

## General Information

Chassis : C4E-R

### Safety Instructions

#### X-RAY RADIATION PRECAUTION

- The E.H.T. must be checked every time the receiver is serviced to ensure that the C.R.T. does not emit X-ray radiation as result of excessive E.H.T. voltage. The nominal E.H.T. for this receiver is 29.8 kV at zero beam current (minimum brightness) operating at 220V a.c. The maximum E.H.T. voltage permissible in any operating circumstances must not exceed 31.5 kV. When checking the E.H.T., use the 'High Voltage Check' procedure using an accurate E.H.T. voltmeter.
- The only source of X-RAY radiation in this receiver is the C.R.T. To prevent X-ray radiation, the replacement C.R.T. must be identical to the original fitted as specified in the Parts List.
- Some components used in this receiver have safety related characteristics preventing the C.R.T. from emitting X-ray radiation. For continued safety, replacement component should only be made after referring to the *Product Safety Notice*.

#### SAFETY PRECAUTION

- This receiver has a nominal working E.H.T. voltage of 26.0 kV. Extreme caution should be exercised when working on the receiver with the back removed. Do not attempt to service this receiver if you are not conversant with the precautions and procedures for working on high voltage equipment. When handling or working on the C.R.T., always discharge the anode to the receiver chassis before removing the anode cap. The C.R.T., if broken, will violently expel glass fragments. Use shatter proof goggles and take extreme care while handling. Do not hold

the C.R.T. by the neck as this is a very dangerous practice.

- It is essential that to maintain the safety of the customer all cable forms be replaced exactly as supplied from factory.
- A small part of the chassis used in this receiver is, when operating, at approximately half mains potential at all times. It is therefore essential in the interest of safety that when serving or connecting any test equipment the receiver should be supplied via a suitable isolating transformer of adequate rating.
- Replace blown fuses within the receiver with the fuse specified in the parts list.
- When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be a Toshiba approved type and must be mounted as the original.
- Keep wires away from high temperature components.

#### PRODUCT SAFETY NOTICE

Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the schematic diagram and parts list. Before replacing any of these components read the parts list carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation

## Service Adjustments

### GENERAL INFORMATION

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials. Plug the power cord into a convenient 220 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

#### AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 30 minutes in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures.

#### HIGH VOLTAGE CHECK

**CAUTION:** There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

- Connect an accurate high voltage meter to the second anode of the picture tube.
- Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
- High voltage will be measured below 26.0 kV.
- Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 31.5 kV under any conditions.

#### HEIGHT ADJUSTMENT

- Receive the WG PHILIPS pattern, and set the contrast and colour to minimum, and the brightness to centre.
- Adjust HEIGHT Control (R351) so that white blocks at top and bottom of the picture are just masked.

#### HORIZONTAL CENTRE ADJUSTMENT

- Receive the UK PHILIPS pattern.
- Set the contrast and colour to centre, and the brightness to centre.
- Adjust H. CENTRE SUB Control (R451) so the pattern can be located for d-c to be + 4.0 mm.

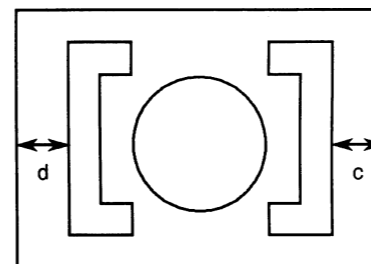


Figure 1

#### FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

#### DELAYED R-F AGC ADJUSTMENT

- Tune the set to the strongest station in your area.
- Turn AGC DELAY Control (R151) on MAIN Board to fully counterclockwise position.
- Adjust AGC DELAY Control clockwise until noise (snow) disappears on the screen.

#### CRT GREY SCALE ADJUSTMENT

- Press VIDEO INPUT button on Remote Control unit to turn TV to video input mode. (Video input should have no signal). Next press PICTURE SELECT button to select function and set CONTRAST to minimum, BRIGHTNESS to maximum, COLOUR to minimum.
- Turn the SCREEN Control (on T461) fully counterclockwise.
- Set the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) counterclockwise to the centre position.
- Set the GREEN and BLUE DRIVE controls (R252, R253) to the centre position.
- Set the CUT OFF SW. (S202) in the H. line position.
- Set the SUB BRIGHTNESS Control to minimum.
- Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen. Set the SCREEN Control to this position.
- Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE). The lines may look like white if the CUT OFF Controls are adjusted properly.
- Return the CUT OFF SW. (S202) in the receiving position. Press VIDEO INPUT button to turn TV to the TV mode.
- Set the BRIGHTNESS Control to the maximum and COLOUR Control to the centre.
- Adjust the BLUE and GREEN DRIVE controls (R252/R253) to obtain proper white-balance picture in highlight areas.
- Set the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls to obtain a good white balance in both low and high light areas.

#### SUB-BRIGHTNESS ADJUSTMENT

- Tune in a colour programme of Philips pattern.
- Set the CONTRAST Control to the minimum and the BRIGHTNESS Control to the centre.
- Set the COLOUR Control to the minimum.
- Set the SUB-BRIGHT. Control (R551) so that

the voltage across terminals Y-Z can be 0.2 ± 0.05V with voltmeter and leave the receiver for five minutes in this state.

- Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
- Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
- If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

#### BUS DATA SETTING

- When QA01 only is replaced, it is not necessary to change the mode data.
- When memory IC (QA02) is replaced, change the mode data in the manner below.

#### ADJUSTMENT METHOD FOR SERVICING

##### 1. OUTLINE

In the service mode, MODE DATA adjustments can be made easily with user remote control unit.

##### 2. SERVICE MODE OPERATION

###### 2-1. How to Enter the Service Mode

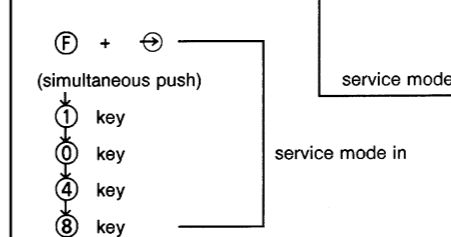


Figure 2

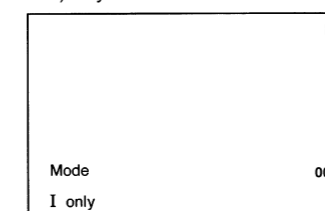
###### 2-2. How to Exit from the Service Mode

Exit the service mode by turning the power on/off with the remote control.

##### 3. ADJUSTMENT IN THE SERVICE MODE

###### Service Mode Level Adjustments

- Push (F) + (M) key (simultaneous push) to appear Mode Data to be adjusted.
- Adjust with the level UP/DOWN (VOL UP/DOWN) key.



Example of screen display in level adjustment.

Figure 3

#### PICTURE I-F ALIGNMENT

##### GENERAL

Refer to figure 4 for test equipment connection.

##### PRELIMINARY STEPS

Supply +5 volts to the 5V-1 line.

##### SIGNAL GENERATOR

Connect to both leads of R101 with signal level of 75 dBμ, and open the solder-link at IF OUT of tuner on the Main Board. (See figure 4.)

##### DVM

Connect to pin #44 of IC501 on the Main Board through the detector.

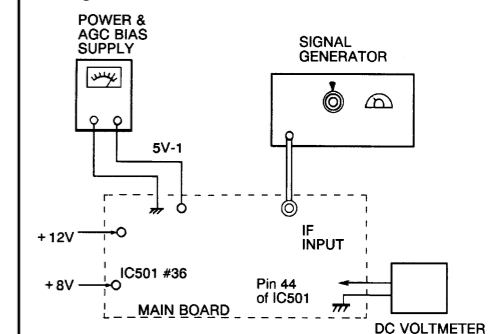


Figure 4. Picture IF Alignment

##### STEP

Detector Coil

##### SIGNAL GENERATOR

39.5 MHz CARRIER WAVE (Level 75 dBμ)

##### ADJUST

T103

##### REMARKS

- Supply external DC power (+ 5V) to 5V-1 line.
- Supply + 8V to pin 36 of IC501.
- Supply external DC power to + 12V line.
- Apply test signal to IF input.
- Adjust T103 so that DC voltage at pin 44 of IC501 becomes 3.2V ± 0.5V.

After completing the above steps, disconnect the equipment and re-solder the links on the Main Board, and adjust the AGC Delay control (R151) following DELAYED RF AGC ADJUSTMENTS.

##### Main Diagram Notes

##### OBSERVATION OF VOLTAGES AND WAVEFORMS

- Voltages read with VTVM from point shown to chassis ground, line voltage 220 volts, colour bar signal. Voltages reading may vary ±20%.
- All waveforms are taken using a wide band oscilloscope and a low capacity probe.
- Waveforms are taken using a standard colour bar signal.
- Make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position. Set other controls for best picture.

##### EXPRESSION

##### VALUE OF RESISTOR, CAPACITOR and INDUCTOR

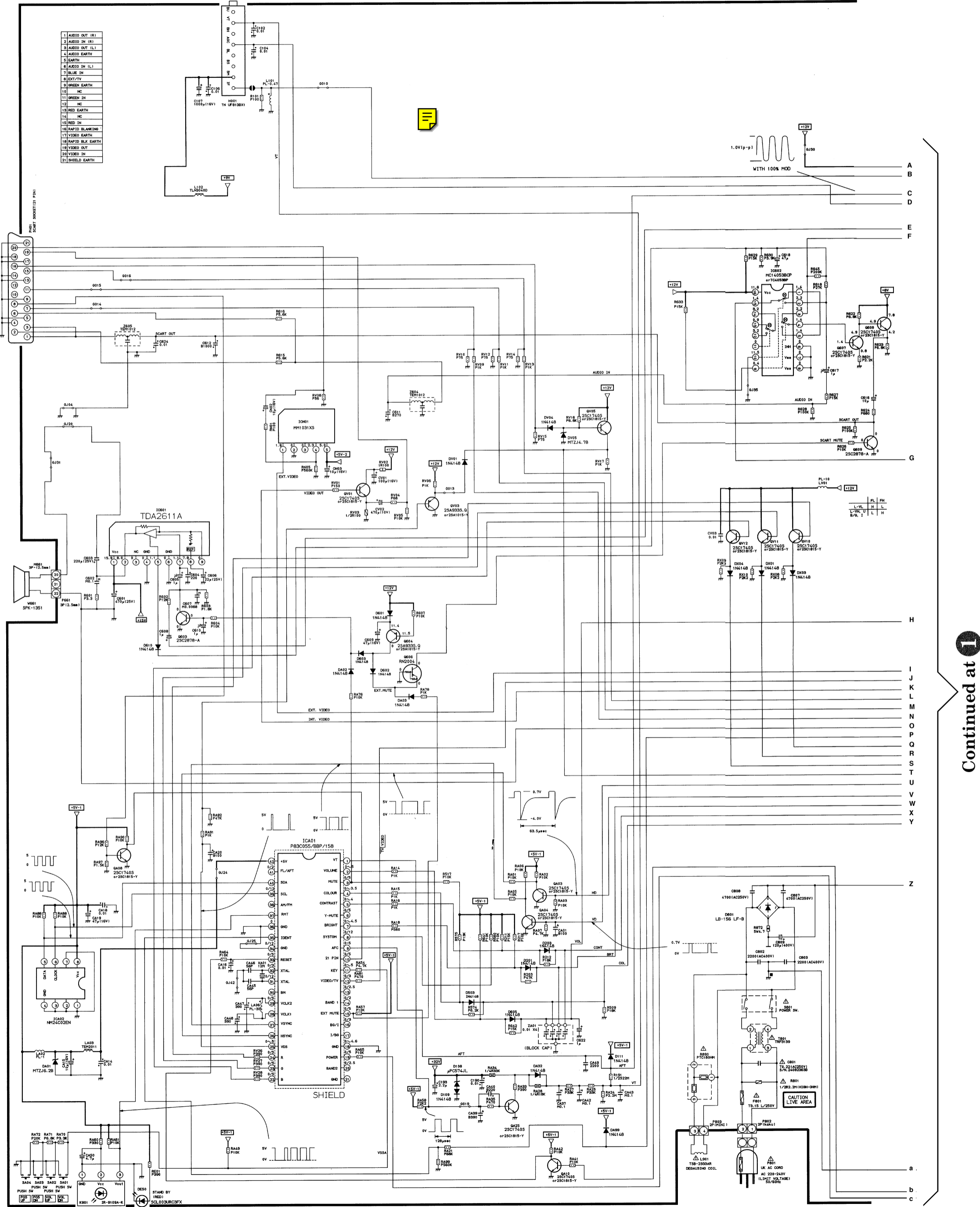
- Resistance is shown in ohm, k=1,000, M=1,000,000
- Unless other wise noted in schematic, all capacitor values less than 1 are expressed in pF and the values more than 1 in pF.
- Unless otherwise noted in schematic, all inductor values more than 1 are expressed in pH, and the values less than 1 in H.

## Recommended Safety Parts

Item	Part No.	Description
C440	24082343	PF, 5600pF, ±3%, 1500V
C463	24212222	CD, 2200pF, ±10%
C801	24082363	PF, Q.22μF, ±20%, AC250V
C802	24094656	CD, 2200pF, ±20%, AC400V
C803	24094656	CD, 2200pF, ±20%, AC400V
C807	24092281	CD, 4700pF, ±20%, AC250V
C808	24092281	CD, 4700pF, ±20%, AC250V
R801	24009954	Metal-Glazed Resistor, 2.2M ohm, 1/2W
R844	24005007	Metal-Glazed Resistor, 8.2M ohm, 1W
3890	24019340	PTC Thermistor, 18 ohm, 290V
3920	24000568	FR, 4.7 ohm, 1W
L462	-----	DY, Supplied with V901
L901	23200205	Coil, Degaussing, TSB-2333AR
T401	23224983	Transformer, Horiz. Drive, TLN1039
T461	23236464	Transformer, Flyback, TFB4123AR
T801	23211858	Line Filter, TRF3139
T803	23217240	Transformer, Converter, TPW3301AR
Q404	23314375	Transistor, ON4409(508D)
Q826	A8643108	Photo Coupler, TLP621(GR-LF
F801	23144898	Fuse, 3.15A
F803	23144875	Fuse, 0.63A
P801	23372012	Power Cord
S801	23145434	Switch, Power, 2C2P
V901A	23902891	Socket, CRT, 10P
V901	23312670	Picture Tube, A51EAL155X01

## Main Diagram

U902A MAIN BOARD PB5860C1



Continued at 1

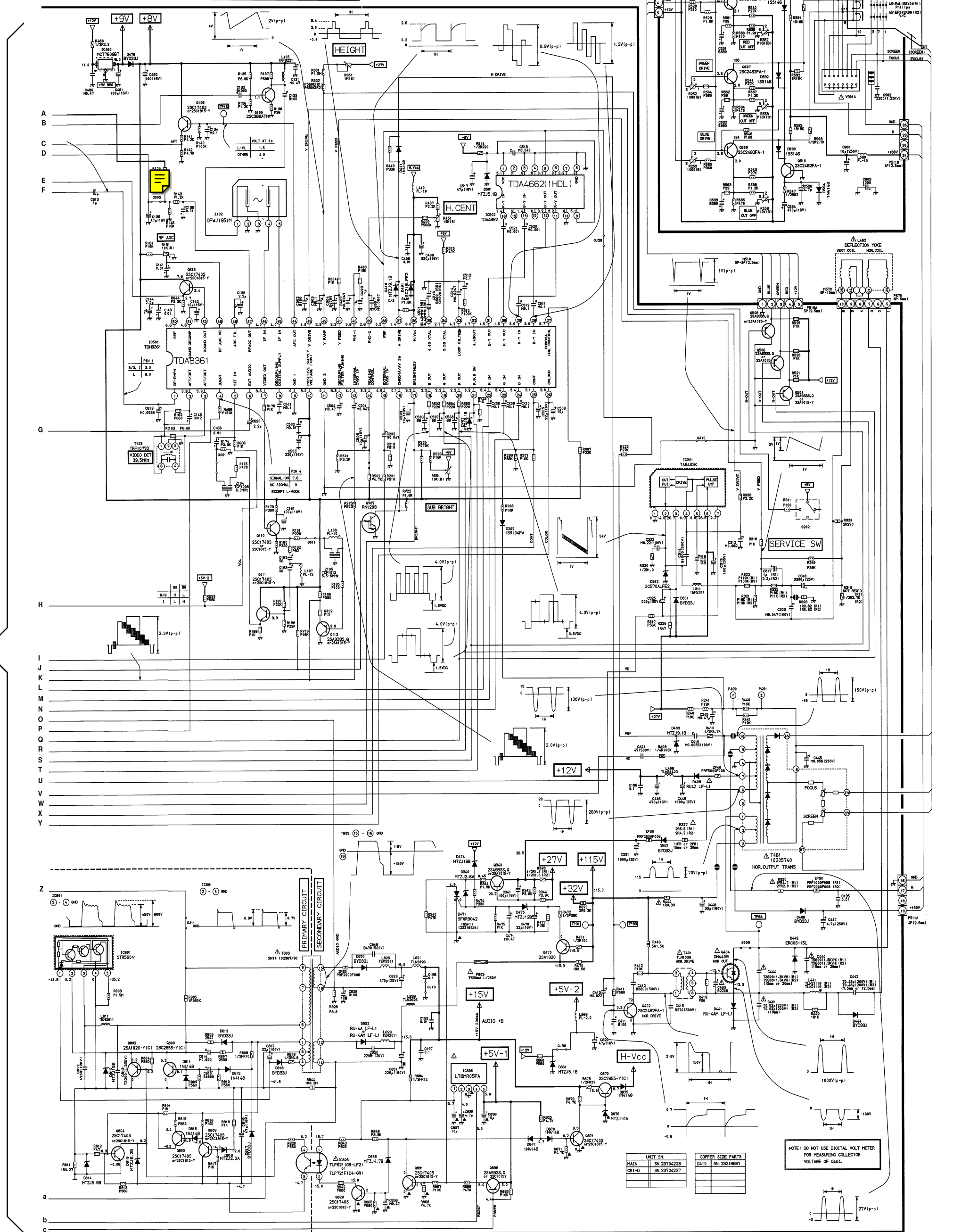
C4ER CIRCUIT SPEC COMPONENT VALUES BY OPT TYPE

No.	Loc. No.	R1	R2
1	V901	AS1EAL155X01 (PHILIPS)	AS1EF343X09 (VIDEO COLOR)
2	C917	T1.0	T2.2
3	C401	T0.03 (120V)	T0.03 (120V)
4	C440	T560 (1.5KVH)	T560 (1.5KVH)
5	C442	T0.43 (120V)	T0.43 (120V)
6	C444	T360 (1.5KVH)	T330 (1.5KVH)
7	L441	TLN21110	TLN21110
8	R302	P560K	P680K
9	R319	NOT REQ'D	1/2R2.7K
10	R321	P15K	P13K
11	R322	P110K	P10K
12	R323	1R0.82	1R0.82
13	R325	P10K	P11K
14	R327	P5.6	P4.7
15	R343	1/2R1.5	1/2R1.5
16	R520	1R4.7	2R2.0
17	ZF90	PRF1000F008	PRF2000F008

C4ER CIRCUIT SPEC COMPONENT VALUES BY CRYSTAL TYPE (SUPPLIER)

No.	Loc. No.	R5	R6
1	X501	4.43MHz (N.D.K.)	4.43MHz (PHILIPS)
2	C516	B550	CG220

Main Diagram Cont'd



1

UNIT	SN	COPPER SIDE PARTS
MAIN	SN.23704228	D410 SN.23916887
CR-T	SN.23704227	

NOTE: DO NOT USE DIGITAL VOLT METER FOR MEASURING COLLECTOR VOLTAGE OF Q44.