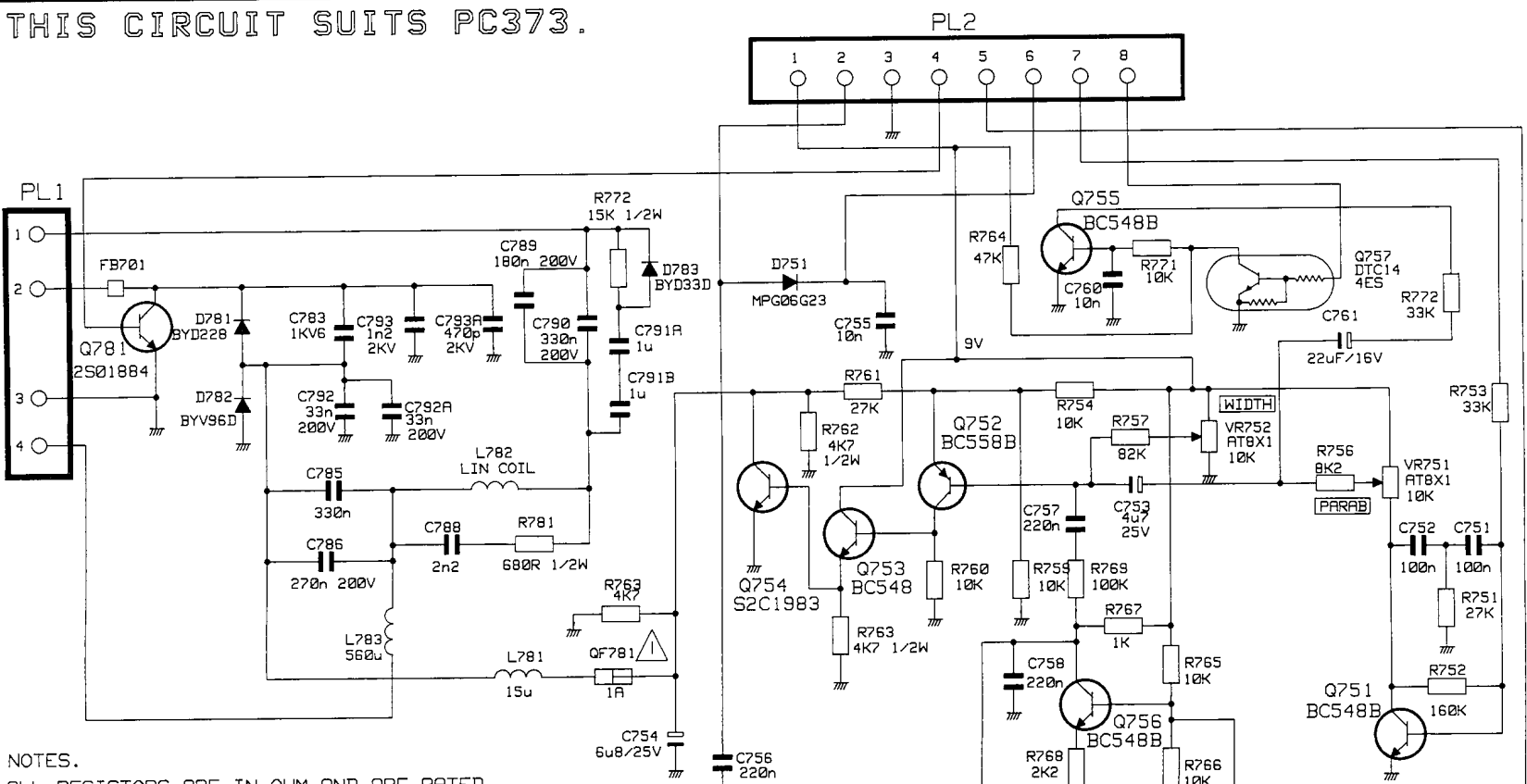
Q754  
Base  
10v p.p. at  
5m secs/cm.

Q754  
Emitter  
10v p p. at  
5m secs/cm.





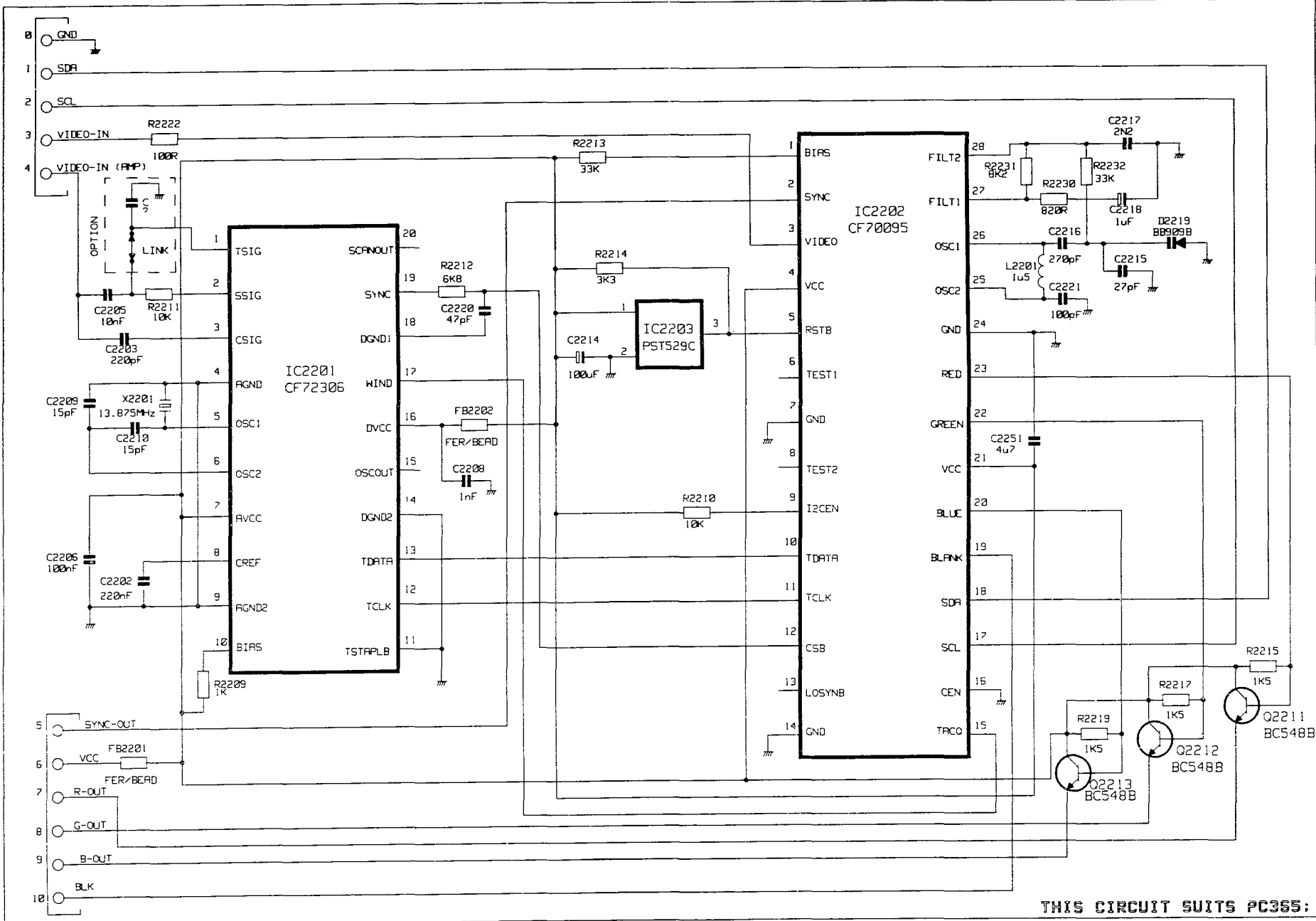
THIS CIRCUIT SUITS PC373.



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.

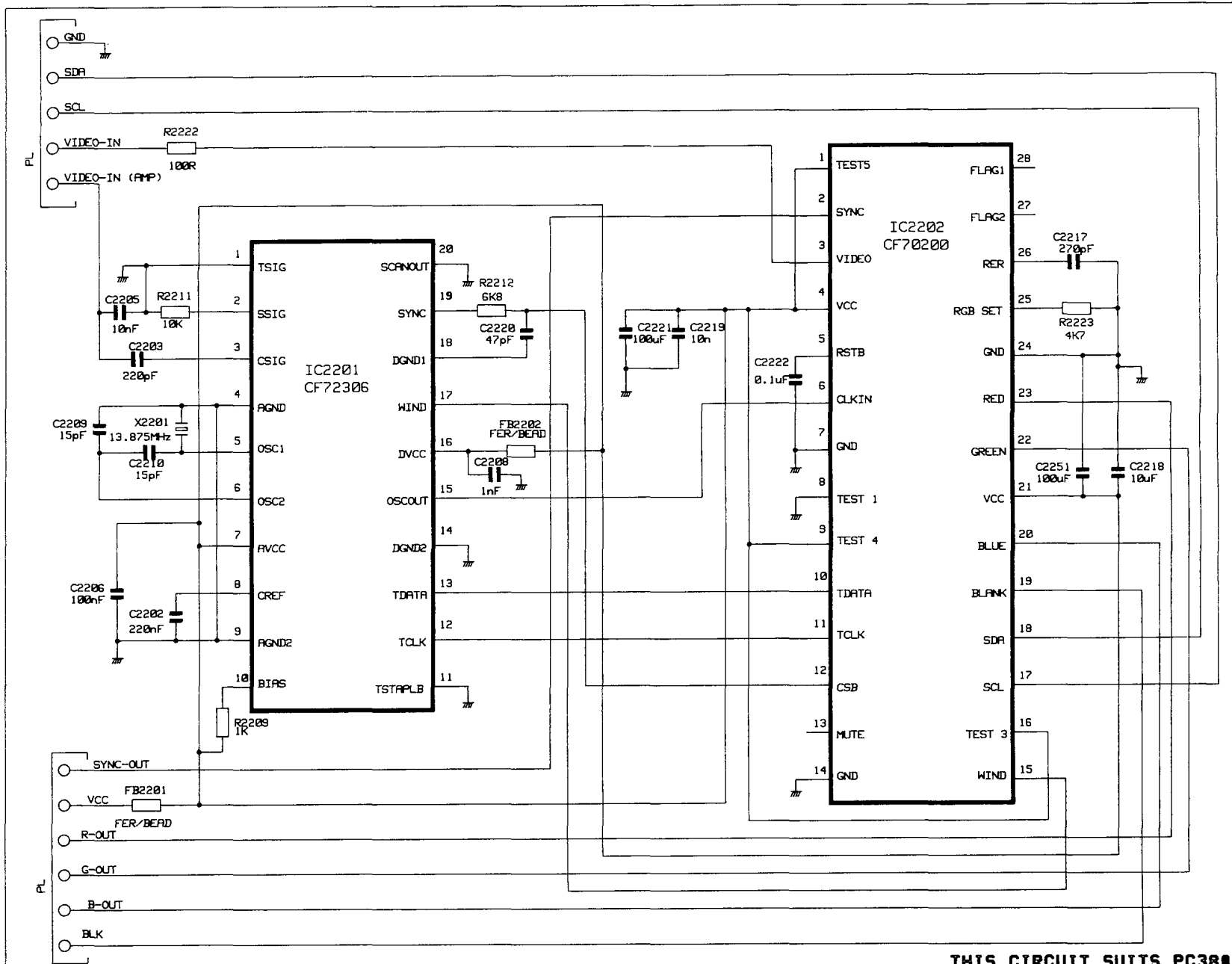
EAST/WEST CORRECTION  
CIRCUIT DIAGRAM

SERVICE NOTE: Should QF781 become open circuit, the Horizontal scan could be reduced to approximately half size,  
and the T.V. will eventually go into standby due to the protection circuit of Q703 operating.



THIS CIRCUIT SUITS PC355.

UNITEXT CIRCUIT DIAGRAM



THIS CIRCUIT SUITS PC380.

EUROTEXT CIRCUIT DIAGRAM



PRESENTATION PARTS

△CRT Type A59ECY13X01 .....	T159006
△Cabinet Back .....	X254105
Cabinet Front Frame .....	X240394
HITACHI Badge .....	X640261
△Mains Lead and Moulded Plug .....	E846629
Mains Switch Knob .....	X321022
Operating Guide .....	X830811
Quick Guide .....	X830812
Remote Control Handset CLE-876D .....	2572285
Remote Control Window (Cabinet) .....	X425042
T.V. Stand Assembly .....	X711203

MISCELLANEOUS PARTS

△CRT Socket .....	2698351
△Degaussing Coil .....	2274361
△Fuse Type T3.15A .....	2722445
Fuse Holder .....	2721793
Phono Sockets (AUDIO/VIDEO-IN) .....	2672073
△ON/OFF Switch .....	2633391
21 Pin Scart Socket .....	E826923
Speaker .....	E511116
S-VHS Input Socket .....	2982811
Touch Button Block (SW001) .....	2632853
Tuner .....	E710035

PRODUCT SAFETY NOTE: Components marked with a △ 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. Later models will contain a "EUROTEXT" assembly. The parts for this are contained in the following list. The parts for the "UNITEXT" assembly used in earlier models can be found at the end of this parts list.

Ref No.	Part No.	Value	Type	Tol %	Wattage
R001	0700059M	27K	CF	5	1/16
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
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	0700063M	47K	CF	5	1/16
R016	0700056M	15K	CF	5	1/16
R017	0700047M	3K3	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	0700056M	15K	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	0700061M	33K	CF	5	1/16
R030	0700029M	150R	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
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	0110281S	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	R227330	270R	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	0700041M	1K0	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
R076	0700058M	22K	CF	5	1/16
R077	0700058M	22K	CF	5	1/16
R079	0700064M	56K	CF	5	1/16
R081	0700041M	1K0	CF	5	1/16
R085	0700027M	100R	CF	5	1/16
R086	0700058M	22K	CF	5	1/16

Ref No.	Part No.	Value	Type	Tol %	Wattage
R087	0700027M	100R	CF	5	1/16
R088	0700054M	10K	CF	5	1/16
R091	0700054M	10K	CF	5	1/16
R092	0700054M	10K	CF	5	1/16
R093	0700054M	10K	CF	5	1/16
R095	0700027M	100R	CF	5	1/16
R097	R812330	82R	CF	5	1/4
R098	0700028M	120R	CF	5	1/16
R099	0700054M	10K	CF	5	1/16
R1	R120319	100R	CF	5	1/2
R201	0700048M	3K9	CF	5	1/16
VR202	0160215R	10K	VR	AGC	ADJUST.
R202	0700037M	560R	CF	5	1/16
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
R214	0700058M	22K	CF	5	1/16
R215	0700026M	82R	CF	5	1/16
R302	0187038M	75R	CF	5	1/16
R303	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	0700031M	180R	CF	5	1/16
R359	0700035M	390R	CF	5	1/16
R360	0700026M	82R	CF	5	1/16
R361	0700053M	8K2	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
△R411	R407551	4R7	FF	5	1/2
△R412	R407551	4R7	FF	5	1/2
R413	0700049M	4K7	CF	5	1/16
R414	0700063M	47K	CF	5	1/16
R415	0700027M	100R	CF	5	1/16
R419	0700064M	56K	CF	5	1/16
R421	0700049M	4K7	CF	5	1/16
R427	0700041M	1K0	CF	5	1/16
R428	0700042M	1K2	CF	5	1/16
R438	0700034M	330R	CF	5	1/16
R441	R353330	330K	CF	5	1/4
R442	R353330	330K	CF	5	1/4
R447	R237330	2K7	CF	5	1/4
R448	R120330	100R	CF	5	1/16
R451	0700041M	1K0	CF	5	1/16
R454	0700049M	4K7	CF	5	1/16
R455	0700027M	100R	CF	5	1/16
R456	0700043M	1K5	CF	5	1/16

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Ref No.	Part No.	Value	Type	Tol %	Wattage	Ref No.	Part No.	Value	Type	Tol %	Wattage
R457	0700035M	390R	CF	5	1/16	R752	0700071M	180K	CF	5	1/16 (Pin Cushion Panel)
R458	0700037M	560R	CF	5	1/16	R753	R526330	560R	CF	5	1/4
R459	0700041M	1K0	CF	5	1/16	R753	0700061M	33K	CF	5	1/16 (Pin Cushion Panel)
R460	0700059M	27K	CF	5	1/16	R754	R125319	150R	CF	5	1/2
R465	0700034M	330R	CF	5	1/16	R754	0700054M	10K	CF	5	1/16 (Pin Cushion Panel)
R466	0700037M	560R	CF	5	1/16	R756	0700053M	8K2	CF	5	1/16
R471	0700056M	15K	CF	5	1/16	R757	0700063M	47K	CF	5	1/16
R472	0700065M	68K	CF	5	1/16	R758	0179561M	2M2	MF	5	1/2
R473	0700062M	39K	CF	5	1/16	R759	0700054M	10K	CF	5	1/16
R491	R000505	0R5	MO	5	7	R760	0700054M	10K	CF	5	1/16
R492	0700064M	56K	CF	5	1/16	R761	0700063M	47K	CF	5	1/16
R493	0700064M	56K	CF	5	1/16	R762	R437319	4K7	CF	5	1/2
R494	0700038M	680R	CF	5	1/16	R763	R437319	4K7	CF	5	1/2
R495	0700038M	680R	CF	5	1/16	R764	0700063M	47K	CF	5	1/16
R496	0700038M	680R	CF	5	1/16	R765	0700054M	10K	CF	5	1/16
R497	0700031M	180R	CF	5	1/16	R766	0700054M	10K	CF	5	1/16
R498	0700063M	47K	CF	5	1/16	R767	0700041M	1K0	CF	5	1/16
R499	0700046M	2K7	CF	5	1/16	R768	0700045M	2K2	CF	5	1/16
R501	0700027M	100R	CF	5	1/16	R769	0700067M	100K	CF	5	1/16
R502	0700037M	560R	CF	5	1/16	R770	0179563M	3M3	MF	5	1/8
R503	0700033M	270R	CF	5	1/16	R771	0700054M	10K	CF	5	1/16
R504	0700045M	2K2	CF	5	1/16	R772	0700061M	33K	CF	5	1/16
R505	0700036M	470R	CF	5	1/16	R773	0700053M	8K2	CF	5	1/16
R506	0187038M	75R	CF	5	1/16	R781	R145319	15K	CF	5	1/2
R509	0700067M	100K	CF	5	1/16	VR801	0160413R	500R	VR	RED	BACKGROUND
R511	0700027M	100R	CF	5	1/16	R801	0700027M	100R	CF	5	1/16
R513	0700027M	100R	CF	5	1/16	VR802	0160413R	500R	VR	GREEN	BACKGROUND
R515	0700027M	100R	CF	5	1/16	R802	0700027M	100R	CF	5	1/16
R522	0700041M	1K0	CF	5	1/16	VR803	0160413R	500R	VR	BLUE	BACKGROUND
R523	0700063M	47K	CF	5	1/16	R803	0700027M	100R	CF	5	1/16
R524	0700058M	22K	CF	5	1/16	R804	0700036M	470R	CF	5	1/16
R525	0700027M	100R	CF	5	1/16	R805	0700036M	470R	CF	5	1/16
R526	0187038M	75R	CF	5	1/16	R806	0700036M	470R	CF	5	1/16
VR601	0160421R	200R	VR	VERTICAL	SIZE	R807	0700044M	1K8	CF	5	1/16
R601	0700051M	5K6	CF	5	1/16	R808	0700044M	1K8	CF	5	1/16
R602	0179557M	680K	MF	5	1/8	R809	0700044M	1K8	CF	5	1/16
R603	0179538M	4M7	MF	5	1/18	R811	0110273S	15K	MO	5	2
R604	0700051M	5K6	CF	5	1/16	R812	0110273S	15K	MO	5	2
R605	0700054M	10K	CF	5	1/16	R813	0110273S	15K	MO	5	2
R606	0700055M	12K	CF	5	1/16	R814	R526319	560R	CF	5	1/2
R607	0700029M	150R	CF	5	1/16	R815	R526319	560R	CF	5	1/2
R608	0700049M	4K7	CF	5	1/16	R816	R526319	560R	CF	5	1/2
R609	R202319	2R2	CF	5	1/2	R817	0700037M	560R	CF	5	1/16
R610	R202319	2R2	CF	5	1/2	R818	0700037M	560R	CF	5	1/16
R611	R227319	270R	CF	5	1/2	R819	0700037M	560R	CF	5	1/16
R612	R822319	820R	CF	5	1/2	R820	0700067M	100K	CF	5	1/16
R613	R822319	820R	CF	5	1/2	R821	0700054M	10K	CF	5	1/16
VR701	0160215R	10K	VR	HORIZ	PHASE	R822	0700027M	100R	CF	5	1/16
R701	0700061M	33K	CF	5	1/16	R831	0700023M	47R	CF	5	1/16
R701A	0700061M	33K	CF	5	1/16	R832	0700023M	47R	CF	5	1/16
R702	0179558M	820K	MF	5	1/8	R833	0700023M	47R	CF	5	1/16
R703	0700034M	330R	CF	5	1/16	R901	R842319	82K	CF	5	1/2
R704	0700056M	15K	CF	5	1/16	R902	0110137S	470R	MO	5	1
R706	0700054M	10K	CF	5	1/16	R903	0110221S	100R	MO	5	1
R710	0145045	6K8	WW	10	7	R904	0700046M	2K7	CF	5	1/16
R712	R457714	470K	MF	5	1/2	R905	0700051M	5K6	CF	5	1/16
R715	0119665M	270K	MF	1	1/8	R906	0700041M	1K0	CF	5	1/16
R716	0119649M	56K	MF	1	1/8	R907	0700048M	3K9	CF	5	1/16
R717	0700056M	15K	CF	5	1/16	R908	0700027M	100R	CF	5	1/16
R718	0700046M	2K7	CF	5	1/16	R909	0700052M	6K8	CF	5	1/16
R719	R832330	8K2	CF	5	1/4	R910	0111401M	7R5	MF	5	1/4
R720	0700054M	10K	CF	5	1/16	R911	R120330	100R	CF	5	1/4
R721	R150330	100K	CF	5	1/4	R912	0700032M	220R	CF	5	1/16
R722	R457330	470K	CF	5	1/4	VR951	0160211R	1K0	VR	HT	PRESET
R723	R150330	100K	CF	5	1/4	R951	R842319	82K	CF	5	1/2
R724	R842330	82K	CF	5	1/4	R952	R339330	3K9	CF	5	1/4
R727	R100542	1R0	MO	5	1	R953	R842319	82K	CF	5	1/2
R728	R339330	3K9	CF	5	1/4	R954	R832319	8K2	CF	5	1/2
R729	R158330	180K	CF	5	1/4	R955	0110137S	470R	MO	5	1
R733	0113722M	75R	CF	5	1/2	R957	R812330	82R	CF	5	1/4
R734	0700037M	560R	CF	5	1/16	R958	0700052M	6K8	CF	5	1/16
VR751	0160215	10K	VR	PIN CUSHIO	N ADJUST.	R959	0700049M	4K7	CF	5	1/16
R751	0700059M	27K	CF	5	1/16	R960	R132330	1K2	CF	5	1/4
VR752	0160215	10K	VR	PIN CUSHIO	N ADJUST						
R752	0700037M	560R	CF	5	1/16						


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Ref No.	Part No.	Value	Type	Tol %	Wattage
R961	0700046M	2K7	CF	5	1/16
R999	R170727	10M	MF	5	1
R2101	0700054M	10K	CF	5	1/16
R2103	0700064M	56K	CF	5	1/16
R2104	0700038M	680R	CF	5	1/16
R2105	0700038M	680R	CF	5	1/16
R2106	0700031M	180R	CF	5	1/16
R2107	0700062M	39K	CF	5	1/16
R2108	0700067M	100K	CF	5	1/16
R2109	0700044M	1K8	CF	5	1/16
R2110	0700035M	390R	CF	5	1/16
R2111	0700035M	390R	CF	5	1/16
R2112	0700035M	390R	CF	5	1/16
R2113	0700041M	1K0	CF	5	1/16
R2118	0700027M	100R	CF	5	1/16
R2121	0700064M	56K	CF	5	1/16
R2122	0110109S	33R	MO	5	1
R2209	0700041M	1K0	CF	5	1/16
R2210	0700054M	10K	CF	5	1/16
R2211	0700054M	10K	CF	5	1/16
R2212	0700052M	6K8	CF	5	1/16
R2213	0700061M	33K	CF	5	1/16
R2222	0700027M	100R	CF	5	1/16
R2232	0700061M	33K	CF	5	1/16

[illegible]

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Ref No.	Part No.	Value	Type	Tol %	Voltage	Ref No.	Part No.	Value	Type	Tol %	Voltage
C001	0890078R	220p	C	10	50	C422	0880044R	10n	PF	10	50
C002	0890087R	1n0	C	—	50	C423	0800003R	1u0	EL	—	50
C003	0890074R	100p	C	5	50	C424	0880036R	2n7	PF	10	50
C005	0800079	1000u	EL	—	6.3	C425	0880044R	10n	PF	10	50
C008	0890074R	100p	C	5	50	C427	0800015R	10u	EL	—	16
C009	0880057R	100n	PF	10	50	C428	0276717R	100n	PF	5	50
C011	0880057R	100n	PF	10	50	C429	0800003R	1u0	EL	—	50
C014	0890087R	1n0	C	—	50	C433	0276724R	390p	PF	5	50
C015	0890087R	1n0	C	—	50	C435	0890083R	470p	C	10	50
C019	0890067M	33p	C	5	50	C444	0800003R	1u0	EL	—	50
C020	0890067M	33p	C	5	50	C451	0800048R	100u	EL	—	10
C021	0890067M	33p	C	5	50	C452	0800015R	10u	EL	—	16
C022	0890089R	1n5	C	10	50	C452A	0800015R	10u	EL	—	16
C023	0880039R	4n7	PF	10	50	C471	0800015R	10u	EL	—	16
C024	0890065R	22p	C	5	50	C501	0890117R	18p	C	5	50
C025	0890065R	22p	C	5	50	C502	0880039R	4n7	PF	10	50
C026	0890116R	15p	C	5	50	C503	0276717R	100n	PF	5	50
C027	0890118R	22p	C	5	50	C504—07	0800015R	10u	EL	—	16
C029	0800003R	1u0	EL	—	50	C509	0800048R	100u	EL	—	10
C031	0890079R	270p	C	10	50	C510	0890087R	1n0	C	—	50
C033	0880057R	100n	PF	10	50	C511	0890087R	1n0	C	—	50
C034	0880057R	100n	PF	10	50	C515	0276717R	100n	PF	5	50
C035	0800003R	1u0	EL	—	50	C516	0276717R	100n	PF	5	50
C041	0890074R	100p	C	5	50	C531	0890085R	680p	C	—	50
C047	0800012R	4u7	EL	—	50	C552	0800015R	10u	EL	—	16
C049	0800047R	100u	EL	—	6.3	C601	0278331	100n	PF	5	50
C055	0880057R	100n	PF	10	50	C602	0880039R	4n7	PF	10	50
C056	0880057R	100n	PF	10	50	C604	0890083R	470p	C	10	50
C061	0800056R	220u	EL	—	6.3	C605	0800328R	100u	EL	—	35
C062	0890101R	10n	C	10	50	C606	0890087R	1n0	C	—	50
C063	0800003R	1u0	EL	—	50	C608	0800009R	4u7	EL	—	25
C070	0800047R	100u	EL	—	6.3	C609	0800372	3300u	EL	—	16
C072	0890074R	100p	C	5	50	C610	0279695R	220n	PF	10	100
C073	0890084R	560p	C	10	50	C701	0880039R	4n7	PF	10	50
C076	0800015R	10u	EL	—	16	C702	0800003R	1u0	EL	—	50
C086	0880048R	22n	PF	10	50	C703	0880044R	10n	PF	10	50
C1	0890067R	33p	C	5	50	C704	0890074R	100p	C	5	50
C101	0800048R	100u	EL	—	10	C705	0800039R	47u	EL	—	10
C102	0276717R	100n	PF	5	50	C709	0259152	100u	EL	—	160
C103	0880057R	100n	PF	10	50	C710	0890074R	100p	C	5	50
C104	0800015R	10u	EL	—	16	C711	0244501R	1n0	C	10	500
C151	0890083R	470p	C	10	50	C712	0250511R	22n	PF	10	250
C152	0800015R	10u	EL	—	16	C716	0255031	47u	EL	—	200
C201	0890087R	1n0	C	—	50	C717	0800048R	100u	EL	—	10
C202	0890065R	22p	C	5	50	C718	0243504R	180p	C	10	500
C202A	C110182	10p	C	2	50	C719	0253935	3300u	EL	—	35
C205	0800012R	4u7	EL	—	50	C720	0279687R	10n	PF	10	100
C206	0800359R	1000u	EL	—	10	C721	0800007R	3u3	EL	—	50
C207	0276717R	100n	PF	5	50	C722	0880035R	2n2	PF	10	50
C208	0276717R	100n	PF	5	50	C723	0880039R	4n7	PF	10	50
C209	0800057R	220u	EL	—	10	C724	0890087R	1n0	C	—	50
C212	0890101R	10n	C	—	50	C729	0880048R	22n	PF	10	50
C213	0890101R	10n	C	—	50	C751	0800007R	3u3	EL	—	50
C215	0276717R	100n	PF	5	50	C751	0276717R	100n	PF	5	50 (Pin Cushion Panel)
C301	0890085R	680p	C	—	50	C752	0800047R	100u	EL	—	6.3
C302	0276713R	47n	PF	5	50	C752	0276717R	100n	PF	5	50 (Pin Cushion Panel)
C303	0276713R	47n	PF	5	50	C753	0800117R	4u7	EL	—	25
C304	0276717R	100n	PF	5	50	C754	0259472	6u8	EL	—	25
C305	0276717R	100n	PF	5	50	C755	0880044R	10n	PF	10	50
C306	0276717R	100n	PF	5	50	C756	0276721R	220n	PF	5	50
C307	0800015R	10u	EL	—	16	C757	0276721R	220n	PF	5	50
C309	0890081R	330p	C	10	50	C758	0276721R	220n	PF	5	50
C310	0276717R	100n	PF	5	50	C760	0880044R	10n	PF	10	50
C353	0800015R	10u	EL	—	16	C761	0800117R	4u7	EL	—	25
C354	0890085R	680p	C	—	50	C780	C160718	1u0	MP	10	250
C403	0890079R	270p	C	10	50	C783	0299939	12n	PF	5	1600
C407	0890092R	2n2	C	10	50	C785	0299932	330n	PF	10	200
C411	0276717R	100n	PF	5	50	C786	0299931	270n	PF	10	200
C412	0276717R	100n	PF	5	50	C789	0299929	180n	PF	10	200
C413	C343877	33n	C	10	25	C790	0299932	330n	PF	10	200
C414	0800015R	10u	EL	—	16	C792	0299920	33n	PF	10	200
C415	0880044R	10n	PF	10	50	C792A	0299919	27n	PF	10	200
C416	0800023R	22u	EL	—	16	C793	0246357	1n0	C	10	2000
C417	0800082	1000u	EL	—	16	C793A	0246353	470p	C	10	2000
C420	0880044R	10n	PF	10	50						
C421	0800009R	4u7	EL	—	25						

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Ref No.	Part No	Value	Type	Tol %	Voltage	
	C801	0890083R	470p	C	10	50
	C802	0890082R	390p	C	—	50
	C803	0890084R	560p	C	10	50
	C805	0245612	4n7	C	10	1000
	C806	0800057R	220u	EL	—	10
△	C901	0279698	220n	C	10	250AC
△	C902	0249396	10n	C	10	250AC
△	C903	0249395	4n7	C	10	250AC
	C904	0249395	4n7	C	10	250AC
	C905	0284831	150u	EL	—	400
	C906	0244215	2n2	C	10	2000
	C907	0880044R	10n	PF	10	50
	C908	C457715	470n	MPO	10	63
	C909	0880033R	1n5	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	0800049R	100u	EL	—	16
△	C998	0249498	1n0	C	10	250AC
△	C999	0247975	3n3	C	10	250AC
	C2102	0800047R	100u	EL	—	6 3
	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	C	10	50
	C2209	0890011M	15p	C	5	50
	C2210	0890011M	15p	C	5	50
	C2214	0800143R	100u	EL	—	6 3
	C2216	0890027M	270p	C	10	50
	C2220	0890017M	47p	C	5	50
	C2222	C150715	100n	MPO	10	63
	C2240	0880044R	10n	PF	10	50
	C2251	0890096R	4n7	C	5	50

Ref No.	Part No.	Value	Type	Tol %	Voltage

PRODUCT SAFETY NOTE: Components marked with a  $\Delta$  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.

$\Delta$

Ref No.	Part No	Description
IC001	2001558	TMP47C834N-R137
IC002	2007653	ST93CS56B1
IC010	2009401R	PST529C
IC011	2009401R	PST529C
IC201	T900567	TDA8361-N3
IC401	2004451	TDA2824S
IC451	2004471	HEF4053
IC501	2003652	TDA4661
IC601	2003951	TA8427K
IC901	2917781	CNX82A
IC951	2000252	MC7809CT
IC2201	2004441	CF72306
IC2202	T900570	CF70200
Q001	T633134	BF240
Q003	T631275	BC548B
Q004	T631276	BC558B
Q005-08	T631275	BC548B
Q201	T631275	BC548B
Q301	T631275	BC548B
Q425	T631275	BC548B
Q440	T631276	BC558B
Q451	T631275	BC548B
Q453	T631275	BC548B
Q454	T631275	BC548B
Q455	T631275	BC548B
Q460	T631275	BC548B
Q461	T631276	BC558B
Q501	T631276	BC558B
Q502	T631275	BC548B
Q701	T633140	BF483
Q703	T732013	TS0820-20
Q704	T633138	BF423
Q750	T631275	BC548B
Q751	T631276	BC558B
Q751	T631275	BC548B (Pin Cushion Panel)
Q752	T631276	BC558B
Q753	T631275	BC548B
Q754	2315461	BD242B
Q755	T631275	BC548B
Q756	T631275	BC548B
Q757	2326873R	DTC144EST
QF781	T550002	Quick Fuse N15104
Q801	T633137	BF459
Q802	T633137	BF459
Q803	T633137	BF459
Q804	T631276	BC558B
Q901	T631276	BC558B
Q902	T631291	BC368
Q903	2314791	BUT12AF
Q951	T633138	BF423
Q952	T631275	BC548B
Q953	2315611	BD438
Q2101	T631276	BC558B
Q2102	T631275	BC548B
Q2103	T631275	BC548B
D001	2483551	SLP-155B-81
D002	2348921M	IN4531
D006	2348921M	IN4531
D008	2348921M	IN4531
D009	2348921M	IN4531
D010	2348921M	IN4531
D012-16	2348921M	IN4531
D021	2348921M	IN4531
D022	2348921M	IN4531
D031	2348921M	IN4531
D213	2343963M	MPG06J
D301	T531055	BAT85
D351	2348921M	IN4531
D451	2348921M	IN4531
D601	T531063	IN4002
D701	2343942M	RGP10J
D702	2343941M	RGP10G
D703	2348921M	IN4531
D704	2348921M	IN4531
D705	2348921M	IN4531
D706	2343962M	MPG06G

Ref. No	Part No	Description
D707	2343962M	MPG06G
D751	2343962M	MPG06G
D781	T431117	BY228
D782	T431116	BYW96D
D783	T431112	BYD33D
D801-05	2348921M	IN4531
D901-04	2344111M	BY134GP
D905	2348921M	IN4531
D906	2348921M	IN4531
D907	2343963M	MPG06J
D908	2348921M	IN4531
D909	2343963M	MPG06J
D951	2336612	RU3AM
D952	2336612	RU3AM
D953	2348921M	IN4531
D954	2343963M	MPG06J
D955	2348921M	IN4531
D956	T531055	BAT85
D2115	2348921M	IN4531
D2116	2348921M	IN4531
D2117	2348921M	IN4531
ZD001	T536201	BZX79B5V1
ZD002	2335991M	HZT33-02TA
ZD401	2339061M	HZS7C1L
ZD501	T536174	BZX79C5V1
ZD701	2339251M	HZS36-ILT
ZD702	T536183	BZX79C11V
ZD703	T536190	BZX79C2V7
ZD901	T536190	BZX79C2V7
ZD902	T536223	BZX79B4V7
ZD903	T536223	BZX79B4V7
ZD951	T536175	BZX79C6V8
ZD952	2344122M	PGKE180AG23
ZD2101	T536174	BZX79C5V1
L016	2123109M	33uH COIL
L1	2122242M	15uH AXIAL COIL
L101	2122956M	100uH COIL
L151	2123105M	15uH COIL
L202	2145877	AFC FILTER COIL
L401	2123104M	12uH COIL
L451	2123781R	100uH FILTER COIL
L501	2123105M	15uH COIL
L701	2123334	47uH FILTER COIL AND CORE
L703	2274772	VARIABLE INDUCTOR
L781	2220641	E/W INJECTION COIL
L782	2161371	LINEARITY COIL
L783	2220642	FILTER COIL
L802	2122095	27uH FIXED INDUCTOR
L901	2122694	LINE FILTER COIL
L902	2124531	LINE FILTER COIL
L903	2125593	470uH CHOKE COIL
L951	2125579	47uH CHOKE COIL
L2101	2123781R	100uH FILTER COIL
T701	2260291	HORIZ DRIVE TRANSFORMER
T702	2436771	FLYBACK TRANSFORMER
T901	2274991	SWITCH MODE TRANSFORMER

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# FILTERS, CRYSTALS etc.

CP201	2305341	SAW FILTER F1045AK
F001-05	2791759R	FILTERS
MF422	2142603	6MHz CERAMIC FILTER
MF501	2142244	6MHz CERAMIC TRAP
SG801	2340037	SPARK GAP
TH901	E441034	THERMISTOR
U001	2574741	I R AMPLIFIER UNIT
X001	2168461	4.194MHz CRYSTAL
X501	2168741	4 43MHz CRYSTAL
X2201	2168671	13 875MHz CRYSTAL

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# **"UNITEXT" ASSEMBLY PARTS LIST**

Ref No.	Part No.	Value	Type	Tol %	Wattage
R2200A	R160330	1M0	CF	5	1/4
R2209	0700041M	1K0	CF	5	1/16
R2210	0700054M	10K	CF	5	1/16
R2211	0700054M	10K	CF	5	1/16
R2212	0700052M	6K8	CF	5	1/16
R2213	0700061M	33K	CF	5	1/16
R2214	0700047M	3K3	CF	5	1/16
R2215	0700043M	1K5	CF	5	1/16
R2217	0700043M	1K5	CF	5	1/16
R2219	0700043M	1K5	CF	5	1/16
R2222	0700027M	100R	CF	5	1/16
R2230	0700039M	820R	CF	5	1/16
R2231	0700053M	8K2	CF	5	1/16
R2232	0700061M	33K	CF	5	1/16

Ref No.	Part No.	Value	Type	Tol %	Voltage
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	C	10	50
C2209	0890011M	15p	C	5	50
C2210	0890011M	15p	C	5	50
C2214	0800143R	100u	EL	-	6.3
C2215	0890014M	27p	C	5	50
C2216	0890027M	270p	C	10	50
C2217	0880035R	2n2	PF	10	50
C2218	0800109R	1u0	EL	-	50
C2220	0890017M	47p	C	5	50
C2221	0890022M	100p	C	10	50
C2251	0890096R	4n7	C	5	50

Ref. No	Part No	Description
IC2201	2004441	CF72306
IC2202	2009661	CF70095
IC2203	2009401R	PST529C
Q2211	T631275	BC548B
Q2212	T631275	BC548B
Q2213	T631275	BC548B
D2219	2345251M	BB909B
L2201	2123092M	1 5uH AXIAL COIL
X2201	2168671	13 875MHz CRYSTAL