

Technical Service Data

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Electrical Adjustments

REFER TO SAFETY GUIDELINES

SAFETY NOTICE: ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING

Alignments

Note: The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in ***Service Modes Error Codes And Fault Finding***. Menu navigation is done with the 'CURSOR UP, DOWN, LEFT or RIGHT' keys of the remote control transmitter.

General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- AC voltage and frequency: 110 V ($\pm 10\%$), 60 Hz ($\pm 5\%$).
- Connect the set to the AC power via an isolation transformer.
- Allow the set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use the cooling fins / plates as ground.
- Test probe: $R_i > 10\text{ M}\Omega$; $C_i < 2.5\text{ pF}$.
- Use an isolated trimmer / screwdriver to perform the alignments.

Hardware Alignments

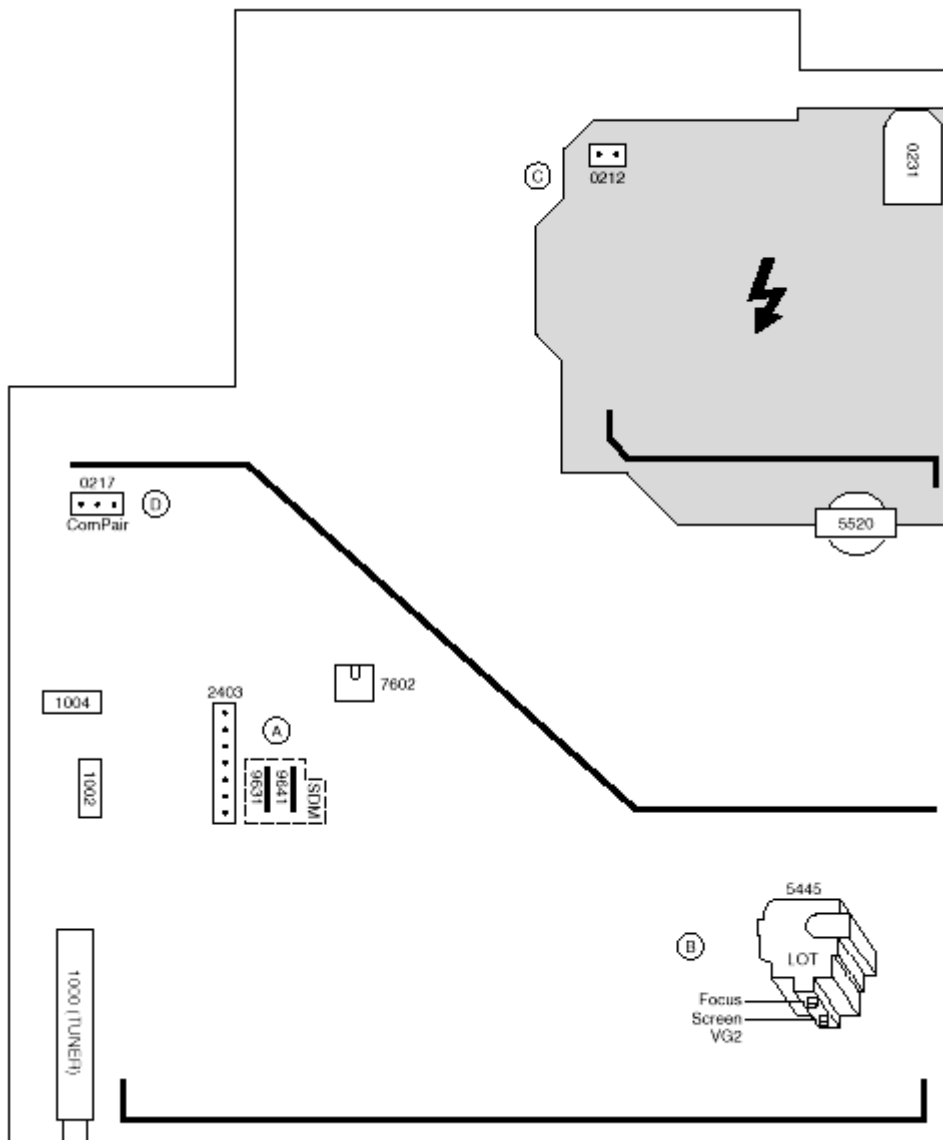


Fig. 1

Vg2 Adjustment

1. Activate the SAM.
2. Go to the WHITE TONE sub menu.
3. Set the values of NORMAL RED, GREEN and BLUE to 40.
4. Go, via the MENU key, to the normal user menu and set
 - CONTRAST to zero.
 - BRIGHTNESS to minimum (OSD just visible in a dark room).
5. Return to the SAM via the MENU key.
6. Connect the RF output of a pattern generator to the antenna input. Test pattern is a 'black' picture (blank screen on CRT without any OSD info).

- Set the channel of the oscilloscope to 50 V/div and the time base to 0.2 ms (external triggering on the vertical pulse).
- Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket (see diagram B).
- Measure the cut off pulse during first full line after the frame blanking (see Fig. 2). You will see two pulses, one being the cut off pulse and the other being the white drive pulse. Choose the one with the lowest value, this is the cut off pulse.
- Select the cathode with the highest V_{DC} value for the alignment. Adjust the V_{cutoff} of this gun with the SCREEN potentiometer (see Fig. 1) on the LOT to the correct value (see table below).
- Restore BRIGHTNESS and CONTRAST to normal (= 31).

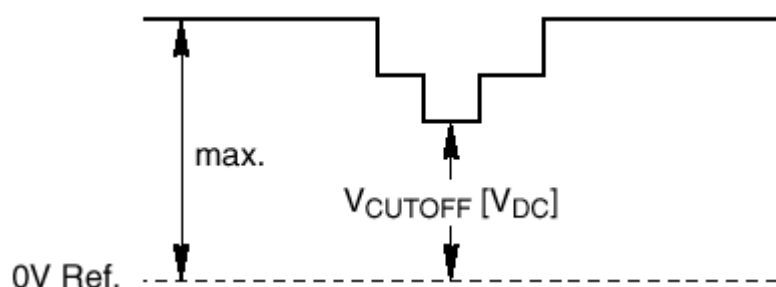


Fig. 2

Screen size	Cut-off [V]
13V, 14", 14RF, 15RF, 17", 19V, 20"	140 ± 4
21" (L8)	150 ± 4
21" (M8), 20RF, 21RF, 24WS, 25BLD, 25HF, 28 BLD, 28WS	125 ± 4
25V, 25BLS, 25RF, 27V, 28BLS, 29", 29RF, 32V, 33", 32WS, 35V	145 ± 10

Focusing

- Tune the set to a circle or crosshatch test pattern (use an external video pattern generator).
- Choose picture mode NATURAL (or MOVIES) with the 'SMART PICTURE' button on the remote control transmitter.
- Adjust the FOCUS potentiometer (see Fig.1) until the vertical lines at 2/3 from east and west, at the height of the centerline, are of minimum width without visible haze.

Software Alignments And Settings

Enter the Service Alignment Mode (see **Service Modes Error Codes And Fault Finding.**). The SAM menu will now appear on the screen.

Options

Display Option Byte Table

		S A M
OP 1		X X X
OP 2		X X X
OP 3		X X X
OP 4		X X X
OP 5		X X X
OP 6		X X X
OP 7		X X X

Options are used to control the presence / absence of certain features and hardware.

How to change an Option Byte

An Option Byte represents a number of different options.

Changing these bytes directly makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OB1.. OB7) with the MENU UP/DOWN keys, and enter the new value.

Leaving the OPTION submenu saves changes in the Option Byte settings. Some changes will only take effect after the set has been switched OFF and ON with the AC power switch (cold start).

How to calculate the value of an Option Byte

Calculate an Option Byte value (OB1 .. OB7) in the following way:

1. Check the status of the single option bits (OP): are they enabled (1) or disabled (0).
2. When an option bit is enabled (1) it represents a certain value (see column 'Dec. value' in table below). When an option bit is disabled, its value is 0.
3. The total value of an Option Byte is formed by the sum of its eight option bits.

OPTION BYTE STRUCTURE									
Bit	7	6	5	4	3	2	1	0	TOTAL VALUE
Dec. value	128	64	32	16	8	4	2	1	
OB1	OP17	OP16	OP15	OP14	OP13	OP12	OP11	OP10	Sum (OP10 to OP17)
OB2	OP27	OP26	OP25	OP24	OP23	OP22	OP21	OP20	Sum (OP20 to OP27)
OB3	OP37	OP36	OP35	OP34	OP33	OP32	OP31	OP30	Sum (OP30 to OP37)
OB4	OP47	OP46	OP45	OP44	OP43	OP42	OP41	OP40	Sum (OP40 to OP47)
OB5	OP57	OP56	OP55	OP54	OP53	OP52	OP51	OP50	Sum (OP50 to OP57)
OB6	OP67	OP66	OP65	OP64	OP63	OP62	OP61	OP60	Sum (OP60 to OP67)
OB7	OP77	OP76	OP75	OP74	OP73	OP72	OP71	OP70	Sum (OP70 to OP77)

Option Bit Assignment

Following are the option bit assignments for all L01 software clusters.

- Option Byte 1 (OB1)
 - OP10: CHINA
 - OP11: VIRGIN_MODE

- OP12: UK_PNP
- OP13: ACI
- OP14: ATS
- OP15: LNA
- OP16: FM_RADIO
- OP17: PHILIPS_TUNER
- Option Byte 2 (OB2)
- OP20: HUE
- OP21: COLOR_TEMP
- OP22: CONTRAST_PLUS
- OP23: TILT
- OP24: NOISE_REDUCTION
- OP25: CHANNEL_NAMING
- OP26: SMART_PICTURE
- OP27: SMART_SOUND
- Option Byte 3 (OB3)
- OP30: AVL
- OP31: WSSB
- OP32: WIDE_SCREEN
- OP33: SHIFT_HEADER_SUBTITLE
- OP34: CONTINUOUS_ZOOM
- OP35: COMPRESS_16_9
- OP36: EXPAND_4_3
- OP37: EW_FUNCTION
- Option Byte 4 (OB4)
- OP40: STEREO_NON_DBX
- OP41: STEREO_DBX
- OP42: STEREO_PB
- OP43: STEREO_NICAM_2CS
- OP44: DELTA_VOLUME
- OP45: ULTRA_BASS
- OP46: VOLUME_LIMITER
- OP47: INCR_SUR
- Option Byte 5 (OB5)
- OP50: PIP
- OP51: HOTEL_MODE
- OP52: SVHS
- OP53: CVI
- OP54: AV3
- OP55: AV2
- OP56: AV1
- OP57: NTSC_PLAYBACK
- Option Byte 6 (OB6)
- OP60: Reserved (value = 0)
- OP61: SMART_TEXT
- OP62: SMART_LOCK
- OP63: VCHIP
- OP64: WAKEUP_CLOCK
- OP65: SMART_CLOCK

- OP66: SMART_SURF
- OP67: PERSONAL_ZAPPING
- Option Byte 7 (OB7)
- OP70: SOUND_SYSTEM_AP_3 / MULTI_STANDARD_EUR / SYSTEM_LT_2
- OP71: SOUND_SYSTEM_AP_2 / WEST_EU / SYSTEM_LT_1
- OP72: SOUND_SYSTEM_AP_1
- OP73: COLOR_SYSTEM_AP
- OP74: Reserved (value = 0)
- OP75: Reserved (value = 0)
- OP76: TIME_WIN2
- OP77: TIME_WIN1

Option bit definition

- OP10: CHINA
0 : Tuning is not for China set, or this option bit is not applicable,
1 : Tuning is for China set,
Default setting : 0.
- OP11: VIRGIN_MODE 0 :
Virgin mode is disabled or not applicable,
1 : Virgin mode is enabled. Plug and Play menu item will be displayed to perform installation at the initial startup of the TV when VIRGIN_MODE is set to 1. After installation is finished, this option bit will be automatically set to 0,
Default setting : 0.
- OP12: UK_PNP
0 : UK's default Plug and Play setting is not available or not applicable, 1 : UK's default Plug and Play setting is available. When UK_PNP and VIRGIN_MODE are set to 1 at the initial setup, LANGUAGE = ENGLISH, COUNTRY = GREAT BRITAIN and after exiting from menu, VIRGIN_MODE will be set automatically to 0 while UK_PNP remains 1,
Default setting : 0.
- OP13: ACI
0 : ACI feature is disabled or not applicable,
1 : ACI feature is enabled,
Default setting : 0.
- OP14: ATS
0 : ATS feature is disabled or not applicable, 1 : ATS feature is enabled. When ATS is enabled, it sorts the program in an ascending order starting from program 1,
Default setting : 0.
- OP15: LNA
0 : Auto Picture Booster is not available or not applicable,
1 : Auto Picture Booster is available,
Default setting : 0.
- OP16: FM_RADIO
0 : FM radio feature is disabled or not applicable,
1 : FM radio feature is enabled,
Default setting : 0.
- OP17: PHILIPS_TUNER
0 : ALPS / MASCO compatible tuner is in use,
1 : Philips compatible tuner is in use,
Default setting : 0.
- OP20: HUE

- 0 : Hue/Tint Level is disabled or not applicable,
1 : Hue/Tint Level is enabled,
Default setting : 0.
- OP21: COLOR_TEMP
0 : Color Temperature is disabled or not applicable,
1 : Color Temperature is enabled,
Default setting : 0.
 - OP22: CONTRAST_PLUS
0 : Contrast+ is disabled or not applicable,
1 : Contrast+ is enabled,
Default setting : 0.
 - OP23: TILT
0 : Rotate Picture is disabled or not applicable,
1 : Rotate Picture is enabled,
Default setting : 0.
 - OP24: NOISE_REDUCTION
0 : Noise Reduction (NR) is disabled or not applicable,
1 : Noise Reduction (NR) is enabled,
Default setting : 0.
 - OP25: CHANNEL_NAMING
0 : Name FM Channel is disabled or not applicable,
1 : Name FM Channel is enabled,
Default setting : 0.
Note : Name FM channel can be enabled only when FM_RADIO = 1.
 - OP26: SMART_PICTURE
0 : Smart Picture is disabled or not applicable,
1 : Smart Picture is enabled,
Default setting : 1
 - OP27: SMART_SOUND
0 : Smart Sound is disabled or not applicable,
1 : Smart Sound is enabled,
Default setting : 1
 - AP30: AVL
0 : AVL is disabled or not applicable,
1 : AVL is enabled,
Default setting : 0.
 - OP31: WSSB
0 : WSSB is disabled or not applicable,
1 : WSSB is enabled,
Default setting : 0.
Note : This option bit can be set to 1 only when WIDE_SCREEN = 1.
 - OP32: WIDE_SCREEN
0 : Software is used for 4:3 set or not applicable,
1 : Software is used for 16:9 set,
Default setting : 0.
 - OP33: SHIFT_HEADER_SUBTITLE
0 : Shift Header / Subtitle is disabled or not applicable,
1 : Shift Header / Subtitle is enabled,
Default setting : 0.
Note : This option bit can be set to 1 only when WIDE_SCREEN = 1.

- OP34: CONTINUOUS_ZOOM
0 : Continuous Zoom is disabled or not applicable,
1 : Continuous Zoom is enabled,
Default setting : 0.
Note : This option bit can be set to 1 only when WIDE_SCREEN = 1.
- OP35: COMPRESS_16_9
0 : COMPRESS 16:9 selection is not applicable. Item should not be in the FORMAT menu list,
1 : COMPRESS 16:9 selection is applicable. Item should not be in the FORMAT menu list,
Default setting : 0.
- OP36: EXPAND_4_3
0 : Expand 4:3 selection is not applicable. Item should not be in the FORMAT menu list,
1 : Expand 4:3 selection is applicable. Item should be in the FORMAT menu list,
Default setting : 0.
- OP37: EW_FUNCTION
0 : EW function is disabled. In this case, only Expand 4:3 is allowed, Compress 16:9 is not applicable.
1 : EW function is enabled. In this case, both Expand 4:3 and Compress 16:9 are applicable.
Default setting : 0.
- OP40: STEREO_NON_DBX
0 : For AP_NTSC, chip TDA 9853 is not present,
1 : For AP_NTSC, chip TDA 9853 is present,
Default setting : 0.
- OP41: STEREO_DBX
0 : For AP_NTSC, chip MSP 3445 is not present,
1 : For AP_NTSC, chip MSP 3445 is present, Default setting : 0.
- OP42: STEREO_PB
0 : For AP_PAL, chip MSP3465 is not present,
1 : For AP_PAL, chip MSP3465 is present,
Default setting : 0.
- OP43: STEREO_NICAM_2CS
0 : For EU and AP_PAL, chip MSP 3415 is not present,
1 : For EU and AP_PAL, chip MSP 3415 is present,
Default setting : 0.
- OP44: DELTA_VOLUME
0 : Delta Volume Level is disabled or not applicable,
1 : Delta Volume Level is enabled,
Default setting : 0.
- OP45: ULTRA_BASS
0 : Ultra Bass is disabled or not applicable,
1 : Ultra Bass is enabled,
Default setting : 0.
- OP46: VOLUME_LIMITER
0 : Volume Limiter Level is disabled or not applicable,
1 : Volume Limiter Level is enabled,
Default setting : 0.
- OP47: INCR_SUR
0 : Incredible Surround feature is disabled,
1 : Incredible Surround feature is enabled,
Default setting : 1
- OP50: PIP
0 : PIP is disabled or not applicable,

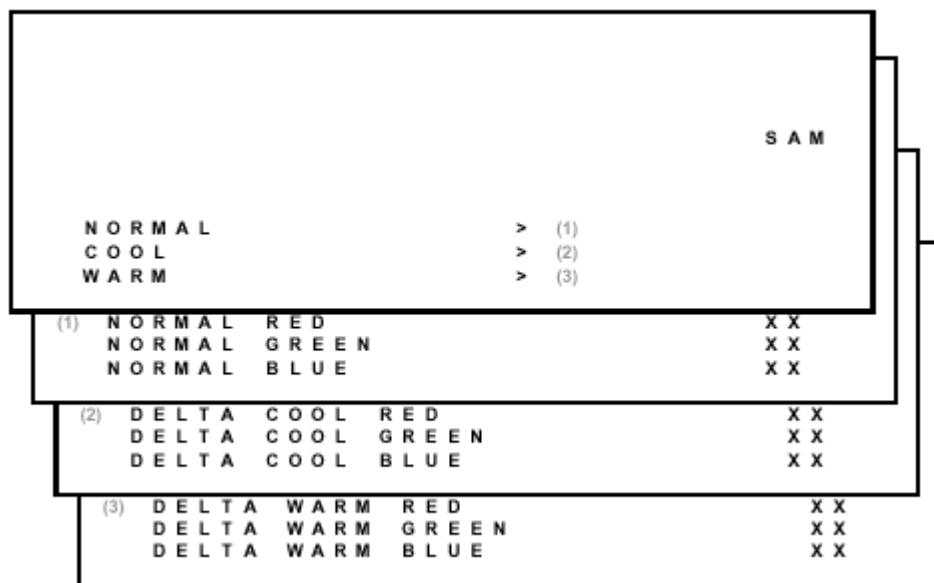
- 1 : PIP is enabled,
Default setting : 0.
- OP51: HOTEL_MODE
0 : Hotel mode is disabled or not applicable,
1 : Hotel mode is enabled,
Default setting : 0.
 - OP52: SVHS
0 : SVHS source is not available,
1 : SVHS source is available,
Default setting : 0.
Note : This option bit is not applicable for EU.
 - OP53: CVI
0 : CVI source is not available,
1 : CVI source is available,
Default setting : 0.
 - OP54: AV3
0 : Side/Front AV3 source is not present,
1 : Side/Front AV3 source is present,
Default setting : 0.
 - OP55: AV2
0 : AV2 source is not present,
1 : AV2 source is present,
Default setting : 0.
Note : For EU, when AV2=1, both EXT2 and SVHS2 should be included in the OSD loop.
 - OP56: AV1
0 : AV1 source is not present,
1 : AV1 source is present,
Default setting : 0.
 - OP57: NTSC_PLAYBACK
0 : NTSC playback feature is not available,
1 : NTSC playback feature is available,
Default setting : 0.
 - OP60: Reserved
Default setting : 0.
 - OP61: SMART_TEXT
0 : Smart Text Mode and Favorite Page are disabled or not applicable,
1 : Smart Text Mode and Favorite Page are enabled,
Default setting : 1.
 - OP62: SMART_LOCK
0 : Child Lock and Lock Channel are disabled or not applicable for EU,
1 : Child Lock and Lock Channel are enabled for EU,
Default setting : 1.
 - OP63: VCHIP
0 : VCHIP feature is disabled,
1 : VCHIP feature is enabled,
Default setting : 1.
 - OP64: WAKEUP_CLOCK
0 : Wake up clock feature is disabled or not applicable,
1 : Wake up clock feature is enabled,
Default setting : 1.

- OP65: SMART_CLOCK
0 : Smart Clock Using Teletext and Smart Clock Using PBS is disabled or not applicable,
1 : Smart Clock Using Teletext and Smart Clock Using PBS is enabled. For NAFTA, menu item AUTOCHRON is present in the INSTALL submenu,
Default setting : 0.
- OP66: SMART_SURF
0 : Smart Surf feature is disabled or not applicable,
1 : Smart Surf feature is enabled,
Default setting : 0.
- OP67: PERSONAL_ZAPPING
0 : Personal Zapping feature is disabled or not applicable,
1 : Personal Zapping feature is enabled,
Default setting : 0.
- OP70: MULTI_STANDARD_EUR
0 : Not for Europe multi standard set, or this option bit is not applicable,
1 : For Europe multi standard set.
Default setting : 0.
Note : This option bit is used to control the SYSTEM selection in Manual Store : If MULTI_STANDARD_EUR = 1 then SYSTEM = Europe, West Europe, East Europe, UK, France otherwise SYSTEM = 'Europe, West Europe, UK for West Europe' (WEST_EU=1) or SYSTEM = 'Europe, West Europe, East Europe for East Europe' (WEST_EU=0)
- OP71: WEST_EU
0 : For East Europe set, or this option bit is not applicable,
1 : For West Europe set,
Default setting : 0.
- OP71 and 70: SYSTEM_LT_1, SYSTEM_LT_2
These two option bits are allocated for LATAM system selection.
00 : NTSC-M
01 : NTSC-M, PAL-M
10 : NTSC-M, PAL-M, PAL-N
11 : NTSC-M, PAL-M, PAL-N, PAL-BG
Default setting : 00
- OP70, 71 and 72: SOUND_SYSTEM_AP_1, SOUND_SYSTEM_AP_2, SOUND_SYSTEM_AP_3
These three option bits are allocated for AP_PAL sound system selection.
000 : BG
001 : BG / DK
010 : I / DK
011 : BG / I / DK
100 : BG / I / DK / M
Default setting : 00
- OP73: COLOR_SYSTEM_AP
This option bit is allocated for AP-PAL color system selection.
0 : Auto, PAL 4.43, NTSC 4.43, NTSC 3.58
1 : Auto, PAL 4.43, NTSC 4.43, NTSC 3.58, SECAM
Default setting : 0
- OP74: Reserved
Default setting : 0.
- OP75: Reserved
Default setting : 0.

- OP77 and 76: TIME_WIN1, TIME_WIN2
 00 :The time window is set to 1.2s
 01 : The time window is set to 2s
 10 : The time window is set to 5s
 11 : not in use
 Default setting : 01
 Note :The time-out for all digit entries depend on this setting.

Tuner

Note: Described alignments are only necessary when the NVM (item 7602) is replaced.



IF PLL

This adjustment is auto-aligned. Therefore, no action is required.

AFW (AFC window)

Fixed value is OFF.

AGC (AGC take over point)

Set the external pattern generator to a color bar video signal and connect the RF output to aerial input. Set amplitude to 10 mV and set frequency to 61.25 MHz (channel 3).

Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main panel).

1. Activate the SAM.
2. Go to the TUNER sub menu.
3. Select AFW with the UP/DOWN cursor keys and set to ON.
4. Select AGC with the UP/DOWN cursor keys.
5. Adjust the AGC-value (default value is 27) with the LEFT/RIGHT cursor keys until the voltage at pin 1 of the tuner

lies between 3.8 and 2.3 V.

6. Select AFW with the UP/DOWN cursor keys and set to OFF.
7. Switch the set to STANDBY.

YD (Y-delay adjustment)

Always set to 3.

CL (Cathode drive level)

Always set to 4.

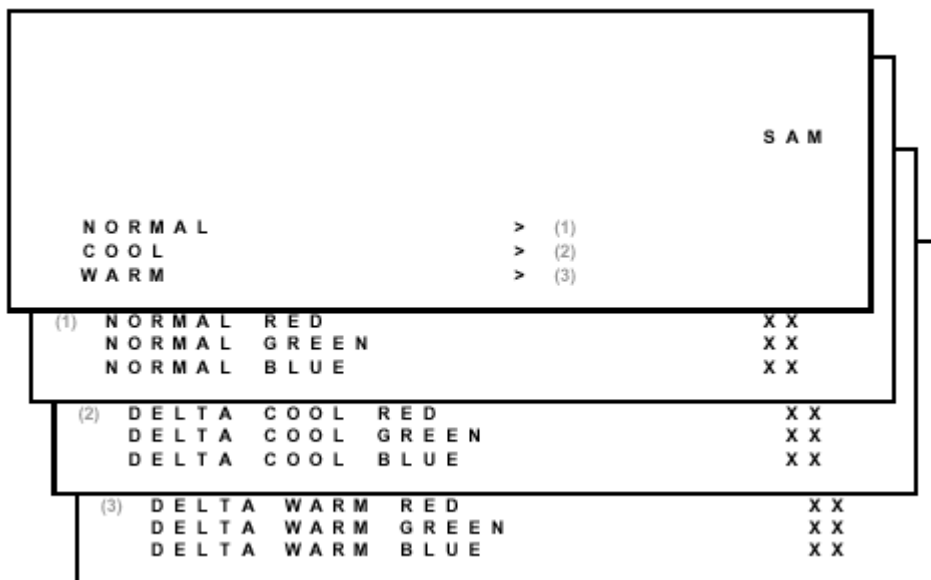
AFA

Read only bit, for monitoring purpose only.

AFB

Read only bit, for monitoring purpose only.

White Tone



In the WHITE TONE sub menu, the values of the black cut off level can be adjusted. Normally, no alignment is needed for the WHITE TONE. You can use the given default values.

The color temperature mode (NORMAL, COOL and WARM) and the color (R, G, and B) can be selected with the UP/DOWN RIGHT/LEFT cursor keys. The value can be changed with the LEFT/RIGHT cursor keys. First, select the values for the NORMAL color temperature. Then select the values for the COOL and WARM mode. After alignment, switch the set to standby, in order to store the alignments.

Default settings:

1. **NORMAL** (color temperature = 10500 K):

- NORMAL R = 40
- NORMAL G = 40
- NORMAL B = 40

2. **COOL** (color temperature = 14000 K):

- DELTA COOL R = -2
- DELTA COOL G = 0
- DELTA COOL B = 6

3. **WARM** (color temperature = 8200 K):

- DELTA WARM R = 2
- DELTA WARM G = 0
- DELTA WARM B = -7

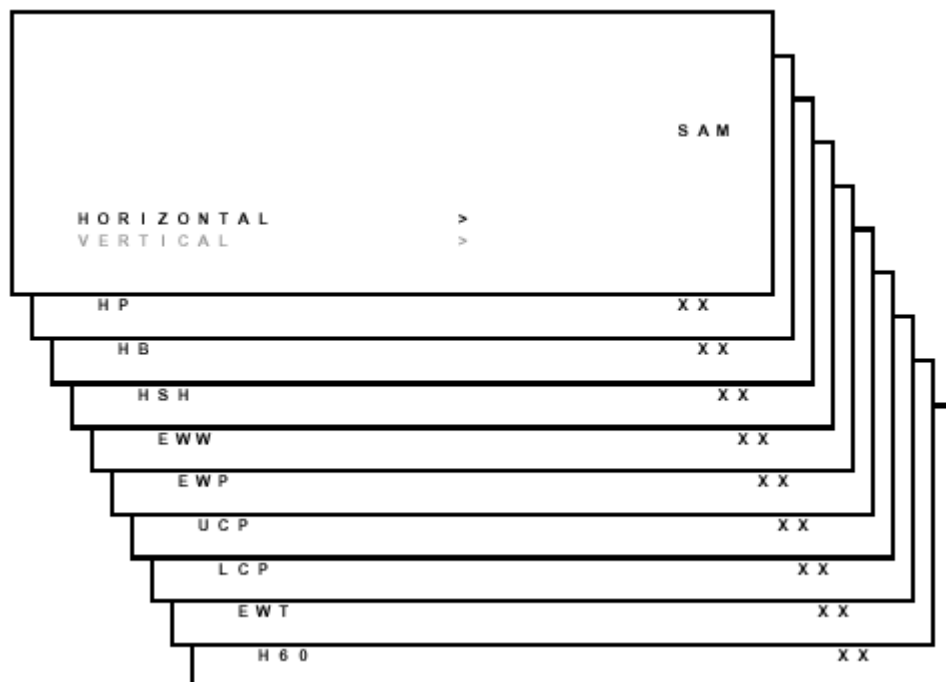
Geometry

The geometry alignments menu contains several items to align the set, in order to obtain a correct picture geometry.

Connect an external video pattern generator to the aerial input of the TV-set and input a crosshatch test pattern. Set the generator amplitude to at least 1 mV and set frequency to 61.25 MHz (channel 3).

1. Set 'Smart Picture' to NATURAL (or MOVIES).
2. Activate the SAM menu (see chapter 5).
3. Go to the GEOMETRY sub menu.
4. Choose HORIZONTAL or VERTICAL alignment

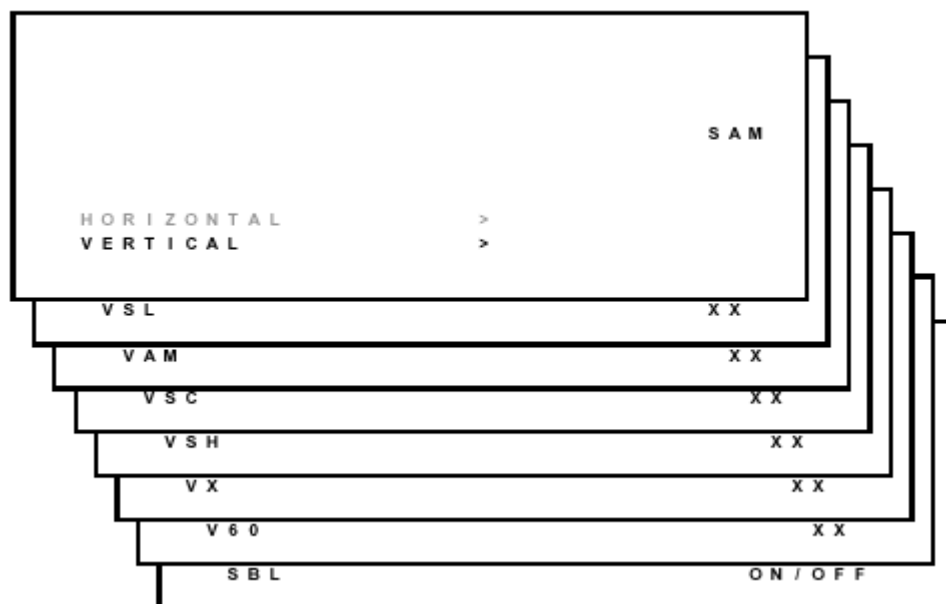
Now the following alignments can be performed:



Horizontal:

- **Horizontal Parallelogram (HP)** Align straight vertical lines in the top and the bottom; vertical rotation around the center.
- **Horizontal Bow (HB)** Align straight horizontal lines in the top and the bottom; horizontal rotation around the center.

- **Horizontal Shift (HSH)** Align the horizontal center of the picture to the horizontal center of the CRT.
- **East West Width (EWW)** Align the picture width until the complete test pattern is visible.
- **East West Parabola (EWP)** Align straight vertical lines at the sides of the screen.
- **Upper Corner Parabola (UCP)** Align straight vertical lines in the upper corners of the screen.
- **Lower Corner Parabola (LCP)** Align straight vertical lines in the lower corners of the screen.
- **East West Trapezium (EWT)** Align straight vertical lines in the middle of the screen.
- **H60** Align straight horizontal lines if NTSC system is used (60 Hz) i.s.o. PAL (50 Hz).



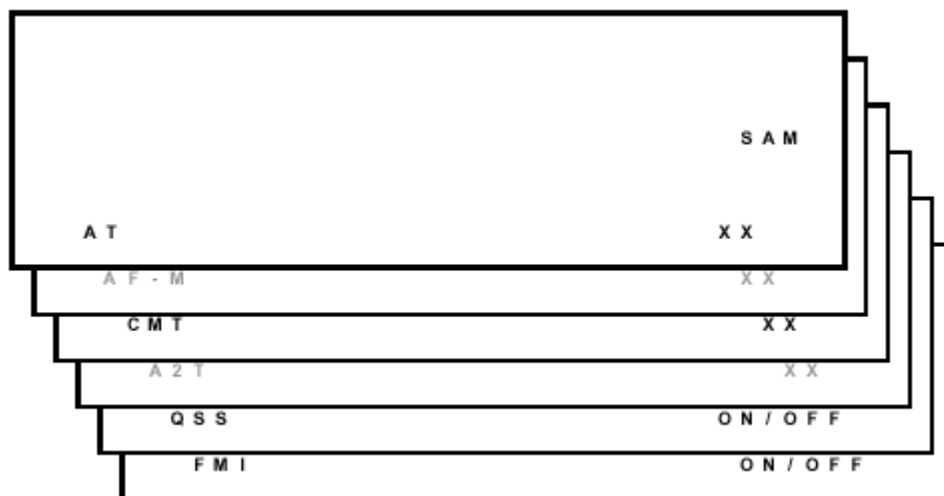
Vertical:

- **Vertical slope (VSL)** Align the vertical center of the picture to the vertical center of the CRT. This is the first of the vertical alignments to perform. For an easy alignment, set SBL to ON.
- **Vertical Amplitude (VAM)** Align the vertical amplitude so that the complete test pattern is visible.
- **Vertical S-Correction (VSC)** Align the vertical linearity, meaning that vertical intervals of a grid pattern must be equal over the entire screen height.
- **Vertical Shift (VSH)** Align the vertical centering so that the test pattern is located vertically in the middle. Repeat the 'vertical amplitude' alignment if necessary.
- **Vertical Zoom (VX)** The vertical zoom is added in for the purpose of development. It helps the designer to set a proper values for the movie expand or movie(16x9) compress. Default value is 25.
- **V60** Align straight vertical lines if NTSC system (60 Hz) is used i.s.o. PAL (50 Hz).
- **Service blanking (SBL)** Switch the blanking of the lower half of the screen ON or OFF (to be used in combination with the vertical slope alignment).

In the table below, you will find the GEOMETRY default values for the different sets.

DEFAULT GEOMETRY VALUES (L01 SMALL SCREEN)									
Alignment	Description	13V	14"	14RF	15RF	17"	19V	20"	21"
HP	Hor. Parallelogram	31	31	31	31	31	31	31	31
HB	Hor. Bow	31	31	31	31	31	31	31	31
HSH	Hor. Shift	23	35	23	35	35	23	35	35
EWV	East West Width	-	-	-	-	-	-	-	-
EWV	East West Parabola	-	-	-	-	-	-	-	-
UCP	Upper Corner Parabola	-	-	-	-	-	-	-	-
LCP	Lower Corner Parabola	-	-	-	-	-	-	-	-
EWV	East West Trapezium	-	-	-	-	-	-	-	-
VSL	Vert. Slope	31	33	31	33	33	31	33	33
VAM	Vert. Amplitude	26	26	26	26	26	26	26	26
VSC	Vert. S-correction	23	23	23	23	23	23	23	23
VSH	Vert. Shift	30	35	30	35	35	30	35	35
VX	Vert. Zoom	-	-	-	-	-	-	-	-
H60	Hor. Shift offset (60 Hz)	0	9	0	9	9	0	9	9
V60	Vert. Shift offset (60 Hz)	0	-2	0	-2	-2	0	-2	-2
Abbreviations: V= visual, RF= Real Flat									

Audio



No alignments are needed for the audio sub menu. Use the given default values.

AT

Default value is 8.

CMT

Default value is 42.

QSS

OFF for mono sets, ON for stereo sets.

FMI

OFF for mono sets, ON for stereo sets.

Technical Service Data

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Troubleshooting

REFER TO SAFETY GUIDELINES

SAFETY NOTICE: ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING

Service Modes, Error Codes And Fault Finding

Test Points

The chassis is equipped with test points printed on the circuit board assemblies. These test points refer to the functional blocks:

Test point	Circuit	Diagram
A1-A2-A3-..	Audio processing	A8, A9 / A11
C1-C2-C3-..	Control	A7
F1-F2-F3-..	Frame drive and output	A3
I1-I2-I3-..	Tuner & IF	A4
L1-L2-L3-..	Line drive and output	A2
P1-P2-P3-..	Power supply	A1
S1-S2-S3-..	Synchronization	A6
V1-V2-V3-..	Video processing	A5, B1

The numbering is in a logical sequence for diagnostics.

Always start diagnosing within a functional block in the sequence of the relevant test points for that block.

Perform measurements under the following conditions:

- Service Default Mode.
- Video: color bar signal.
- Audio: 3 kHz left, 1 kHz right.

Service Modes

Service Default Mode (SDM) and Service Alignment Mode (SAM) offer several features for the service technician, while the Customer Service Mode (CSM) is used for communication between dealer and customer.

Note: Some L8 and M8 chassis sets use a software version that does not contain the Service Modes (see table). In this case, use the special Factory Mode Remote Control. This can be ordered by service code 4835 310 57511.

Complete instructions are included. This remote control will place the TV in the Factory Mode and allow access to all adjustments that a normal Service Mode contains (including setting Option Bytes). Error codes will not be available. There is also the option of using ComPair, a hardware interface between a computer (see requirements) and the TV chassis. It offers the ability of structured trouble shooting, error code reading and software version readout for all L8 and M8 chassis.

Requirements: To run ComPair on a computer (laptop or desktop) requires, as a minimum, a 486 processor, Windows 3.1 and a CD-ROM drive. A Pentium Processor and Windows 95/98 are also acceptable (see also

ComPair).

SW. cluster	Softwar name	UOC type	Diversity	Remark
1US0	L01UN0-x.y	TDA9587	Stereo,	All Service

1US0	L01UN0-x.y	TDA9587	Stereo, non-DBX, CC	All Service Modes
1US1	L01US1-x.y	TDA9587/ TDA9588	Stereo,-DBX CC	Only Com-Pair (*)
2US0	L01UM0-x.y	TDA9587	Mono, CC	All Service Modes
2US1	L01UM1-x.y	TDA9587	Mono, CC	Without CSM (*)
3US0	L01US0-x.y	TDA9588	Stereo,-DBX CC	Only Con-Pair (*)
3US1	L01UN1-x.y	TDA9587	Stereo, non-DBX, CC	Without CSM (*)
Abbreviations in "Software Name": U=USA, N=Stereo non-DBX, S=Stereo DBX, M=Mono				

Service Default Mode (SDM)

Purpose

- To create a predefined setting to get the same measurement results as given in this manual.
- To override SW protections.
- To start the blinking LED procedure.

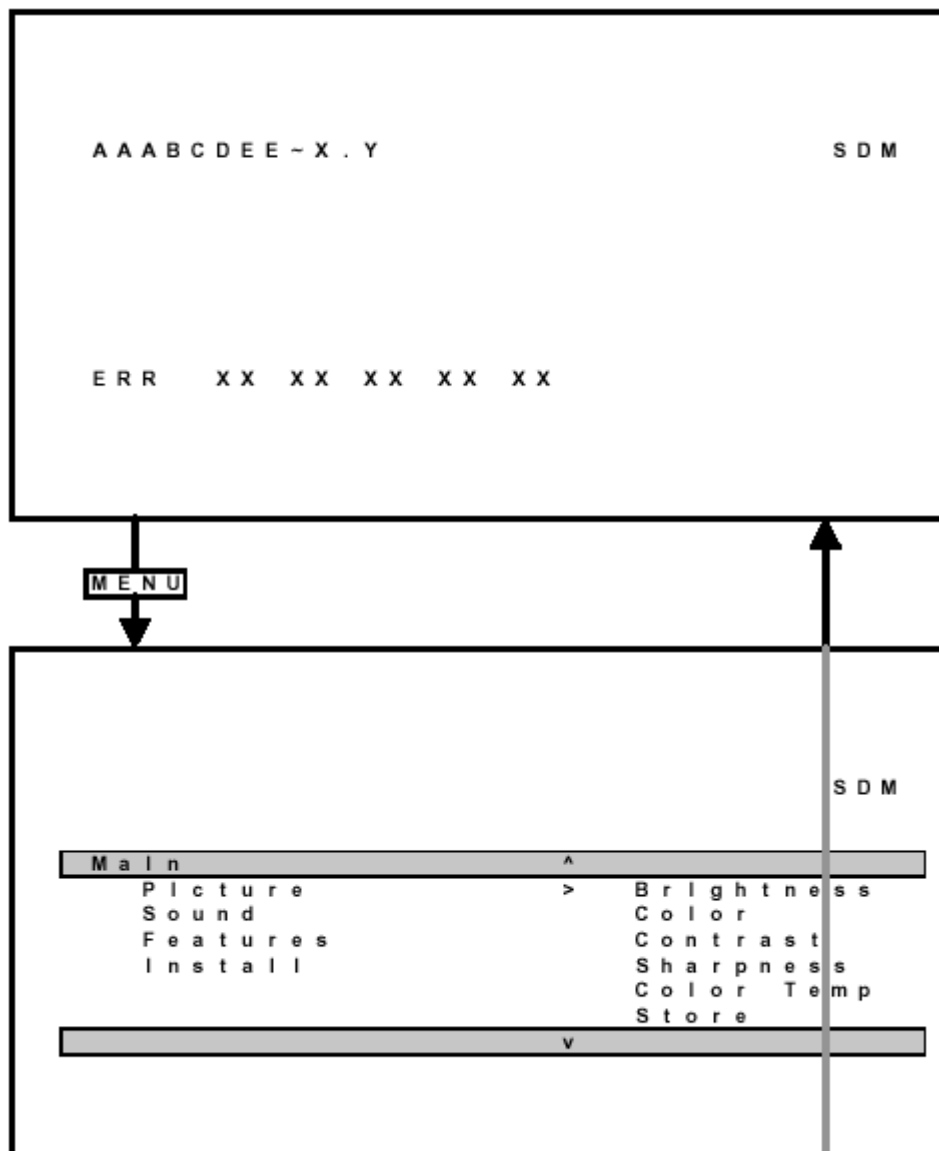
Specifications

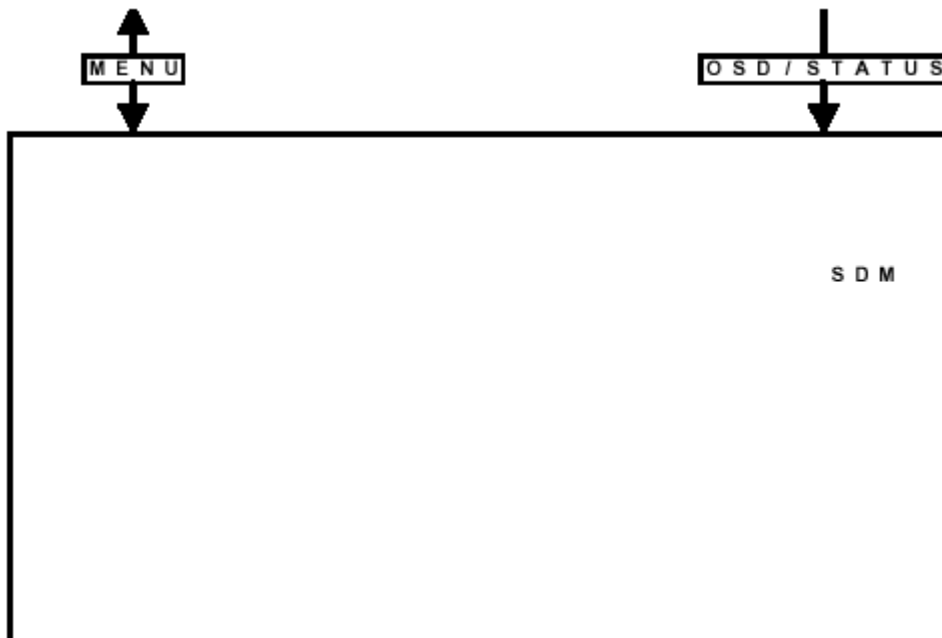
- Tuning frequency: 61.25 MHz (channel 3).
- Color system: NTSC.
- All picture settings at 50 % (brightness, color contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
 - (sleep) timer,
 - child/parental lock,
 - blue mute,
 - hotel/hospitality mode
 - auto switch-off (when no 'IDENT' video signal is received for 15 minutes),
 - skip / blank of non-favorite presets / channels,
 - auto store of personal presets,
 - auto user menu time-out.

How to enter SDM

- Use a standard customer RC-transmitter and key in the code 062596 directly followed by the MENU button, or
 - Short wires 9631 and 9641 on the mono carrier and switch the set ON apply AC power. Then press the power button (remove short after start-up).
- Caution: Entering SDM by shorten wires 9631 and 9641 will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could lead to damaging

After entering SDM, the following screen is visible, with SDM at the upper right side for recognition.





How to navigate

- When you press the MENU button on the remote control, the set will switch between the SDM and the normal user menu (with the SDM mode still active in the background). Return to the SDM screen with the OSD / STATUS button.
- When you press the OSD / STATUS button on the remote control, the menu will show or hide the error buffer. This feature is available to prevent interference during waveform measurements.
- On the TV press and hold the 'VOLUME down' and press the 'CHANNEL down' for a few from SDM to SAM and reverse.

How to exit

Switch the set to STANDBY by pressing the power button on the remote control transmitter (if you switch the set OFF by removing the AC power, the set will return in SDM when AC power is re-applied). The error buffer is cleared.

Service Alignment Mode (SAM)

Purpose

- To perform alignments.
- To change option settings.
- To display / clear the error code buffer.

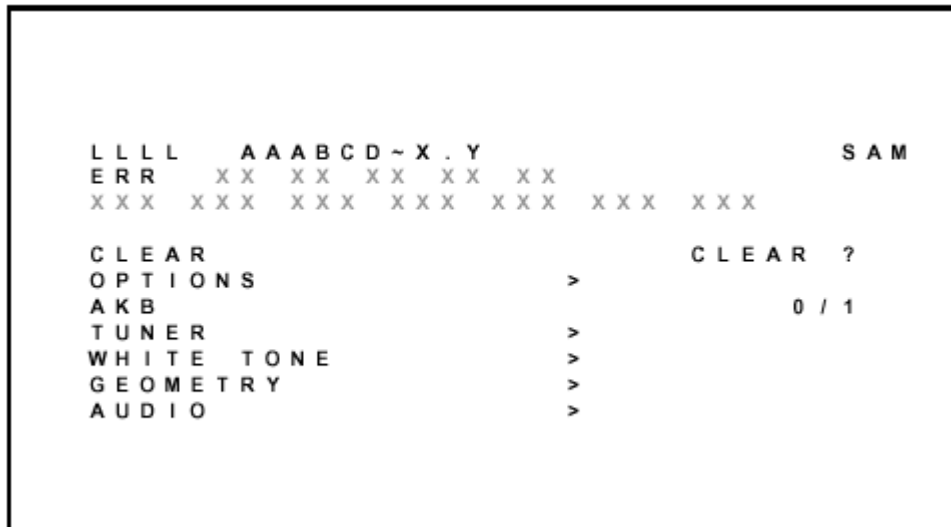
Specifications

- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to enter

- Use a standard customer RC-transmitter and key in the code 062596 directly followed by the OSD / STATUS button or
- Via ComPair.

The following screen is visible, with SAM at the upper right side for recognition.



1. LLLL This is the operation hours counter. It counts the normal operation hours, not the standby hours.
2. AAABCD-X.Y This is the software identification of the main micro controller
 - A = the project name (L01).
 - B = the region: E = Europe, A = Asia Pacific, U = NAFTA, L = LATAM.
 - C = the software diversity: N = stereo non-DBX, S = stereo DBX, M = mono, D = DVD.
 - D = the language cluster number.
 - E = UOC diversity.
 - X = the main software version number.
 - Y = the sub software version number.
3. SAM Indication of the actual mode.
4. Errors buffer Five errors possible.
5. Option bytes Seven codes possible.
6. Clear Erase the contents of the error buffer. Select the CLEAR menu item and press the CURSOR RIGHT key. The content of the error buffer is cleared.
7. Options To set the Option Bytes. See chapter 8.3.1 for a detailed description.
8. AKB Disable (0) or enable (1) the 'black current loop' (AKB = Auto Kine Bias).
9. Tuner To align the Tuner. See chapter 8.3.2 for a detailed description.
10. White Tone To align the White Tone. See **White tone** for a detailed description.
11. Geometry To align the set geometry. See **Geometry** for a detailed description.
12. Audio No audio alignment is used for NTSC.

How to navigate

- In SAM, select menu items with the CURSOR UP/DOWN key on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the CURSOR UP/DOWN key to display the next / previous menu items.

- With the CURSOR LEFT/RIGHT keys, it is possible to:
 - (De)activate the selected menu item.
 - Change the value of the selected menu item.
 - Activate the selected submenu.
- When you press the MENU button twice, the set will switch to the normal user menus (with the SAM mode still active in the background). To return to the SAM menu press the OSD / STATUS button [i+].
- When you press the MENU key in a submenu, you will return to the previous menu.

How to exit

Switch the set to STANDBY by pressing the power button on the remote control transmitter (if you switch the set OFF by removing the AC power, the set will return in SAM when AC power is re-applied). The error buffer is not cleared.

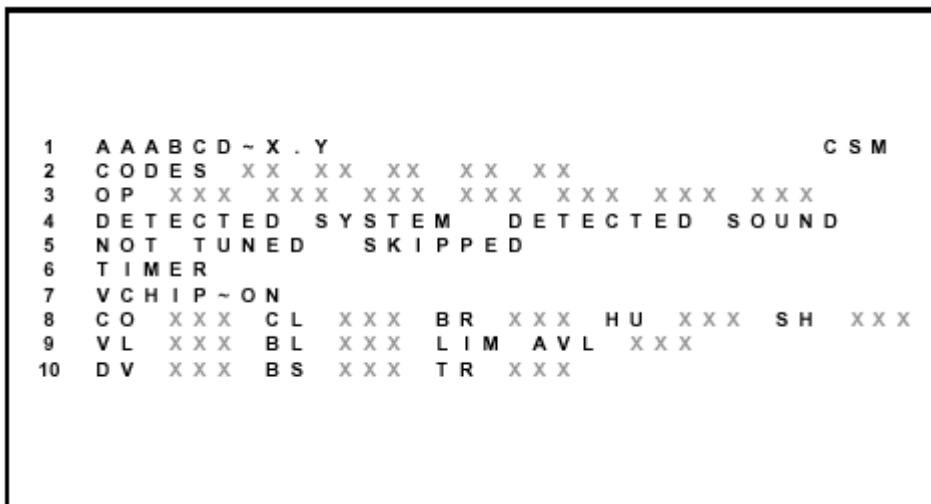
Customer Service Mode (CSM)

Purpose

The Customer Service Mode is (de-)activated by the customer upon request of the service technician during a telephone conversation, in order to identify the status of the set. This CSM is a read only mode, therefore modifications in this mode are not possible.

How to enter

The CSM will be turned on after pressing the MUTE key on the remote control transmitter and any of the control buttons on the TV for at least 4 seconds simultaneously. This activation only works if there is no menu on the screen. After switching ON the Customer Service Mode, the following screen will appear:



1. Software identification of the main micro controller (see **Service Alignment Mode** for an explanation).
2. Error code buffer (see for more details). Displays the last seven errors of the error code buffer.
3. In this line, the Option Bytes (OB) are visible. Each Option Byte is displayed as a decimal number between 0 and 255. The set may not work correctly when an incorrect option code is set. See **Options** for more information on the option settings.
4. Indicates which color and sound system is installed for the selected pre-set.
5. Indicates if the set is not receiving an 'IDENT' signal on the selected source. It will display 'Not Tuned'.

6. Indicates if the sleep timer is enabled.
7. Indicates if the V-chip feature is enabled.
8. Value indicates parameter levels at CSM entry.
CO = CONTRAST, CL = COLOR, BR = BRIGHTNESS,
HU = HUE, SH = SHARPNESS
9. Value indicates parameter levels at CSM entry.
VL = VOLUME LEVEL, BL = BALANCE LEVEL, AVL LIM
= AUTO VOLUME LEVEL LIMITER
10. Value indicates parameter levels at CSM entry.
DV = DELTA VOLUME, BS = BASS LEVEL, TR = TREBLE LEVEL

How to exit

You can turn the Customer Service Mode off:

- After you press 'any' key of the remote control transmitter with exception of the CHANNEL and VOLUME keys.
- After you switch-off the TV set with the AC power switch.

Problems And Solving Tips (Related To CSM)

Picture Problems

No colors / noise in picture

Check CSM line 4. Wrong color system installed. To change the setting:

1. Select the MANUAL STORE sub menu.
2. Select and change the SYSTEM setting until picture and sound are correct.
3. Select the STORE menu item.

Colors not correct / unstable picture

Check CSM line 4. Wrong color system installed. To change the setting:

1. Press the MENU button on the remote control.
2. Select the INSTALL sub menu.
3. Select the MANUAL STORE sub menu.
4. Select and change the SYSTEM setting until picture and sound are correct.
5. Select the STORE menu item.

TV switches off or changes channel without any user action

The TV set switches off after TV SWITCHING OFF was displayed.

Auto standby switched the set off because:

- There was no 'ident' signal for more than 15 minutes or
- There was no remote control signal received or local key pressed for > 2 hours.

See **Alignments** for a description of the options to enable / disable auto standby

Picture too dark or too bright

Increase / decrease the BRIGHTNESS and / or the CONTRAST value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

White line around picture elements and text

Decrease the SHARPNESS value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

Snowy picture

Check CSM line 5. If this line indicates 'Not Tuned', check the following:

- No or bad antenna signal. Connect a proper antenna signal.
- Antenna not connected. Connect the antenna.
- No channel / preset is stored at this program number. Go to the INSTALL menu and store a proper channel at this program number.
- The tuner is faulty (in this case the CODES line will contain error number 10). Check the tuner and replace / repair if necessary.

Snowy picture and/or unstable picture

- A scrambled or decoded signal is received.

Black and white picture

Increase the COLOR value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

Menu text not sharp enough

Decrease the CONTRAST value when:

- The picture improves after you have pressed the 'Smart Picture' button on the remote control.
- The picture improves after you have switched on the Customer Service Mode

The new 'Personal' preference value is automatically stored.

Sound Problems

No sound or sound too loud (after channel change / switching on)

Increase / decrease the VOLUME level when the volume is OK after you switched on the CSM. The new 'Personal' preference value is automatically stored.

ComPair

Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics.

Compare has three big advantages:

- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I²C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I²C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the

microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable.

In case of the L8/M8 chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector (located on the Main panel, see [Hardware alignments](#) suffix D).

The ComPair faultfinding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:

1. Automatic (by communication with the television)

ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I²C level.

ComPair can access the I²C bus of the television. ComPair can send and receive I²C commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I²C busses of the TV-set.

2. Manually (by asking questions to you)

Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (e.g. Does the screen gives a picture? Click on the correct answer: YES / NO) and showing you examples (e.g. Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the faultfinding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:

- Up- or downloading of presets.
- Managing of preset lists.
- Emulation of the (European) Dealer Service Tool (DST).
- If both ComPair and SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink.

Example: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Monocarrier.*

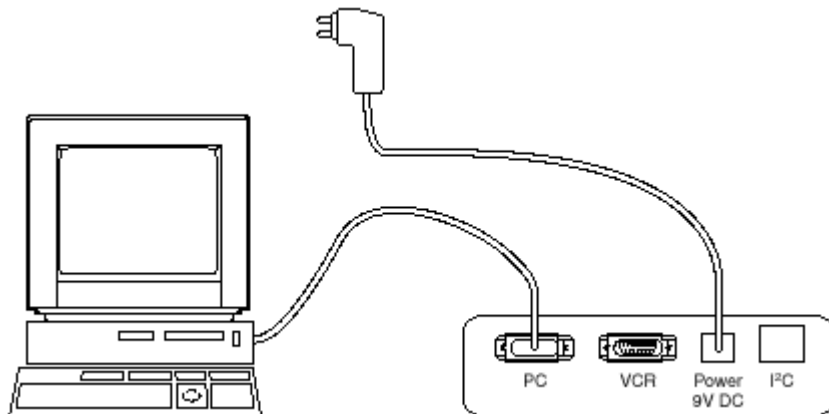
Click on the 'Panel' hyperlink to automatically show the PWB with a highlighted capacitor C2568.

Click on the 'Schematic' hyperlink to automatically show the position of the highlighted capacitor.

How To Connect

1. First install the ComPair Browser software (see the Quick Reference Card for installation instructions).
2. Connect the RS232 interface cable between a free serial (COM) port of your PC and the PC connector (marked with 'PC') of the ComPair interface.
3. Connect the AC power adapter to the supply connector (marked with 'POWER 9V DC') on the compare interface.
4. Switch the ComPair interface OFF.
5. Switch the television set OFF, remove the AC power.
6. Connect the ComPair interface cable between the connector on the rear side of the ComPair interface (marked with 'I²C') and the ComPair connector on the mono carrier (see figure 8-1 suffix D).
7. Plug the AC power adapter in the AC power outlet and switch on the interface. The green and red LEDs light up

- together. The red LED extinguishes after approx. 1 second while the green LED remains lit.
8. Start the ComPair program and read the introduction chapter.



How To Order

ComPair order codes:

- Starter kit ComPair + SearchMan software + compare interface (excluding transformer): 4822 727 21629
- ComPair interface (excluding transformer): 4822 727 21631
- Starter kit ComPair software (registration version): 4822 727 21634
- Starter kit SearchMan software: 4822 727 21635
- ComPair CD (update): 4822 727 21637
- SearchMan CD (update): 4822 727 21638
- ComPair interface cable: 3122 785 90004

Error Codes

Introduction

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is written at the left side and all other errors shift one position to the right.

The error code buffer is cleared in the following cases:

- By activation of the CLEAR command in the SAM menu:
- When you exit SDM / SAM with the STANDBY command on the remote control (when leaving SDM / SAM, by disconnecting the set from AC power, the error buffer is not reset).
- When you transmit the command DIAGNOSE-99-OK with ComPair.
- If the content of the error buffer has not changed for 50 hours, it resets automatically.

Examples:

ERROR: 0 0 0 0 0: No errors detected.

ERROR: 6 0 0 0 0: Error code 6 is the most recent and only detected error.

ERROR: 9 6 0 0 0: Error code 6 was first detected and error code 9 is the most recent detected error.

You can also make the contents of the error buffer visible via the blinking LED procedure (see **The Blinking LED Procedure**). This is especially useful when there is no picture.

Error Codes

In case of non-intermittent faults, clear the error buffer before you begin the repair. These to ensure that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations an error code is only the result of another error code and not the actual cause (e.g., a fault in the protection detection circuitry can also lead to a protection).

E	Device	Error description	Symptom	Check	Diagram
0	-	No Error	-	-	-
1	-	X-Ray / over-voltage protection	Set will hiccup until it goes to protection mode	2407 & 7402 (L8), 2465 & 7460 (M8)	A2
2	-	High beam current		CRT panel, 3340	B1, B2
	-	Horizontal Protection	Set will hiccup until it goes to protection mode-Fly back line after 5 s in protection mode	+200V, LOT 5445, 7460-7463, 6467, hor. Defl. Coil	A2
3	TDA8359/ TDA9302	Vertical Protection	Set will hiccup until it goes to protection mode-One hor. Line after 5 s in protection mode	ViotlAux +13V, +50V (M8) 7471, vert. Defk, Coil	A2, A3
4	MSP34X5/ TDA9853	MSP I ² C identification error	Set turned on without sound output	ViotlAux +5V, +8V, 7831, 3823/33, 7861, 3865/66	A9 or A11
5	TDA95xx	POR / +8V protection	Set will hiccup until it goes to protection mode after 8 s	3V3, +8V, 7200, 7560, 7480	A5-A7, A1, A2
6	I ² C bus	General I ² C bus error	Set is in protection mode	SDA/SCL, 1000, 7200, 7600/01, 3624/25	A7
7	AN7522/3	Power down (over current) protection	Set will hiccup until it goes to protection mode	MainAux, 7901/02, 7561/62	A8, A1
8	-	E/W protection (Large Screen)	Geometry wrong or set in protection mode	ViotlAux+11V, 3400, 3405/06, 7400	A2
9	M24C08	NVM I ² C identification error	Set will turn on but is unable to store data	3V3, 7601/02, 3611, 3603/04	A7
10	Tuner	Tuner I ² C identification error	Set will turn on but has no picture and sound	ViotlAux +5V, 1100, 7482	A4, A2
11	TDA6107/8	Black current loop protection	Fly back line after 5 s in protection mode	+200V, 7330, RGB amps, CRT	B1, B2
12	M65669	PIP I ² C identification error	Picture in picture does not function	+5V, +8V, 7803, 7890/91	P

The Blinking LED Procedure

Via this procedure you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDM is entered, the LED will blink the contents of the error-buffer.

Error-codes ≥ 10 are shown as follows:

- a long blink of 750 ms (which is an indication of the decimal digit),
- a pause of 1.5 s,
- n short blinks ($n = 1 - 9$),
- when all the error-codes are displayed, the sequence finishes with a LED blink of 3 s,
- the sequence starts again.

Example of error buffer: 12 9 6 0 0

After entering SDM:

- 1 long blink of 750 ms followed by a pause of 1.5 s,
- 2 short blinks followed by a pause of 3 s,
- 9 short blinks followed by a pause of 3 s,
- 6 short blinks followed by a pause of 3 s,
- 1 long blink of 3 s to finish the sequence,
- the sequence starts again.

Protections

If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection mode.

Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases the microprocessor does not put the set in the protection mode. The error codes of the error buffer can be read via the service menu (SAM), the blinking LED procedure or via ComPair. The DST diagnose functionality will force the set into the Service-standby, which is similar to the usual standby mode, however the microprocessor has to remain in normal operation completely.

To get a quick diagnosis the chassis has three service modes implemented:

- The Customer Service Mode (CSM).
- The Service Default Mode (SDM). Start-up of the set in a predefined way.
- The Service Alignment Mode (SAM). Adjustment of the set via a menu and with the help of test patterns.

See for a detailed description ***Circuit description***

Repair Tips

Below some failure symptoms are given, followed by a repair tip.

- **Set is dead and makes hiccuping sound**
'MainSupply' is available. Hiccupping stops when de-soldering L5561, meaning that problem is in the 'MainSupply' line. No output voltages at LOT, no horizontal deflection. Reason: line transistor 7460 is defective.
- **Set is dead, and makes no sound**
Check power supply IC 7520. Result: voltage at pins 1, 3, 4, 5 and 6 are about 180 V and pin 8 is 0 V. The reason why the voltage on these pins is so high is because the output driver (pin 6) has an open load. That is why MOSFET 7521 is not able to switch. Reason: feedback resistor 3523 is defective. Caution: be careful measuring on the gate of 7521; circuitry is very high ohmic and can easily be damaged!
- **Set is in hiccup mode and shuts down after 8 s.**
Blinking LED (set in SDM mode) indicates error 5. As it is unlikely that ?P 'POR' and '+8V protection' happen at the same time, measure the '+8V'. If this voltage is missing, check transistor 7480.

- **Set is non-stop in hiccup mode**

Set is in over current mode; check the secondary sensing (opto coupler 7515) and the 'MainSupply' voltage.

Signal 'Stdby_con' must be logic low under normal operation conditions and goes to high (3.3 V) under standby and fault conditions.

- **Set turns on, but without picture and sound**

The screen shows snow, but OSD and other menus are okay. Blinking LED procedure indicates error 11, so problem is expected in the tuner (pos. 1000). Check presence of supply voltages. As 'Vlotaux+5V' at pin 5 and 7 are okay, 'VT_supply' at pin 9 is missing.

Conclusion: resistor 3460 is defective.

- **Set turns on, but with a half screen at the bottom.**

Sound is okay

Blinking LED (set in SDM mode) indicates error 3. Check 'Vlotaux+11V' and '+50V'. If they are okay, problem is expected in the vertical amplifier IC 7471. Measure with a scope the waveform on pin 17 of the UOC. Measure also at pin 1 of IC 7471. If here the signal is missing, a defective resistor R3244 causes the problem.

Contents of Known Faults for: 19L8

1. - 19PS45S121 and S122 with 19L8 chassis
2. - CHANNELS 5 AND 6 SLOW TO TUNE ON ICC CABLE
3. - CLIP FOR HORIZONTAL XISTOR HEATSINK
4. - COLOR INTERMITTENT, MISSING, MARGINAL
5. - ComPair COMMUNICATION ERRORS
6. - ComPair WILL NOT SAVE
7. - CRACK POP IN DBX STEREO MODELS
8. - F ON SCREEN, IN FACTORY MODE
9. - Jack Panel Connectors
10. - LINES ON LEFT EDGE OF PICTURE
11. - LOCKUP, CORRUPT CLOSED CAPTION, MORE MODELS
12. - MODELS WITHOUT SERVICE MODES
13. - REMOTE RANGE
14. - SLUGGISH RESPONSE/CORRUPT CLOSED CAPTION
15. - SOUND SCREECH
16. - STEREO WITH VCR AND SET TOP BOX
17. - V-CHIP BLOCK IN FACTORY MODE
18. - V-CHIP BLOCKING BACK DOOR ENTRY
19. - VERTICAL SLOPE CHANGE WITH WARM UP

No. 1 *****

Manual Number: 7602

19PS45S121 and S122 with 19L8 chassis

INFORMATION: This model, 19PS45S121, or -S122 is a "mixed model". While it has a model (19PS45) that is a 2002 introduction it has the 2001 chassis (19L8). It was only built during February, March and April of 2002. In May of 2002 the chassis changed to 19S8 and the model changed from -S121/-S122 to -S321 and -S322.

The micro/UOC (7200) for the -S121/-S122 version is 9352 699 89557. Refer to 19PS40 for other information.

No. 2 *****

Manual Number: 7602

CHANNELS 5 AND 6 SLOW TO TUNE ON ICC CABLE

SYMPTOM: Channel 5 and 6 slow to settle tuning on ICC cable system. Incremental Coherent Carrier cable systems have all channels at normal frequencies, except 5 and 6 which are 2 Mhz above normal. May be accompanied by a screech sound during the delayed tuning sequence.

CURE: Enter customer Install menu and select CABLE instead of AUTO. Then run AUTO PROGRAM function.

No. 3 *****

Manual Number: 7602

CLIP FOR HORIZONTAL XISTOR HEATSINK

Symptom:

There have been a few scattered reports of
a broken heat sink clip for the horizontal output transistor (7402).

Resolution:

The correct part number is :

Order 3139 121 24581.

Applies To:

13L8, 13PR10G121, 13PR10G199, 13PR11M121, 13PR11M199, 13PR12W121, 13PR12W199,
14L8, 14LL100121, 14LW102221, 14LX100121, 14RF50S3, 14RF50S399, 15PV1022, 19L8,
19PR11C121, 19PR11C122, 19PR11C125, 19PR11C199, 19PR16C121, 19PR16C122,
19PR16C125, 19PR16C199, 19PS30C121, 19PS30C122, 19PS30C125, 19PS30C199,
19PS40C121, 19PS40C122, 19PS40C125, 19PS40C199, 19PS45S121, 19PS45S199,
19PS50S121, 19PS50S122, 19PS50S125, 19PS50S199, 20LL200122, 20LL200125,
20LW202222, 20LW202225, 20LX200122, 20LX200125, 20LZ202222

No. 4 *****

Manual Number: 7602

COLOR INTERMITTENT, MISSING, MARGINAL

SYMPTOM: Color missing, marginal or intermittent.

Sometimes on one or some channels or sources.

CURE: Replace UOC 7200

No. 5 *****

Manual Number: 7602

ComPair COMMUNICATION ERRORS

SYMPTOM: When using ComPair with these chassis
and attempting to save changes to the NVM (memory)
you may receive an error message:

AN ERROR HAS OCCURRED DURING
COMMUNICATION WITH THE SET-TIMEOUT

CAUSE: This can occur if there is any IR input or keyboard
input while the TV is in the ComPair mode (displayed "C").
The only input allowed is to turn on the TV after ComPair is

connected and AC power applied to the TV.

CURE: Exit ComPair program and remove AC power from the TV
Start ComPair again and be cautious about any command inputs.

No. 6 *****

Manual Number: 7602
ComPair WILL NOT SAVE

SYMPTOM: When ComPair is connected to these some of these chassis the function; "Store in NVM" may not function. Error/Time out is displayed.

POSSIBLE CAUSES/CURES:

- 1) There has been an IR or Keyboard command to the TV since the original turn on from standby mode with ComPair connected.
- 2) The I2C connector on the ComPair box is not seated fully.

If either of these occurred close ComPair and start over.

- 3) The ComPair mode of the TV has not pulled pin7-7602 low (memory IC).

If C is in top right corner of screen then clip lead pin 7-7602 to ground and repeat "Store in NVM". This should be successful.

Pin 7 is "write enable" of NVM and must be low to write to memory.
Do not leave low because stray data will write to memory and corrupt stored data.

No. 7 *****

Manual Number: 7602
CRACK POP IN DBX STEREO MODELS

Symptom:
A small number of these chassis may have a cracking or popping in the sound At times it may be related to a specific volume control setting.

Resolution:
Replace SMD capacitors 2849 and 2850, using service code 3198 016 31020.

These parts are located adjacent to pins 24 and 25 of 7831, the DBX stereo decoder IC.

Applies To:
13L8, 14L8, 14RF50S3, 14RF50S399, 15PV1022, 19L8, 19PS50S121, 19PS50S122, 19PS50S125, 19PS50S199, 20LW202222, 20LW202225

No. 8 *****

Manual Number: 7602

F ON SCREEN, IN FACTORY MODE

IN THE FOLLOWING TIP YOU MUST RELEASE
THE ON-SET KEYBOARD AS SOON AS THE "F"
DISAPPEARS (ABOUT 4 SECONDS).

FAILURE TO RELEASE THE KEYBOARD WILL
ALLOW THE TV TO RETURN TO FACTORY MODE.

SYMPTOM: In Factory Mode with F in upper right corner of screen

CURE: Press Volume UP and Channel DOWN for 5 seconds at
on-set keyboard.

No. 9 *****

Manual Number: 7602

Jack Panel Connectors

INFORMATION: The following jacks and connectors are used
in the K8/L8/M8/H8 chassis. When looking for a part number know
function, location (front/side/rear) and number of connectors on the
connector cluster. Front and Side use the same connectors.

2422 015 19364 Surround Speaker Jacks
2422 026 04637 Front AV Jacks Mono
2422 026 04742 Front AV Jacks Stereo
2422 026 04747 Headphone Jack
2422 026 04826 AV IO Jack Cluster-K8
2422 026 04926 S-Video Jacks *
2422 026 05026 Side AV Stereo Jacks
2422 026 05106 AV Stereo Jacks (12)
2422 026 05184 AV Stereo Jacks (6)
2422 026 05211 AV Stereo Jacks (9)
3139 110 38951 M-Link Jack (J)

No. 10 *****

Manual Number: 7602

LINES ON LEFT EDGE OF PICTURE

SYMPTOM: Line down left edge of picture, worse on channel 5
using dipole. Will radiate to other sets that are on dipole nearby
offending set.

CAUSE: Oscillation in 7403 Forward Drive transistor.

CURE: Add tack on capacitor from base to collector of 7403.

Use: 3198 019 03990 39pf

Or 3198 019 03390 33pf

Both are NPO, 5% ceramic, 50 volt.

No. 11 *****

Manual Number: 7602

LOCKUP, CORRUPT CLOSED CAPTION, MORE MODELS

SYMPTOM: The TV will lock-up (not respond to remote) and/or display scrambled Closed Caption. Other unusual responses may occur.

CLUE: Break AC supply to reset the micro will cure for short time.

CURE: Replace 7200 UOC, the microprocessor.

NEW MODELS INVOLVED:

14RF50	7200 UOC	9352 699 87557
20RF50		9352 699 90557
24RF50		9352 699 90557

No. 12 *****

Manual Number: 7602

MODELS WITHOUT SERVICE MODES

Models without Service Modes

14RF50

19PS50

20LW20

All versions

Use special Factory Mode Remote

4835 310 57511

No. 13 *****

Manual Number: 7602

REMOTE RANGE

SYMPTOM: A small number of L8 chassis may show a lack of sensitivity of IR receiver. This may appear as limited range of remote operation.

CURE: Replace capacitor 2691 in chassis section B-1 with Service Code 4835 124 47557. This is a 25 volt, 220 mfd lytic.

No. 14 *****

Manual Number: 7602

SLUGGISH RESPONSE/CORRUPT CLOSED CAPTION

Any or all of the following.

Sluggish remote response.

Slow mute release.

Slow channel change.

Corrupt or scrambled Closed Caption.

CLUE: May clear with AC break.

CURE: IC 7200 (UOC) Signal/Micro Processor

No. 15 *****

Manual Number: 7602

SOUND SCREECH

SYMPTOM: Sound intermittently "screeches", very loudly.

Especially noted with dipole (rabbit ears) or other weak signal conditions.

CORRECTION:

Replace the following SMD parts in section 6E, between the UOC (7200) and edge of board.

2227 use 1n2 (1.2 nf) capacitor 4822 122 32614

2228 use 330pf capacitor 4835 122 87032

3232 use 3k9 (3.9K ohms) resistor 4835 111 37254

No. 16 *****

Manual Number: 7602

STEREO WITH VCR AND SET TOP BOX

GENERAL INFORMATION:

There is some misunderstanding about TV broadcast stereo and how it can be received by a TV set.

VCR

TO TV ANTENNA INPUT:

When the VCR is connected to the antenna (coax) connector on the TV, stereo can only be received by the TV if the VCR is in the "TV" mode. This is the mode that allows the TV to use it's channel selector. In the TV mode of the VCR the station signal

is bypassed around the VCR circuits and the original (antenna or cable) signal goes to the TV channel selector. In this mode of operation (TV selects channels) the TV will receive stereo if the station is transmitting stereo.

If the VCR is set to the "VCR" mode the VCR selects the TV channel and NO stereo is passed to the TV antenna (coax) connector. The process of the TV signal in the VCR erases the stereo portion of the signal when the VCR is in the "VCR" mode.

Playing a stereo tape on a stereo VCR will not deliver stereo to the TV antenna (coax) connector, only to the A/V jacks.

TO AUDIO/VIDEO JACKS ON TV:

TV broadcast stereo may be heard by the using TV A/V jacks if two conditions are met.

1) The VCR has a stereo decoder built in. Only a few older VCR's have this. This decoder is called MCTS (Multi Channel Television Sound) or BTSC (Broadcast Television Systems Committee).

2) The TV (or cable) channel selected is transmitting stereo.

SET TOP CABLE BOX

These will not send a stereo signal to the antenna (coax) connector of the TV set. If (rare case) the set top cable box has A/V output it might be able to supply video and stereo audio to the TV A/V jacks. Check with the cable company.

SET TOP HIGH DEFINITION BOX

These HD boxes can only supply stereo via A/V cables to the TV, not by the TV antenna (coax) connector.

SATELLITE RECEIVERS

A satellite receiver can only supply stereo via A/V cables to the TV, not by the TV antenna (coax) connector.

No. 17 *****

Manual Number: 7602

V-CHIP BLOCK IN FACTORY MODE

INFORMATION: There are reports of the last 2 years (2001/2002) of Direct View Color TV displaying a V-Chip block when entering Factory Mode . This is reported to happen at random intervals if Factory Mode is entered by the Factory Mode Remote while viewing a TV program.

The random factor comes from the fact that while programs are

rated in many cases, the commercials are not.

When entering Factory Mode all v-chip ratings are turned on. This is to allow a quick check in the factory process. At exit of Factory Mode all settings are turned off.

For stable and visible display use a pattern generator. It will not give a V-Chip block.

No. 18 *****

Manual Number: 7602
V-CHIP BLOCKING BACK DOOR ENTRY

INFORMATION: The entry code for AutoLock (Magnavox SmartLock) to reset the password code number is 0711 twice.

How ever if 0711 is entered the response the first time is INCORRECT. If the word INCORRECT is allowed to time out then the second entry of 0711 is not accepted.

To avoid this response when the first 0711 responds with INCORRECT at once enter 0711 a second time. It will then ask for the new code.

Enter the new code and confirm it (2nd time) and proceed to set the blocking as desired.

No. 19 *****

Manual Number: 7602
VERTICAL SLOPE CHANGE WITH WARM UP

SYMPTOM: Vertical size or linearity change with warm up.

CURE: Replace 2244 with part number 2222 370 75104.
A 100 nf, 63 volt, 10% Metal Polyester.

Philips Consumer Electronics

Technical Service Data

Service and Quality
Service Publications Dept.
One Philips Drive
P.O. Box 14810
Knoxville, TN 37914

Manual 7602

Model no.: 20LW202222
First Publish: 5-10-2001
Rev. Date: 10-16-2002
Print Date: 19/11/2005

Parts List

REFER TO SAFETY GUIDELINES

SAFETY NOTICE: ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING

Main Chassis

S = Safety Part Be sure to use exact replacement part.

2850	Cap, 1n, 5%, 50v, Ceramic.	3198	016	01020	3322	Res, 330 ohm, 5%, 1/10W, Metalized Glas	3198	021	53310
2851	Cap, 4u7, +80/-20%, 10v, Ceramic . . .	2020	552	96305	3323	Res, 10 ohm, 5%, 1/10W, Metalized Glass	3198	021	51090
2852	Cap, 1n, 5%, 50v, Ceramic.	3198	016	01020	3324	Res, 18K, 5%, 2 1/2W, Metal Film . . .	2322	195	63183
2853	Cap, 4u7, +80/-20%, 10v, Ceramic . . .	2020	552	96305	3326	Res, 68 ohm, 5%, 1/3W, Metal Film. . .	2306	204	03689
2854	Cap, 1n, 5%, 50v, Ceramic.	3198	016	01020	3327	Res, 1K5, 20%, 1/2W, Carbon Film . . .	3198	013	01520
2855	Cap, 33p, 5%, 50v, Ceramic.	3198	019	03390	3331	Res, 1K5, 5%, 1/10W, Metalized Glass. .	3198	021	51520
2856	Cap, 47p, 5%, 50v, Ceramic.	3198	016	04790	3332	Res, 330 ohm, 5%, 1/10W, Metalized Glas	3198	021	53310
2857	Cap, 150p, 5%, 50v, Ceramic.	3198	016	01510	3333	Res, 10 ohm, 5%, 1/10W, Metalized Glass	3198	021	51090
2860	Cap, 180p, 5%, 50v, Ceramic.	3198	016	01810	3334	Res, 18K, 5%, 2 1/2W, Metal Film . . .	2322	195	63183
2894	Cap, 220p, 5%, 50v, Ceramic.	3198	016	02210	3336	Res, 68 ohm, 5%, 1/3W, Metal Film. . .	2306	204	03689
2895	Cap, 560p, 5%, 50v, Ceramic.	3198	016	05610	3337	Res, 1K5, 20%, 1/2W, Carbon Film . . .	3198	013	01520
2897	Cap, 390p, 5%, 50v, Ceramic.	3198	016	03910	3341	Res, 1K5, 20%, 1/2W, Carbon Film . . .	3198	013	01520
2898	Cap, 10n, 10%, 50v, Ceramic.	3198	017	01030	3347	Res, 220 ohm, 5%, 1/3W, Metal Film . . .	2306	204	03221
2902	Cap, 1000u, 20%, 16v, Electrolytic . . .	3198	026	21020	3348	Res, 1K5, 20%, 1/2W, Carbon Film . . .	3198	013	01520
2903	Cap, 1u, 20%, 50v, Electrolytic. . . .	3198	025	51080	3349	Res, 1R2, 5%, 1/3W, Metal Film	2306	204	03128
2904	Cap, 470n, +80/-20%, 16v, Ceramic. . .	3198	017	24740	3350	Res, 1R2, 5%, 1/3W, Metal Film	2306	204	03128
2905	Cap, 1n, 5%, 50v, Ceramic.	3198	016	01020	3401	Res, 330K, 5%, 1/2W, Metalized Glass . .	2322	242	13334
2906	Cap, 470n, +80/-20%, 16v, Ceramic. . .	3198	017	24740	3402	Res, 18K, 5%, 1/6W, Carbon Film. . . .	3198	011	01830
2907	Cap, 1n, 5%, 50v, Ceramic.	3198	016	01020	3403	Res, 22 ohm, 5%, 2 1/2W, Metal Film. . .	3198	012	32290
2908	Cap, 10u, 20%, 50v, Electrolytic . . .	3198	025	51090	3404	Res, 6R8, 5%, 1/3W, Metal Film	2306	204	03688
2950	Cap, 330p, 5%, 50v, Ceramic.	3198	016	03310	3406	Res, 10K, 5%, 1/6W, Carbon Film. . . .	3198	011	01030
2981	Cap, 10u, 20%, 50v, Electrolytic . . .	3198	025	51090	3407	Res, 220 ohm, 5%, 2 1/2W, Metal Film . .	3198	012	32210
2982	Cap, 470p, 5%, 50v, Ceramic.	3198	016	04710	3408	Res, 1K, 5%, 1/6W, Carbon Film	3198	011	01020
2983	Cap, 10u, 20%, 50v, Electrolytic . . .	3198	025	51090	3410	Res, 33K, 5%, 1/10W, Metalized Glass . .	3198	021	53330
2984	Cap, 470p, 5%, 50v, Ceramic.	3198	016	04710	3411	Res, 10 ohm, 5%, 1/3W, Metal Film. . . .	2306	204	03109
3000	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3412	Res, 3K3, 1%, 3/5W, Metal Film	2312	915	13302
3001	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3413	Res, 10K, 5%, 1/10W, Metalized Glass . .	3198	021	51030
3002	Res, Zero ohm, "Chip" Jumper	3198	021	90020	3414	Res, 1K5, 1%, 3/5W, Metal Film	2312	915	11502
3003	Res, 1K5, 5%, 1/10W, Metalized Glass .	3198	021	51520	3415	Res, 1K, 5%, 1/6W, Carbon Film	3198	011	01020
3004	Res, 8K2, 5%, 1/10W, Metalized Glass .	3198	021	58220	3416	Res, 3R9, 5%, 1/2W, Metal Film	2306	207	03398
3005	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3417	Res, 33K, 5%, 1/6W, Carbon Film. . . .	3198	011	03330
3101	Res, 68 ohm, 5%, 1/6W, Carbon Film . .	3198	011	06890	3418	Res, 33K, 5%, 1/10W, Metalized Glass . .	3198	021	53330
3102	Res, 1K, 5%, 1/10W, Metalized Glass. .	3198	021	51020	3419	Res, 6K8, 5%, 1/10W, Metalized Glass . .	3198	021	56820
3103	Res, 150 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01510	3420	Res, 33K, 5%, 1/10W, Metalized Glass . .	3198	021	53330
3104	Res, 220K, 5%, 1/10W, Metalized Glass. .	3198	021	52240	3421	Res, 6R8, 5%, 1 1/3W, Metal Film	3198	012	26880
3105	Res, 150 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01510	3422	Res, 100 ohm, 5%, 1/10W, Metalized Glas	3198	021	51010
3106	Res, 220K, 5%, 1/10W, Metalized Glass. .	3198	021	52240	3423	Res, 820 ohm, 5%, 1/10W, Metalized Glas	3198	021	58210
3123	Res, 150 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01510	3424	Res, 100 ohm, 5%, 1/6W, Carbon Film. . .	3198	011	01010
3124	Res, 47K, 5%, 1/10W, Metalized Glass . .	3198	021	54730	3425	Res, 15K, 5%, 1/6W, Carbon Film. . . .	3198	011	01530
3125	Res, 150 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01510	3426	Res, Zero ohm, "Chip" Jumper	3198	021	90020
3126	Res, 47K, 5%, 1/10W, Metalized Glass . .	3198	021	54730	3427	Res, 12K, 5%, 1/6W, Carbon Film. . . .	3198	011	01230
3135	Res, 75 ohm, 5%, 1/6W, Carbon Film . .	3198	011	07590	3428	Res, 39 ohm, 5%, 1/2W, Metal Film. . . .	2306	207	03399
3136	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3431	Res, Zero ohm, "Chip" Jumper	3198	021	90020
3137	Res, 75 ohm, 5%, 1/6W, Carbon Film . .	3198	011	07590	3432	Res, 22 ohm, 5%, 1/6W, Carbon Film . . .	3198	011	02290
3138	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3471	Res, 4R7, 1%, 3/5W, Metal Film	2312	915	14708
3141	Res, 1K, 5%, 1/6W, Carbon Film	3198	011	01020	3472	Res, 4R7, 1%, 3/5W, Metal Film	2312	915	14708
3181	Res, 75 ohm, 5%, 1/6W, Carbon Film . .	3198	011	07590	3473	Res, 2K2, 1%, 3/5W, Metal Film	2312	915	12202
3182	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3474	Res, 1K, 5%, 1/6W, Carbon Film	3198	011	01020
3183	Res, 150 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01510	3475	Res, 2K2, 1%, 3/5W, Metal Film	2312	915	12202
3184	Res, 47K, 5%, 1/10W, Metalized Glass . .	3198	021	54730	3476	Res, 1R5, 5%, 1/3W, Metal Film	2306	204	03158
3185	Res, 150 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01510	3477	Res, 220 ohm, 5%, 1/6W, Carbon Film. . .	3198	011	02210
3186	Res, 47K, 5%, 1/10W, Metalized Glass . .	3198	021	54730	3478	Res, 220 ohm, 5%, 1/6W, Carbon Film. . .	3198	011	02210
3200	Res, 390 ohm, 5%, 1/6W, Carbon Film. .	3198	011	03910	3479	Res, 1K, 5%, 1/6W, Carbon Film	3198	011	01020
3201	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3500	Res, 3M3, 5%, 1/2W, Metalized Glass. . .	2322	242	13335
3202	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3501	Res, 3M3, 5%, 1/2W, Metalized Glass. . .	2322	242	13335
3203	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	S 3502	NTC, B57237, 3W1, 4R7, 20%	2122	612	00055
3204	Res, 10K, 5%, 1/6W, Carbon Film. . . .	3198	011	01030	S 3503	PTC, ZPB, 120V, 10R, 30%	2120	661	00026
3206	Res, 100K, 5%, 1/10W, Metalized Glass. .	3198	021	51040	3506	Res, 220 ohm, 20%, 1/2W, Carbon Film . .	3198	013	02210
3207	Res, 1K, 5%, 1/6W, Carbon Film	3198	011	01020	3507	Surge Protector.	2422	549	43073
3208	Res, 220 ohm, 5%, 1/10W, Metalized Glas	3198	021	52210	3508	Res, 1M5, 5%, 1/2W, Metalized Glass. . .	2322	242	13155
3209	Res, 68 ohm, 5%, 1/10W, Metalized Glass	3198	021	56890	3519	Res, 270 ohm, 5%, 1/6W, Carbon Film. . .	3198	011	02710
3212	Res, 470 ohm, 5%, 1/10W, Metalized Glas	3198	021	54710	3520	Res, 1K2, 5%, 1/10W, Metalized Glass . .	3198	021	51220
3213	Res, 560 ohm, 5%, 1/6W, Carbon Film. .	3198	011	05610	3521	Res, 22 ohm, 5%, 1/6W, Carbon Film . . .	3198	011	02290
3217	Res, 330K, 5%, 1/10W, Metalized Glass. .	3198	021	53340	3522	Res, 330K, 5%, 1/10W, Metalized Glass. .	3198	021	53340
3218	Res, 82K, 5%, 1/10W, Metalized Glass . .	3198	021	58230	3523	Res, 100 ohm, 5%, 1/3W, Metal Film . . .	2306	204	03101
3219	Res, 2K2, 5%, 1/10W, Metalized Glass . .	3198	021	52220	3524	Res, 56K, 5%, 1/10W, Metalized Glass . .	3198	021	55630
3220	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3525	Res, 1K, 5%, 1/10W, Metalized Glass. . .	3198	021	51020
3221	Res, 560 ohm, 5%, 1/6W, Carbon Film. .	3198	011	05610	3526	Res, 0R15, 5%, 3/5W, Metal Film. . . .	3198	012	11570
3222	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3527	Res, 2K2, 5%, 1/3W, Metal Film	2306	204	03222
3226	Res, 560 ohm, 5%, 1/10W, Metalized Glas	3198	021	55610	3528	Res, 10K, 5%, 1/10W, Metalized Glass . .	3198	021	51030
3235	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3529	Res, 47K, 5%, 1/10W, Metalized Glass . .	3198	021	54730
3241	Res, 22K, 5%, 1/10W, Metalized Glass . .	3198	021	52230	3530	Res, 4K7, 5%, 1/10W, Metalized Glass . .	3198	021	54720
3242	Res, 12K, 5%, 1/10W, Metalized Glass . .	3198	021	51230	3531	Res, Zero ohm, "Chip" Jumper	3198	021	90020
3244	Res, 820 ohm, 5%, 1/6W, Carbon Film. .	3198	011	08210	3541	Res, 470 ohm, 5%, 1/10W, Metalized Glas	3198	021	54710
3245	Res, 39K, 5%, 1/10W, Metalized Glass . .	3198	021	53930	3542	Res, 1K5, 5%, 1/10W, Metalized Glass . .	3198	021	51520
3246	Res, 10K, 5%, 1/10W, Metalized Glass . .	3198	021	51030	3543	Res, 82K, 1%, 3/5W, Metal Film	2312	915	18203
3247	Res, 220K, 5%, 1/10W, Metalized Glass. .	3198	021	52240	3544	Res, 6K8, 1%, 3/5W, Metal Film	2312	915	16802
3248	Res, 27K, 5%, 1/10W, Metalized Glass . .	3198	021	52730	3545	Res, 82K, 5%, 1/10W, Metalized Glass . .	3198	021	58230
3249	Res, 820 ohm, 5%, 1/6W, Carbon Film. .	3198	011	08210	3546	Res, Zero ohm, "Chip" Jumper	3198	021	90020
3251	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010	3547	Res, 0R33, 5%, 3/5W, Metal Film. . . .	3198	012	13370
3254	Res, 1M, 5%, 1/10W, Metalized Glass. .	3198	021	51050	3548	Res, 8K2, 5%, 1/10W, Metalized Glass . .	3198	021	58220
3256	Res, 1K, 5%, 1/10W, Metalized Glass. .	3198	021	51020	3549	Res, 220 ohm, 5%, 1/6W, Carbon Film. .	3198	011	02210
3257	Res, 10M, 5%, 1/10W, Metalized Glass . .	3198	021	51060	3552	Res, 10K, 5%, 1/10W, Metalized Glass . .	3198	021	51030
3258	Res, 330K, 5%, 1/10W, Metalized Glass. .	3198	021	53340	3559	Res, 1K, 5%, 1/10W, Metalized Glass. . .	3198	021	51020
3259	Res, 470K, 5%, 1/10W, Metalized Glass. .	3198	021	54740	3560	Res, 47 ohm, 5%, 1/6W, Carbon Film . . .	3198	011	04790
3311	Res, 1K5, 5%, 1/10W, Metalized Glass . .	3198	021	51520	3561	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198	011	01010
3312	Res, 330 ohm, 5%, 1/10W, Metalized Glas	3198	021	53310	3562	Res, 10K, 5%, 1/10W, Metalized Glass . .	3198	021	51030
3313	Res, 10 ohm, 5%, 1/10W, Metalized Glass	3198	021	51090	3563	Res, 4K7, 5%, 1/10W, Metalized Glass . .	3198	021	54720
3314	Res, 18K, 5%, 2 1/2W, Metal Film . . .	2322	195	63183	3564	Res, 0R1, 5%, 1 1/3W, Metal Film	3198	012	21070
3316	Res, 68 ohm, 5%, 1/3W, Metal Film. . .	2306	204	03689	3565	Res, 330 ohm, 5%, 1W, Metal Film	3198	012	13310
3317	Res, 1K5, 20%, 1/2W, Carbon Film . . .	3198	013	01520	3566	Res, 2K2, 5%, 1/10W, Metalized Glass . .	3198	021	52220
3321	Res, 1K5, 5%, 1/10W, Metalized Glass . .	3198	021	51520	3567	Res, 2K2, 5%, 1/10W, Metalized Glass . .	3198	021	52220

S = Safety Part Be sure to use exact replacement part.

3568	Res, 8K2, 5%, 1/10W, Metalized Glass .	3198 021 58220	4835	Res, Zero ohm, "Chip" Jumper	3198 021 90020
3569	Res, 5K6, 5%, 1/10W, Metalized Glass .	3198 021 55620	4901	Res, Zero ohm, "Chip" Jumper	3198 021 90020
3580	Res, 47K, 5%, 1/10W, Metalized Glass .	3198 021 54730	4903	Res, Zero ohm, "Chip" Jumper	3198 021 90020
3601	Res, 8K2, 5%, 1/6W, Carbon Film. . . .	3198 011 08220	4911	Res, Zero ohm, "Chip" Jumper	3198 021 90020
3603	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	4982	Res, Zero ohm, "Chip" Jumper	3198 021 90020
3604	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	5001	Coil, 5u6.	3198 018 25680
3605	Res, 4K7, 5%, 1/10W, Metalized Glass .	3198 021 54720	5002	Coil, 820n	3198 018 18270
3606	Res, 2K2, 5%, 1/6W, Carbon Film. . . .	3198 011 02220	5201	Coil, 6u8.	3198 018 16880
3607	Res, 2K2, 5%, 1/6W, Carbon Film. . . .	3198 011 02220	5202	Coil, 10u.	3198 018 21090
3608	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	5241	Coil, 10u.	3198 018 21090
3609	Res, 1K, 5%, 1/6W, Carbon Film.	3198 011 01020	5242	Coil, 10u.	3198 018 11090
3610	Res, 8K2, 5%, 1/6W, Carbon Film. . . .	3198 011 08220	5341	Coil, 22u.	2422 535 95365
3611	Res, 100 ohm, 5%, 1/10W, Metalized Glas	3198 021 51010	5342	Fixed, Inductor, 100MHZ, 50R.	3198 018 90010
3618	Res, 6K8, 5%, 1/6W, Carbon Film. . . .	3198 011 06820	5408	Coil, 27u.	2422 535 95366
3622	Res, 100 ohm, 5%, 1/10W, Metalized Glas	3198 021 51010	5410	Coil, 27u.	2422 535 95366
3623	Res, 4K7, 5%, 1/10W, Metalized Glass .	3198 021 54720	5444	Transformer, Signal Driver, SC100. . . .	2422 531 02446
3624	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	5445	Transformer.	3128 138 21541
3625	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	S 5502	Filter, Mains, 5Mh, 1A	2422 549 44284
3626	Res, 4K7, 5%, 1/10W, Metalized Glass .	3198 021 54720	5520	Transformer, SMT, SS28032-01A B. . . .	2422 531 02458
3627	Res, 4K7, 5%, 1/10W, Metalized Glass .	3198 021 54720	5521	Fixed, Inductor, 100MHZ, 50R.	3198 018 90010
3628	Res, 10K, 5%, 1/10W, Metalized Glass .	3198 021 51030	5560	Fixed, Inductor, 100MHZ, 50R.	3198 018 90010
3630	Res, 2K2, 5%, 1/10W, Metalized Glass .	3198 021 52220	5561	Coil, 27u.	3198 018 22790
3632	Res, Zero ohm, "Chip" Jumper	3198 021 90020	5562	Fixed, Inductor, 100MHZ, 50R.	3198 018 90010
3635	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	5563	Fixed, Inductor, 100MHZ, 50R.	3198 018 90010
3636	Res, 100 ohm, 5%, 1/10W, Metalized Glas	3198 021 51010	5602	Coil, 5u6.	3198 018 15680
3681	Res, 390 ohm, 5%, 1/10W, Metalized Glas	3198 021 53910	5603	Coil, 5u6.	3198 018 15680
3682	Res, 3K3, 5%, 1/10W, Metalized Glass .	3198 021 53320	5604	Coil, 5u6.	3198 018 15680
3683	Res, 390 ohm, 5%, 1/10W, Metalized Glas	3198 021 53910	5831	Coil, 6u8.	3198 018 16880
3684	Res, 560 ohm, 5%, 1/10W, Metalized Glas	3198 021 55610	5832	Coil, 6u8.	3198 018 16880
3685	Res, 560 ohm, 5%, 1/10W, Metalized Glas	3198 021 55610	5833	Coil, 6u8.	3198 018 16880
3686	Res, 1K5, 5%, 1/10W, Metalized Glass .	3198 021 51520	5835	Coil, 12u.	3198 018 31290
3691	Res, 330 ohm, 5%, 1/10W, Metalized Glas	3198 021 53310	6001	Zener Diode, 33 volt	3198 010 23390
3693	Res, 220 ohm, 5%, 1/10W, Metalized Glas	3198 021 52210	6201	Diode, Signal, BAS316.	3198 010 10630
3694	Res, 4K7, 5%, 1/10W, Metalized Glass .	3198 021 54720	6202	Diode, Signal, BAS316.	3198 010 10630
3801	Res, 220 ohm, 5%, 1/6W, Carbon Film. .	3198 011 02210	6206	Zener Diode, 6.8 volt.	3198 020 56880
3802	Res, 1K, 5%, 1/6W, Carbon Film.	3198 011 01020	6241	Zener Diode, 6.8 volt.	3198 020 56880
3803	Res, 100K, 5%, 1/10W, Metalized Glass. .	3198 021 51040	6311	Diode, Signal, BAV21	3198 010 10070
3804	Res, 82K, 5%, 1/10W, Metalized Glass .	3198 021 58230	6321	Diode, Signal, BAV21	3198 010 10070
3805	Res, 1K, 5%, 1/10W, Metalized Glass. . .	3198 021 51020	6331	Diode, Signal, BAV21	3198 010 10070
3806	Res, 100K, 5%, 1/10W, Metalized Glass. .	3198 021 51040	6341	Diode, Signal, BAV21	3198 010 10070
3807	Res, 82K, 5%, 1/10W, Metalized Glass .	3198 021 58230	6342	Diode, Signal, BAS282	9337 587 20673
3808	Res, 1K, 5%, 1/6W, Carbon Film.	3198 011 01020	6343	Zener Diode, 8.2 volt.	3198 020 58280
3831	Res, 47K, 5%, 1/10W, Metalized Glass .	3198 021 54730	6401	Diode, Signal, BAV21	3198 010 10070
3832	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	6402	Diode, Rect, BYV27-200.	9322 126 72673
3833	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	6404	Diode, Rect, BYD33M	9337 410 30133
3836	Res, 1K, 5%, 1/6W, Carbon Film.	3198 011 01020	6405	Diode, Rect, BYD33D	9337 234 00133
3837	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	6406	Diode, Signal, BAV70	9331 849 10215
3838	Res, 1K, 5%, 1/10W, Metalized Glass. . .	3198 021 51020	6407	Diode, Signal, BAS316.	3198 010 10630
3839	Res, 100 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01010	6408	Diode, Signal, BAS316.	3198 010 10630
3843	Res, 2K2, 5%, 1/10W, Metalized Glass .	3198 021 52220	6409	Diode, Rect, BYD33D	9337 234 00133
3901	Res, 1K, 5%, 1/10W, Metalized Glass. . .	3198 021 51020	6410	Diode, Rect, BYD33D	9337 234 00133
3902	Res, 3K3, 5%, 1/10W, Metalized Glass .	3198 021 53320	6413	Diode, Signal, 1N4148.	3198 010 10010
3903	Res, 3K3, 5%, 1/10W, Metalized Glass .	3198 021 53320	6414	Zener Diode, 6.2 volt.	9331 668 30133
3904	Res, 10K, 5%, 1/10W, Metalized Glass .	3198 021 51030	6415	Diode, Signal, BAS316.	3198 010 10630
3905	Res, 3K3, 5%, 1/10W, Metalized Glass .	3198 021 53320	6419	Zener Diode, 5.6 volt.	9331 177 30133
3906	Res, 10K, 5%, 1/10W, Metalized Glass .	3198 021 51030	6420	Zener Diode, 9.1 volt.	9331 177 80133
3907	Res, 8K2, 5%, 1/10W, Metalized Glass .	3198 021 58220	6423	Diode, Rect, BYD33D	9337 234 00133
3981	Res, 120 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01210	6471	Diode, Rect, BYD33D	9337 234 00133
3982	Res, 120 ohm, 5%, 1/6W, Carbon Film. .	3198 011 01210	6500	Diode, Rect, 1N5062	3198 010 10120
4001	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6501	Diode, Rect, 1N5062	3198 010 10120
4002	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6502	Diode, Rect, 1N5062	3198 010 10120
4101	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6503	Diode, Rect, 1N5062	3198 010 10120
4102	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6520	Diode, Rect, BYD33D	9337 234 00133
4104	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6523	Diode, Signal, 1N4148.	3198 010 10010
4121	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6540	Zener Diode, 6.2 volt.	9331 668 30133
4181	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6541	Zener Diode, 10 volt	3198 010 21090
4209	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6560	Diode, Rectifier, BYW76 RAS15-10. . . .	9322 187 13682
4216	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6561	Diode, Rectifier, BYW76 RAS15-10. . . .	9322 187 13682
4217	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6562	Diode, Rect, EGP20DL-5100	9322 164 42682
4410	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6563	Diode, Signal, BAS316.	3198 010 10630
4501	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6565	Diode, Signal, BAV70	9331 849 10215
4601	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6566	Diode, Signal, BAS316.	3198 010 10630
4613	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6569	Diode, Signal, BAS316.	3198 010 10630
4614	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6570	Zener Diode, 6.8 volt.	3198 020 56880
4615	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6580	Diode, Signal, BAS316.	3198 010 10630
4616	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6681	Diode, Signal, BAT85	9336 247 60133
4617	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6691	LED, LTL-10224WHCR.	9322 050 99682
4618	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6692	IR Receiver, TSOP1836UH3V	9322 127 54667
4619	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6831	Diode, Signal, 1N4148.	3198 010 10010
4622	Res, Zero ohm, "Chip" Jumper	3198 021 90020	6901	Res, Zero ohm, "Chip" Jumper	3198 021 90020
4623	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7101	Transistor, NPN, BC847B.	3198 010 42030
4691	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7200	IC, TDA9587H/N1/3/0481	9352 699 87557
4692	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7201	Transistor, NPN, BC847B.	3198 010 42030
4693	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7204	Transistor, PNP, BC857B.	3198 010 42150
4802	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7205	Transistor, PNP, BC857B.	3198 010 42150
4804	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7241	Transistor, PNP, PDA114ET	3198 010 44010
4811	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7311	Transistor, NPN, BF422	3198 020 43010
4812	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7312	Transistor, NPN, BF422	3198 020 43010
4813	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7313	Transistor, PNP, BF423	3198 020 43020
4814	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7321	Transistor, NPN, BF422	3198 020 43010
4831	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7322	Transistor, NPN, BF422	3198 020 43010
4833	Res, Zero ohm, "Chip" Jumper	3198 021 90020	7323	Transistor, PNP, BF423	3198 020 43020

S = Safety Part Be sure to use exact replacement part.

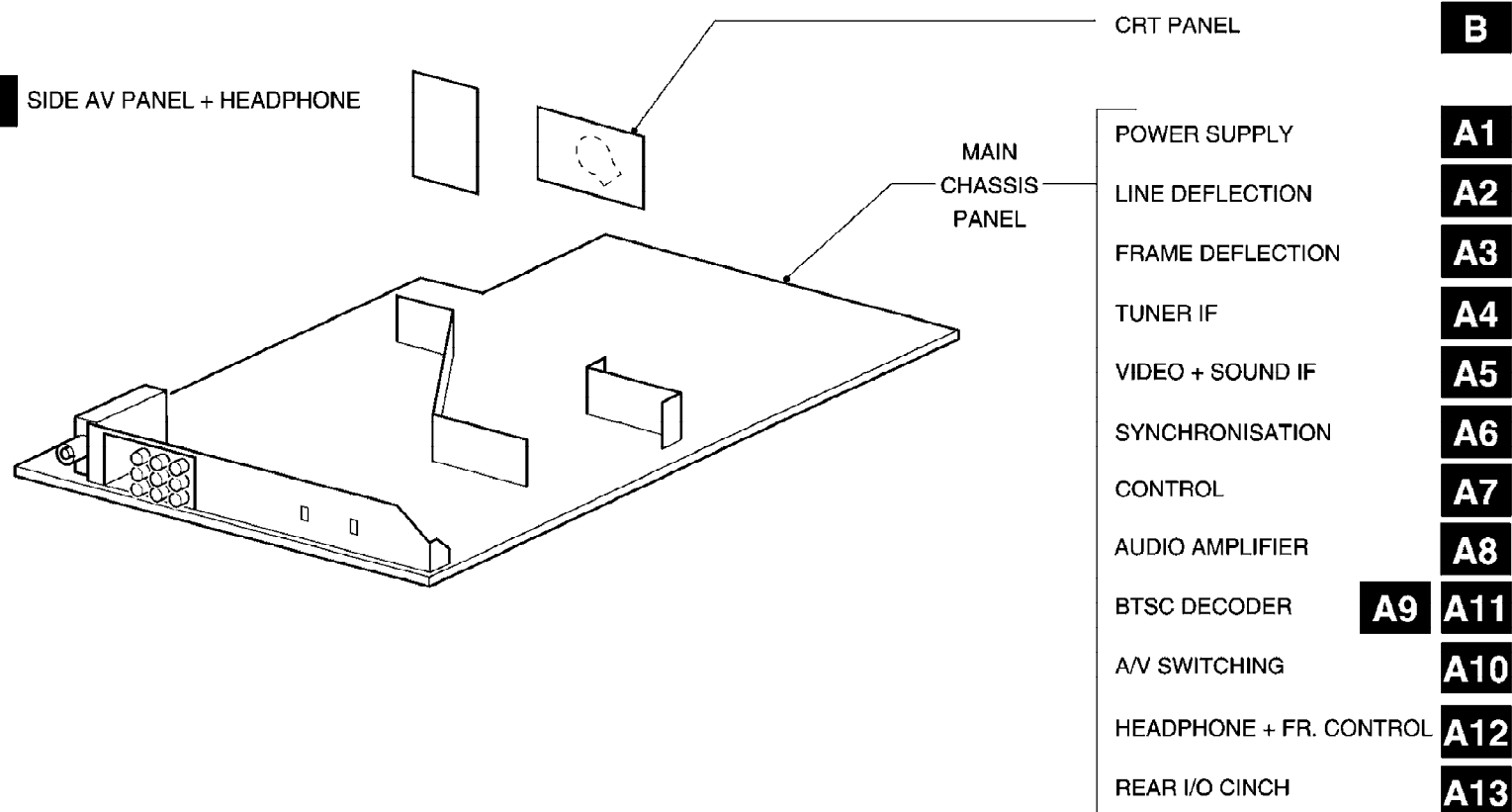
S = Safety Part Be sure to use exact replacement part.

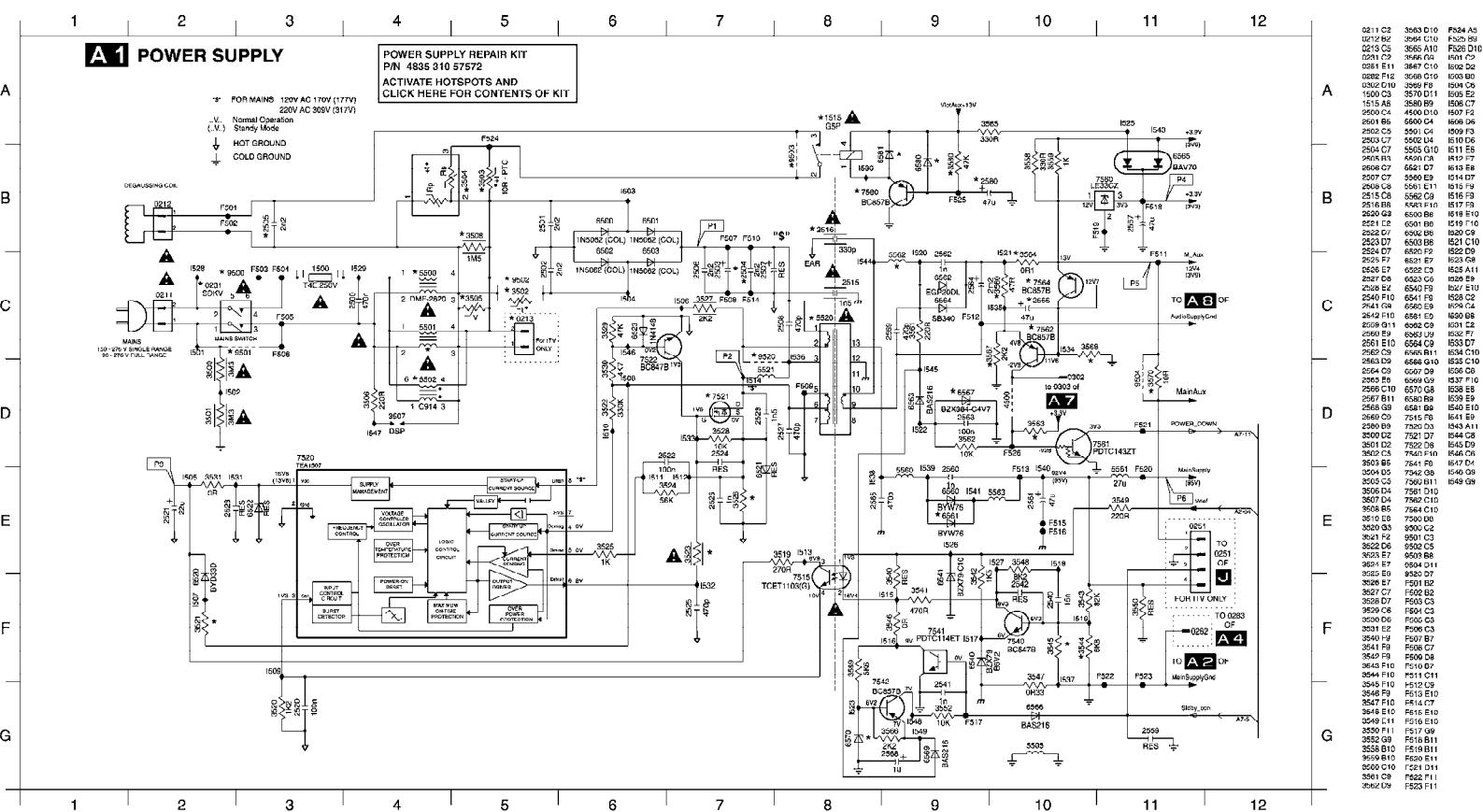
9993	Wire Jumper, 0.58MM.	3198	036	90010
9994	Wire Jumper, 0.58MM.	3198	036	90010
9996	Wire Jumper, 0.58MM.	3198	036	90010
9997	Wire Jumper, 0.58MM.	3198	036	90010
9998	Wire Jumper, 0.58MM.	3198	036	90010
CBA	Main Chassis	3139	177	21311

Model 20LW202222 Cabinet Parts

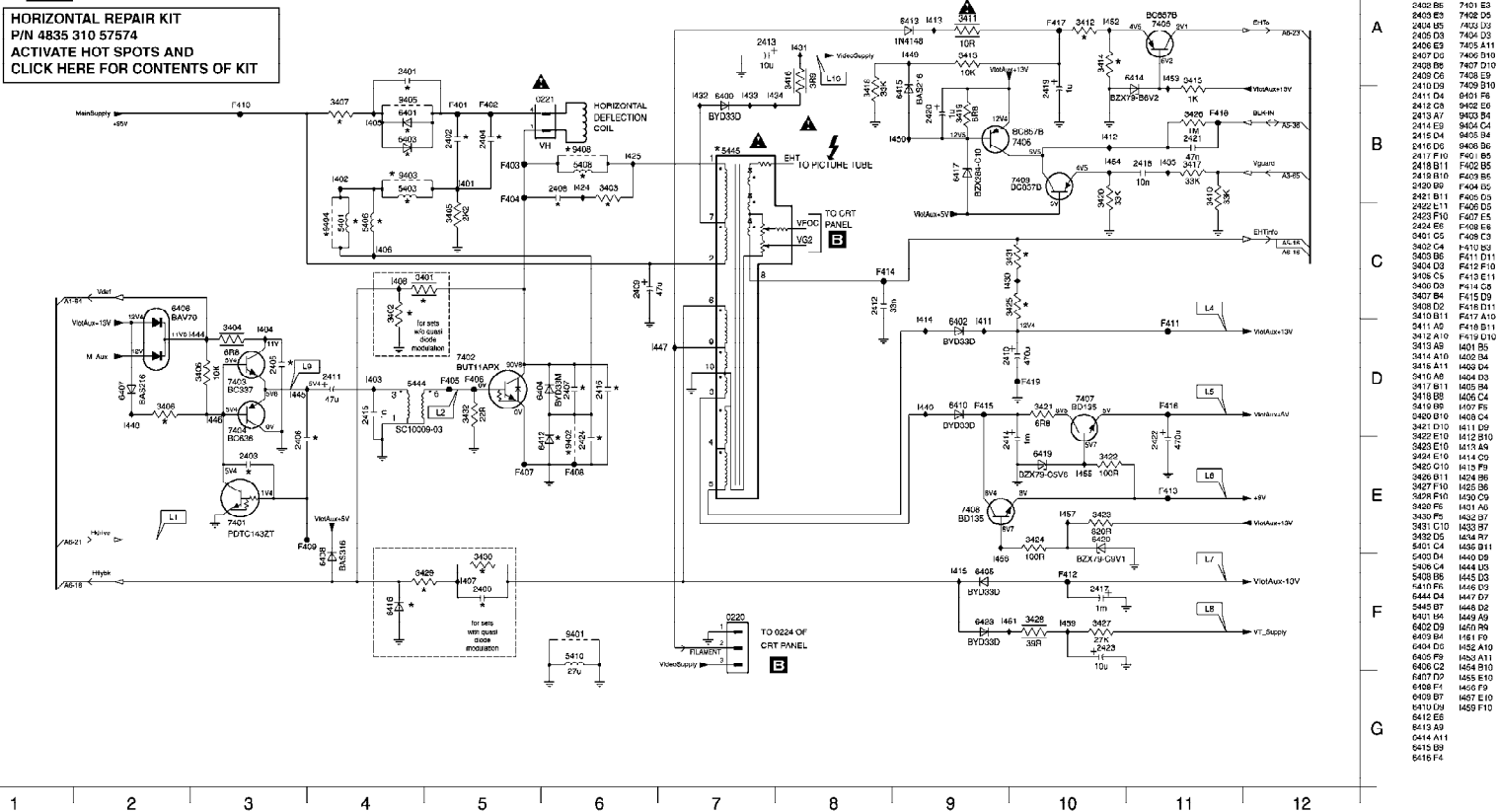
	Model 20LW202222 Cabinet Parts			
S AC01	AC Power Cord.	3135	010	04781
AC03	Cabinet, Back.	3139	124	35352
AC04	Cabinet, Front	3139	137	83621
AC05	Chassis Guide.	3135	014	00691
AC06	Control Buttons.	3139	137	83601
S AC08	CRT A48JLL40X46(M0).	9322	166	57682
AC09	Coil, Degaussing, 19V.	2422	549	44428
AC10	Holder, Degaussing (4 Used).	3135	013	01641
AC11	Light Guide.	3139	124	36021
AC13	Owner's Manual	3121	235	20192
AC14	Power Button	3139	137	83611
AC16	Speaker, 16 ohm, 5W.	2422	264	00411
AC18	ITC = Integrated Tube Component, CRT & Yoke Pre-Set	0000	000	00ITC
AC21	Battery, 1.5V, 2-Pack.	9299	000	65263
AC24	Degaussing Coil Spring	3139	121	26231
AC32	Braid, Assembly.	3135	010	07321
AC34	Wordmark (Not Shown)	3139	120	01391
REMOTE	Remote Transmitter RC19036001/01 . . .	3139	228	86491

L8 Chassis, Manual 7602



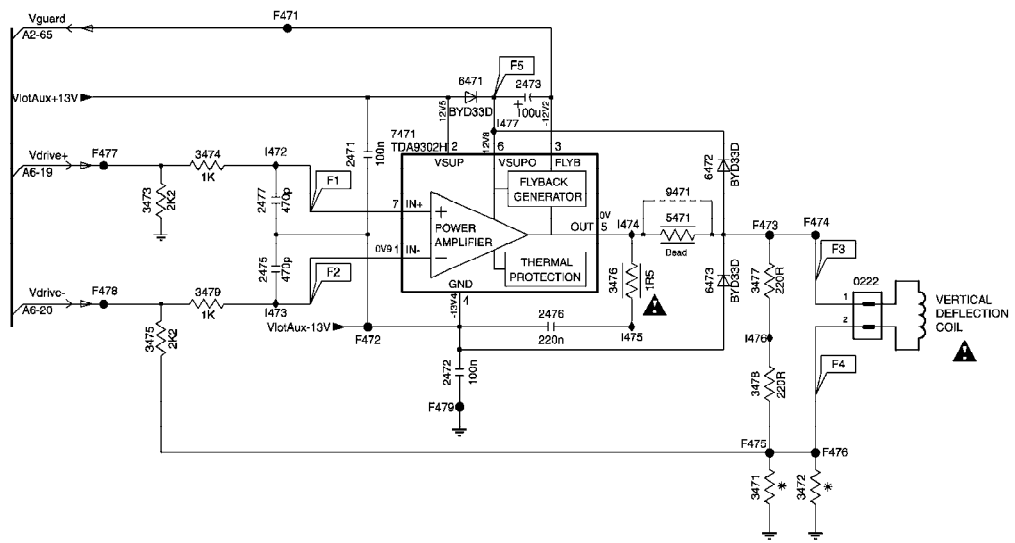


HORIZONTAL REPAIR KIT
P/N 4835 310 57574
ACTIVATE HOT SPOTS AND
CLICK HERE FOR CONTENTS OF KIT



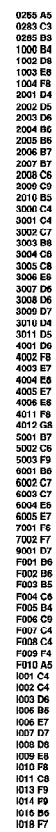
A 3 FRAME DEFLECTION

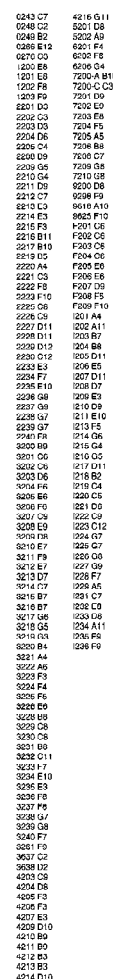
VERTICAL REPAIR KIT
P/N 4835 310 57573
ACTIVATE HOT SPOTS AND
CLICK HERE FOR CONTENTS OF KIT

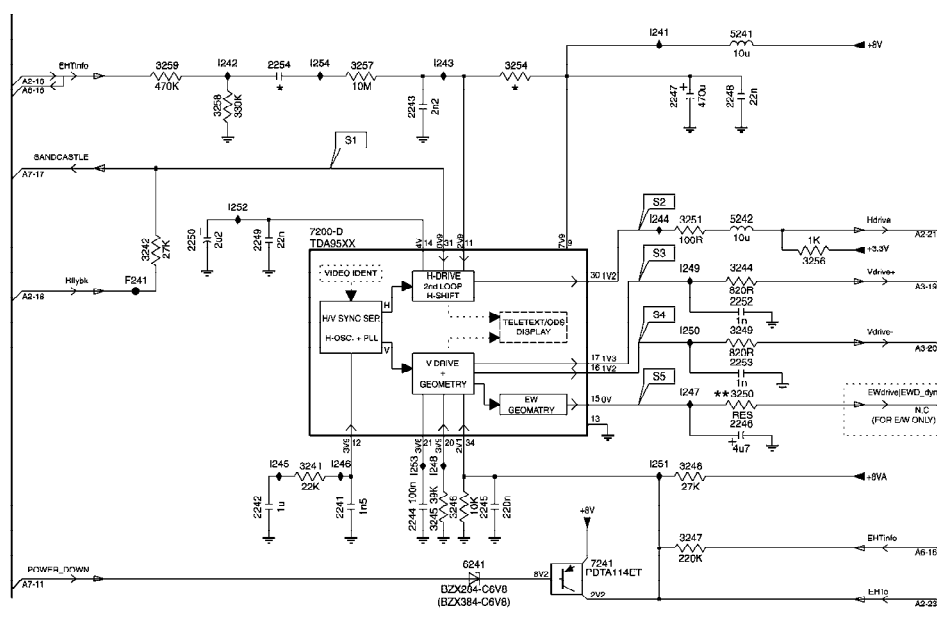


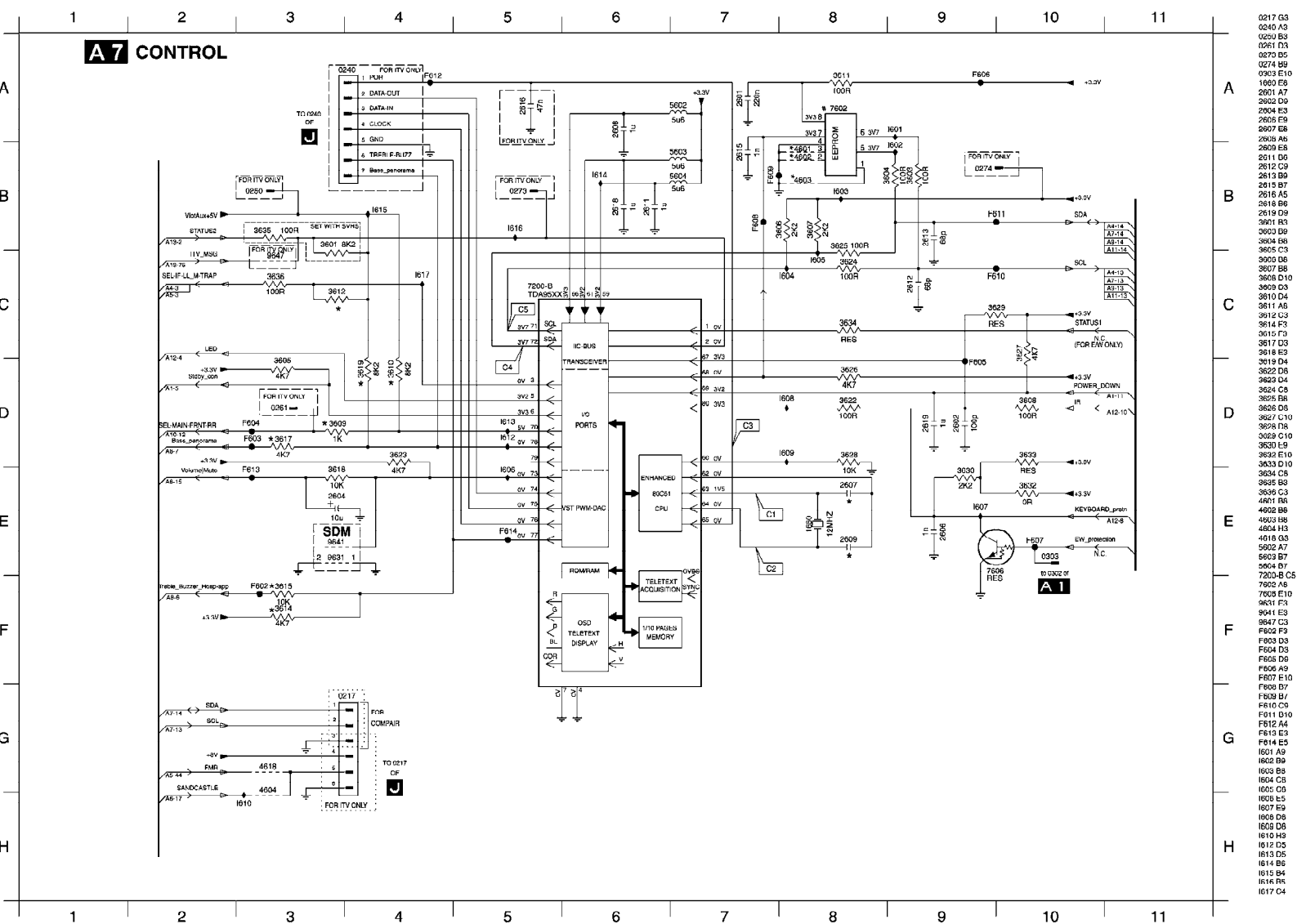
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2471 C5
2472 E6
2473 C6
2475 D4
2476 D6
2477 D4
3471 F7
3472 F8
3473 D4
3474 C4
3475 E4
3476 D7
3477 D7
3478 E7
3479 D4
5471 D7
6471 C6
6472 D7
6473 D7
7471 C5
9471 D7
F471 C5
F472 E5
F473 D8
F474 D8
F475 E7
F476 E8
F477 C3
F478 D3
F479 E6
I472 C4
I473 D4
I474 D7
I475 E7
I476 E7
I477 C6

A
B
C
D
E
F

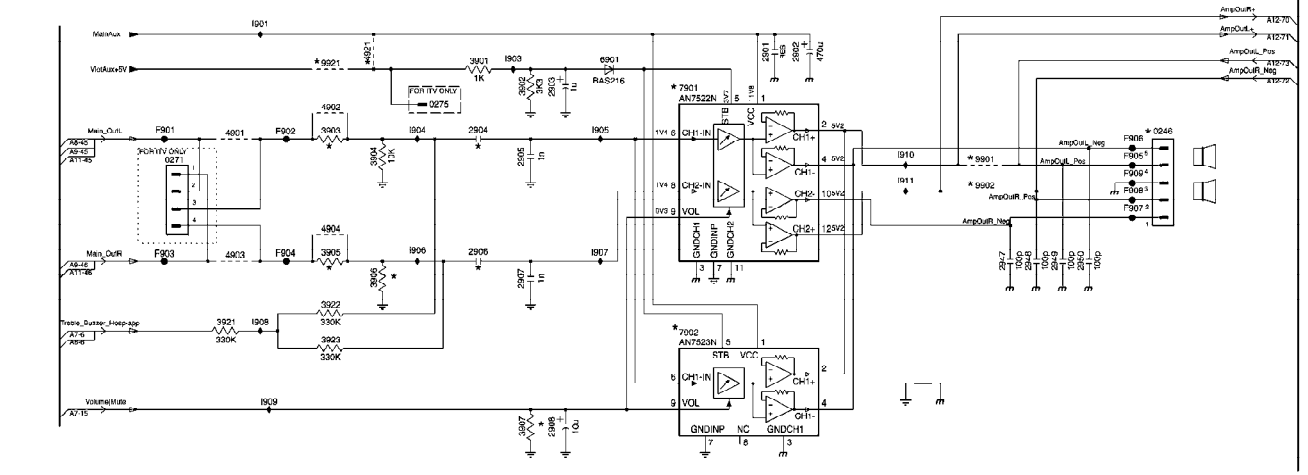




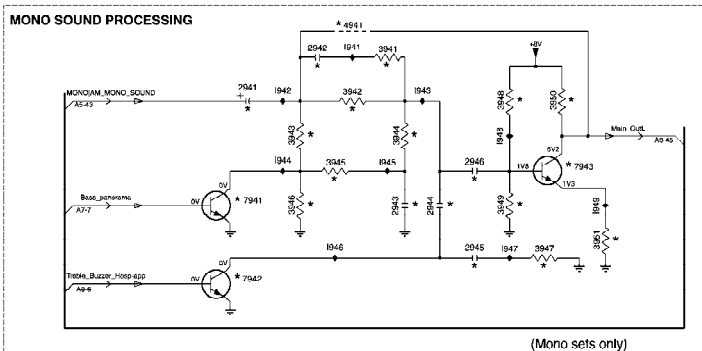




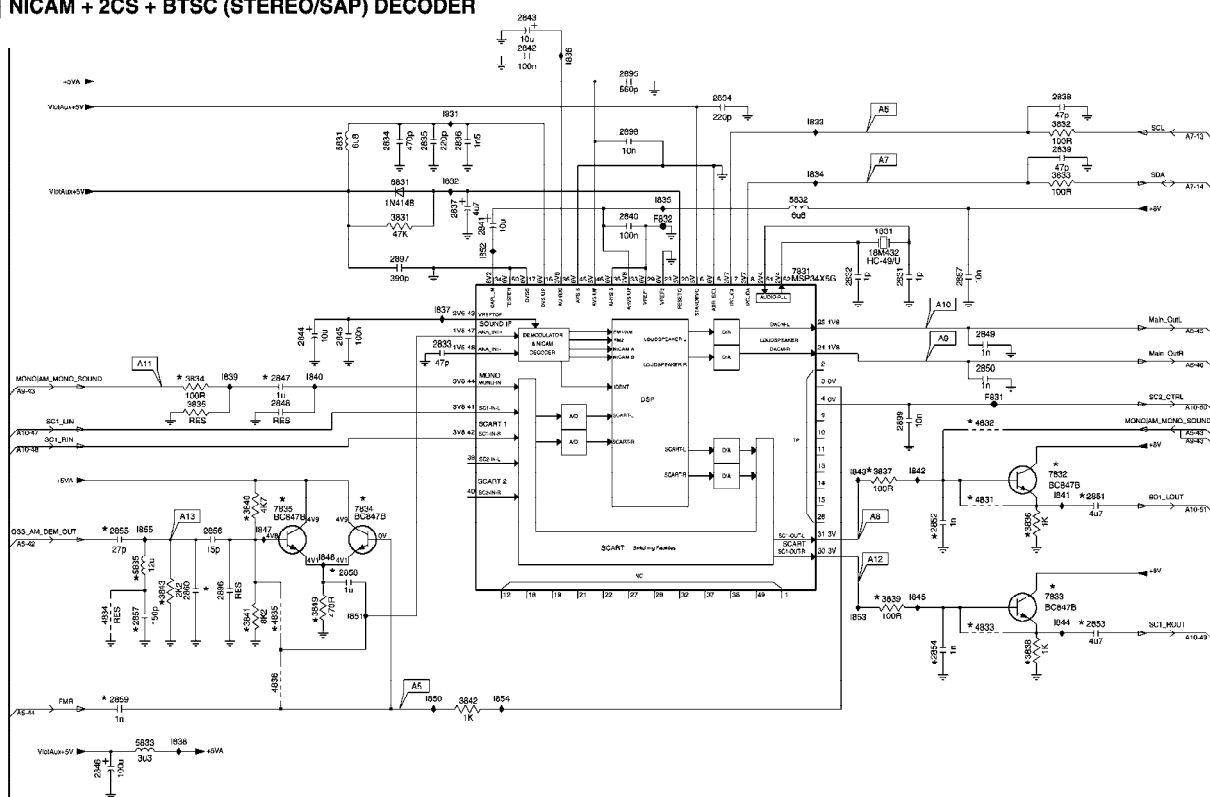
AUDIO AMPLIFIER



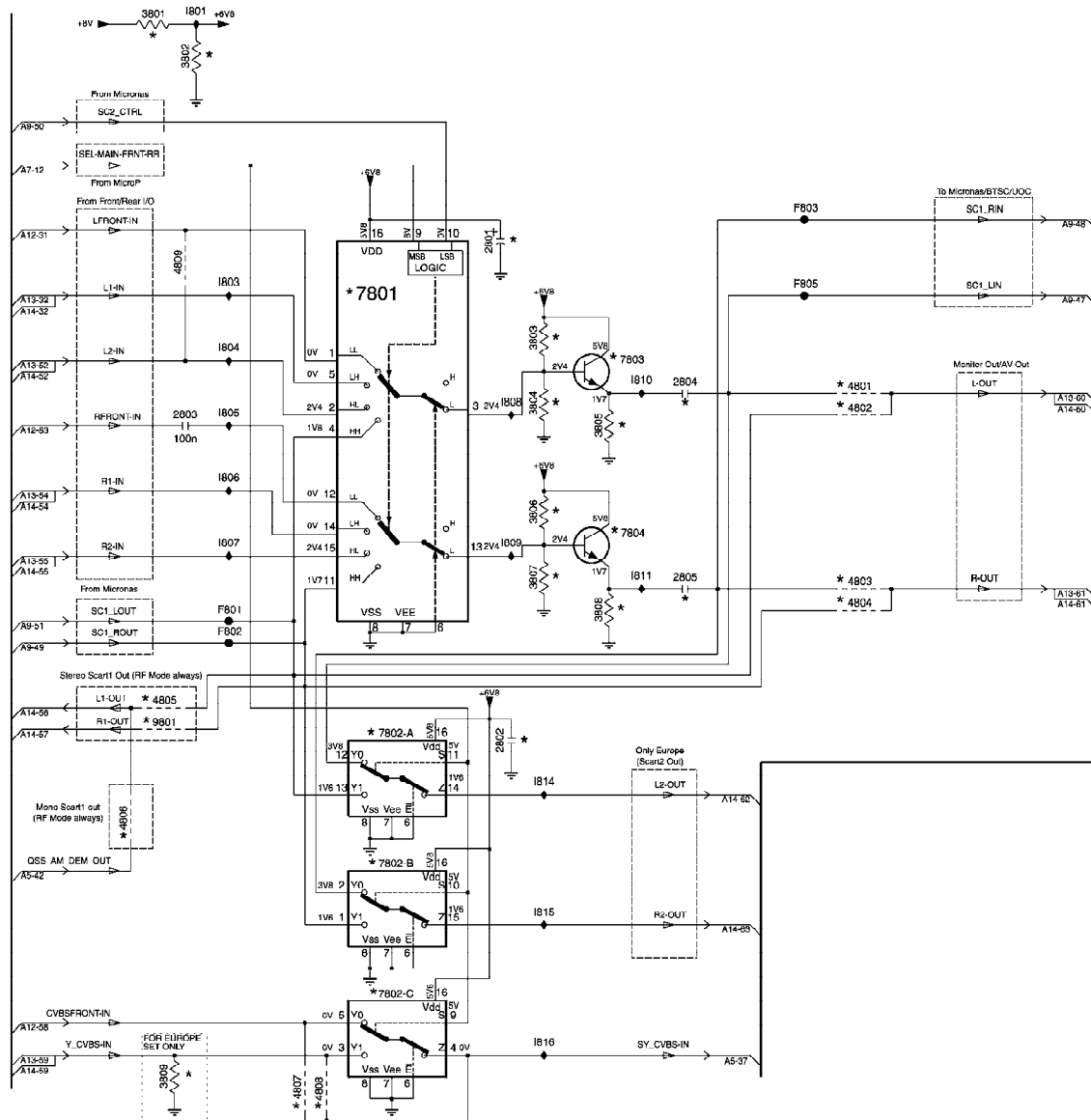
MONO SOUND PROCESSING



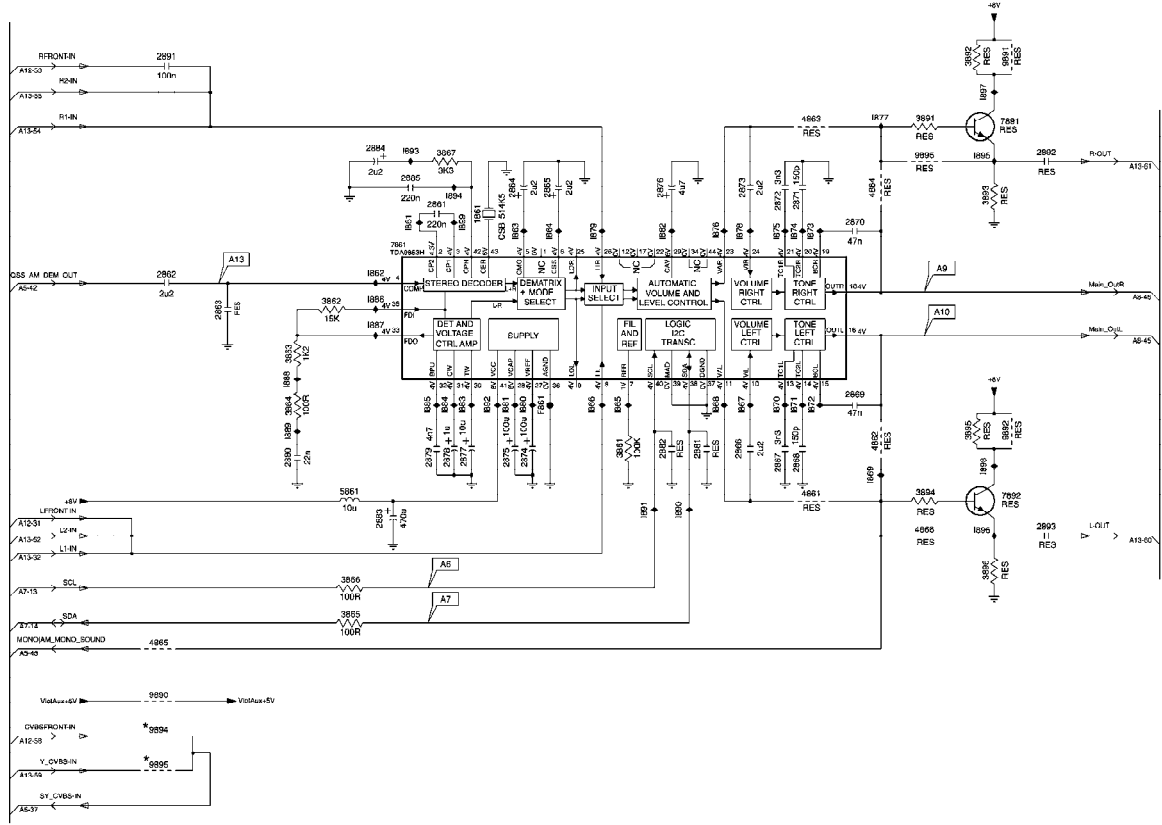
(Mono sets only)



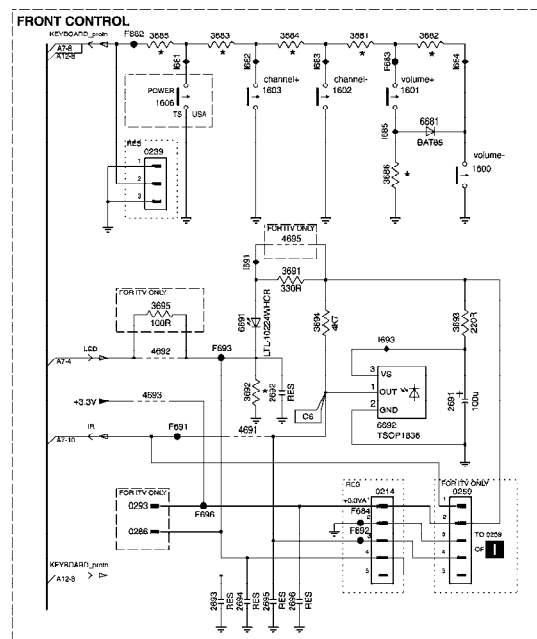
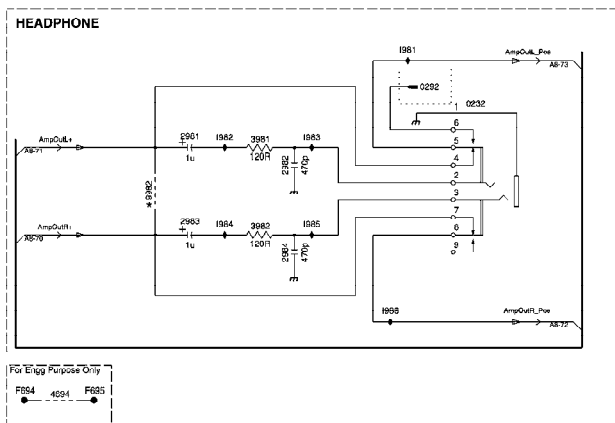
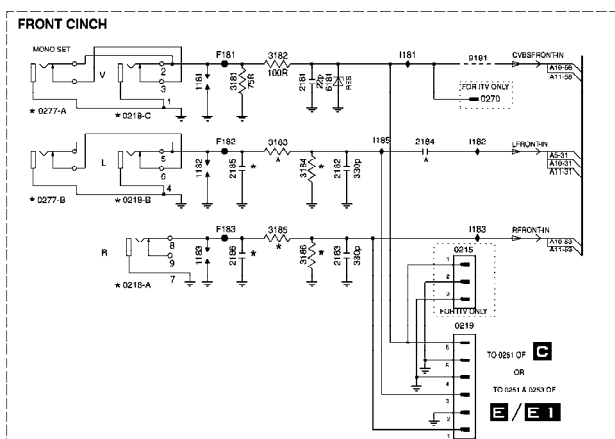
A 10 AUDIO/VIDEO SOURCE SWITCHING

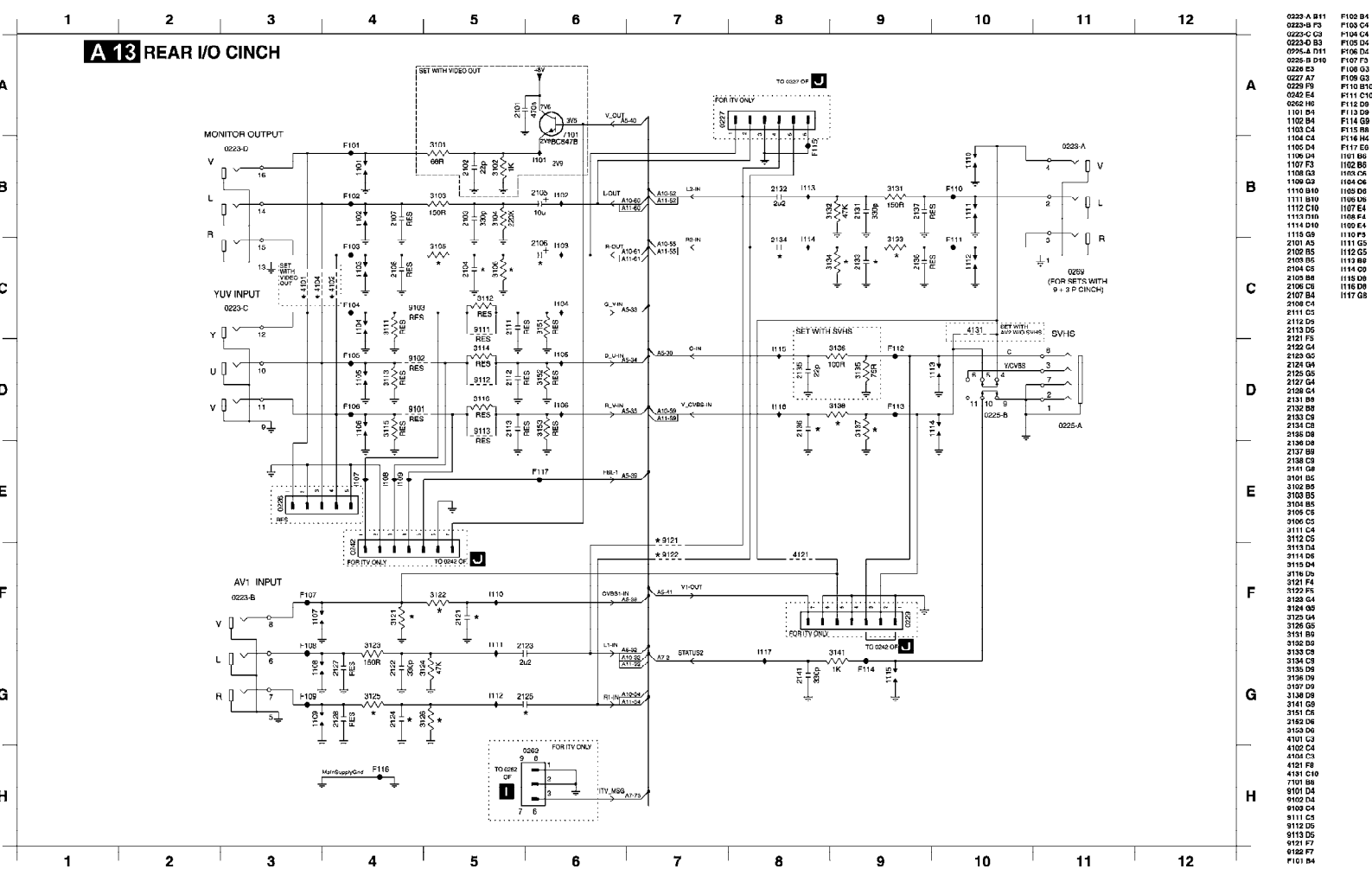


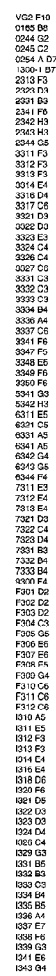
2801 B5
2802 F5
2803 D3
2804 C6
2805 E6
3801 A2
3802 A3
3803 C6
3804 D5
3805 D5
3806 D5
3807 E5
3808 E6
3809 H2
4801 C7
4802 D7
4803 E7
4804 E7
4805 F2
4806 F2
4807 H2
4808 H3
4809 C3
7801 C4
7802-A F4
7802-B G4
7802-C G4
7803 C5
7804 D5
9801 F2
F801 E3
F802 E3
F803 B7
F805 C7
I801 A3
I803 C3
I804 C3
I805 D3
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I810 C6
I811 E6
I814 F5
I815 G5
I816 H5

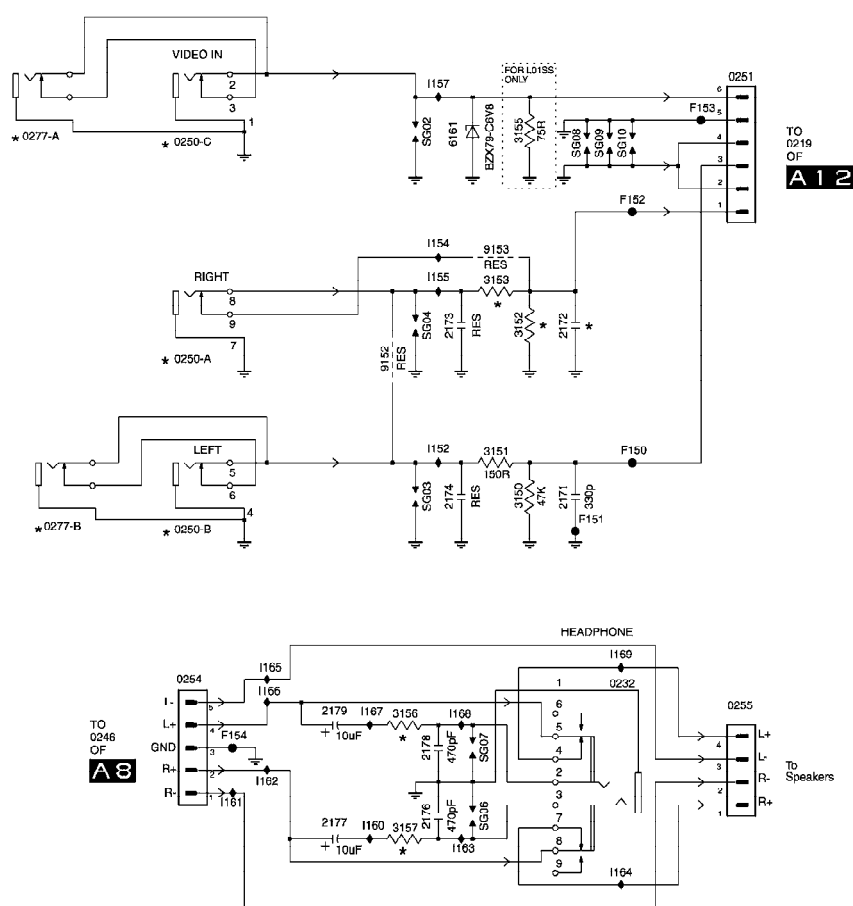
A 11 AUDIO - BTSC STEREO DECODER (ECONOMIC)

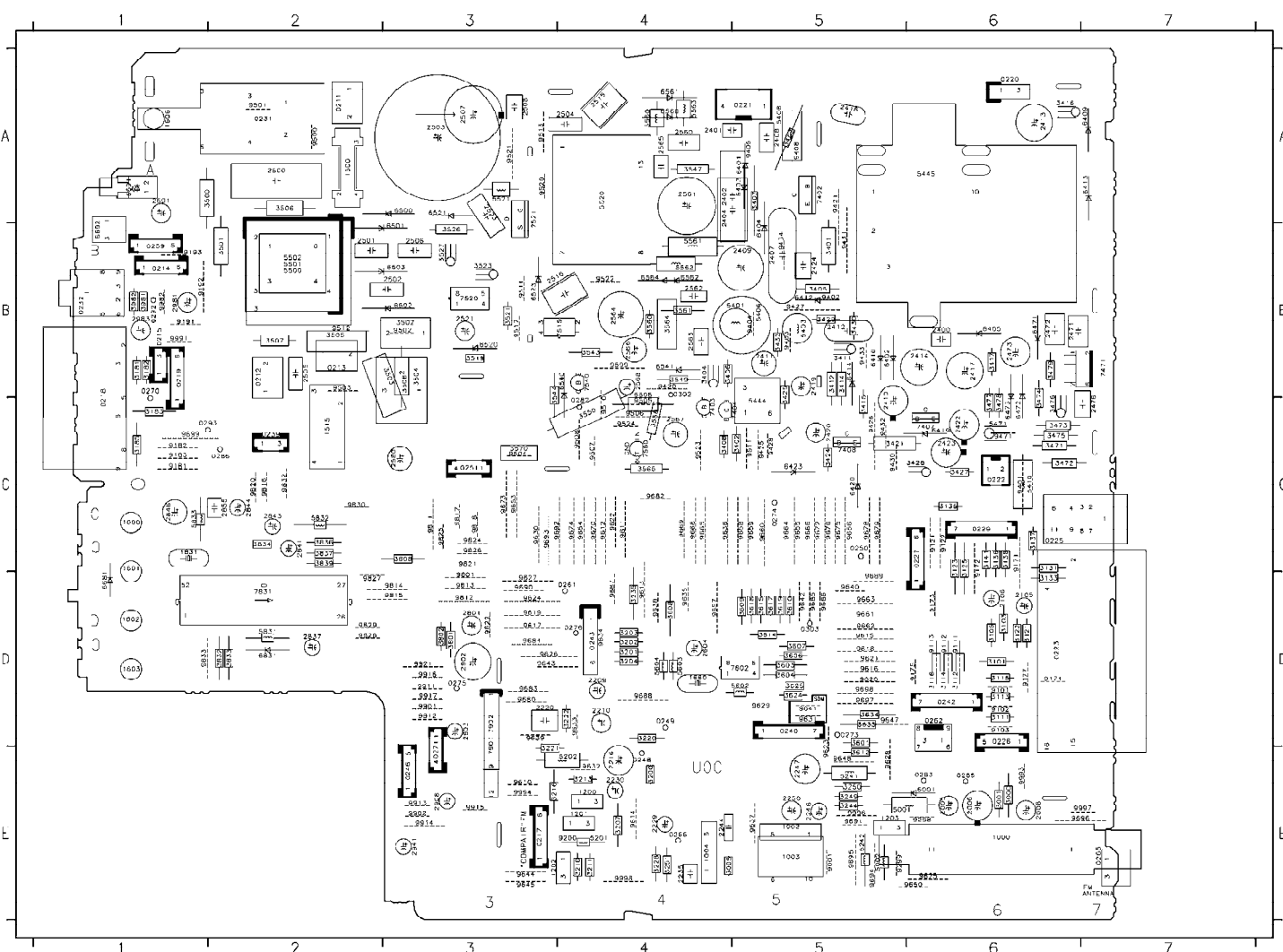
A 12 FRONT IO + FRONT CONTROL + HEADPHONE

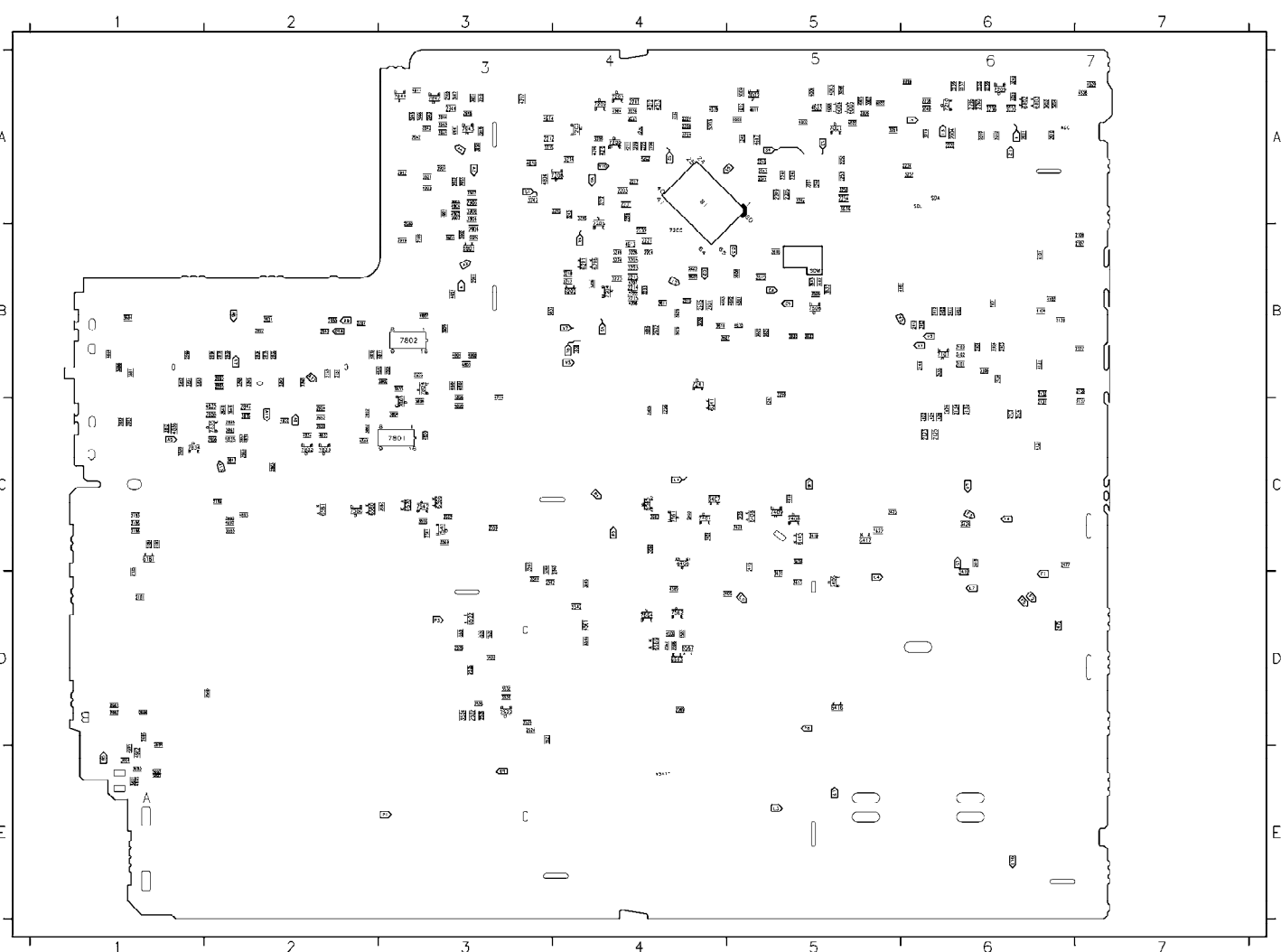


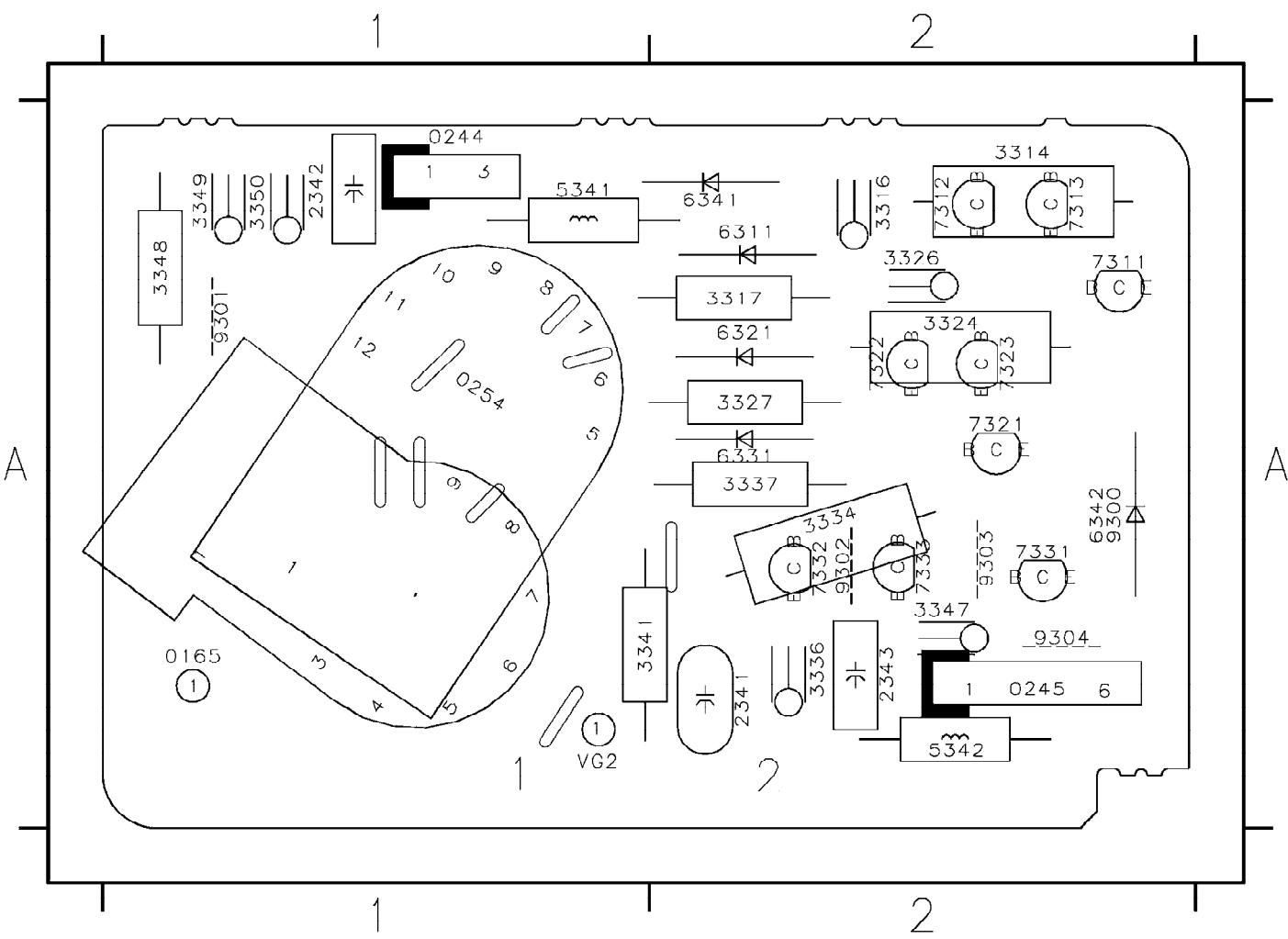




C SIDE AV PANEL + HP PANEL







VG2 A1
 0165 A1
 0244 A1
 0245 A2
 0254 A1
 1300 A1
 2341 A2
 2342 A1
 2343 A2
 3314 A2
 3316 A2
 3317 A2
 3324 A2
 3326 A2
 3327 A2
 3334 A2
 3336 A2
 3337 A2
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 3349 A1
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 9300 A2
 9301 A1
 9302 A2
 9303 A2
 9304 A2

