

Service
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Service Manual

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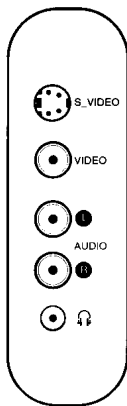
1. Technical specifications

1.1 Specifications

Mains voltage	: 220V - 240V (± 10%); 50-60Hz (± 5%)
Aerial input impedance	: coaxial 75 Ω
Minimal aerial voltage	: 30μV (VHF), 40μV (UHF)
Maximum aerial voltage	: 180 mV
Programmes	: 0-99
VCR programmes	: 0, 90-99

1.2 Specification of the terminal sockets

1.2.1 Front connections

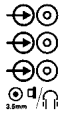


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Figure 1-1

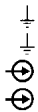
Audio/Video

- Video 1Vpp/75Ω
- Audio L(0.5Vrms ≥10kΩ)
- Audio R(0.5Vrms ≥10kΩ)
- Headphone (32-600Ω ≥10mΩ)

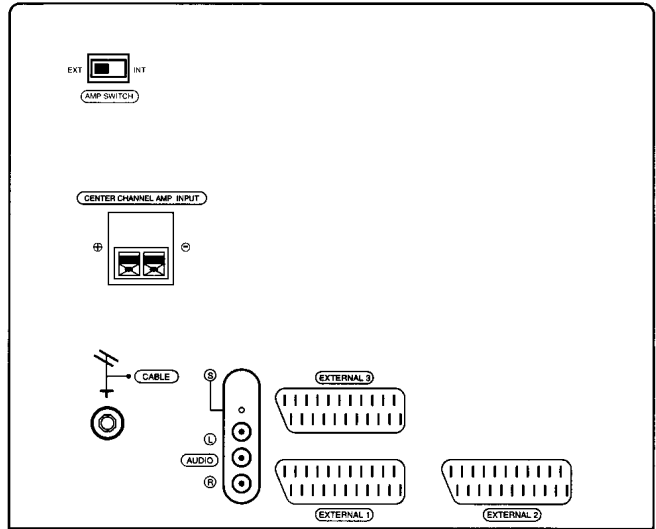


SVHS

- 1 -
- 2 -
- 3 - Y (1Vpp; 75Ω)
- 4 - C (0.3 Vpp; 75Ω)



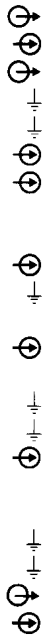
External 1 (in/out): RGB+CVBS



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Figure 1-2

- 1 - Audio R (0.5Vrms ≤1kΩ)
- 2 - Audio R (0.5Vrms ≥10kΩ)
- 3 - Audio L (0.5Vrms ≤1kΩ)
- 4 - Audio
- 5 - Blue
- 6 - Audio L (0.5Vrms ≥10kΩ)
- 7 - Blue (0.7Vpp/75Ω)
- 8 - CVBS-status 0-1.3V:INT
4.5-7V:EXT 16:9
9.5-12V:EXT 4:3
- 9 - Green
- 10 -
- 11 - Green (0.7Vpp/75Ω)
- 12 -
- 13 - Red
- 14 - RGB-status
- 15 - Red (0.7Vpp/75Ω)
- 16 - RGB-status 0-0.4V:INT
1-3V:EXT/75Ω
- 17 - CVBS
- 18 - CVBS
- 19 - CVBS (1Vpp/75Ω)
- 20 - CVBS (1Vpp/75Ω)
- 21 - Earth socket



External 2 (in/out): SVHS+RGB+CVBS (intended for VCR.)

- 1 - Audio R (0.5Vrms ≤1kΩ)
- 2 - Audio R (0.5Vrms ≥10kΩ)
- 3 - Audio L (0.5Vrms ≤1kΩ)
- 4 - Audio
- 5 - Blue
- 6 - Audio L (0.5Vrms ≥10kΩ)
- 7 - Blue / Chroma out (0.7Vpp/75Ω)
- 8 - CVBS-status 0-1.3V:INT
4.5-7V:EXT 16:9
9.5-12V:EXT 4:3
- 9 - Green
- 10 - Easy link
- 11 - Green (0.7Vpp/75Ω)
- 12 -
- 13 - Red
- 14 - RGB-status



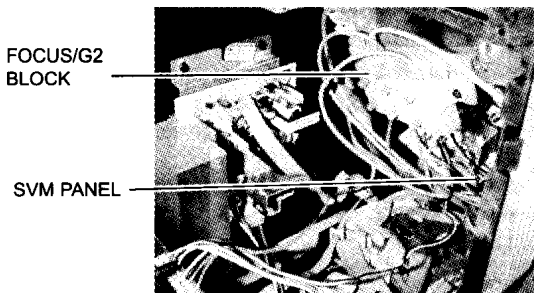
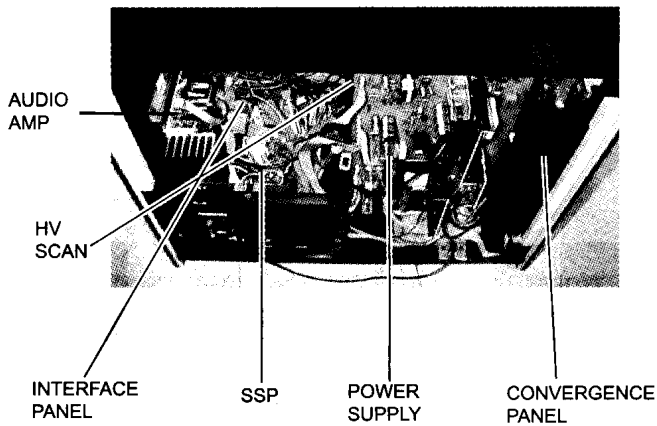
1.2.2 Rear connections

See figure 1.2

- 15- Red / chroma- in (0.7Vpp/75Ω) ⊕
- 16- RGB-status (0-0.4V:INT
1-3V:EXT/75Ω)
- 17- CVBS ⊕
- 18- CVBS ⊕
- 19- Y/CVBS (1Vpp/75Ω) ⊕
- 20- Y/CVBS (1Vpp/75Ω) ⊕
- 21- Earth socket

External 3 (in): CVBS+Audio (optional)

- 1 -
- 2 - Audio R (0.5Vrms >10kΩ) ⊕
- 3 -
- 4 - Audio ⊕
- 5 -
- 6 - Audio L (0.5Vrms>10kΩ) ⊕
- 7 -
- 8 - CVBS-status 0-1.3V:INT
4.5-7V:EXT 16:9
9.5-12V:EXT 4:3 ⊕
- 9 -
- 10-
- 11-
- 12-
- 13-
- 14-
- 15-
- 16-
- 17- CVBS ⊕
- 18- CVBS ⊕
- 19-
- 20- CVBS (1Vpp/75Ω) ⊕
- 21- Earth socket




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Figure 1-3

2. Safety instructions, Maintenance instruction, Warnings and Notes

2.1 Safety instructions for repairs

1. Safety regulations require that during a repair:
 - The set should be connected to the mains via an isolating transformer;
 - Safety components, indicated by the symbol , should be replaced by components identical to the original ones;
 - When replacing the CRT, safety goggles must be worn.
2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.
 - As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular ('general repair instruction'):
 - All pins of the line output transformer (LOT);
 - Fly-back capacitor(s);
 - S-correction capacitor(s);
 - Line output transistor;
 - Pins of the connector with wires to the deflection coil;
 - Other components through which the deflection current flows.
 - Note:
 - This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.
 - The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
 - The insulation of the mains lead should be checked for external damage.
 - The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
 - The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
 - Unplug the mains cord and connect a wire between the two pins of the mains plug;
 - Set the mains switch to the "on" position (keep the mains cord unplugged!);
 - Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ
 - Switch off the TV and remove the wire between the two pins of the mains plug.
 - The cabinet should be checked for defects to avoid touching of any inner parts by the customer.


2.2 Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:

- When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.
- When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
- The maintenance inspection contains the following actions:
 - Execute the above mentioned 'general repair instruction'.



- Clean the power supply and deflection circuitry on the chassis.
- Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

1. ESD 
2. All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
3. Available ESD protection equipment:
 - Complete kit ESD3 (small table mat, Wristband, Connection box, Extension cable and Earth cable) 4822 310 10671
 - Wristband tester 4822 344 13999
4. In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 2-4 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).
5. Together with the deflection unit and any multipole unit, the flat square picture tubes used form an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
6. Be careful during measurements in the high-voltage section and on the picture tube.
7. Never replace modules or other components while the unit is switched on.
8. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
9. Wear safety goggles during replacement of the picture tube.

2.4 Notes

The direct voltages and oscillograms should be measured with regard to the tuner earth (\perp), or hot earth ($\perp f$) as this is called. The direct voltages and oscillograms shown in the diagrams are indicative and should be measured in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L:3 kHz, R:1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.

Where necessary, the oscillograms and direct voltages are measured with  and without aerial signal . Voltages in the power supply section are measured both for normal operation (\textcircled{D}) and in standby (\textcircled{S}). These values are indicated by means of the appropriate symbols.

The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

4. Disassembly procedure

4.1 To remove the rear cover

1. Remove the 10 screws located on the sides and bottom of the lower center rear cover (1).
2. Remove the 3 screws on the bottom of the plastic upper rear cover (2). Remove the lower center rear cover (1).

Note: If you are only servicing a PWB or loudspeaker, you do not have to remove the plastic upper rear cover.

1. Remove the remaining 11 screws located in the upper rear cover (2). Lift cover up to dislodge from pegs and remove the cover.
2. Remove the 6 screws located in the mirror mounting board (18) and remove the board.

Note: care should be taken NOT to place fingerprints or smudges on the mirror.

1. Remove the 2 screws located in the plastic light barrier (16) and remove the barrier.
2. Remove the 12 screws located in the end rear covers (3), 6 per cover, and remove each cover.

4.2 To remove the optical assembly or individual light box assemblies

1. Separate CRT boards from assemblies to be removed.
2. To remove the optical assembly, loosen the 4 screws located in the assembly and lift assembly up and out.
3. To remove individual assemblies, loosen the 4 screws located in the assembly you wish to remove and lift the assembly up and out.

4.3 To remove the digital convergence panel

1. Remove the 2 screws located in the digital convergence panel frame. Lift the frame and panel to remove.

4.4 To remove the 25W amplifier panel

1. Remove the 2 screws located at the top of the 25W amplifier panel frame. Lift the frame and panel to remove.

4.5 To remove the rear switch panel

1. Remove the 2 screws located on the bottom of the rear switch panel. Press 2 tabs on the right side, slide back and remove the panel.

4.6 To remove the power supply

1. Remove the 3 screws located in the power supply panel. Press 3 tabs on the left side and remove the panel.

4.7 To remove the interface panel

1. Pull 2 tabs in the front of the interface panel. Lift the panel and slide forward to remove.

4.8 To remove the side jack panel

1. Remove 2 screws from the side jack panel frame. Slide the panel out to remove.

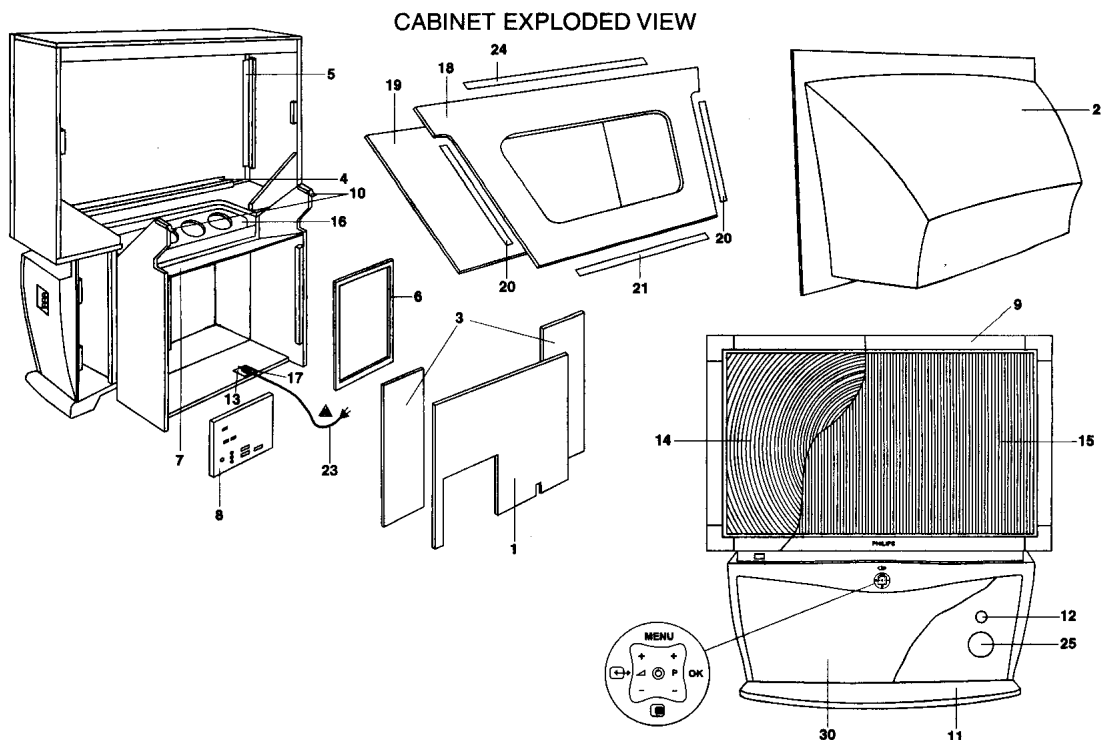


Figure 4-1

5. Service modes, error codes and protections

In this chapter the following paragraphs are included:

- 5.1 Test points
- 5.2 Service modes and Dealer Service Tool and ComPair (including fault finding tips related to CSM-mode)
- 5.3 Error codes
- 5.4 Fault find tree

5.1 Test points

The MG5.1E chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

- P1-P2-P3, etc.: Test points for the power supply.
- L1-L2-L3, etc.: Test points for the line drive and line output circuitry.
- F1K-F2K-F3K, etc on Small Signal Panel: Test points for the frame drive.
- F1F-F2F-F3F, etc. on CRT/Scavem Panel: Test points for the CRT-panel circuitry.
- F1-F2-F3, etc. on Large Small Signal Panel: Test points for the frame output circuitry.
- S1-S2-S3, etc: Test points for the synchronisation circuitry.
- V1-V2-V3, etc: Test points for the video processing circuitry.
- I1-I2-I3, etc: Test points for the Tuner/IF part.
- A1-A2-A3, etc. on Small Signal Panel: Test points for the audio processing circuitry.
- A1-A2-A3, etc. on Large Signal Panel: Test points for the audio amplifiers.
- C1-C2-C3, etc: Test points for the control circuitry.
- T1-T2-T3, etc: Testpoints for the teletext circuitry.
- SC1-SC2-SC3, etc: Test points for the Scavem circuitry.

The numbering is done in a for diagnostics logical sequence; always start diagnosing within a functional block in the sequence of the relevant test points for that functional block.

5.2 Service modes, Dealer Service Tool and ComPair

For easy installation and diagnosis the dealer remote control RC7150 is introduced. The RC7150 can be used for all new TV sets, including all set of the MG5.1E chassis. The RC7150 is also called Dealer Service Tool or DST. The ordering number of the DST (RC7150) is 4822 218 21232.

5.2.1 Installation features for the dealer

The dealer can use the RC7150 for programming the TV-set with presets. 10 Different program tables can be programmed into the DST via a TV-set (downloading from the GFL, MD2 or MG2.1 to the DST; see GFL, MD2 and MG2.1 service manuals) or by the DST-I (DST interface; ordering code 4822 218 21277).

For explanation of the installation features of the DST, the directions for use of the DST (4822 727 20073) are recommended (for the MG5.1E chassis, download code 4 should be used).

5.2.2 Diagnose features for the servicer

The MG5.1E sets can be put in the two service modes via the DST RC7150. These are the Service Default Mode (SDM) and the Service Alignment Mode (SAM). The SDM and SAM can also be entered by short circuiting the relevant pins on the SSP.

Service Default Mode (SDM)

Specification of the SDM:

- Tuning frequency 475.25 MHz.
- TV-system for BGLM sets set to BG, for BGLL'I sets to LL'.
- All picture settings at 50% (brightness, colour, contrast, HUE).
- All sound settings at 50% except volume at 25% (so bass, treble, balance at 50%, volume at 25%).
- All service-unfriendly modes are disabled (like sleep timer, child lock, blue mute).

Entering the SDM can be done in 2 ways:

- By the "DEFAULT" key on the DST while the set is in the normal operation mode.
- By short-circuiting for a moment the two pins (pin 2 and 3 of connector 0356) on the component side of the SSP with the indication "SDM" (activation can be performed in all modes except when the set has a problem with the main-processor).

Note: If the SDM is entered via the pins, all the protections are de-activated.

Exiting the SDM can only be done via the STANDBY command. By switching off-on the set with the mains switch the MG5.1E will come up again in the SDM.

Service Alignment Mode (SAM)

Specification of the SAM:

- Software alignments (see chapter 8).
- Option settings (see chapter 8).
- Error buffer reading and erasing. The most recent error code is displayed on the left side.
- Operation counter.
- Software version.

Entering the SAM can be done in 2 ways:

- By the button on the DST while the set is in the normal operation mode (or SDM). Enter the password '3-1-4-0' and press OK.
- By short-circuiting for a moment the two pins (pin 1 and 2 of connector 0356) on the component side of the SSP with the indication "SAM" (activation can be performed in all modes except when the set has a problem with the microprocessor).

Note: If the SAM is entered via the pins, all protections are de-activated.

Exiting the SAM can be done via the MENU command or via switching off-on the set with the mains switch.

Customer Service Mode (CSM)

All MG5.1E sets are equipped with the 'Customer Service Mode' (CSM). This 'Customer Service Mode' is a special service mode which can be activated and deactivated by the customer upon request of the service technician/dealer 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.

Switching-on of the Customer Service Mode

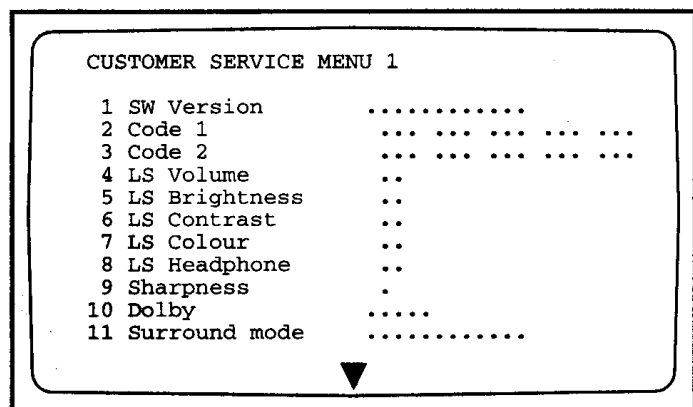
The Customer Service Mode will switch-on after pressing simultaneously the "MUTE" knob on the remote control handset and the "MENU" button on the TV for at least 4 seconds. This activation only works if there is no menu on the screen.

Switching-off the Customer Service Mode

The Customer Service Mode will switch-off after pressing any key of the remote control handset (with exception of the "cursor-up" and "cursor-down" keys), or the buttons on the TV or by switching off the TV set with the mains switch.

Detailed explanation of the Customer service Mode

After switching on the Customer Service Menu the following screen will appear:



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Figure 5-1 Customer Service Menu 1

Line 1: Software version; the build in software version (AAAABCX.Y)

- AAAA= MG21(chassis name)
- B = E (Europe)
- C = 1 (language cluster)
- X = main version number
- Y = sub version number

Details on the software version can be found in the chapter "Software Survey" of the publication "Product Survey - Colour Television".

Line 2: Code 1; gives the last 5 errors of the error buffer.

As soon as the built-in diagnose software has detected an error the buffer is adapted.

Line 3: Code 2; gives the first 5 errors of the error buffer.

As soon as the built-in diagnose software has detected an error the buffer is adapted.

The last occurred error is displayed on the leftmost position of code 2. Each error code is displayed as a 3 digit number. When less than 10 errors occur, the rest of the line(s) is(are) empty. In case of no errors the text "No Errors" is displayed. See paragraph 5.3 of this chapter for a description of the error codes.

Line 4: LS Volume; gives the Last Status of the volume as set by the customer for this selected transmitter.

The value can vary from 0 (volume is minimum) to 24 (volume is maximum). Volume values can be changed via the volume key on the remote control handset.

Line 5: LS Brightness; gives the Last Status of the brightness as set by the customer for this selected transmitter.

The value can vary from 0 (brightness is minimum) to 63 (brightness is maximum). Brightness values can be changed via the "cursor left" and "cursor right" keys on the remote control handset after pressing the red button for picture menu and selecting "brightness".

Line 6: LS Contrast; gives the Last Status of the contrast as set by the customer.

The value can vary from 0 (contrast is minimum) to 63 (contrast is maximum). Contrast values can be changed via "cursor left" and "cursor right" keys on the remote control handset after pressing the red button for picture menu and selecting "contrast".

Line 7: LS Colour; gives the Last Status of the colour saturation, as set by the customer.

The value can vary from 0 (colour is minimum) to 63 (colour is maximum). Colour values can be changed via "cursor left" and "cursor right" keys on the remote control handset after pressing the red button for picture menu and selecting "colour".

Line 8: LS Headphone; gives the Last Status of the headphone volume, as set by the customer.

The value can vary from 0 (volume is minimum) to 24 (volume is maximum). Headphone volume values can be changed via the "cursor left" and "cursor right" keys on the remote control handset after pressing the green button for sound menu and selecting "headphone".

Line 9: Sharpness; gives the sharpness value. The value can vary from 0 (sharpness is minimum) to 7 (sharpness is maximum).

In case of bad antenna signals a too high value of the sharpness can result in a noisy picture. Sharpness values can be changed via the "cursor left" and "cursor right" keys on the remote control handset after pressing the red button for picture menu and selecting "sharpness".

Line 10: Dolby; indicates whether the received transmitter transmits Dolby sound (present) or not (not present).

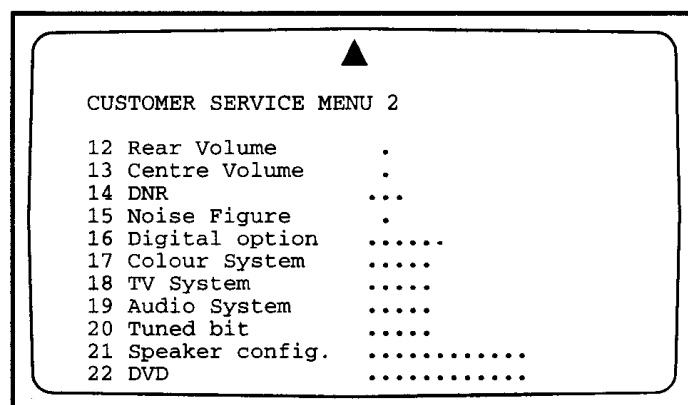
Attention: The presence of Dolby can only be tested by the software on the Dolby Signalling bit. If a Dolby transmission is therefore received without a Dolby Signalling bit, then this indicator will show "not present" even though such a Dolby transmission is received.

Line 11: Surround Mode; indicates the by the customer selected surround mode.

In case the set is a Non-Dolby set there will be displayed "0". If it is a Dolby-set then is displayed: "Pro Logic", "Dolby 3 Stereo", "Hall" or "Off". For Dolby-set surround mode can be changed via the "cursor left" and "cursor right" keys on the remote control handset after pressing the green button for sound menu and selecting "Surround settings".

By means of the "cursor-down" knob on the remote control handset the Customer Service Menu 2 will appear. By means of the "cursor-up" knob on the remote control handset the Customer Service Menu 1 will appear again.

Customer Service Menu 2 represents following information:



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Figure 5-2 Customer Service Menu 2

Line 12: Rear Volume; gives the volume value of the surround sound loudspeakers.

This value can vary from 0 (minimum volume) to 63 (maximum volume). Rear volume can be changed via the "cursor left" and "cursor right" keys on the remote control handset after pressing

the green button for sound menu, selecting "Surround settings" and selecting "Rear volume". This feature is only available when surround mode is in "Dolby Pro Logic" or "Hall".

Line 13: Centre Volume; gives the volume value of the centre loudspeakers. This value can vary from 0 (minimum volume) to 63 (maximum volume). Centre volume can be changed via the "cursor left" and "cursor right" keys on the remote control handset after pressing the green button for sound menu, selecting 'Dolby Pro Logic' and selecting "centre volume". This feature is only available when surround mode is in "Dolby Pro Logic" or "Dolby 3 Stereo".

Line 14: DNR (Dynamic Noise Reduction); gives the setting of the DNR for the selected transmitter. The following selections are possible:

- "off", "min", "med" or "max"
- "off" or "automatic" (MG5.1E with "Automatic Noise Reduction").

The DNR can be changed via the "DNR" key on the remote control handset.

Line 15: Noise Figure; gives the selected noise ratio for this selected transmitter.

This value can vary from 0 (good signal) to 127 (average signal) and to 255 (bad signal). This only works in case the DNR selection is "off/automatic".

Line 16: Digital Option; gives the selected digital mode, "100Hz", Digital Scan" or "Natural Motion". Digital option can be changed via the "cursor left" and "cursor right" keys on the remote control handset after pressing the red button for picture menu and selecting "digital options".

Line 17: Colour System; gives information about the colour system of the selected transmitter.

- Black and white: No colour carrier received
- PAL: PAL signal received
- SECAM: SECAM signal received
- NTSC: NTSC signal received

Line 18: TV System; gives information about the video system of the selected transmitter.

- BG: BG signal received
- DK: DK signal received
- I: PAL I signal received
- L: SECAM L signals received
- M38.9: NTSC M signal received with video carrier on 38.9 MHz
- MN: NTSC M signal received

Line 19: Audio System; gives information about the audio system of the selected transmitter.

- Sound Muted: No sound
- Dolby Pro Logic: Dolby Pro Logic sound received
- Mono: Mono sound received
- Stereo: Stereo sound received
- Dual I: Language I received
- Dual II: Language II received
- Digital Mono: Digital mono sound is received
- Digital Stereo: Digital stereo sound is received
- Digital Dual I: Digital language I is received
- Digital Dual II: Digital language II is received

Line 20: Tuned Bit; gives information about the tuning method of the stored preset.

If the value is "Yes" the preset is stored via manual entry of the frequency when a transmitter was not present on that frequency. In that case the TV will attempt to perform a micro-search every time the preset number is selected. Once the micro-search has been successful the Tuned Bit will be set to "No".

Line 21: Speaker configuration; gives the configuration setting for the speakers.

In case the set is a Non-Dolby set there will be displayed "0". If it is a Dolby-set then is displayed: "Full internal", "L/R external", "Surround external" or "Full external". For the Dolby-set the speaker configuration can be changed via the "cursor left" and "cursor right" keys on the remote control handset after opening the installation menu and selecting "set-up". The installation menu can be opened by pressing "timer" and "enlarge" at the same time. This feature is only available when the set has virtual Dolby.

Line 22: DVD; gives the configuration setting for DVD. This can be "Present" or "Not Present".

If "Present" is selected the starting point is a top quality signal and a number of settings are therefore changed automatically. DVD can be changed via the "cursor left" and "cursor right" keys on the remote control handset after opening the installation menu and selecting "set-up". The installation menu can be opened by pressing "timer" and "enlarge" at the same time.

Problems and solving tips

The procedures to change the value or the status of the different settings is described in the paragraph 'Detailed explanation of the Customer Service Mode'.

Picture problems

Worse picture quality in case of DVD pictures Check line 22 "DVD". In case line 22 gives the indication "Not Present" change the setting into "Present".

Snowy/noisy picture

1. Check line 15 "Noise Figure". In case the value is 127 or higher and the value is also high on other programs check the aerial cable/aerial system.
2. Check lines 9 "Sharpness", 14 "DNR" and 15 "Noise Figure". In case the value of line 9 is 3 or 4 and the value of line 15 is high (127 or higher), lower the value of line 9 "sharpness" and switch DNR (line 14) to "automatic", "on" or to a higher value.

Picture too dark

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 "LS Brightness" and 7 "LS Contrast". The value of line 6 is low (<10) or the value of line 7 is low ((10). Raise the brightness value or raise the contrast value.

Picture too bright

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 "LS Brightness" and 7 "LS Contrast". The value of line 6 is high (>40) or the value of line 7 is high ((50). Reduce the brightness value or raise the contrast value.

Fading picture

Digital scan effect. Check line 14 "DNR". The status of "DNR" is 'med' or 'max'. Reduce "DNR" to 'min' or switch off the digital scan.

White line around picture elements and text

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
3. Check line 8 "Sharpness". Reduce the sharpness value. The new value(s) are automatically stored for all TV channels

No picture.

Check line 20 "Tuned bit". In case the value is 'Yes', install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation.

Blue picture. No proper signal is received.

Check the aerial cable/aerial system.

Blue picture and/or unstable picture.

A scrambled or decoded signal is received.

Black and white picture.

Check line 5 "LS colour". In case the value is low ((10) raise the value of colour. The new value(s) are automatically stored for all TV channels.

No colours/colour lines around picture elements.

1. Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'PAL' and line 18 is 'M 38,9', the installed system for this preset is 'USA', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation. Select 'System; West Europe'.
2. In case line 17 is 'PAL' and line 18 is 'L', the installed system for this preset is 'France', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation. Select 'System; West Europe'.

No colours/noise in picture

1. Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'Black and White' and line 18 is 'BG', the installed system for this preset is 'West Europe', while 'USA' is required. Install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation. Select 'System; USA'.
2. In case line 17 is 'Black and White' and line 18 is 'L', the installed system for this preset is 'France', while 'USA' is required. Install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation. Select 'System; USA'

Colours not correct.

Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'PAL' and line 18 is 'L', the installed system for this preset is 'France', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation. Select 'System; West Europe'.

Colours not correct/unstable picture.

Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'SECAM' and line 18 is 'BG', the installed system for this preset is 'USA', while 'France' is required. Install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation. Select 'System; France'.

Unstable picture.

Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'SECAM' and line 18 is 'M 38,9', the installed system for this preset is 'West Europe', while 'France' is required. Install the required program again. Open the installation menu by pressing "timer" and "enlarge" at the same time and perform manual installation. Select 'System; France'.

Menu text not sharp enough.

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check line 7 "LS Contrast". The value of line 7 is high (>50). Reduce the contrast value.

Sound problems**No sound from left and right speaker.**

1. Press "Smart Sound" button on the Remote Control handset. In case sound improves, raise the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Raise the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 "LS Volume". The value is low. Raise the value of "Volume". The new value(s) are automatically stored for all TV channels.

Sound too loud for left and right speaker.

1. Press "Smart Sound" button on the Remote Control handset. In case sound improves, reduce the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Reduce the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 "LS Volume". The value is high. Reduce the value of "LS Volume". The new value(s) are automatically stored for all TV channels.

No sound from "centre" speaker.

Check line 12 "Centre Volume". The value is low. Raise the value of the "Centre Volume"

Sound too loud from "centre" speaker.

Check line 12 "Centre Volume". The value is high. Reduce the value of the "Centre Volume"

Diagnose Mode (only active during transmission of error codes and diagnose 99)

This mode is activated by the DIAGNOSE command on the DST for reading the error codes and erasing the error buffer by the DST even when the set is in protection and so there is no picture (assuming that the power supply and the control part are working). For activation see paragraph 5.3. The diagnose Mode is only a temporarily mode (the set will go back to the previous mode), and can not be switched on permanently. Note: The diagnose mode can not be entered if the SAM is activated.

ComPair

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the DST service remote control allowing faster and more accurate diagnostics. ComPair has three big advantages:

- ComPair helps you to quickly get an understanding how to repair the MG5.1E in short time by guiding you step by step 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; ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the MG5.1E (when the micro processor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan MG5.1E electronic manual, schematics and PCBs are only a mouse-click away.

ComPair consists of a Windows based fault finding 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 MG5.1E chassis, the ComPair interface box and the television communicate with each other via bi-directional infrared signal.

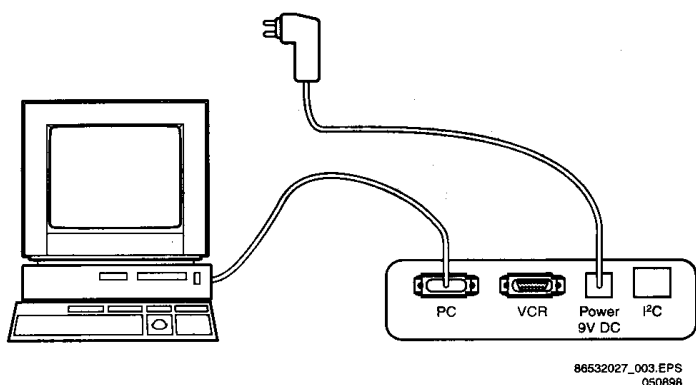


Figure 5-3

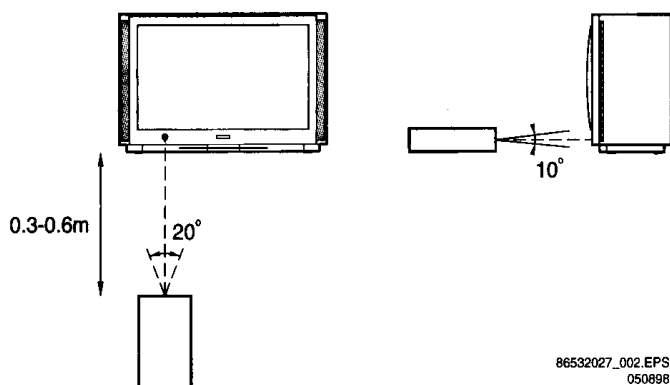


Figure 5-4

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in 2 ways:

1. Communication to the television (automatic)
2. Asking questions to you (manually)

ComPair combines this information with the repair information in its database to find out how to repair the MG5.1E.

Automatic information gathering

Step-by-step start up. Under normal circumstances, a fault in the power supply or an error during start-up will switch the

television to protection-mode. ComPair can take over the initialisation of the television. In this way it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem.

Reading out the error buffer, ComPair can automatically read out the contents of the entire error buffer.

Diagnosis on I2C level. ComPair can access the I2C bus of the television without a physical connection. ComPair can send and receive infrared commands to the micro controller of the television. These commands are translated by the controller to I2C commands and vice versa. In this way it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the MG5.1E.

Manual information gathering

Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extent. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an oscillogram) that will bring you to the next step in the faultfinding process.

A question could be: Do you see snow? (Click on the correct answer)

YES / NO

An example can be: Measure testpoint I7 and click on the correct oscillogram you see on the oscilloscope

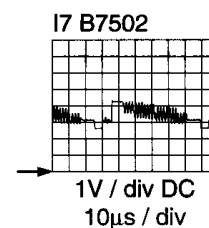


Figure 5-5

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.

Additional features

Beside fault finding, ComPair provides some additional features like:

- Uploading/downloading of presets
- Managing of preset lists
- Emulation of the Dealer Service Tool

SearchMan (electronic service manual)

When ComPair is installed in combination with SearchMan, all schematics and PCBs will be directly available while you repair a television if you click on a PCB or schematic link.

Example: Measure the DC voltage on C2568 (PCB/schematic) on the small signal level.

Clicking on PCB will automatically pop-up a picture of the PCB with the location of C2568 marked. Clicking on schematic will automatically pop-up the schematic with the location of C2568 marked.

5.3 Error codes

5.3.1 Reading error codes from the error buffer

The error buffer can be read in 2 ways:

1. On the screen via the Service Alignment Mode (SAM). In case picture is OK, the error buffer can be read easiest via

the SAM. In the main menu of the SAM the last 10 different error codes occurred are displayed. The most recent detected error code is displayed on the left side, so e.g.:
 0 0 0 0 means no error codes present in the buffer
 3 0 0 0 means one error code present in the buffer; error code 3

2 3 0 0 means two error codes present in the buffer; error code 2 is the most recent, error code 3 is detected before 2

2. On the display of the DST. If an error has been detected by the MG5.1E chassis, the set might go into protection.

Without the presence of a picture the errors can be read by the DST, as long as the main-processor is still active (green LED continuous and red LED blinking fast (5Hz); in case of red LED is blinking slow (1,25Hz) there is a main-processor problem). To transmit the errors from the TV to the DST:

1. Press the "DIAGNOSE" key (in all modes except the SAM).
2. Press "1" to view the last error detected.
3. Hold the DST 5 to 10 cm in front of the stand-by LED of the set (the IR-sending LED of MG5.1E is located near the stand-by LED).
4. Press the "OK" key.

The error is represented by a 2 digit number. The 2 digits on the DST are displayed sequentially, with a pause before it is repeated. The digit after the pause is the 1st digit. If the display

reads 4 - 7, the error code is 47. To read other error codes, press "DIAGNOSE" and one of the other digit keys. Note:

- If the DST cannot communicate to the MG5.1E in a proper way, ERROR 2 is shown in the display of the DST. Trying again by changing the DST position a little bit might help.
- If the error buffer of MG5.1E is empty, no errors are displayed by the DST; the display remains blank.

5.3.2 Clearing the error buffer

The error buffer can be cleared in 2 ways:

1. In the SAM by selecting the item RESET ERROR BUFFER in the main menu.
2. By the "DIAGNOSE 99" command of the DST (in all modes except the SAM). Press the DIAGNOSE key on the DST, followed by 9 and 9 and then .

Note: When error buffer is full (10 codes), no new error can be stored anymore. However of every error raised is monitored how long it exists in the error buffer. When for any reason a false raised error exists in the buffer, it will be deleted after 50 hours. If this error still is actual after 50 hours, it will be raised again. In this way is safeguarded that history of error codes is stored. Sometimes it is an option to first write down the error buffer content, reset the buffer, and look again which error codes are generated by the set.

5.3.3 Error code table

Error messages (see table)

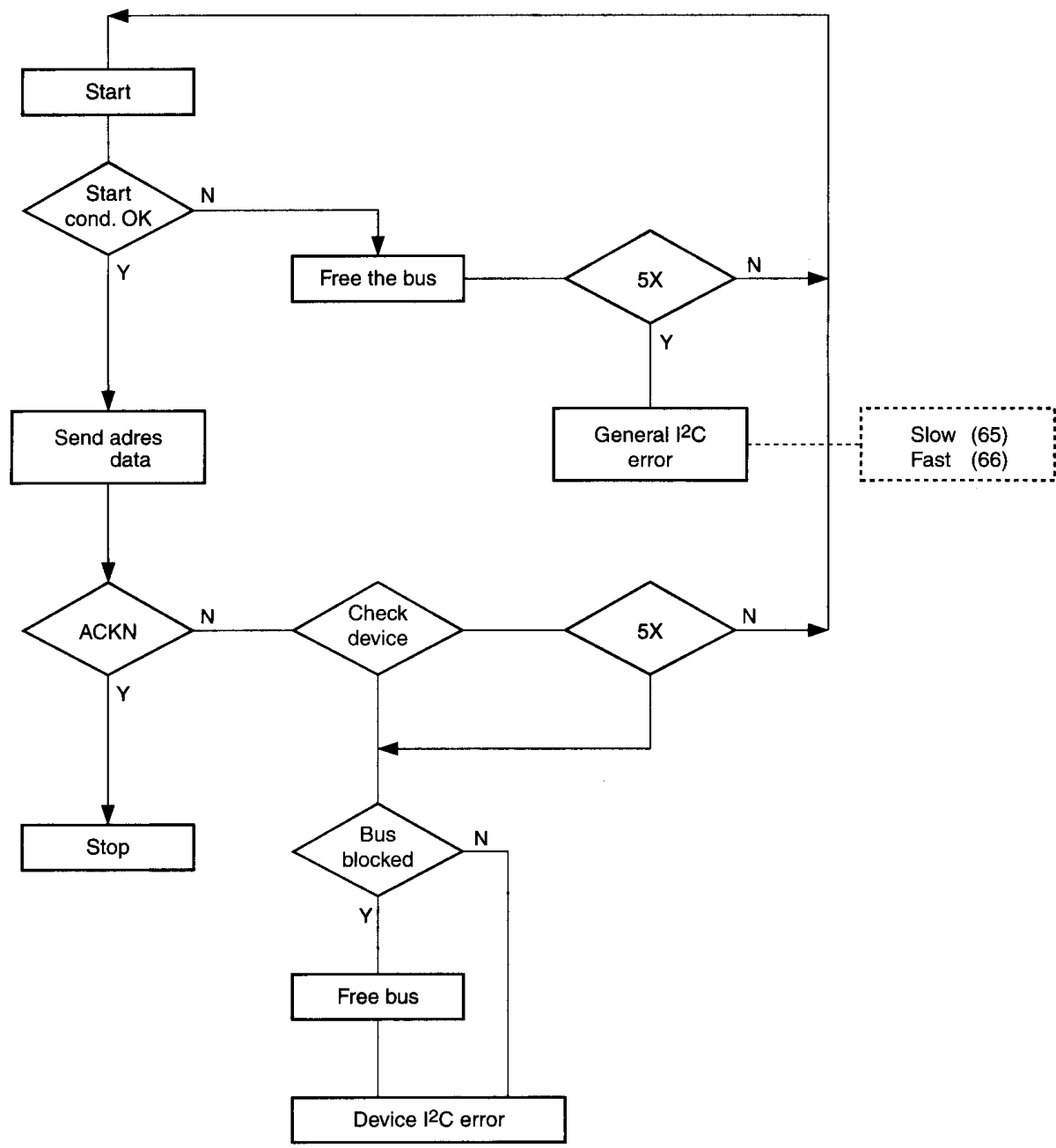
Error	Device	Description	Defective item	Diagram	Defective module indication
2	ST24E32 or M24C32	Non volatile memory	IC7008	K7	Control
3	SAA5801	OTC2.5 microprocessor/TXT	IC7003	K7	Control
5	UV1316	Tuner	U1102	K1	Tuner
10	TEA6415	I/O source select video	IC7208	K8	Source select
11	TEA6422	I/O source selct audio	IC7777	K8	Source select
15	TDA9320H	HIP I/O-video processing	IC7501	K1	Chroma IF I/O
20	TDA9330H	HOP video control/deflection processor	IC7300	K6	Video Controller
21	TDA9178	LTP Peaking	IC7402	K6	Video Controller
25	MSP3410D	ITT sound processor	IC7751	K3	Audio module
26	SAA7712H	SEDSP dolby processor	IC7770	K4	Audio module
35	UV1316	FDS Tuner	U1102	M1	Video Dual Screen Panel
36	PCF8574	FDS I/O Expander	IC7860	M2	Video Dual Screen Panel
37	SAB9079	FDS Popov	IC7700	M4	Video Dual Screen Panel
38	TDA9320	FDS HIP2	IC7501	M1	Video Dual Screen Panel
39	M24C04	FDS NVM	IC7991	M1	Video Dual Screen Panel
40	83C751	Cordless Transmitter processor	IC7105	R	Surround Transmitter Panel
41	TDA7309	FDS Headphone	IC7620	M5	Video Dual Screen Panel
50	SAA4978H	FBX Picnic	IC7611	L1	Feature Box
53	SAA4992	FBX Falconic	IC7626	L3	Feature Box
54	SAA4997	FBX Veric	IC7621	L2	Feature Box
55	SAA4996	FBX Macpatic	IC7616	L2	Feature Box
56	83C654	MCS processor	IC7803	N3	Digital Audio Module
57	TDA7438	MCS SOFAC L/R	IC7540	N8	Digital Audio Module
58	TDA7438	MCS SOFAC L/R	IC7600	N9	Digital Audio Module
59	TDA7438	MCS SOFAC L/R	IC7570	N10	Digital Audio Module
61	PCF8574	MCS I/O expander	IC7690	N16	Digital Audio Module

Error	Device	Description	Defective item	Diagram	Defective module indication
65	Slow I2C bus blocked		see fig 5.6	Slow I2C bus blocked	
66	Fast I2C bus blocked		see fig 5.6	Fast I2C bus blocked	
67	Supply 5V	5V2	see fig 5.5	+5 V Supply	
68	Supply 8V	8V6	see fig 5.5	+8V Supply	
70	V fail protection	VFB	fig 5.8	A3/A1/K6	Vertical Flyback
71	H fail protection	HFB	fig 5.8	A1/K6	Horizontal Flyback
73	Line Deflection protection	LDP	IC7484	A1/K6	Line Deflection
74	Beam Current Protection	BC-PROT	TS7351	K6/K7	Beam Current
76	DC Sound protection	DC-PROT	TS7762	A4	Sound Output
77	Feature box protection	FBX-PROT	Fig 5.6	L1	+3V (FBX) Supply
78	Edric protection	EDRIC-PROT	IC7750	K4	+3V (Edric) Supply
79	POPOV protection	POPOV_PROT			
80	Tuner protection	Tuner-PROT	U1102	K1	+8V (Tuner) Supply
81	UPD65654GF-260	Convergence spline processor	IC102	Convergence	Convergence panel
82	M24C32	Digital Convergence NVM	IC101	Convergence	Convergence panel
83	TDA8444	Interface I/O expander	IC7001	Interface	interface panel

Remark: If on the DST the text "ERROR 2" is displayed, this means that the communication from the TV to the DST has failed

5.4 Fault find trees

I²C drivers



Slow (65)
Fast (66)

Slow

- 1102 (Tuner) (5)
- 7609 (Picnic) (50)
- 7608 (Prozonic) (51)
- 7501 (I/O Video) (10)
- Feature box (77)

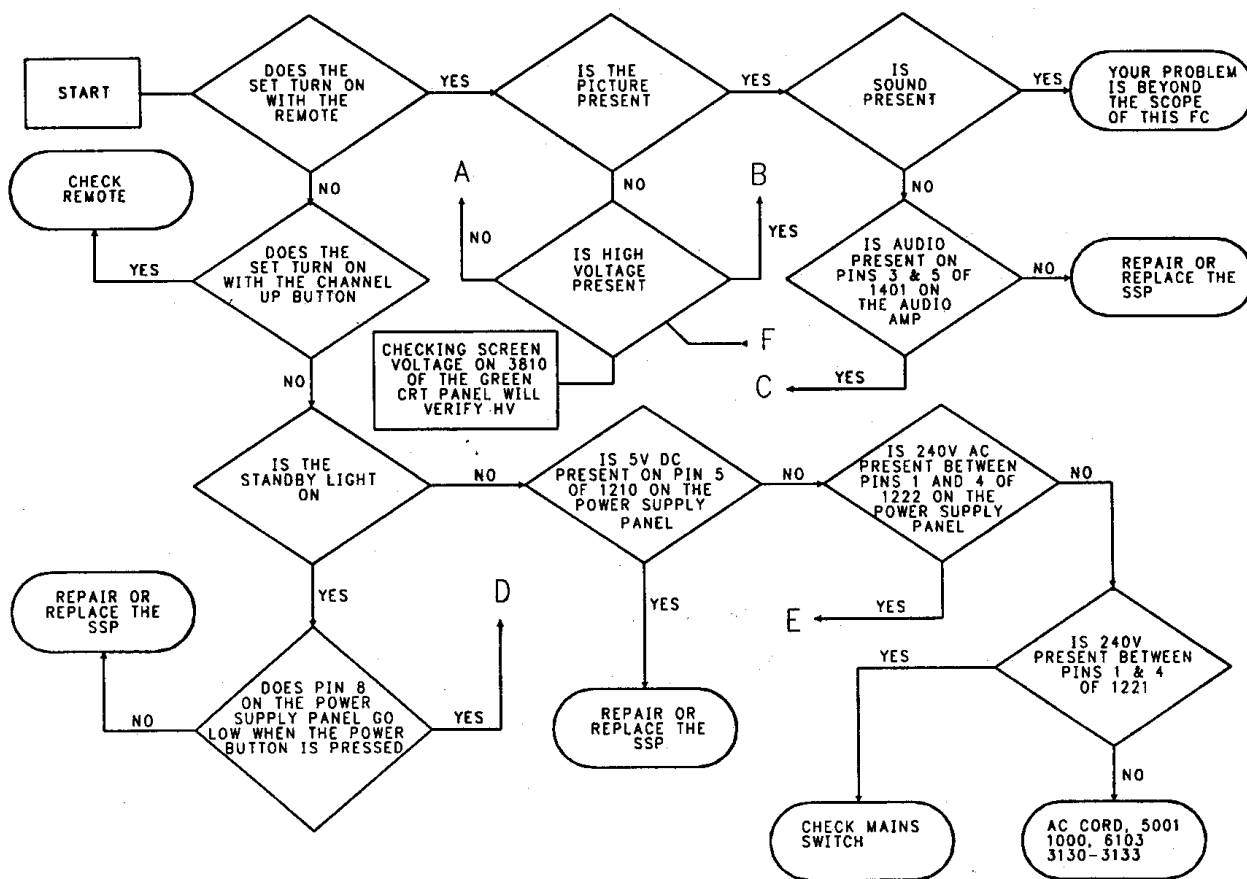
Fast

- 7402 (LTP) (21)
- 7770 (Dolby) (26)
- 7751 (ITT) (25)
- 7501 (HIP) (15)
- 7300 (HOP) (20)

NVM-bus

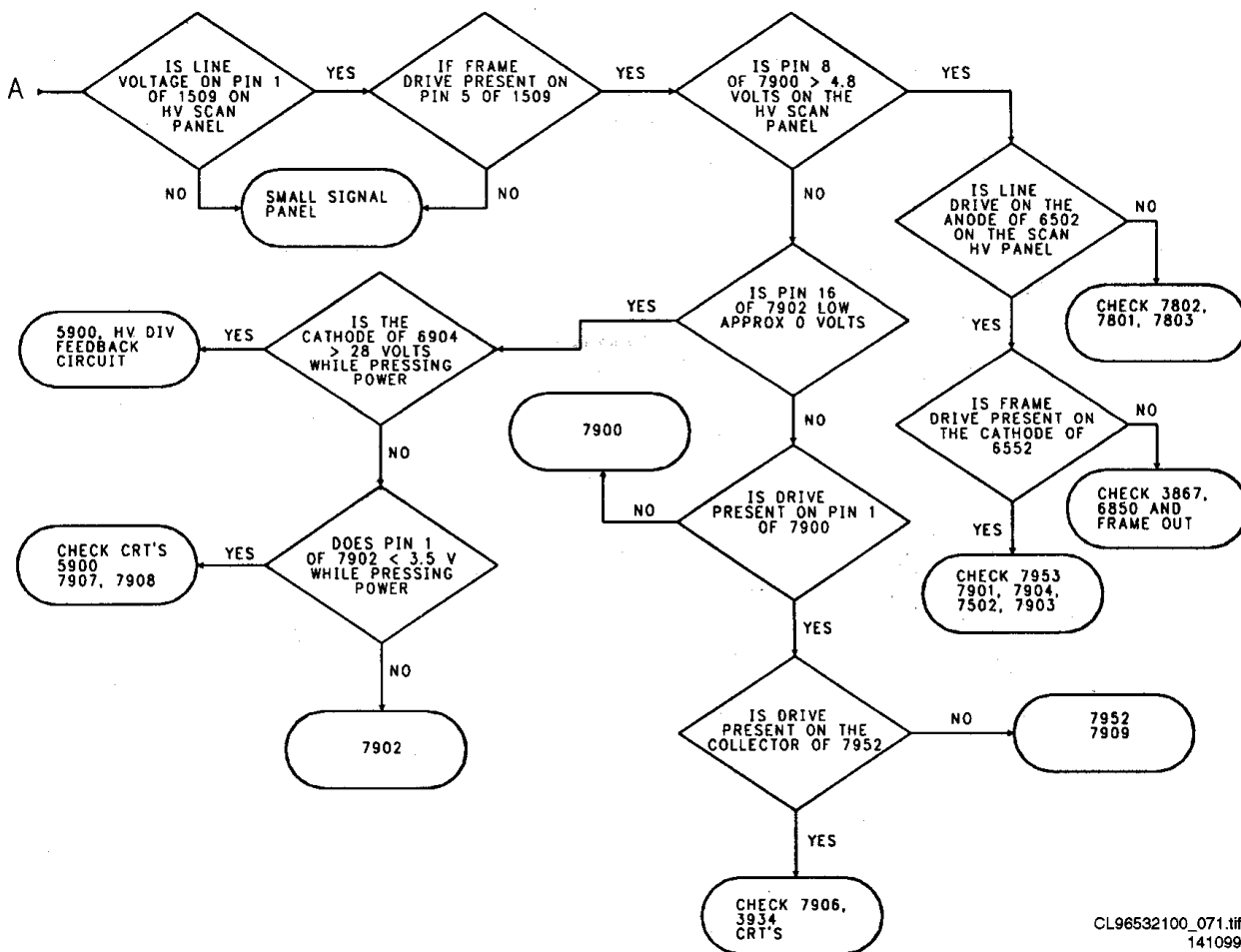
- 7008 (NVM) (1)
(2)

Figure 5-6



CL96532100_070.tif
141099

Figure 5-7



CL96532100_071.tif
141099

Figure 5-8

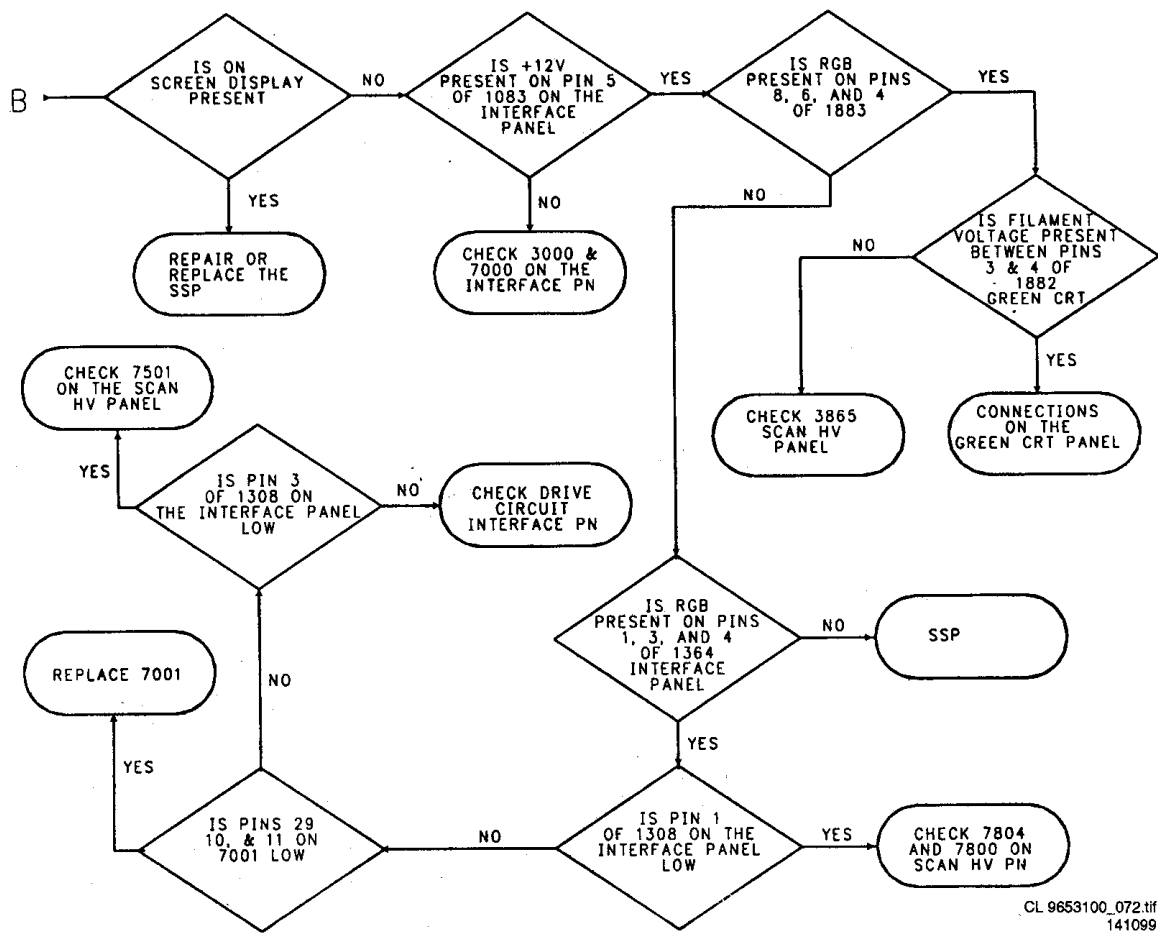


Figure 5-9

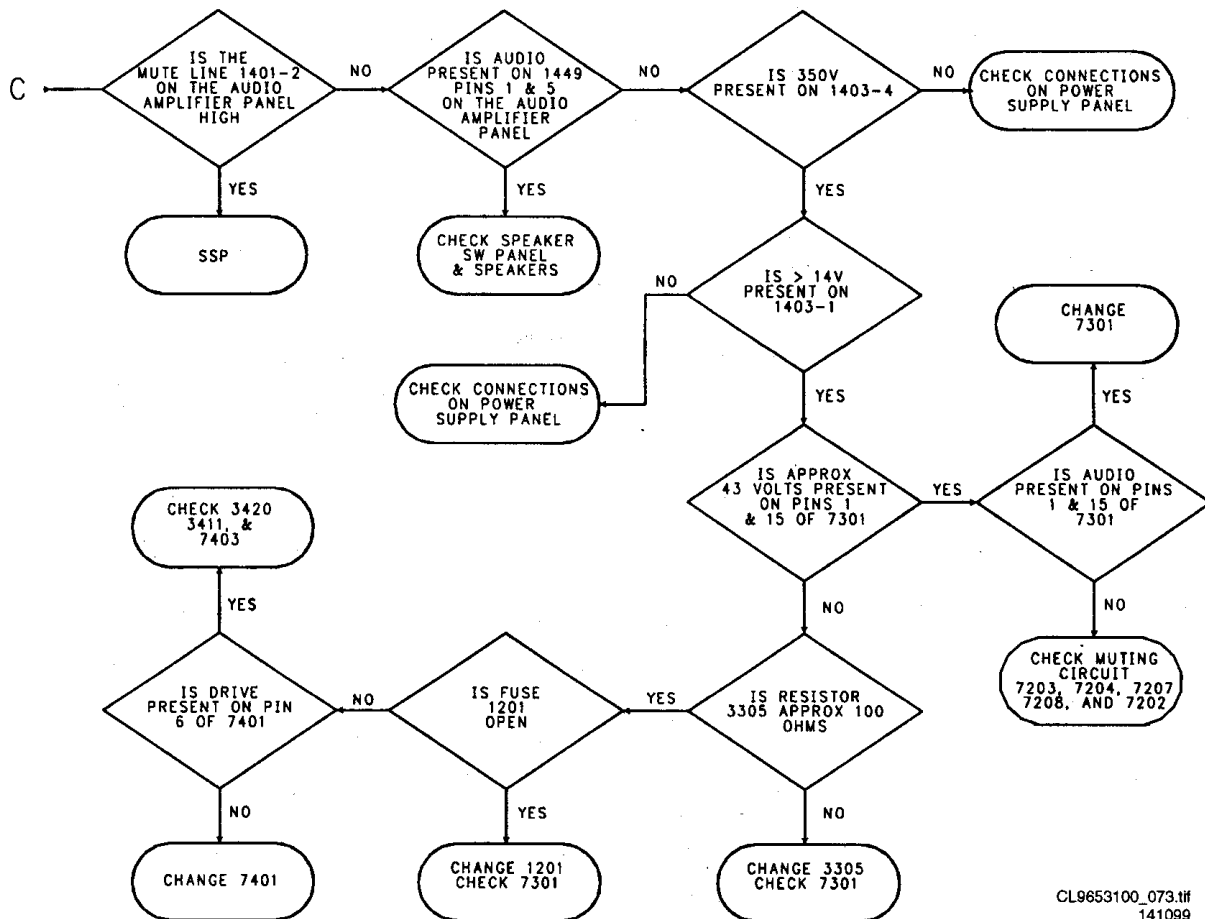
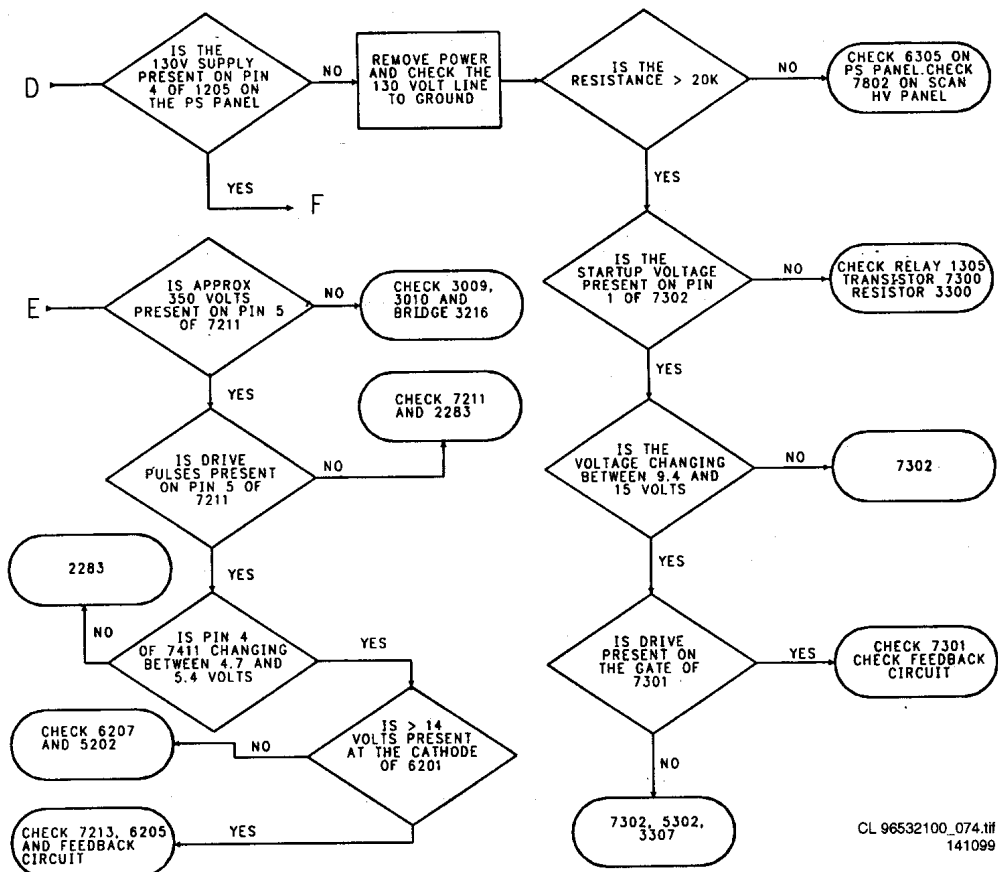
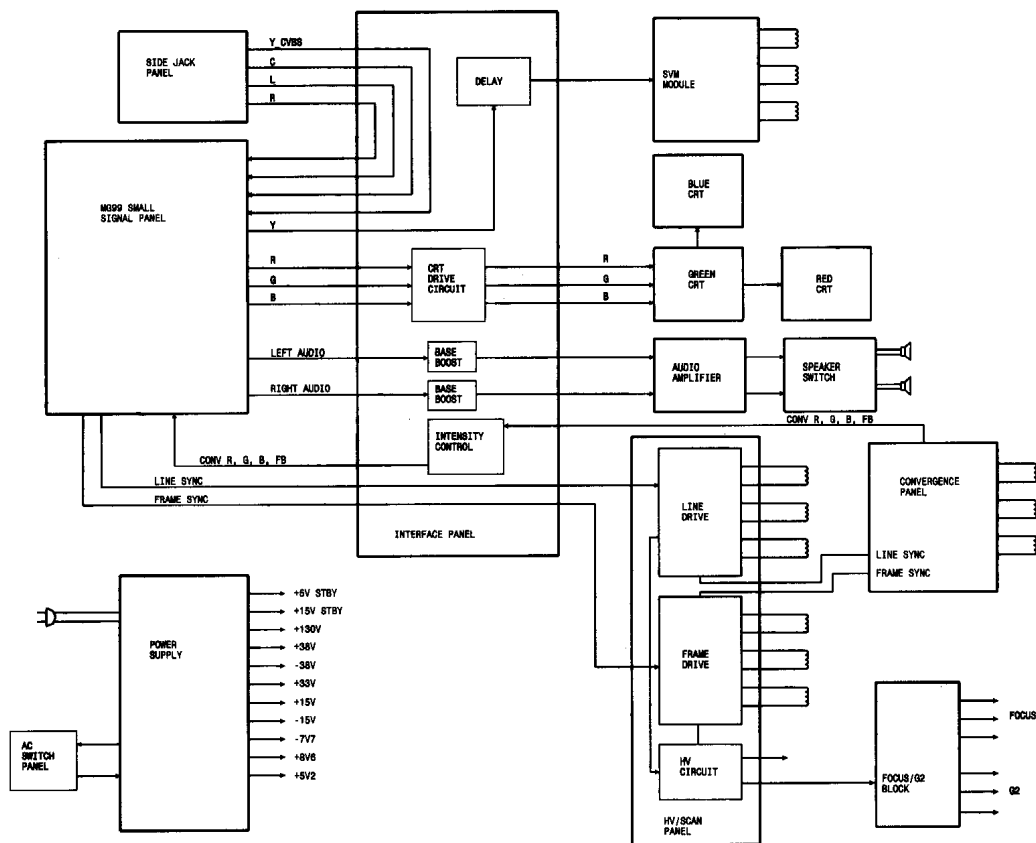


Figure 5-10



CL 96532100_074.tif
141099

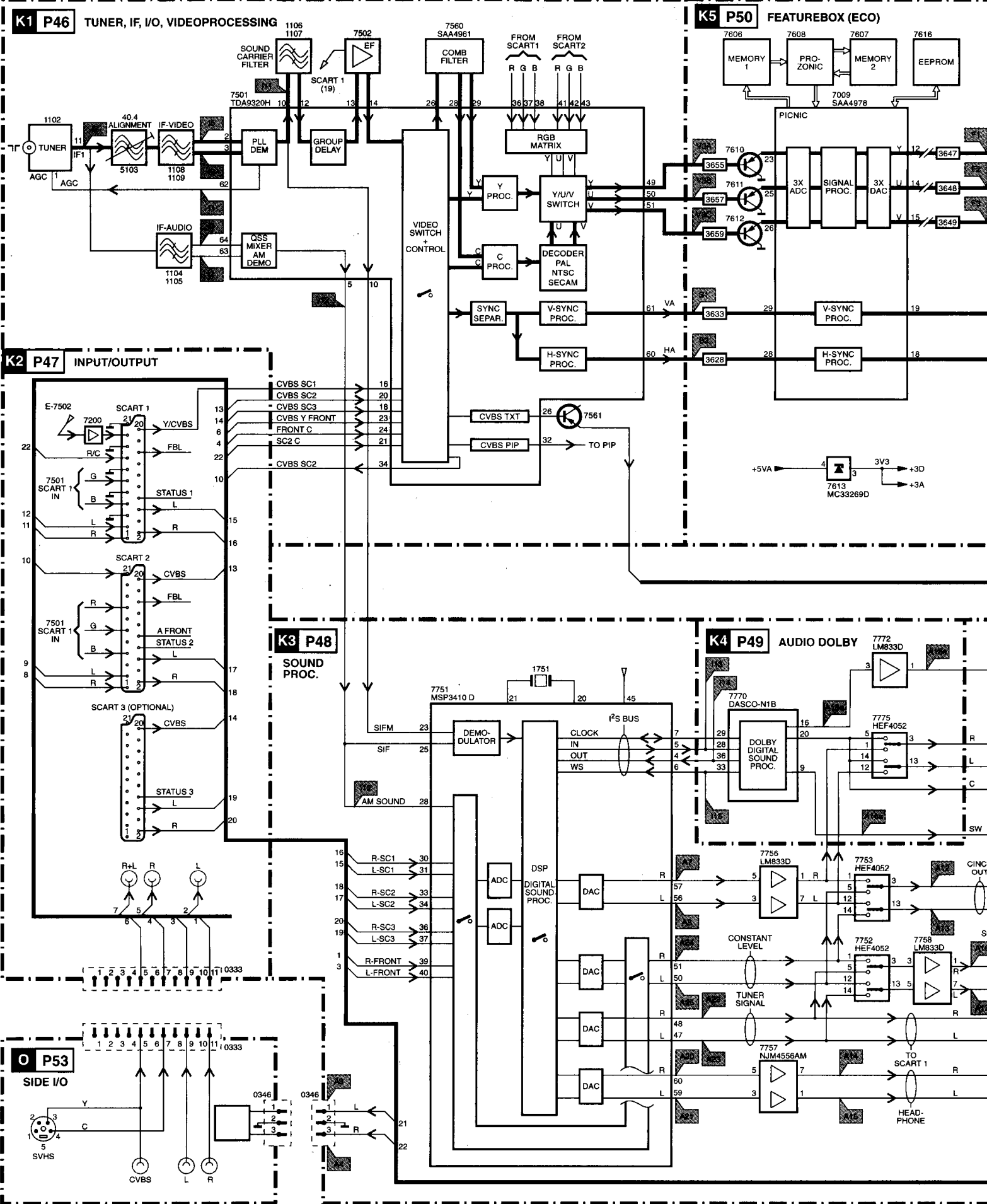
Figure 5-11

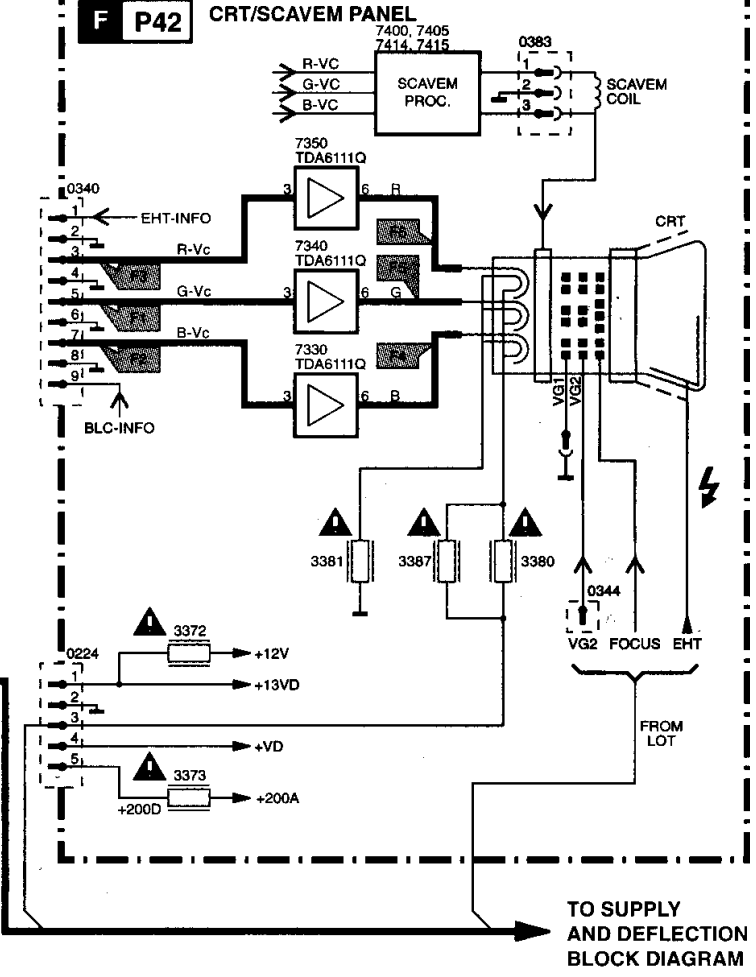
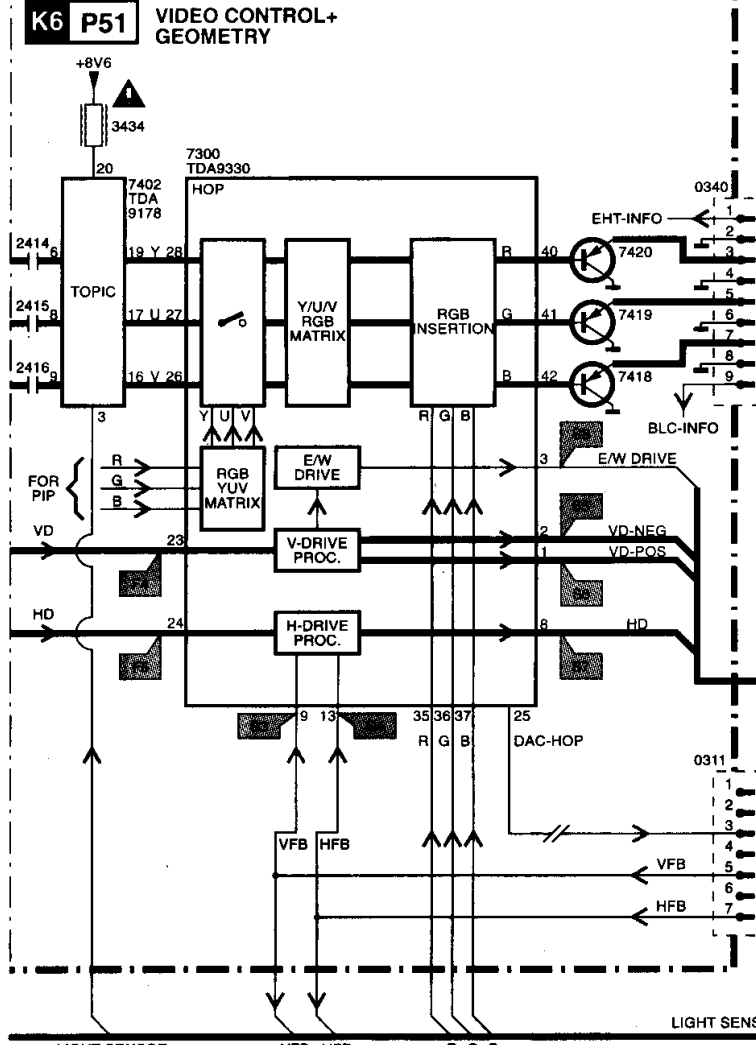


CL 96532100_077.eps
181099

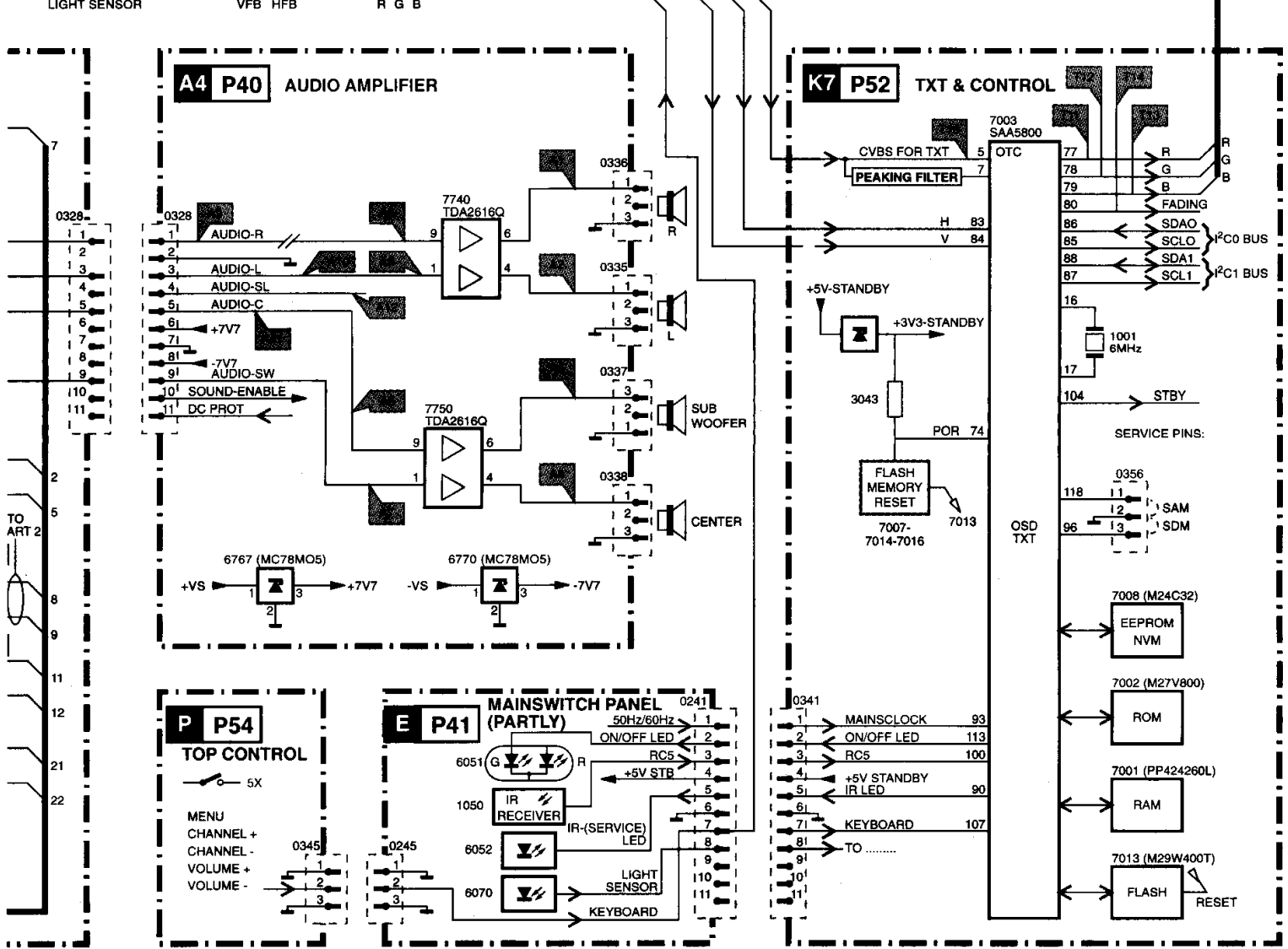
Figure 5-12

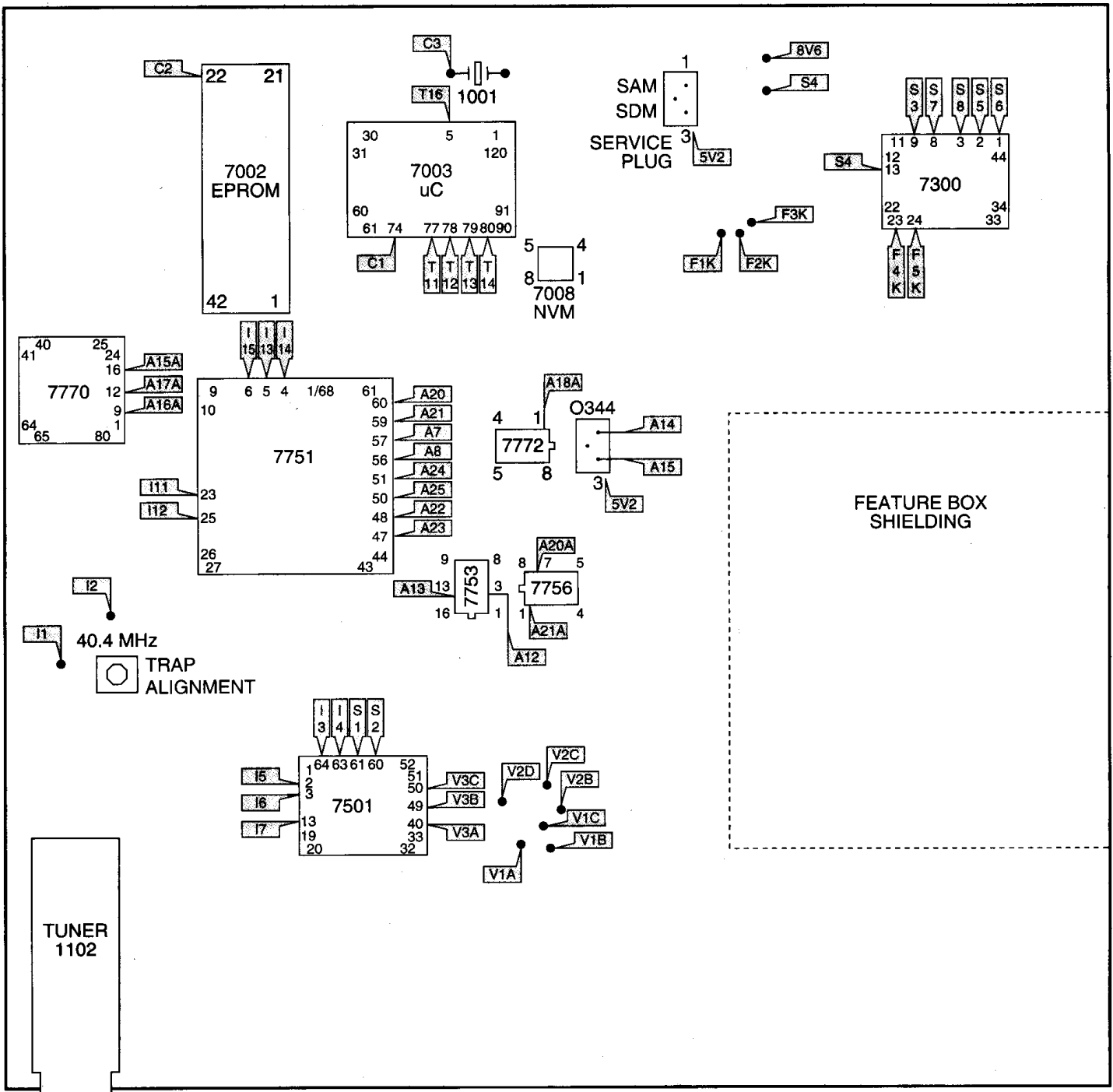
6. Block diagrams





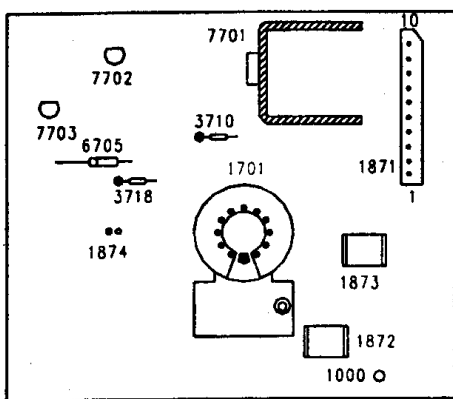
TO SUPPLY AND DEFLECTION BLOCK DIAGRAM



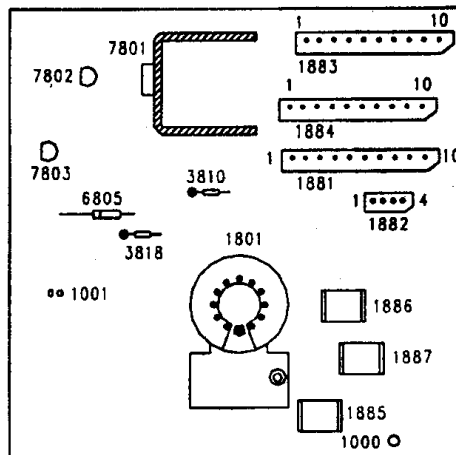


(COMPONENT-SIDE)

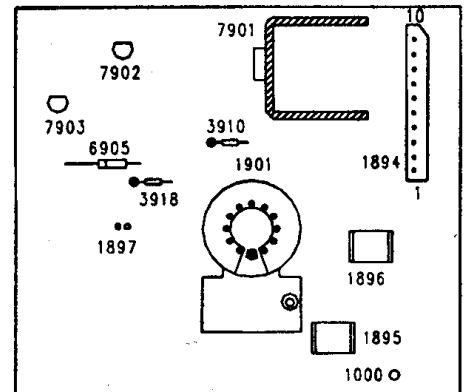
CL 86532092_014.eps
2011 98



RED CRT BOARD



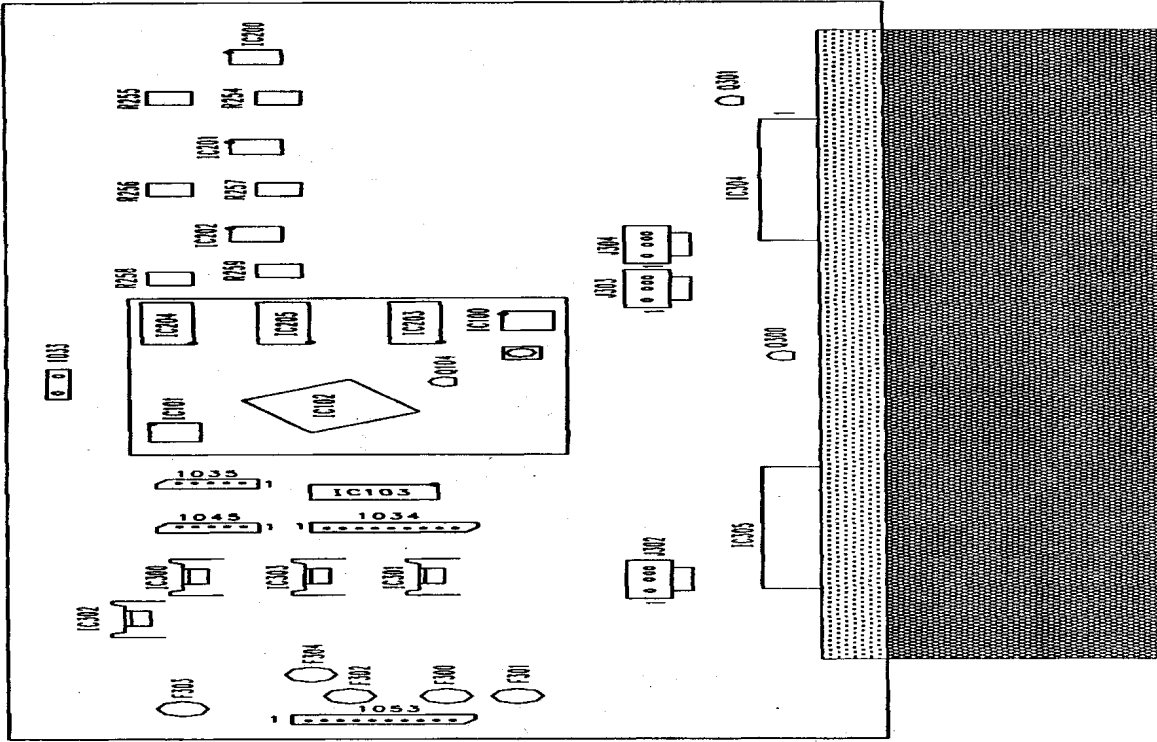
GREEN CRT BOARD



BLUE CRT BOARD

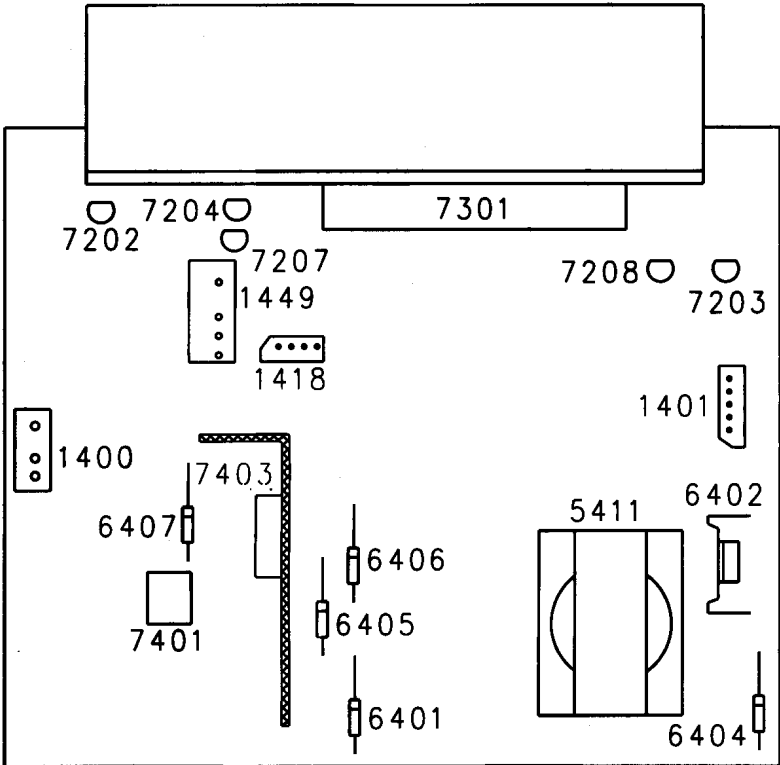
CL 96532100_067.tif
141099

CONVERGENCE PANEL WIRING INTERCONNECT

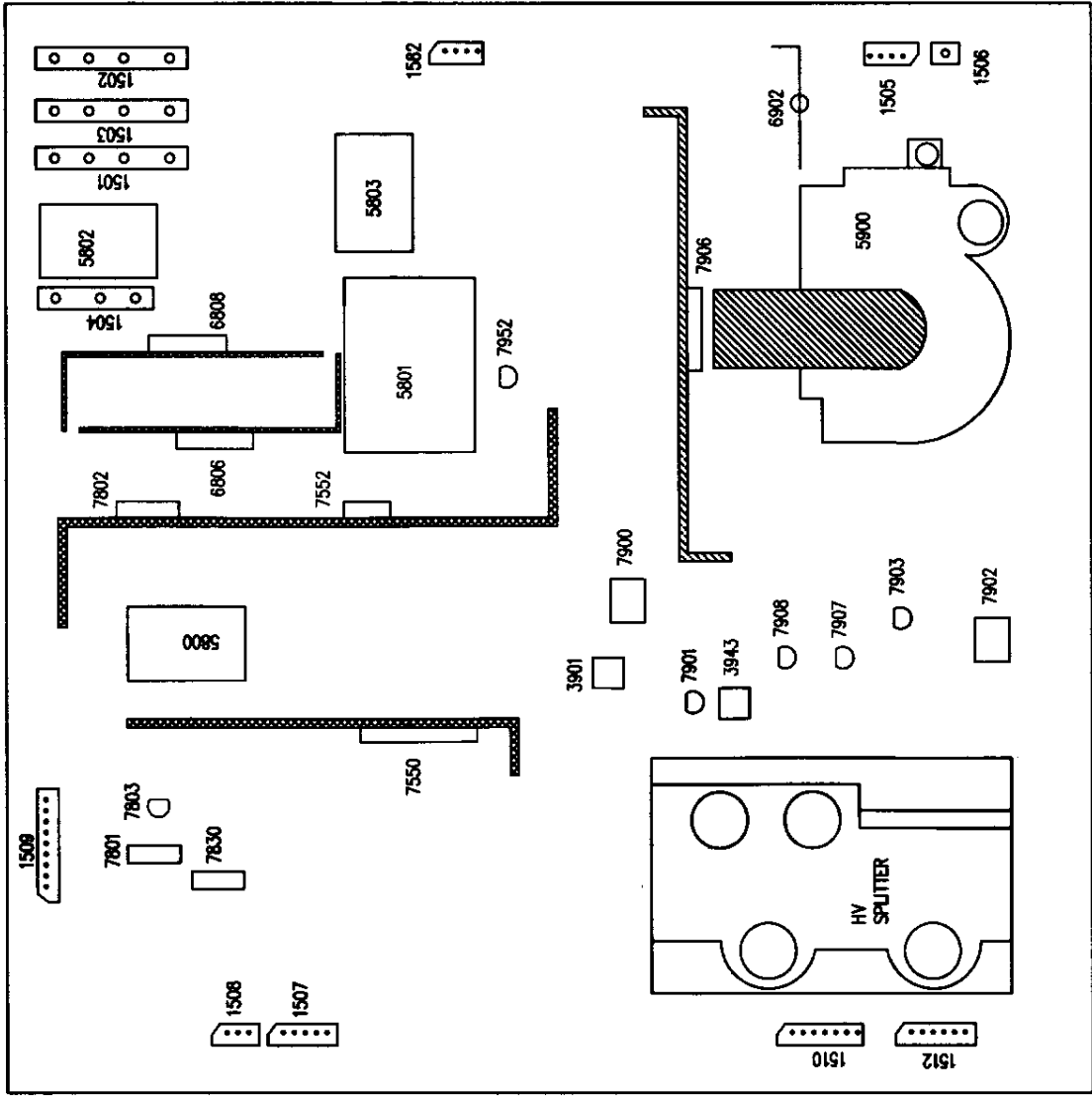


CL96532100_022
051099

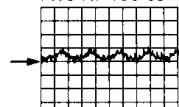
AUDIO AMPLIFIER COMPONENT LOCATION



HIGH VOLTAGE COMPONENT LOCATION

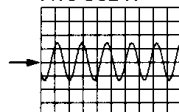


A15 HP-R/3-0344



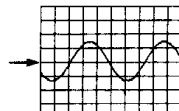
50mV / div DC
0.5ms / div

A16 SC2-R



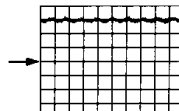
0.5V / div AC
0.2ms / div

A17 SC2-R



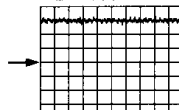
0.5V / div AC
0.2ms / div

A20 R/60-7751



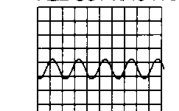
20mV / div DC
1ms / div

A21 L/59-7751



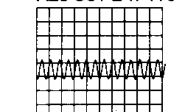
20mV / div DC
1ms / div

A22 SC1-R/48-7751



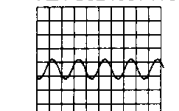
1V / div DC
0.5ms / div

A23 SC1-L/47-7751



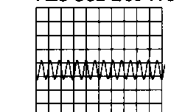
1V / div DC
0.5ms / div

A24 SC2-R/51-7751



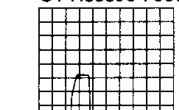
1V / div DC
0.5ms / div

A25 SC2-L/50-7751



1V / div DC
0.5ms / div

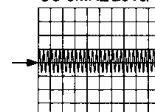
C1 Reset/c-7007



1V / div DC
10ms / div

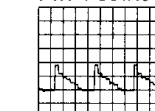
C2 +3V3

C3 6MHz/2016/1001



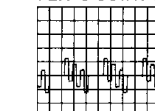
20mV / div AC
0.5μs / div

F1K Y-OUT/19-7402



0.5V / div DC
10μs / div

F2K U-OUT/17-7402



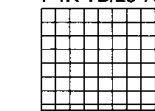
0.5V / div DC
10μs / div

F3K V-OUT/16-7402



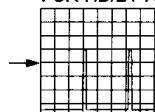
0.5V / div DC
10μs / div

F4K VD/23-7300



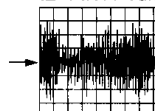
1V / div DC
5ms / div

F5K HD/24-7300



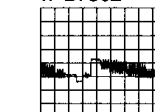
1V / div DC
10μs / div

I2 PIN11-Tuner



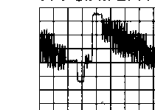
50mV / div AC
10μs / div

I7 B7502

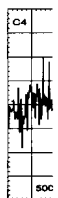
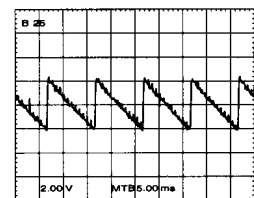
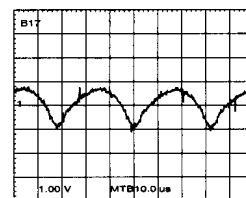
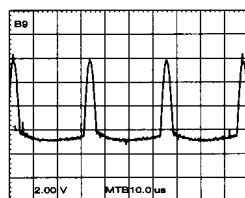
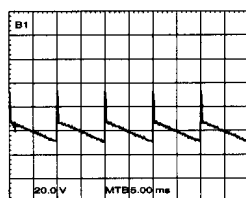
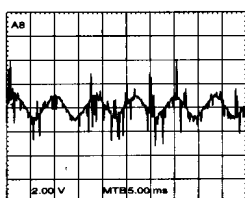
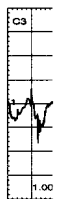
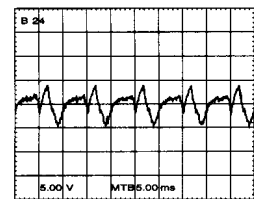
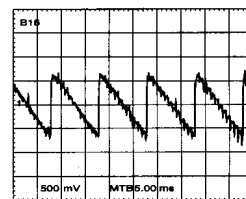
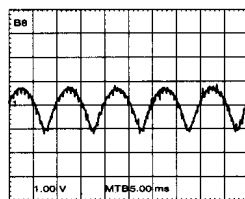
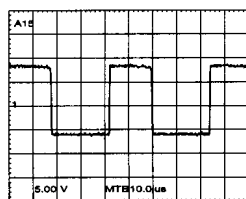
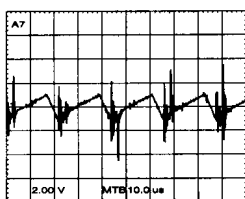
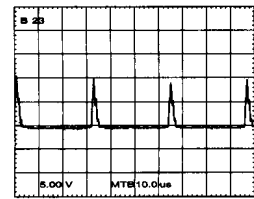
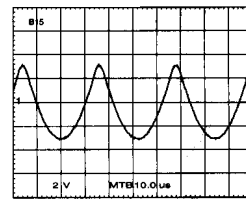
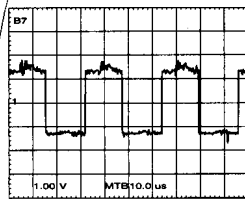
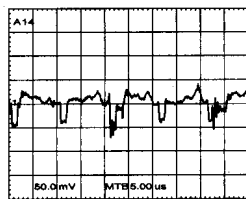
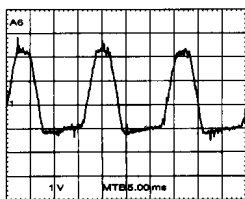
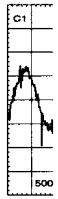
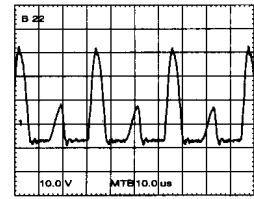
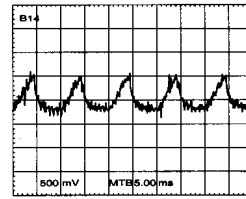
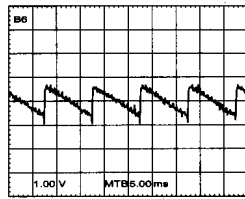
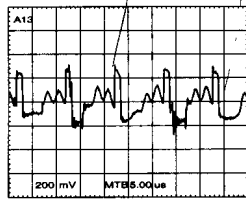
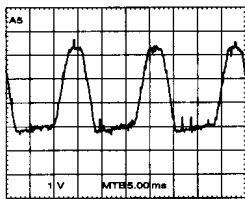
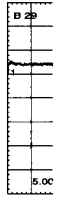
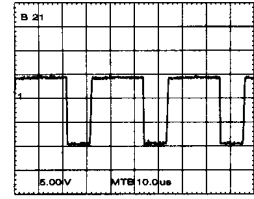
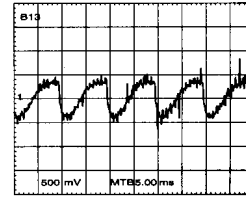
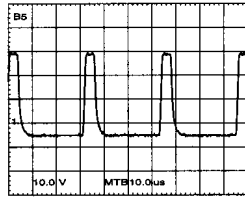
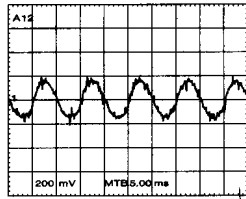
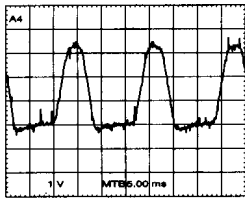
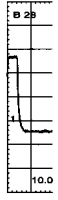
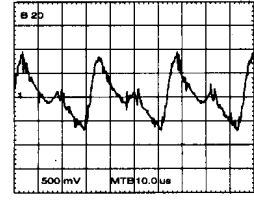
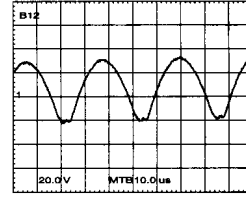
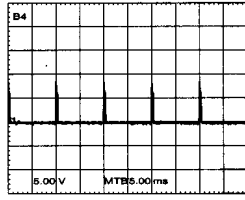
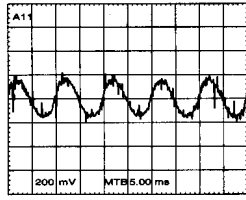
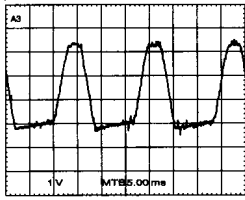
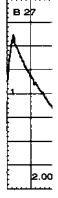
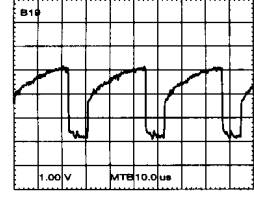
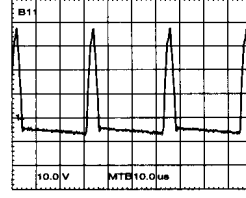
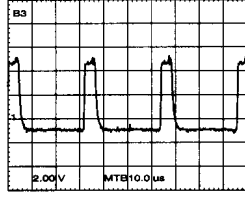
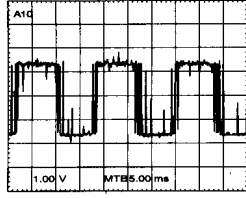
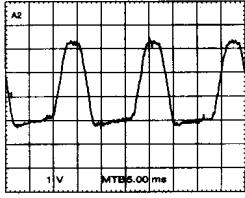
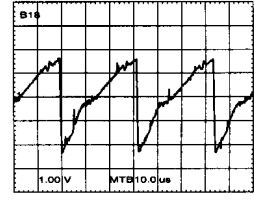
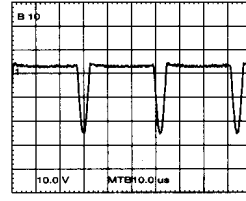
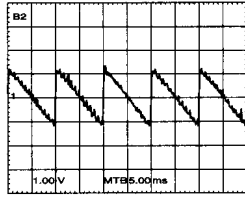
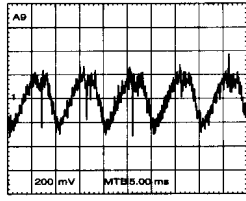
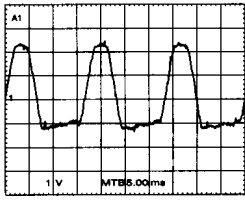


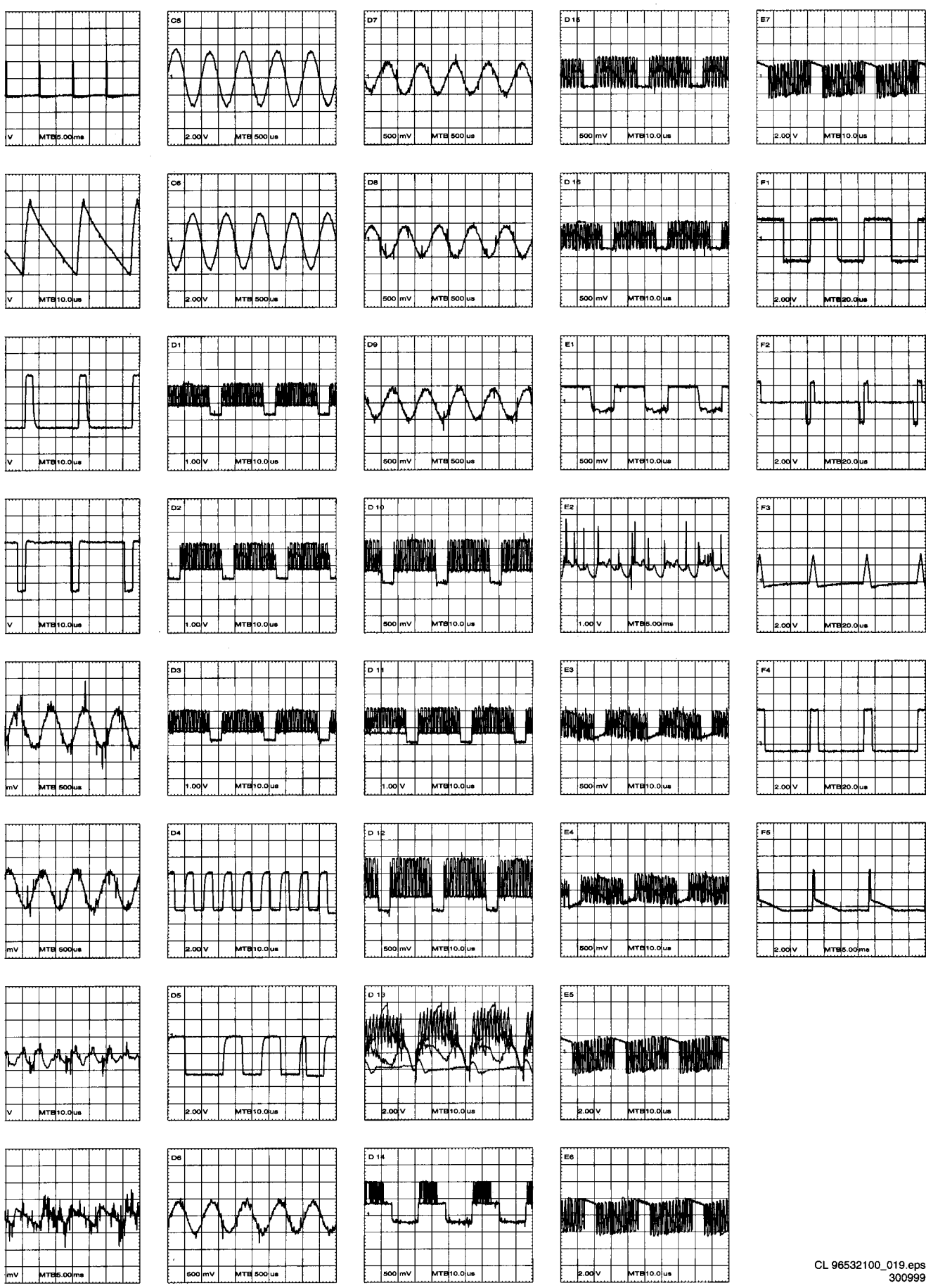
1V / div DC
10μs / div

I11 SIFM-E7111



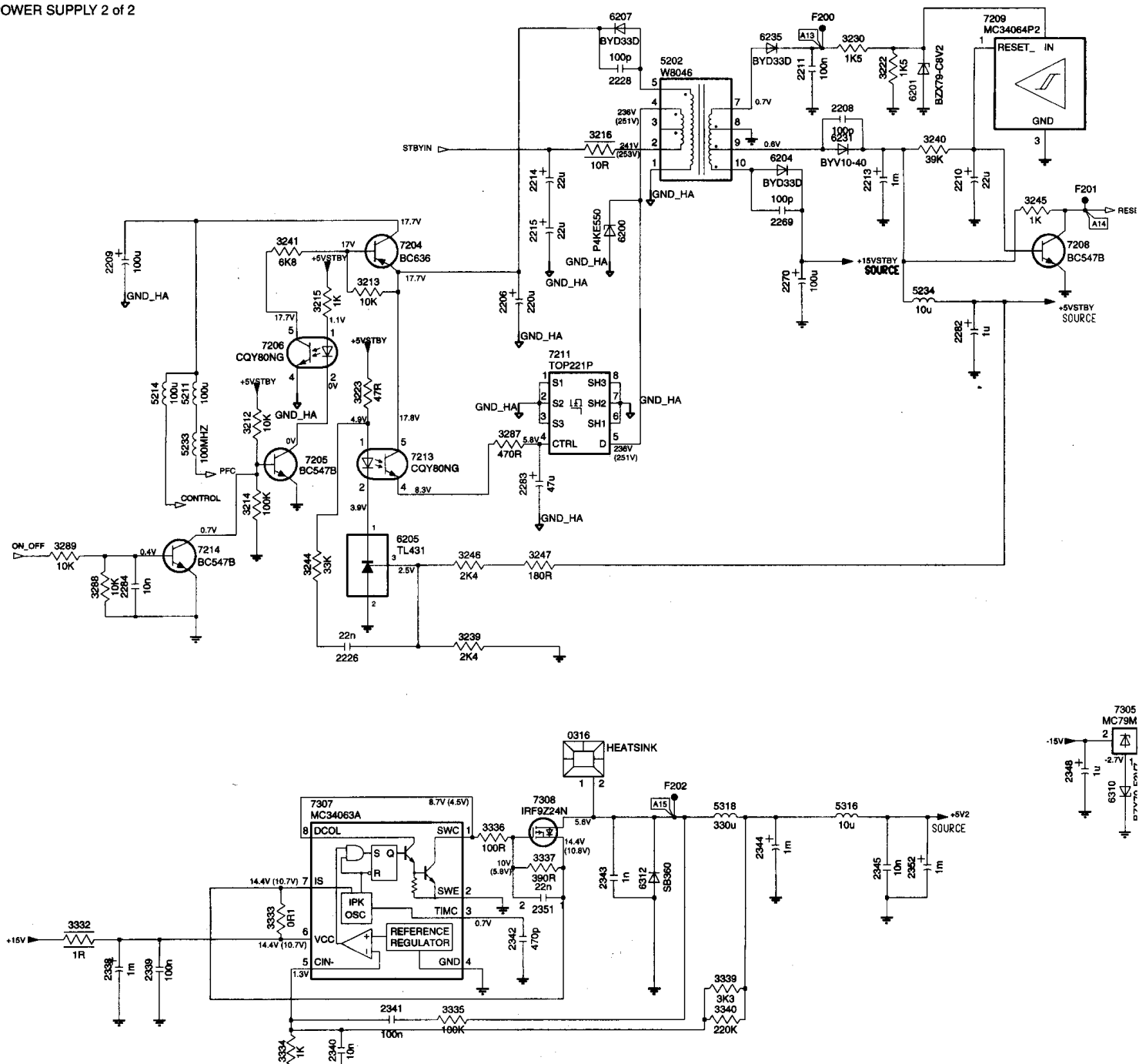
0.5V / div DC
10μs / div





Power supply

POWER SUPPLY 2 of 2



7

8

a

b

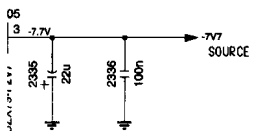
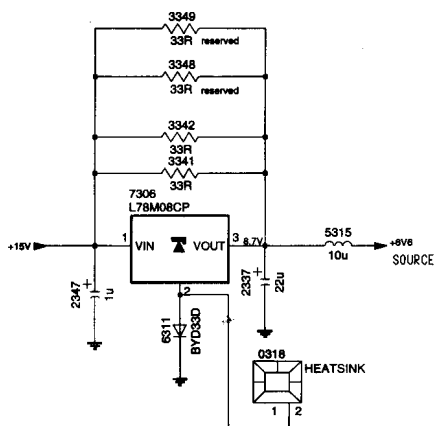
c

d

e

f

g

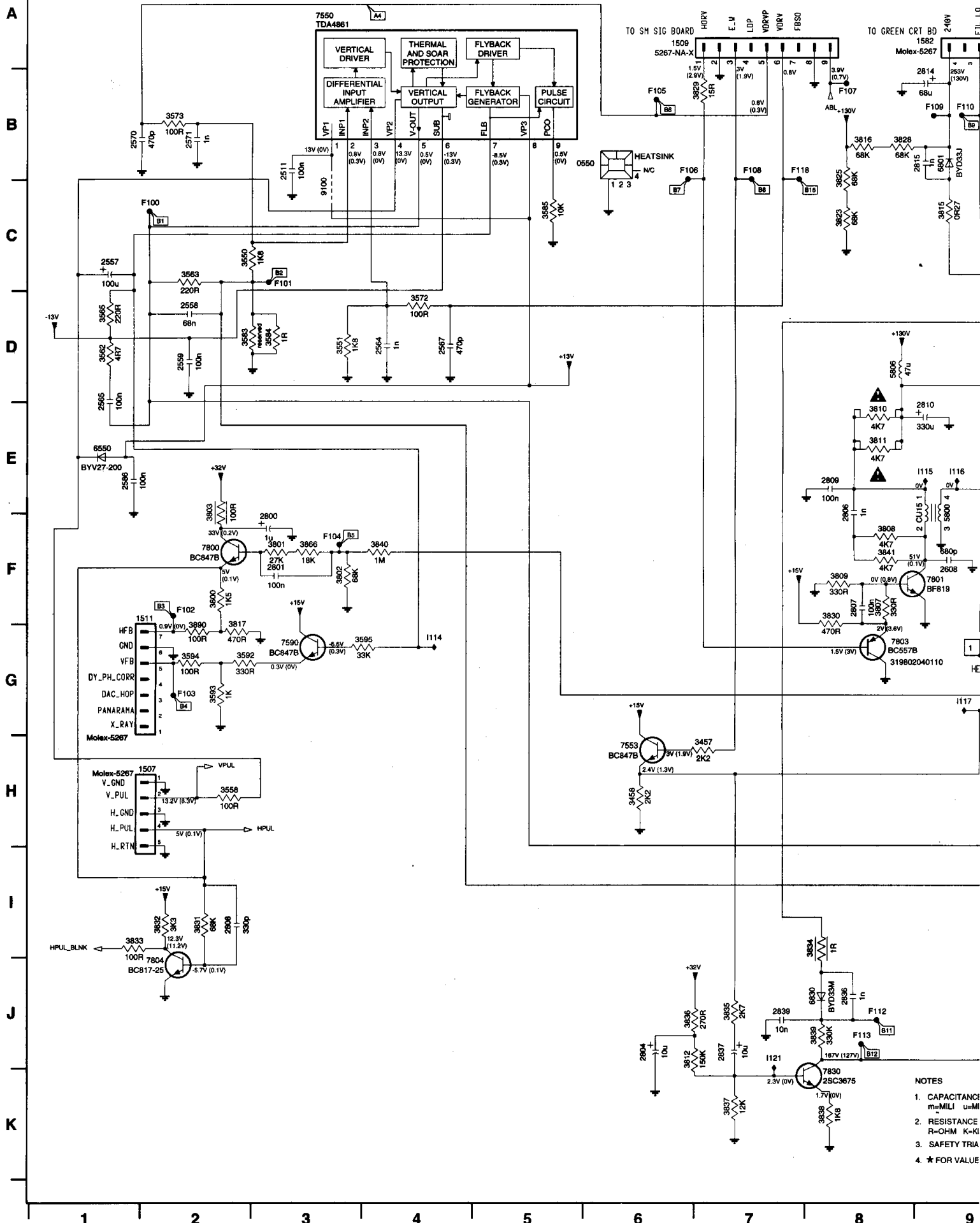


NOTES

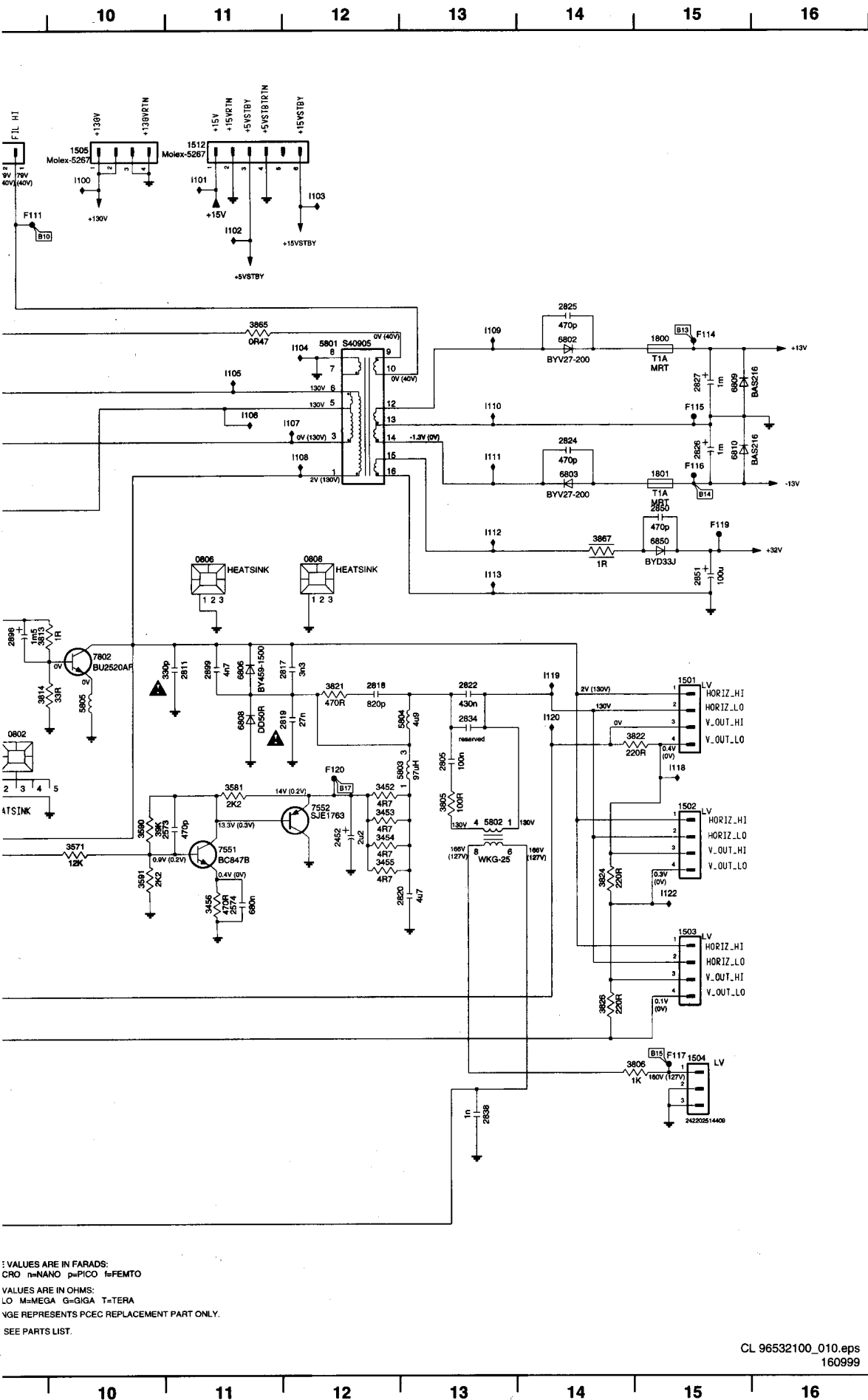
- CAPACITANCE VALUES ARE IN FARADS:
m=MILI u=MICRO n=NANO p=PICO f=FEMTO
- RESISTANCE VALUES ARE IN OHMS:
R=OHM K=KILO M=MEGA G=GIGA T=TERA
- SAFETY TRIANGE REPRESENTS PCEC REPLACEMENT PART ONLY.
- ★ FOR VALUE SEE PARTS LIST.

HV SCAN

HV SCAN 1 of 2



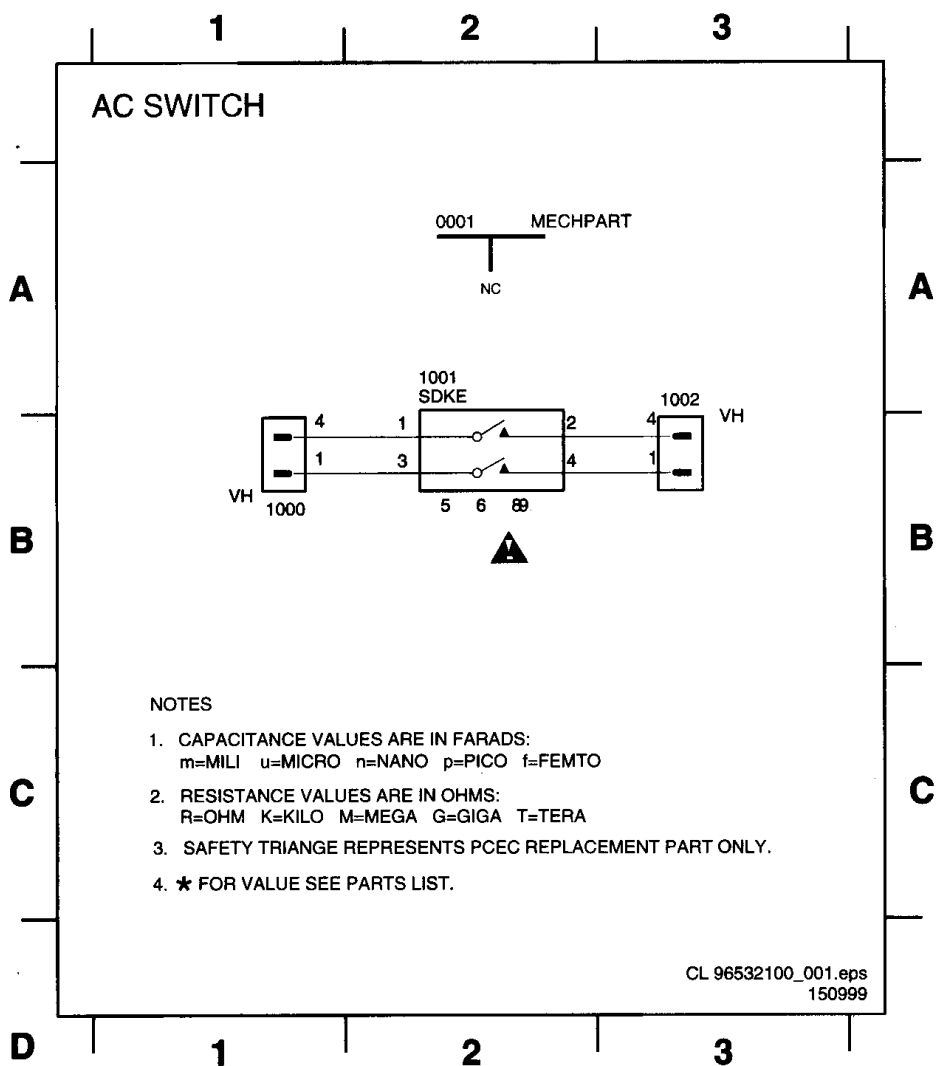
- NOTES
1. CAPACITANCE
m=MILI u=MI
 2. RESISTANCE
R=OHM K=KI
 3. SAFETY TRIA
 4. * FOR VALUE



0550 B5	6801 B9
0802 F9	6802 C14
0806 E11	6803 D14
0808 E12	6806 F11
1501 F15	6808 F11
1502 G15	6809 C15
1503 H15	6810 D15
1504 H15	6830 J8
1505 A10	6850 E15
1507 H2	7550 A3
1509 A6	7551 G11
1511 F2	7552 G12
1512 A11	7553 H6
1582 A9	7590 G3
1800 C15	7800 F2
1801 D15	7801 F9
2452 G12	7802 F10
2511 B3	7803 G8
2559 D2	9100 C9
2564 D4	F100 C2
2565 D1	F101 C3
2567 D4	F102 F2
2570 B1	F103 G2
2571 B2	F104 F3
2573 G11	F105 B6
2574 H11	F106 B6
2586 E1	F107 B9
2608 F9	F108 B7
2800 F3	F109 B9
2801 F3	F110 B9
2804 J6	F111 B9
2805 F13	F112 J8
2806 E8	F113 J8
2807 F8	F114 C15
2808 I2	F115 D15
2809 E8	F116 D15
2810 E9	F117 H15
2811 F11	F118 B7
2814 B9	F119 E15
2815 B9	F120 G12
2817 F12	I100 B10
2818 F12	I101 B11
2819 F12	I102 B11
2820 H13	I103 B12
2822 F13	I104 C12
2824 D14	I105 C11
2825 C14	I106 D11
2826 D15	I107 D12
2827 C15	I108 D12
2834 F13	I109 C13
2836 J8	I110 C13
2837 J7	I111 D13
2838 I13	I112 E13
2839 J7	I113 E13
2850 D15	I114 G4
2851 E15	I115 E9
2898 E9	I116 E9
2899 F11	I117 G9
3452 G12	I118 G15
3453 G12	I119 F14
3454 G12	I120 F14
3455 G12	I121 J7
3456 H11	I122 H15
3457 H7	
3458 H6	
3550 C2	
3551 D3	
3558 H2	
3562 D1	
3563 C2	
3565 D1	
3571 G10	
3572 D4	
3573 B2	
3581 G11	
3583 D2	
3584 D3	
3585 C5	
3590 G10	
3591 G10	
3592 G2	
3593 G2	
3594 G2	
3595 G4	
3600 F2	
3601 F3	
3602 F3	
3603 E2	
3605 G13	
3606 I15	
3607 F8	
3608 F8	
3609 F8	
3610 E8	
3611 E8	
3612 J6	
3613 E9	
3614 F9	
3615 C9	
3616 B8	
3617 G2	
3621 F12	
3622 F15	
3623 C8	
3624 G14	
3625 B8	
3626 I14	
3628 B8	
3629 B7	
3630 F8	
3631 I2	
3632 I2	
3633 I1	
3634 I8	
3635 J7	
3636 J6	
3637 K7	
3638 K8	
3639 J8	
3640 F4	
3641 F8	
3645 C11	
3646 F3	
3647 E14	
3649 G2	
5800 E9	
5801 C12	
5802 G13	
5803 G13	
5804 F13	
5805 F10	
5806 D8	
6550 E1	

VALUES ARE IN FARADS:
 CRO =NANO p=PICO f=FEMTO
 VALUES ARE IN OHMS:
 LO =MEGA G=GIGA T=TERA
 RGE REPRESENTS PCEC REPLACEMENT PART ONLY.
 SEE PARTS LIST.

Mains switch panel



0001 A2
1000 B1
1001 A2
1002 A3

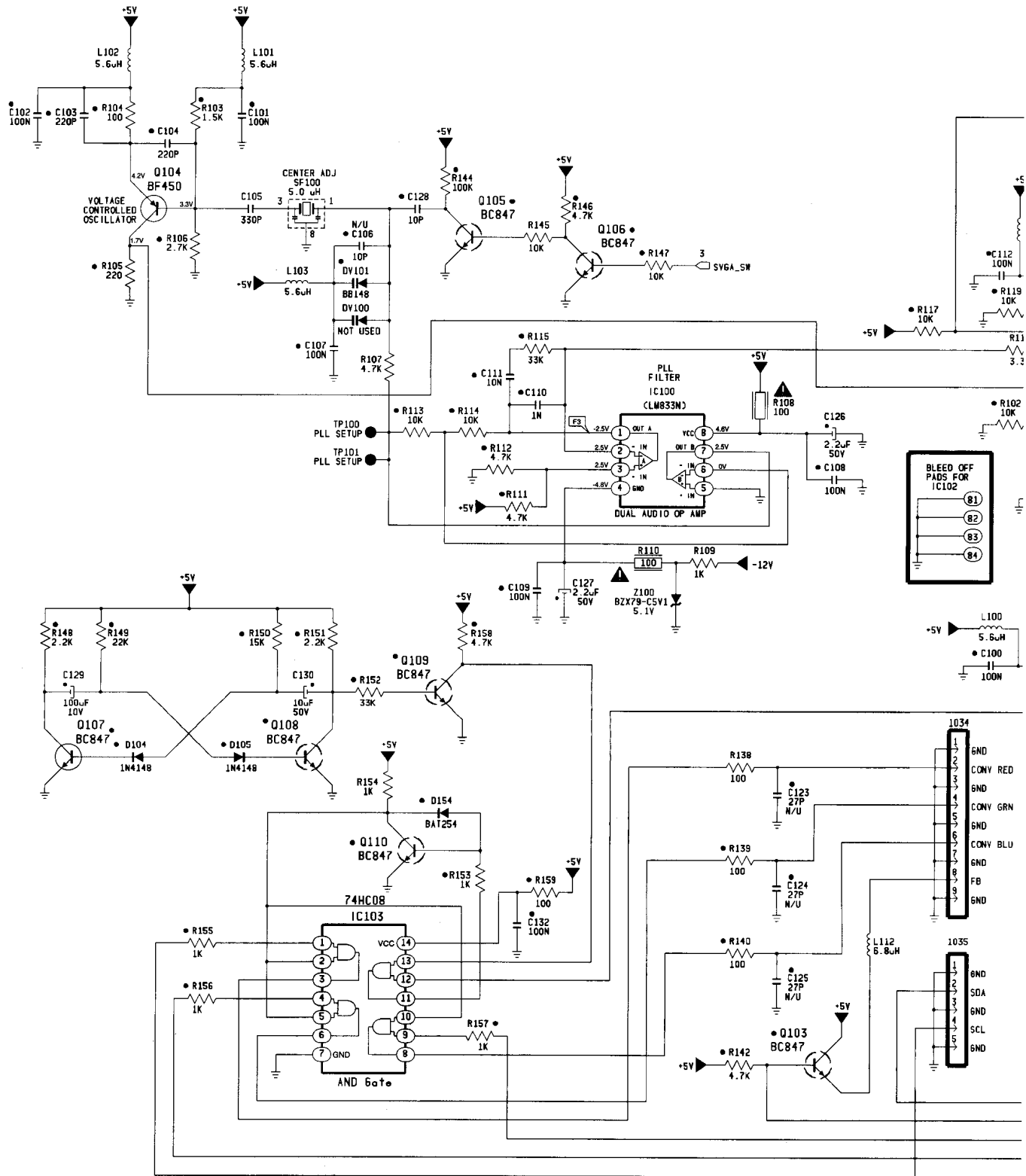
NOTES

1. CAPACITANCE VALUES ARE IN FARADS:
m=MILI u=MICRO n=NANO p=PICO f=FEMTO
2. RESISTANCE VALUES ARE IN OHMS:
R=OHM K=KILO M=MEGA G=GIGA T=TERA
3. SAFETY TRIANGE REPRESENTS PCEC REPLACEMENT PART ONLY.
4. ★ FOR VALUE SEE PARTS LIST.

CL 96532100_001.eps
150999

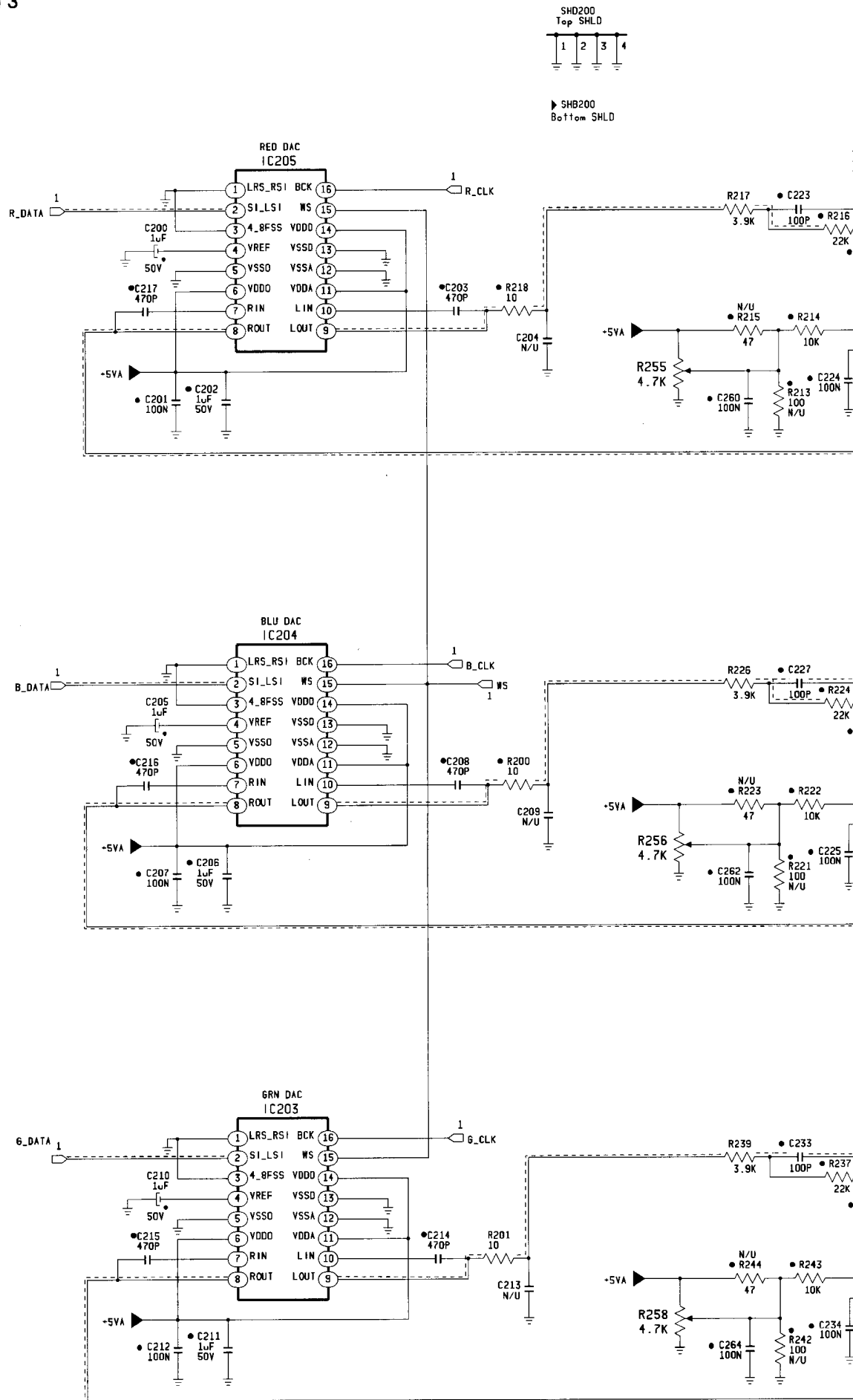
Convergence panel

CONVERGENCE 1 of 3



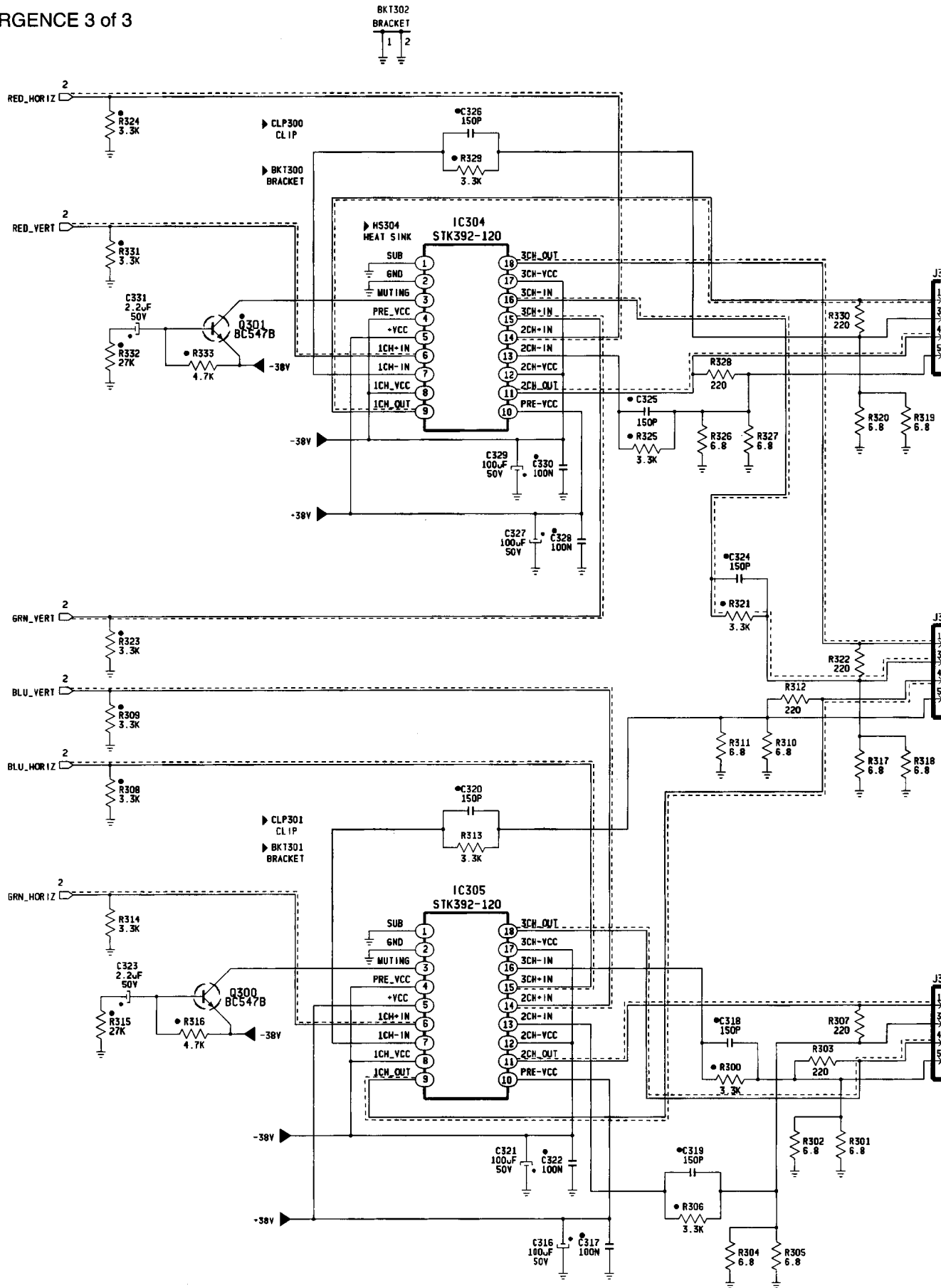
Convergence panel

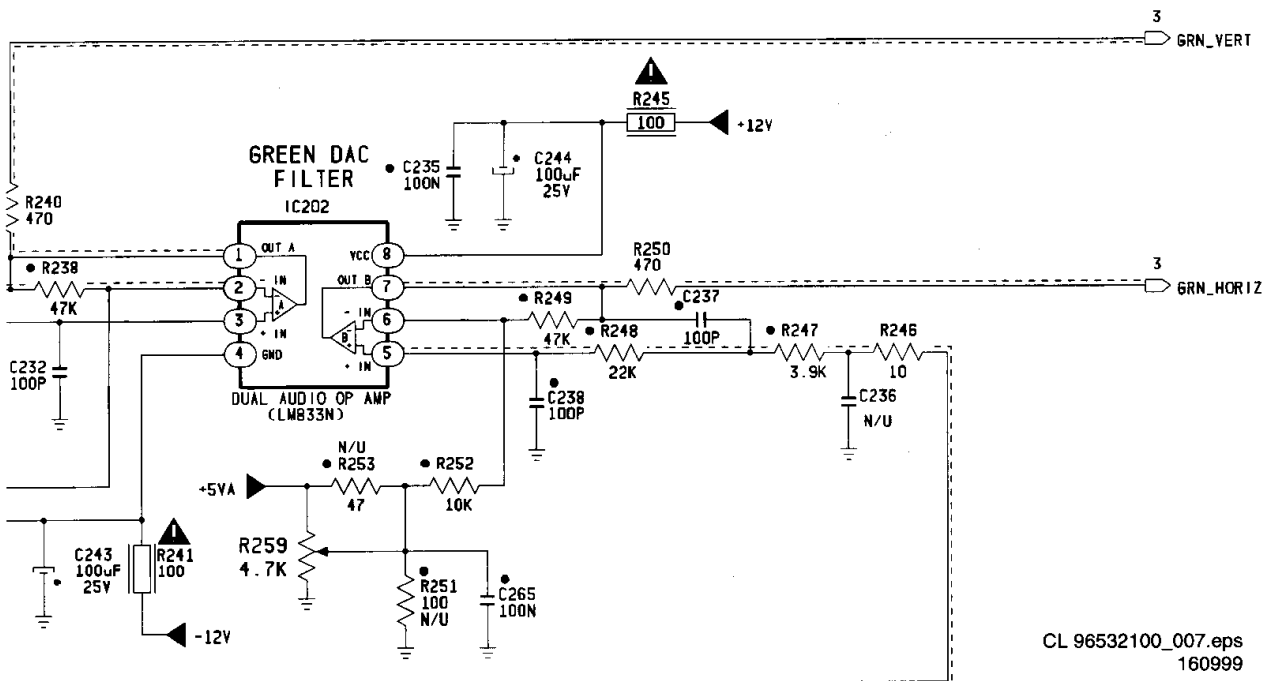
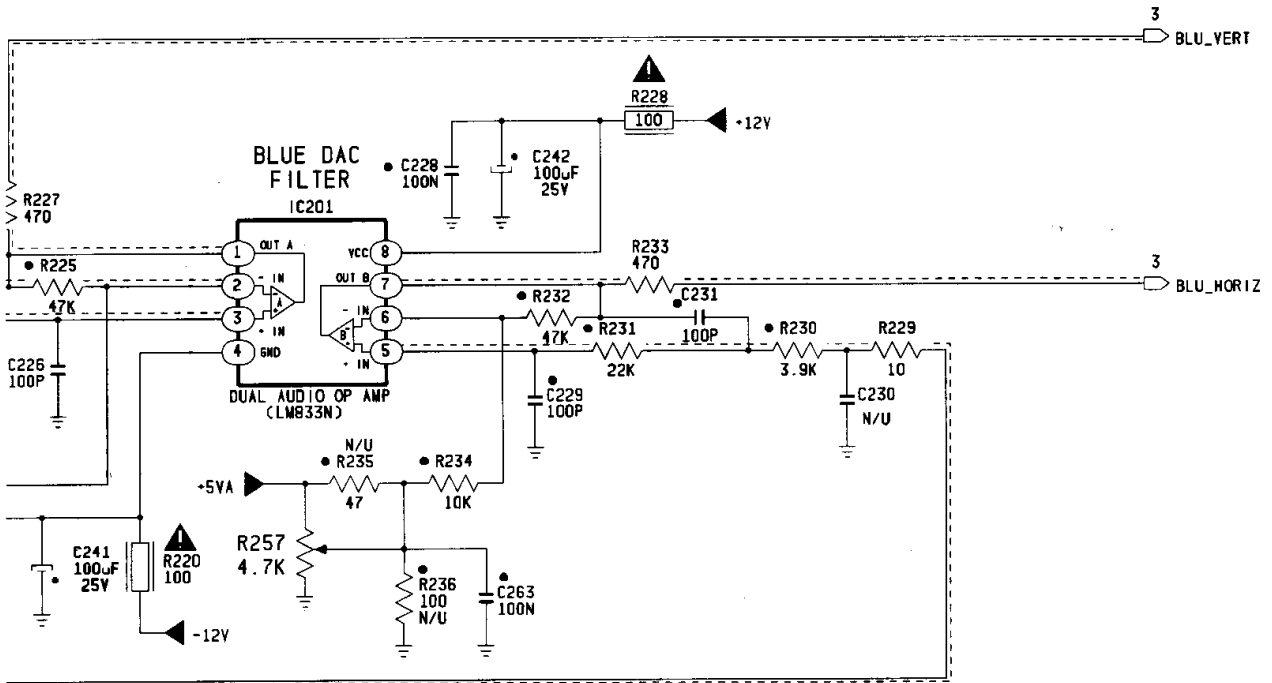
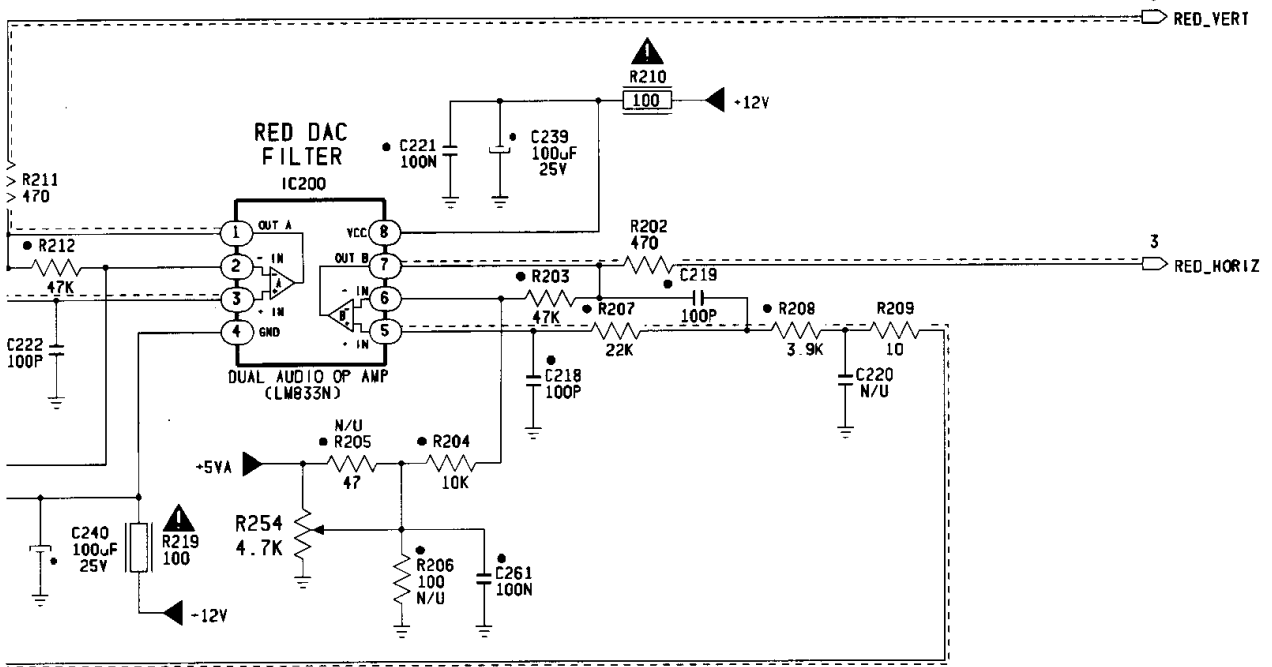
CONVERGENCE 2 of 3



Convergence panel

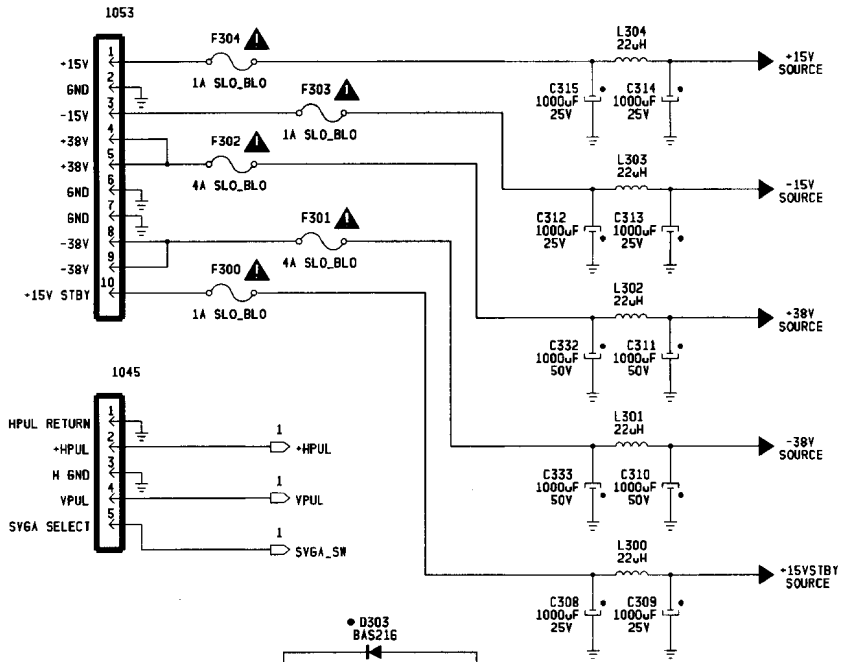
CONVERGENCE 3 of 3





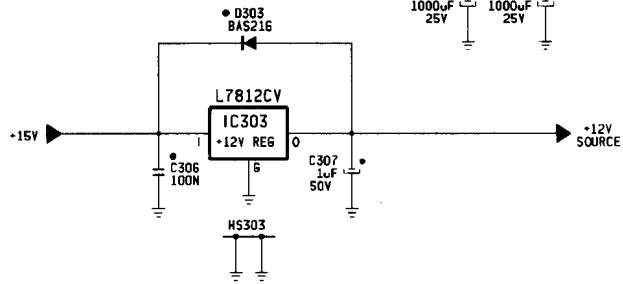
SD4

RED OUTPUT



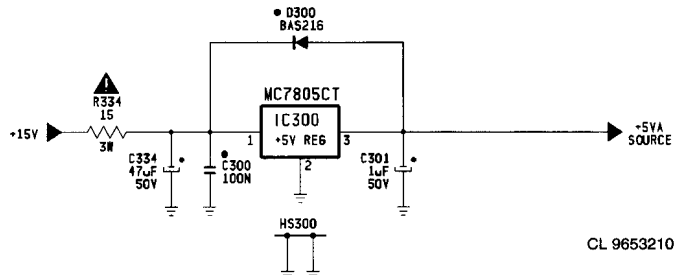
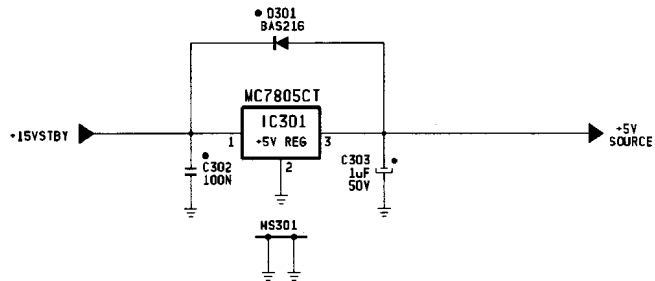
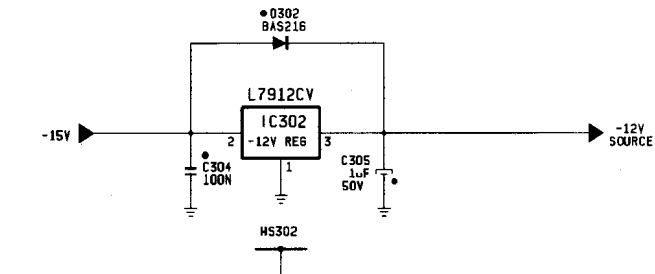
D03

GREEN OUTPUT

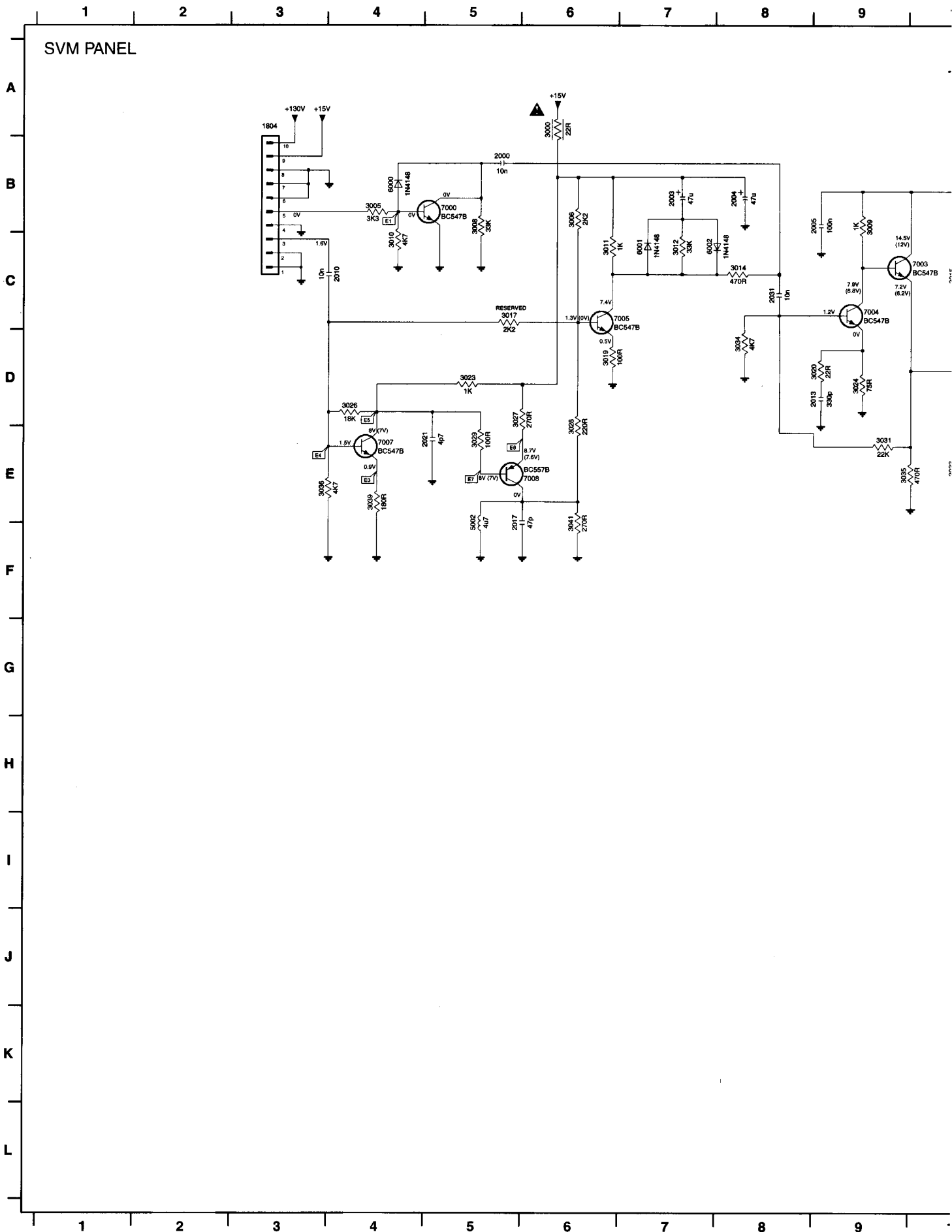


D02

BLUE OUTPUT

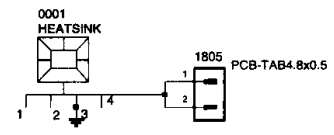
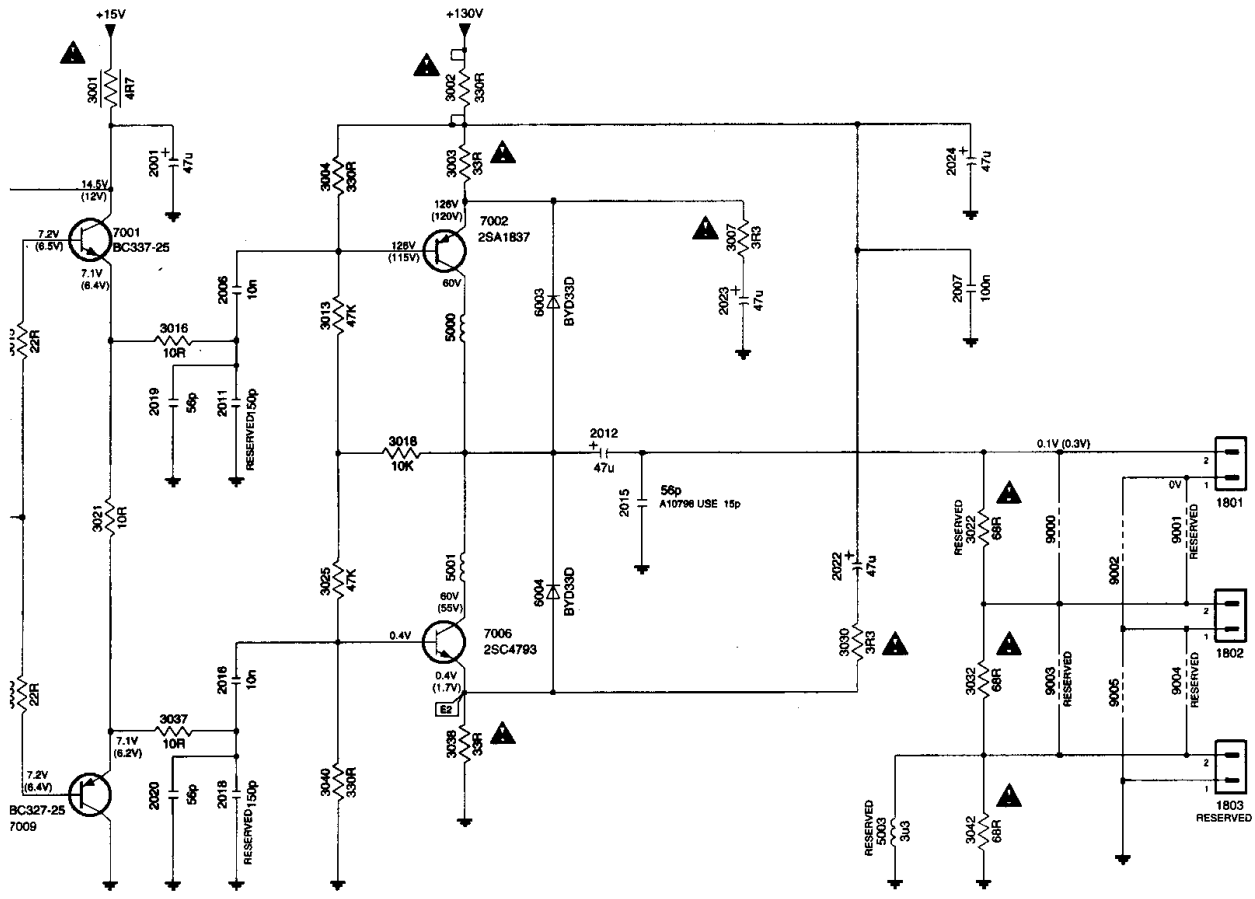


SVM PANEL



A
B
C
D
E
F
G
H
I
J
K
L

0001 H14
1801 D17
1802 E17
1803 F17
1804 A3
1805 H14
2000 B5
2001 B11
2003 B7
2004 B8
2005 B9
2006 C11
2007 C15
2010 C4
2011 C11
2012 C13
2013 D9
2015 D14
2016 E11
2017 E5
2018 E11
2019 C11
2020 F11
2021 E5
2022 D15
2023 B15
2024 B15
2031 C8
3000 A6
3001 B10
3002 A12
3003 B12
3004 B12
3005 B4
3006 B6
3007 B14
3008 B5
3009 B9
3010 C4
3011 C6
3012 C7
3013 C12
3014 C8
3015 C10
3016 C11
3017 C5
3018 D12
3019 D6
3020 D9
3021 D10
3022 D15
3023 D5
3024 D9
3025 D12
3026 D4
3027 D5
3028 E6
3029 E5
3030 E15
3031 E9
3032 E15
3033 E10
3034 D8
3035 E9
3036 E3
3037 E11
3038 E12
3039 E4
3040 E12
3041 F6
3042 F15
5000 C12
5001 D12
5002 E5
5003 F15
6000 B4
6001 C7
6002 C7
6003 C13
6004 D13
7000 B5
7001 B11
7002 B13
7003 C10
7004 C9
7005 C6
7006 E13
7007 E4
7008 E6
7009 F10
9000 D16
9001 D17
9002 D16
9003 E16
9004 E17
9005 E16



- NOTES
1. CAPACITANCE VALUES ARE IN FARADS:
m=MILI u=MICRO n=NANO p=PICO f=FEMTO
 2. RESISTANCE VALUES ARE IN OHMS:
R=OHM K=KILO M=MEGA G=GIGA T=TERRA
 3. SAFETY TRIANGE REPRESENTS PCEC REPLACEMENT PART ONLY.
 4. ★ FOR VALUE SEE PARTS LIST.

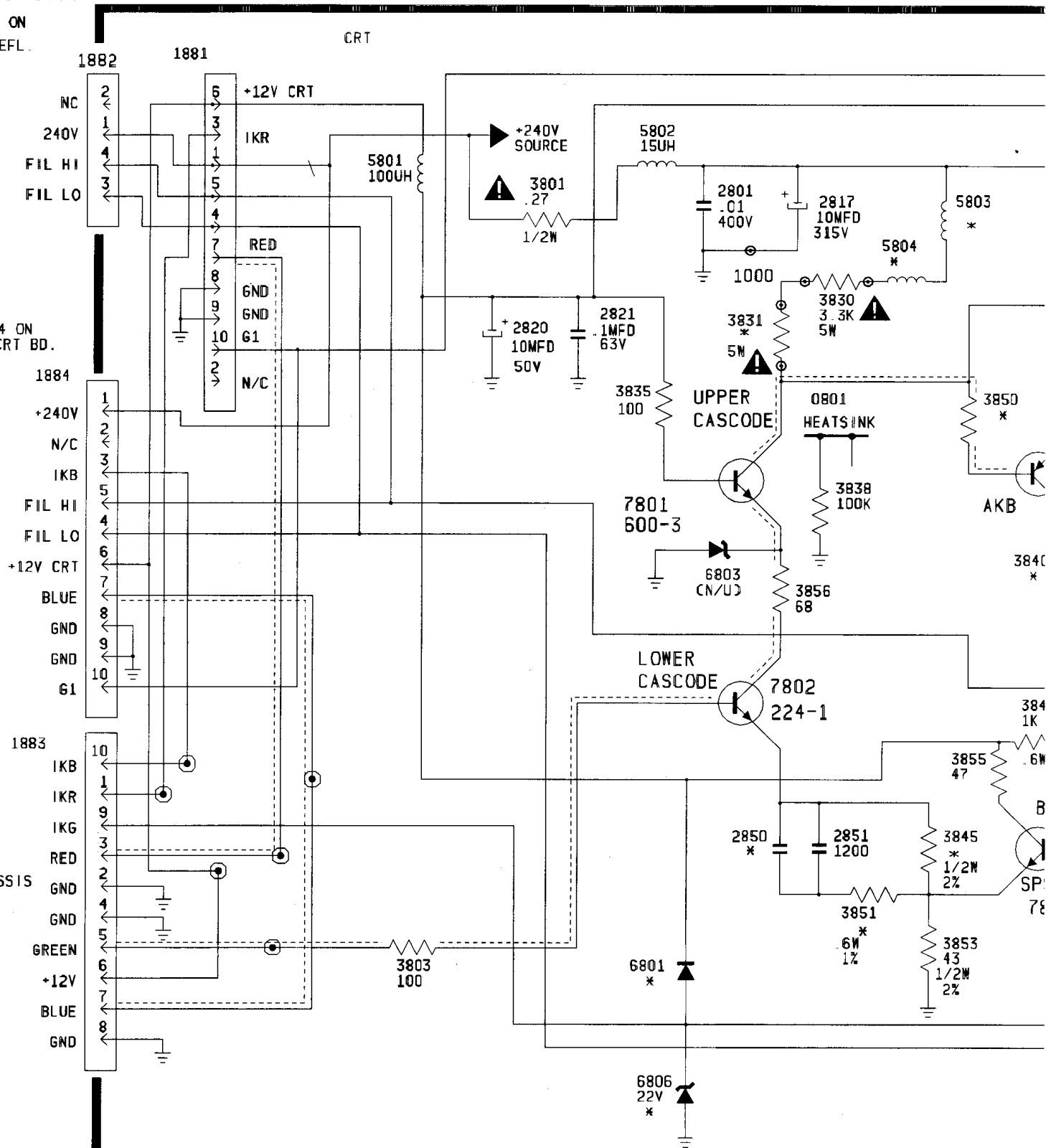
CRT GREEN panel

GREEN CRT

TO 1582 ON
POWER DEFL.

TO 1894 ON
BLUE CRT BD.

TO 1083
MAIN CHASSIS

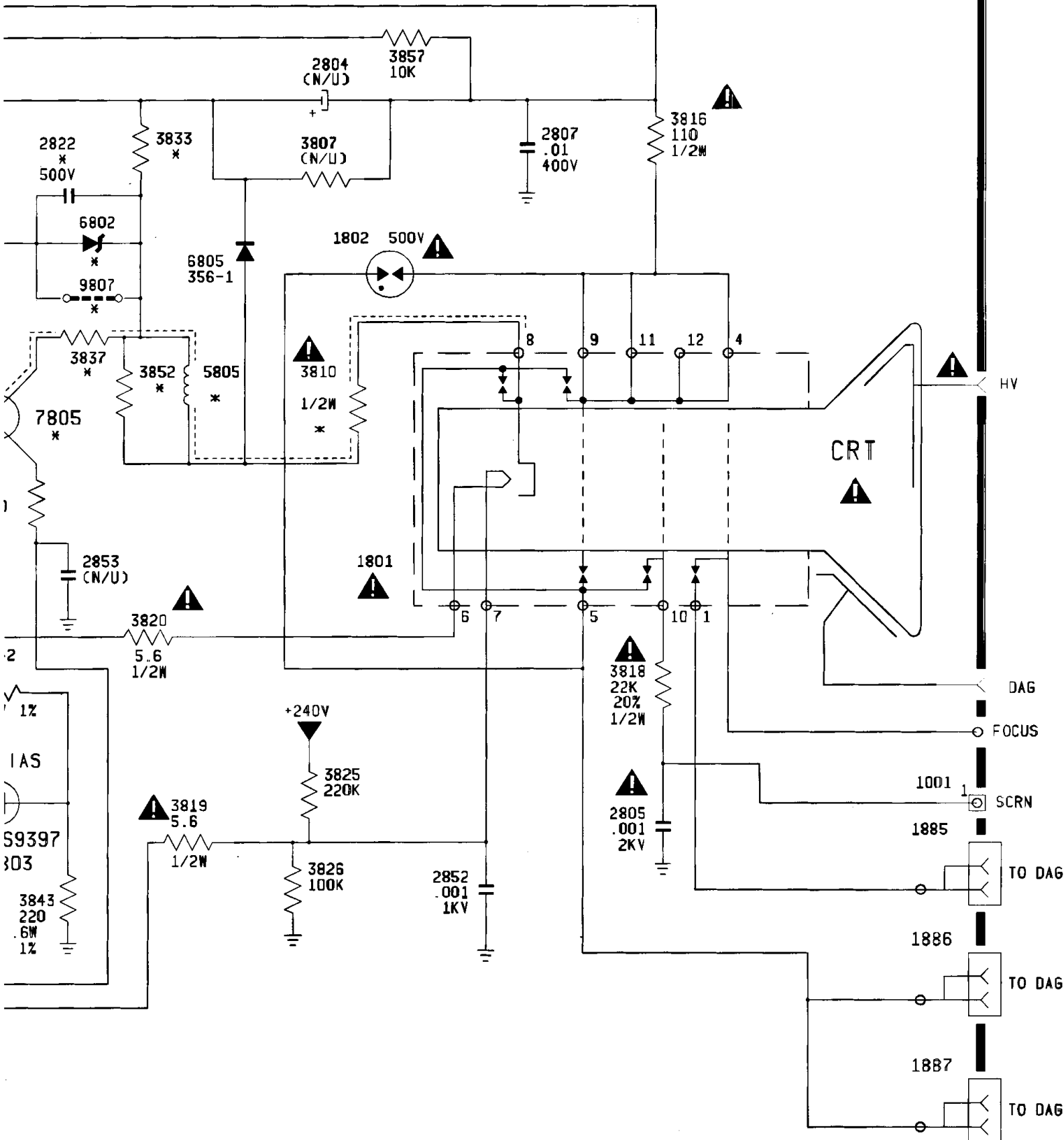


NOTES:

UNLESS OTHERWISE SPECIFIED

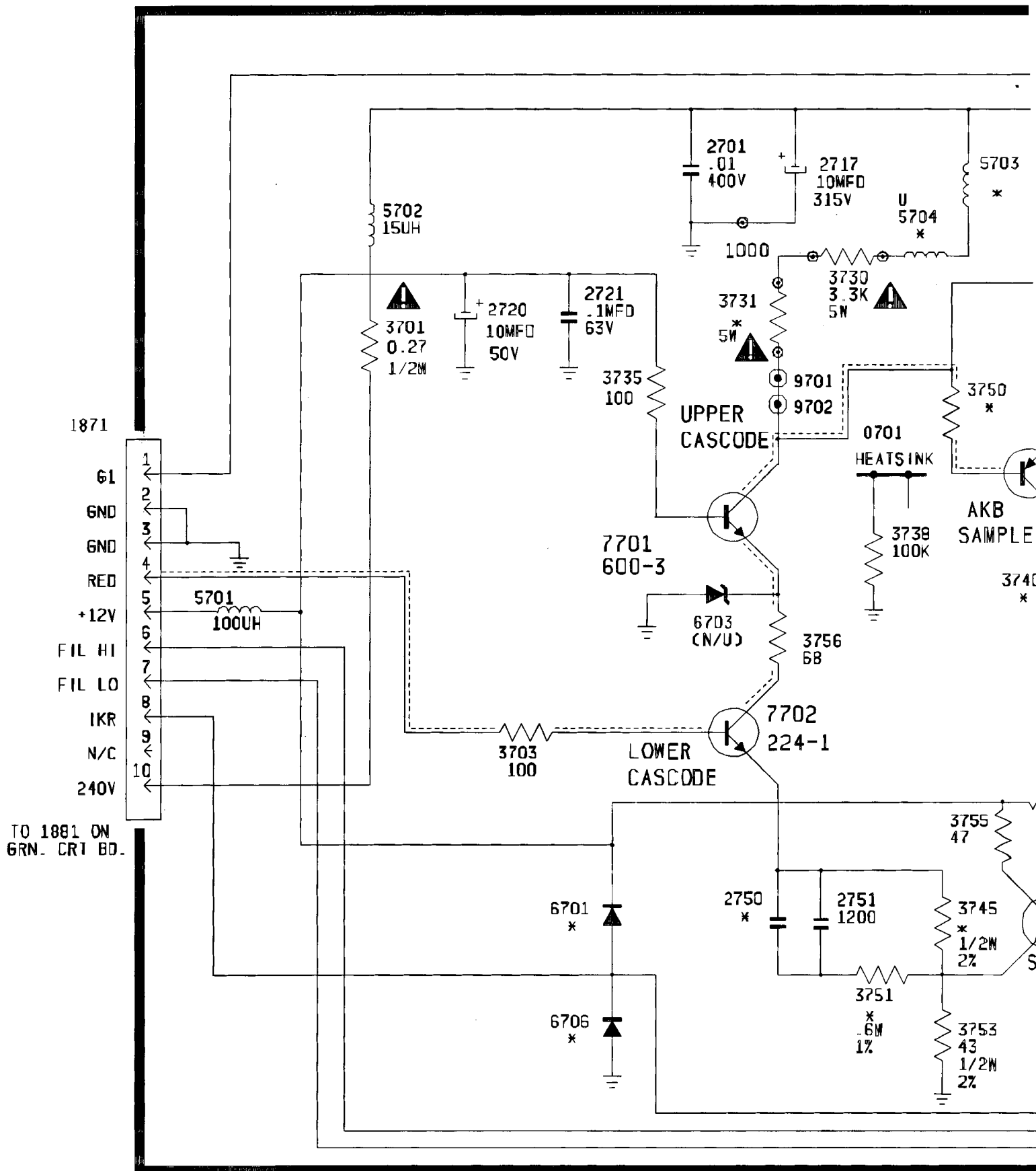
1. CAPACITANCE VALUES OF ONE OR MORE ARE PICO FARADS.
2. CAPACITANCE VALUES LESS THAN ONE ARE MICROFARADS.
3. RESISTORS ARE IN OHMS, 1/4W, 5%.
4. ● = SURFACE MOUNTED DEVICE (SMD).
5. ▲ = PCEC REPLACEMENT PART NUMBERS ONLY.
6. ○ = LAYOUT INDUCED JUMPER.
7. * = SEE PARTS LIST.

E BOARD

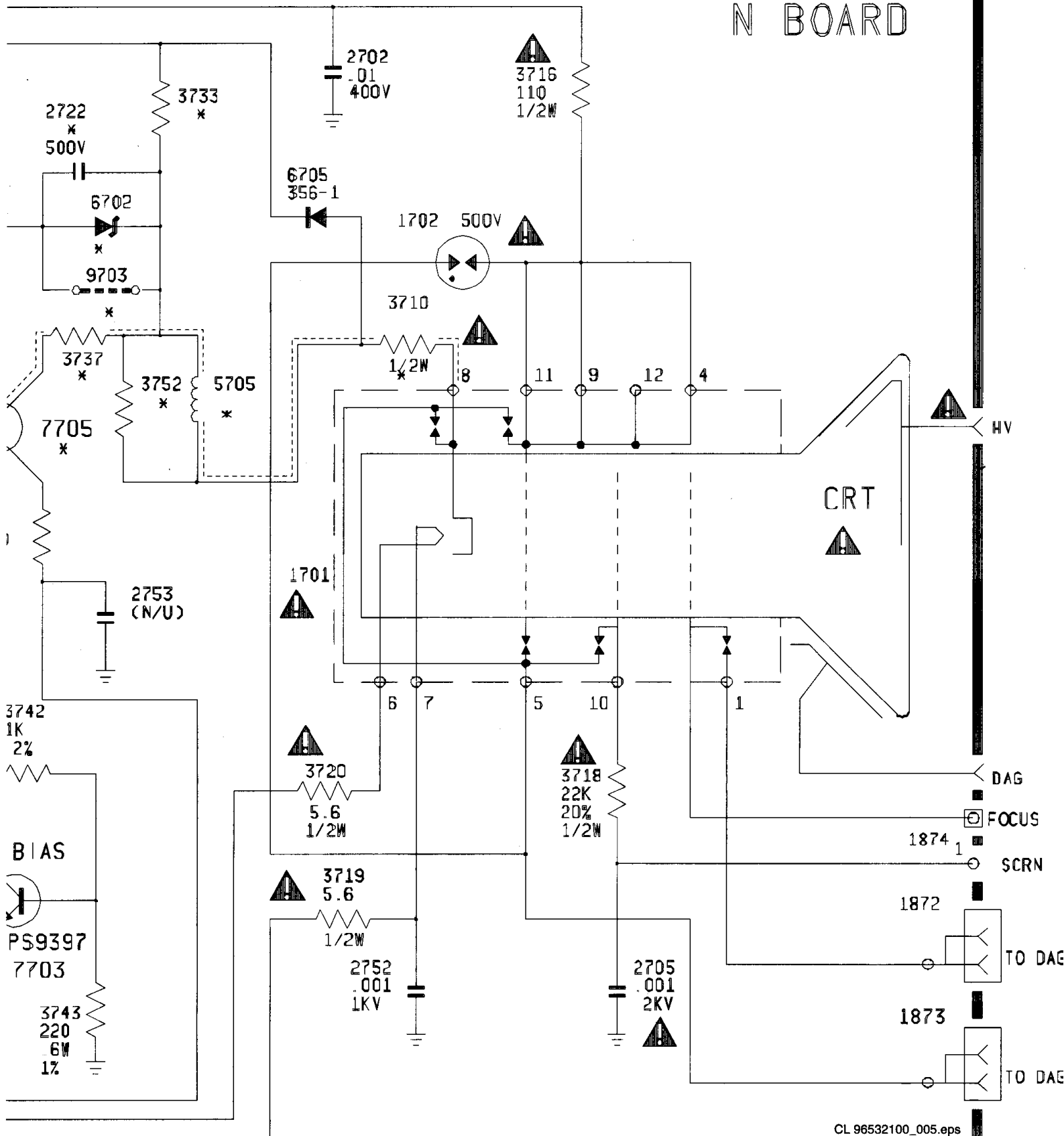


CRT RED panel

RED CRT

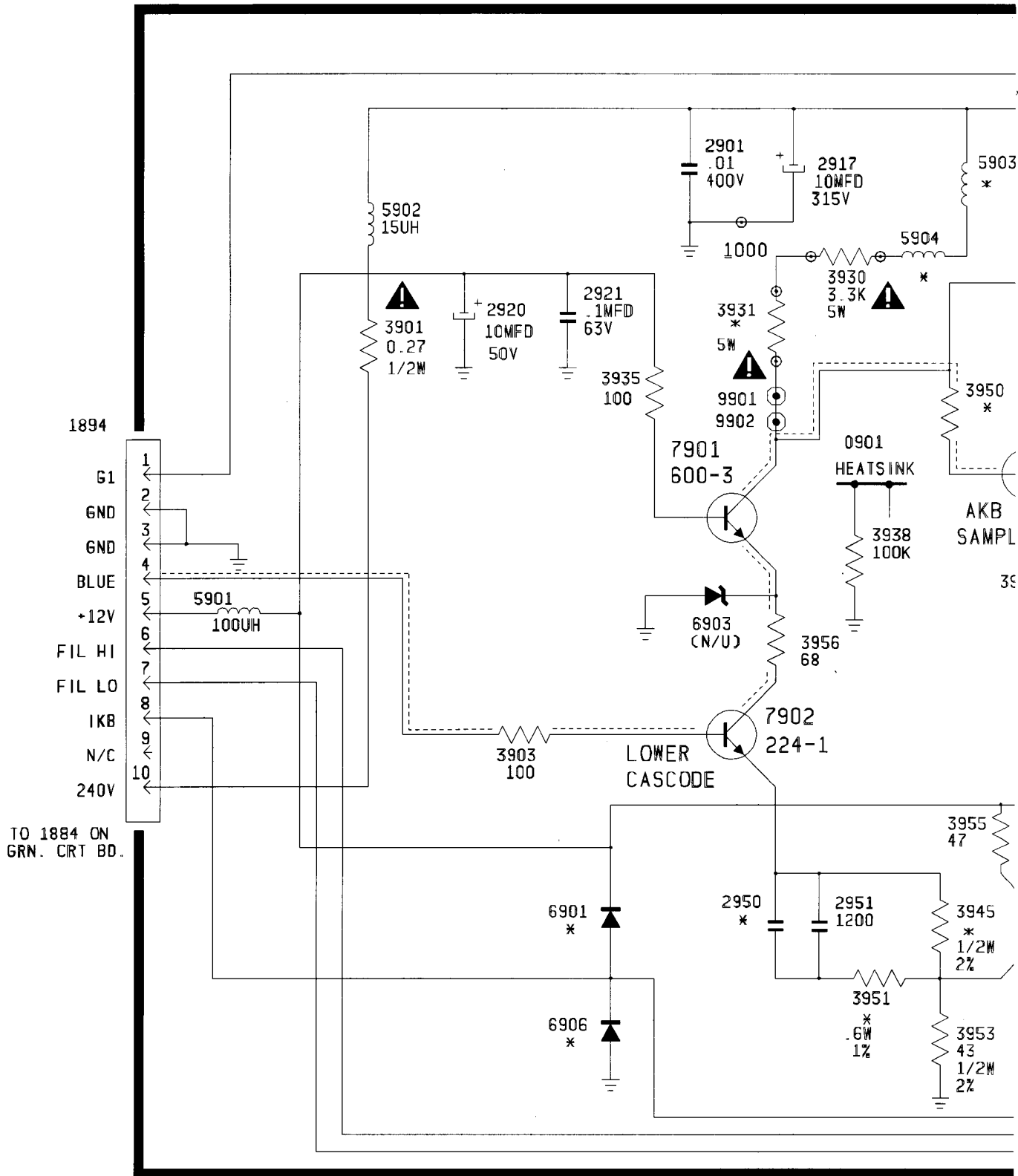


N BOARD

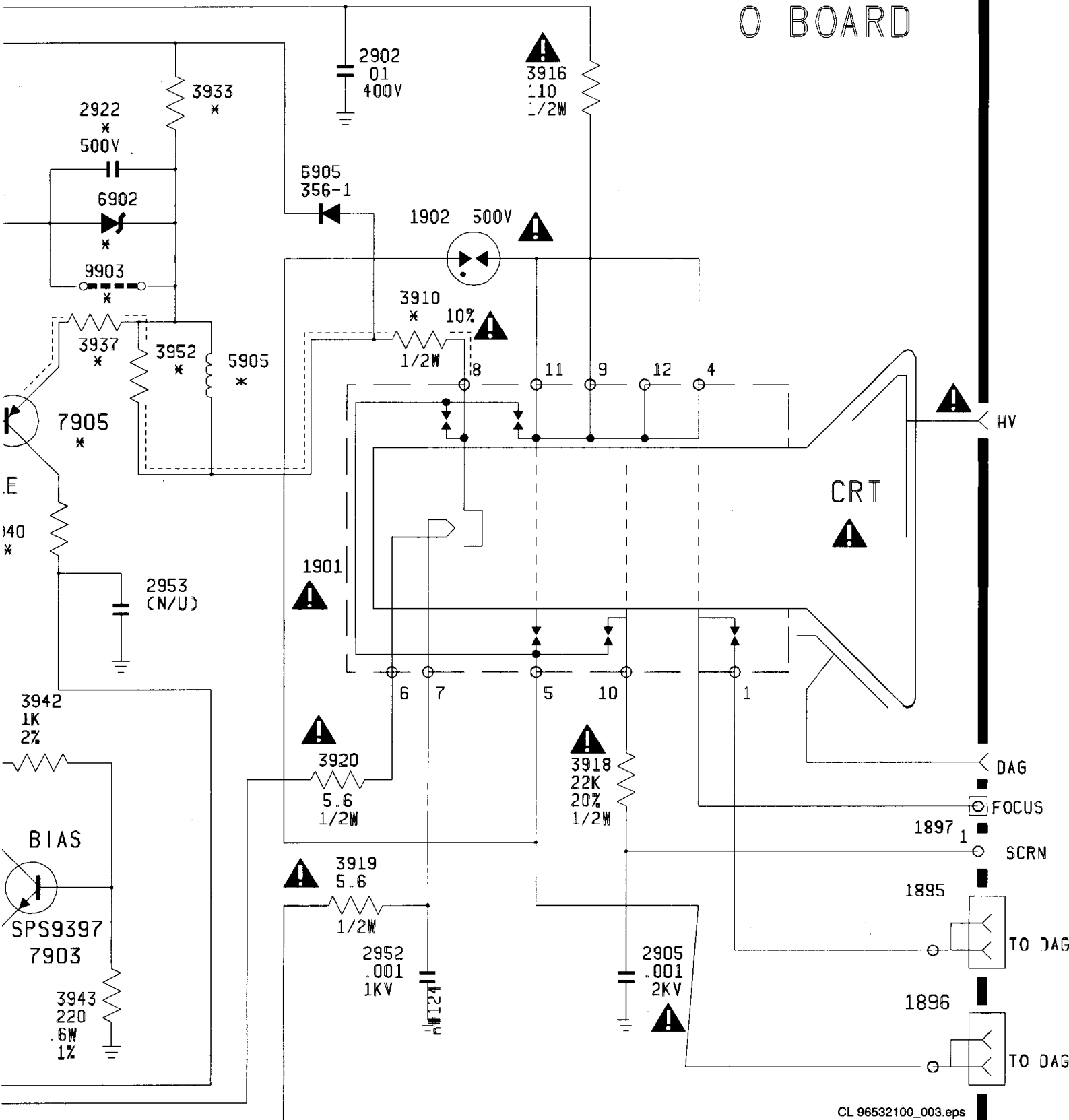


CRT BLUE panel

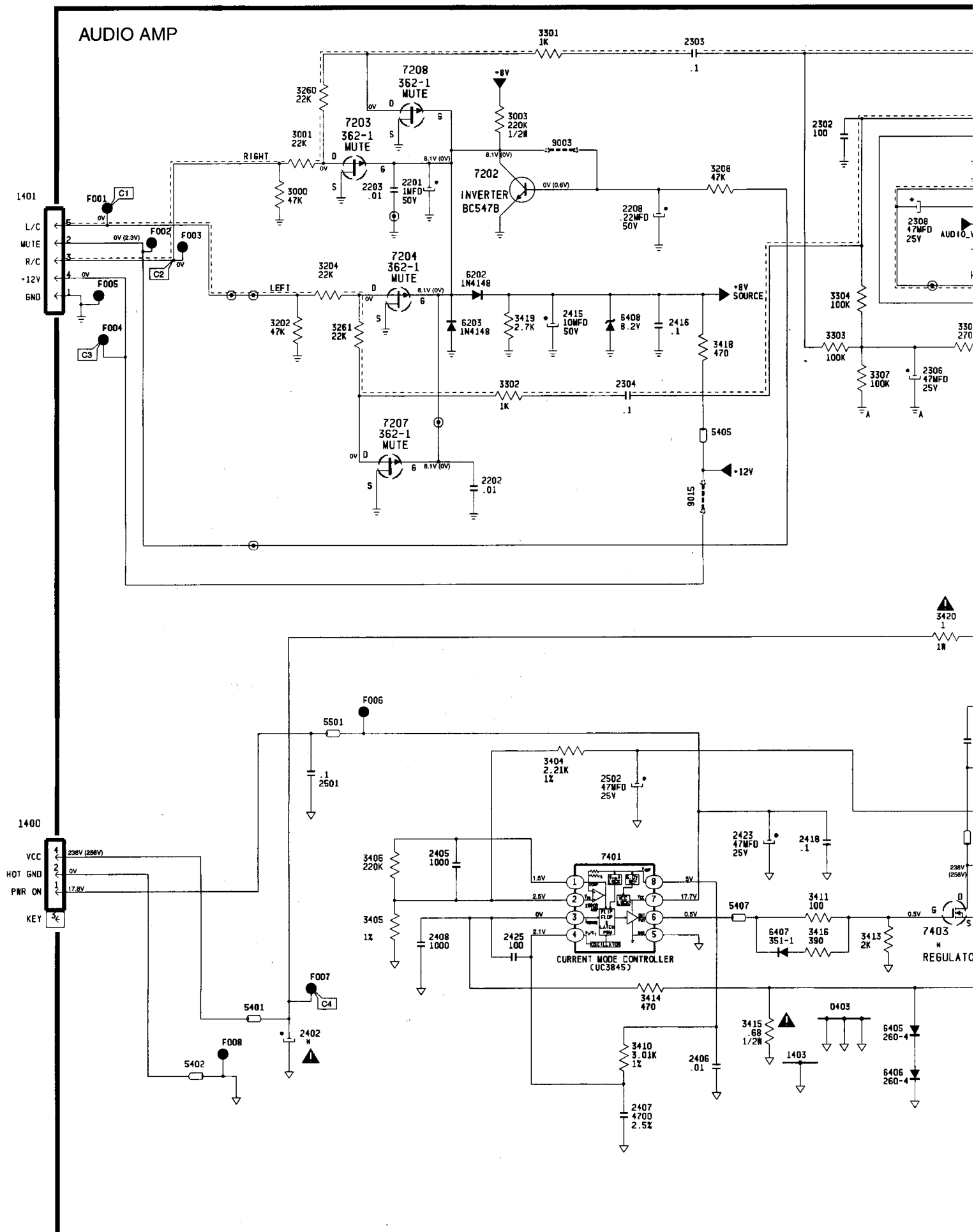
BLUE CRT

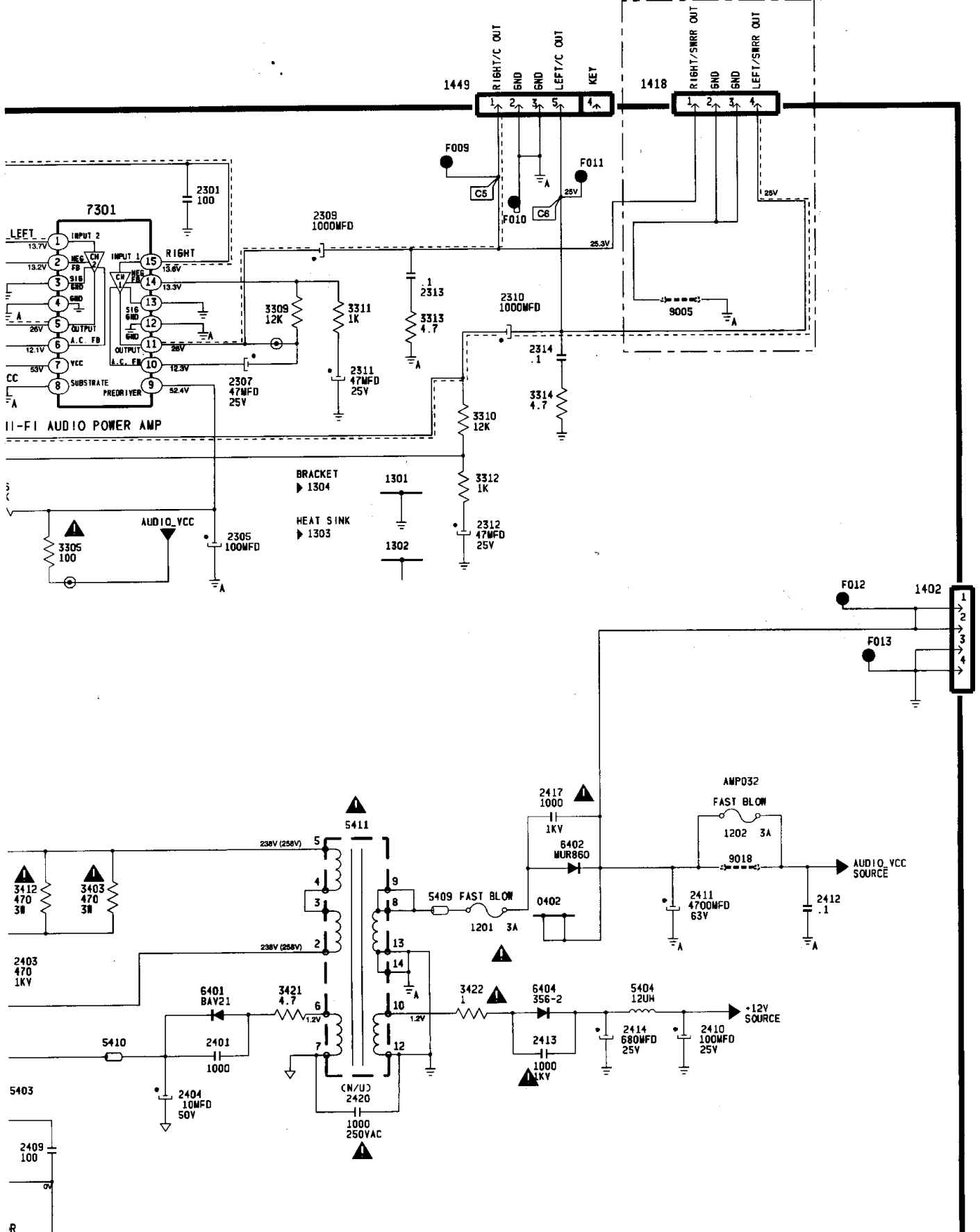


O BOARD



Audio amplifier



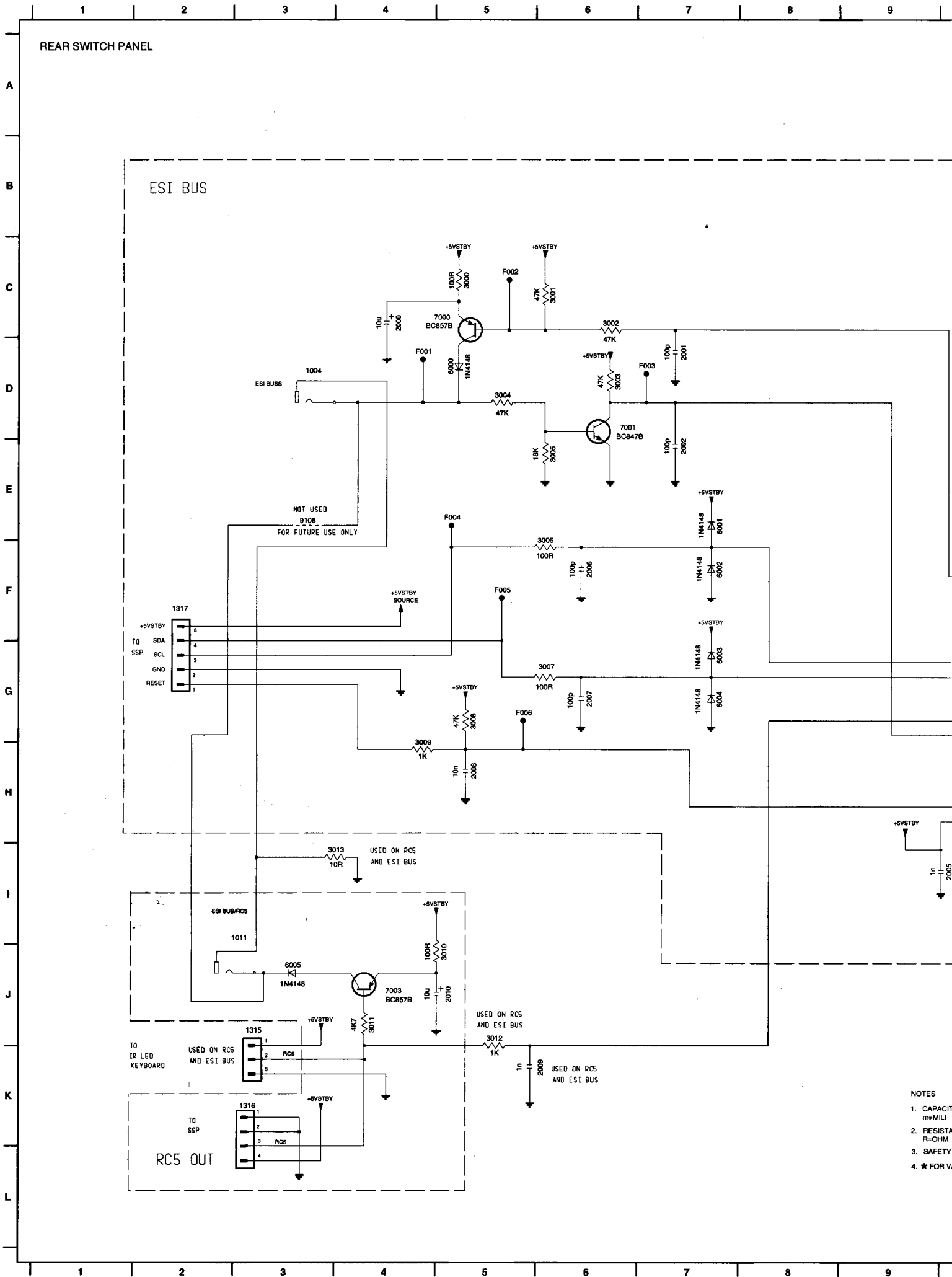


NOTES:

UNLESS OTHERWISE SPECIFIED

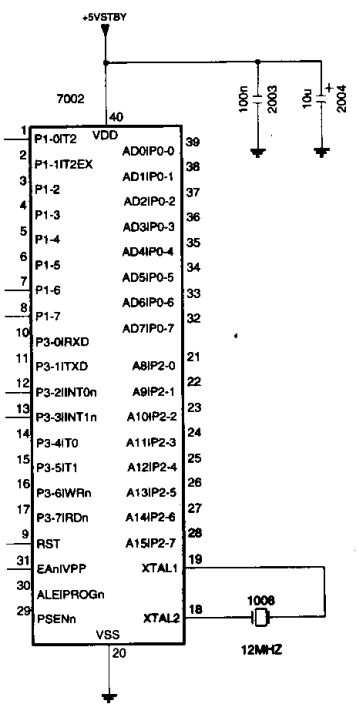
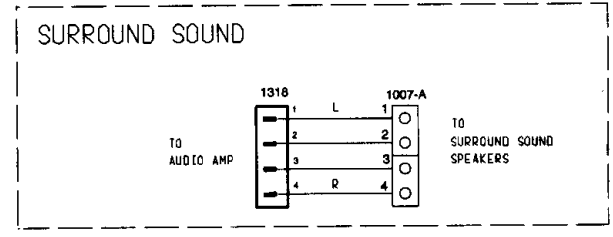
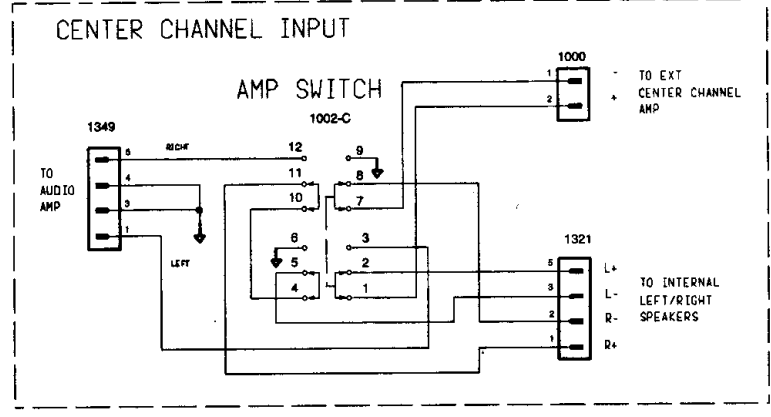
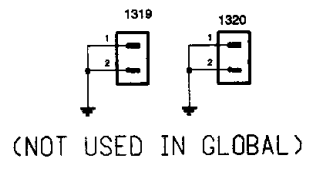
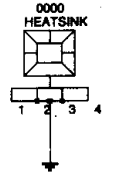
1. CAPACITANCE VALUES OF ONE OR MORE ARE PICOFARADS.
2. CAPACITANCE VALUES LESS THAN ONE ARE MICROFARADS.
3. RESISTORS ARE IN OHMS, 1/4W, 5%.
4. ● = SURFACE MOUNTED DEVICE (SMD).
5. ▲ = PCEC REPLACEMENT PART NUMBERS ONLY.
6. ⊙ = LAYOUT INDUCED JUMPER.
7. * = SEE PARTS LIST.

Rear switch panel



- NOTES
1. CAPACITANCE IN MILLI-FARADS
 2. RESISTANCE IN OHMS
 3. SAFETY
 4. * FOR VOLTAGE

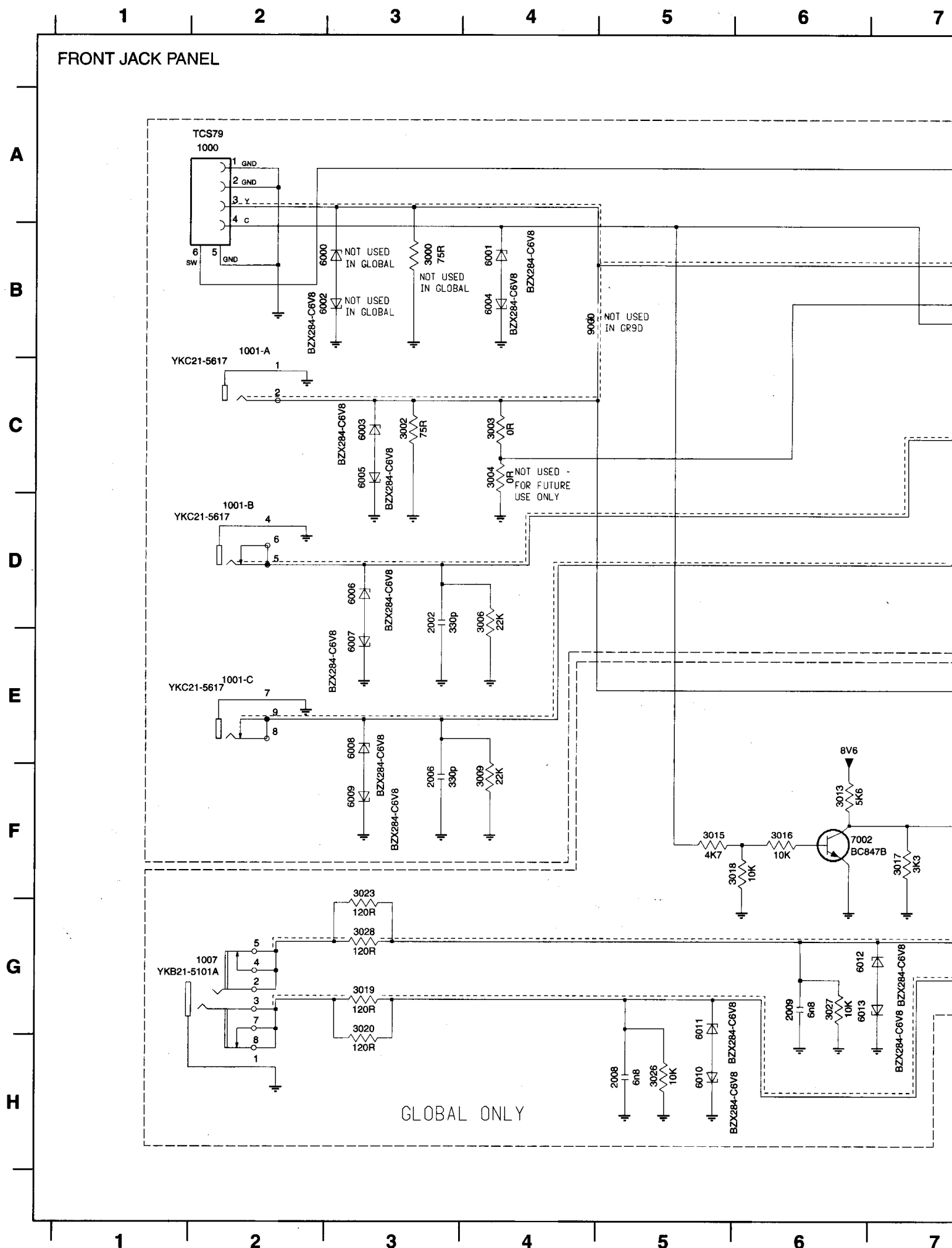
0000 C11
 1000 C16
 1002-C D15
 1004 D3
 1007-A F15
 1008 H11
 1011 I3
 1315 J3
 1316 K3
 1317 F2
 1318 F4
 1319 A15
 1320 A15
 1321 D16
 1349 D13
 2000 C4
 2001 D7
 2002 E7
 2003 F11
 2004 F12
 2005 I10
 2006 F6
 2007 G6
 2008 H5
 2009 K6
 2010 J5
 3000 C5
 3001 C6
 3002 C6
 3003 D6
 3004 D5
 3005 E6
 3006 F6
 3007 G6
 3008 G5
 3009 H4
 3010 J5
 3011 J4
 3012 J5
 3013 I4
 6000 D5
 6001 E7
 6002 F7
 6003 G7
 6004 G7
 6005 J3
 7000 C5
 7001 D6
 7002 F10
 7003 J4
 9108 E3
 F001 D4
 F002 C5
 F003 D7
 F004 E5
 F005 F5
 F006 G5



ANCE VALUES ARE IN FARADS:
 u=MICRO n=NANO p=PICO f=FEMTO
 NCE VALUES ARE IN OHMS:
 K=KILO M=MEGA G=GIGA T=TERA
 TRIANGLE REPRESENTS PCEC REPLACEMENT PART ONLY.
 llUE SEE PARTS LIST.

ORI_dummy

Front jack panel



1000 A2
 1001-A B2
 1001-B C2
 1001-C D2
 1002 C11
 1005 E7
 1006 F7
 1007 F2
 2000 B9
 2001 C10
 2002 D2
 2003 D5
 2004 D5
 2005 D10
 2006 E2
 2007 E6
 2008 G5
 2009 G6
 3000 B7
 3001 C10
 3002 C2
 3003 C3
 3004 C3
 3005 C10
 3006 D3
 3007 D10
 3008 D5
 3009 E3
 3010 E5
 3011 E6
 3012 E5
 3013 E3
 3014 E6
 3015 E2
 3016 E3
 3017 F4
 3018 F3
 3019 F5
 3020 F5
 3023 G5
 3026 G5
 3027 G6
 3028 G5
 5000 F6
 6000 B7
 6001 B9
 6002 B7
 6003 C3
 6004 C9
 6005 C3
 6006 C9
 6007 D9
 6008 D9
 6009 E9
 6010 G4
 6011 G5
 6012 G7
 6013 G7
 7000 D6
 7001 D6
 7002 F3
 9000 B3

A

B

C

D

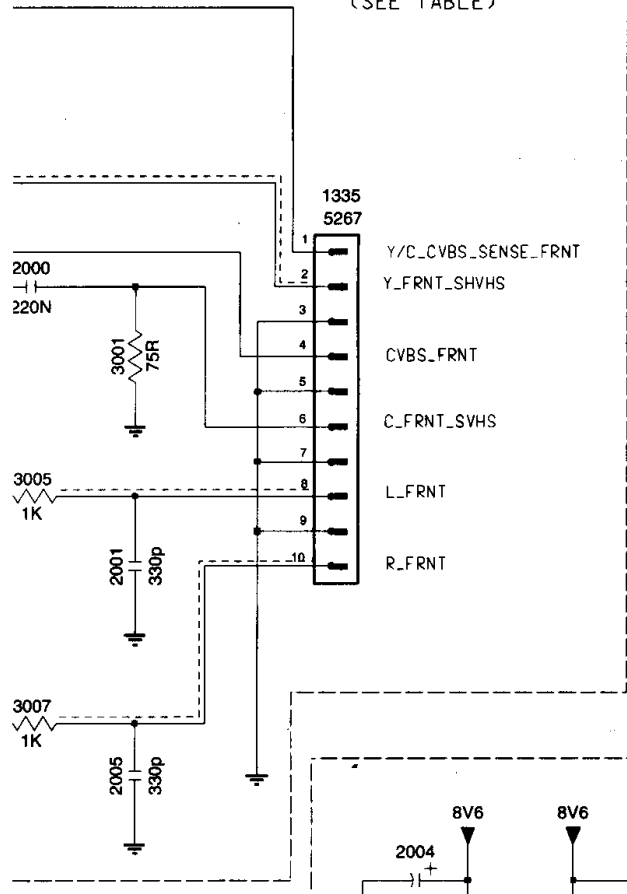
E

F

G

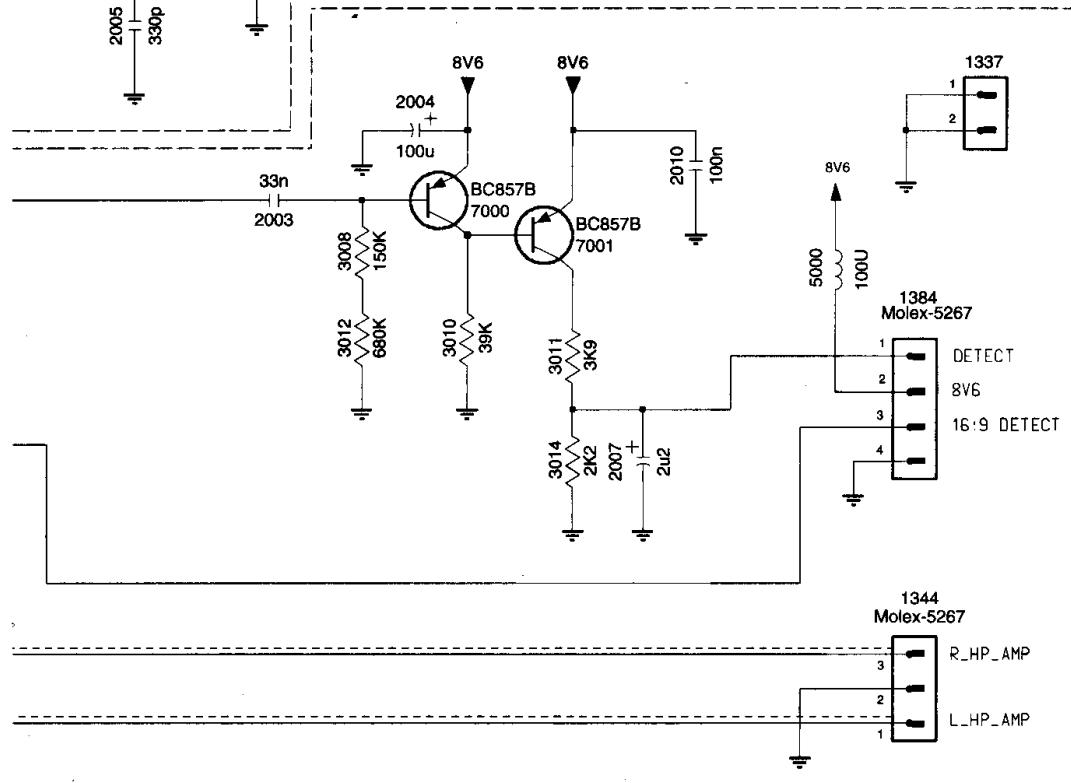
H

GR9D AND GLOBAL
 (SEE TABLE)



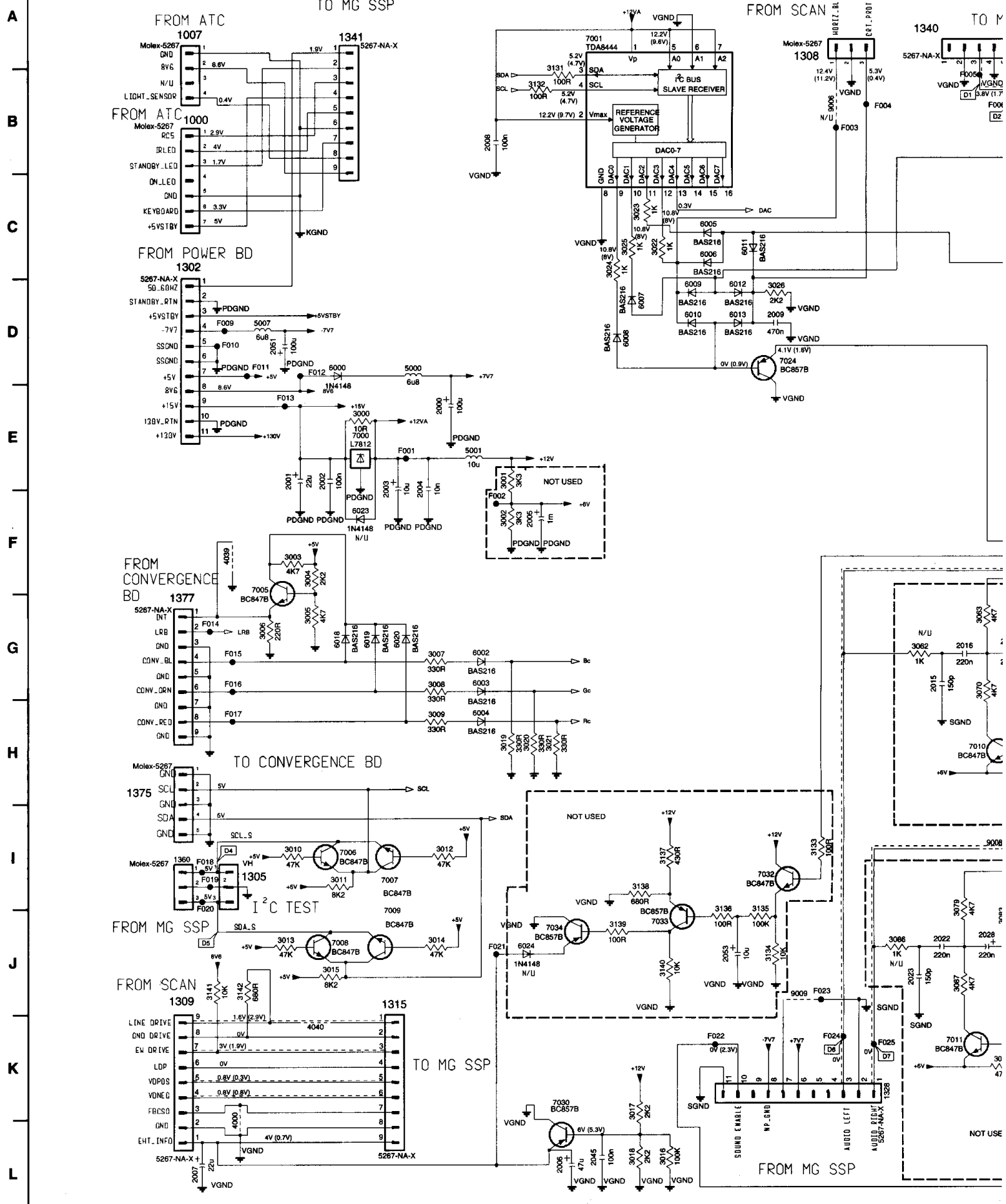
NOTES

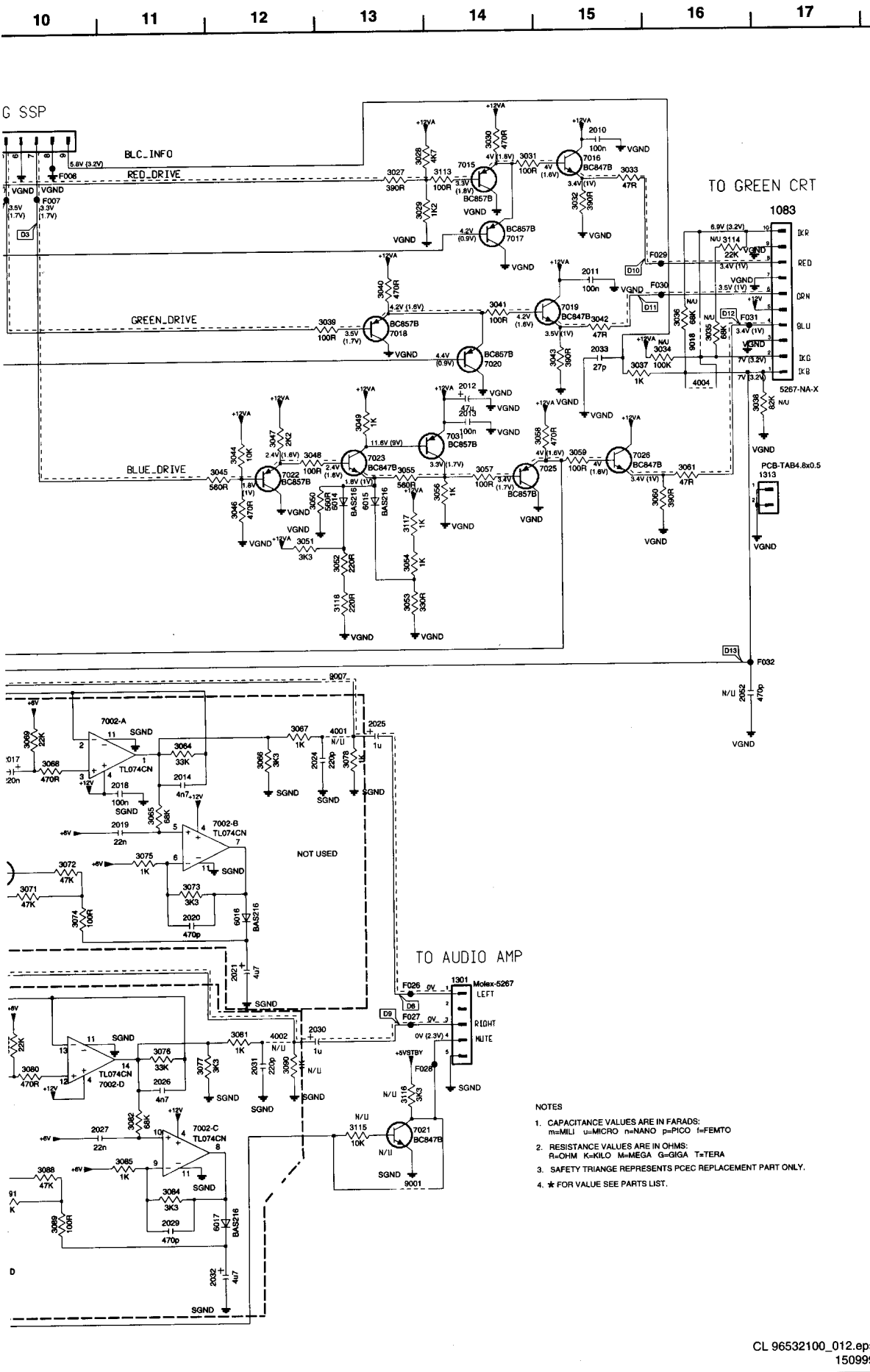
1. CAPACITANCE VALUES ARE IN FARADS:
 m=MILI u=MICRO n=NANO p=PICO f=FEMTO
2. RESISTANCE VALUES ARE IN OHMS:
 R=OHM K=KILO M=MEGA G=GIGA T=TERA
3. SAFETY TRIANGE REPRESENTS PCEC REPLACEMENT PART ONLY.
4. ★ FOR VALUE SEE PARTS LIST.



Interface panel

INTERFACE 1 of 2

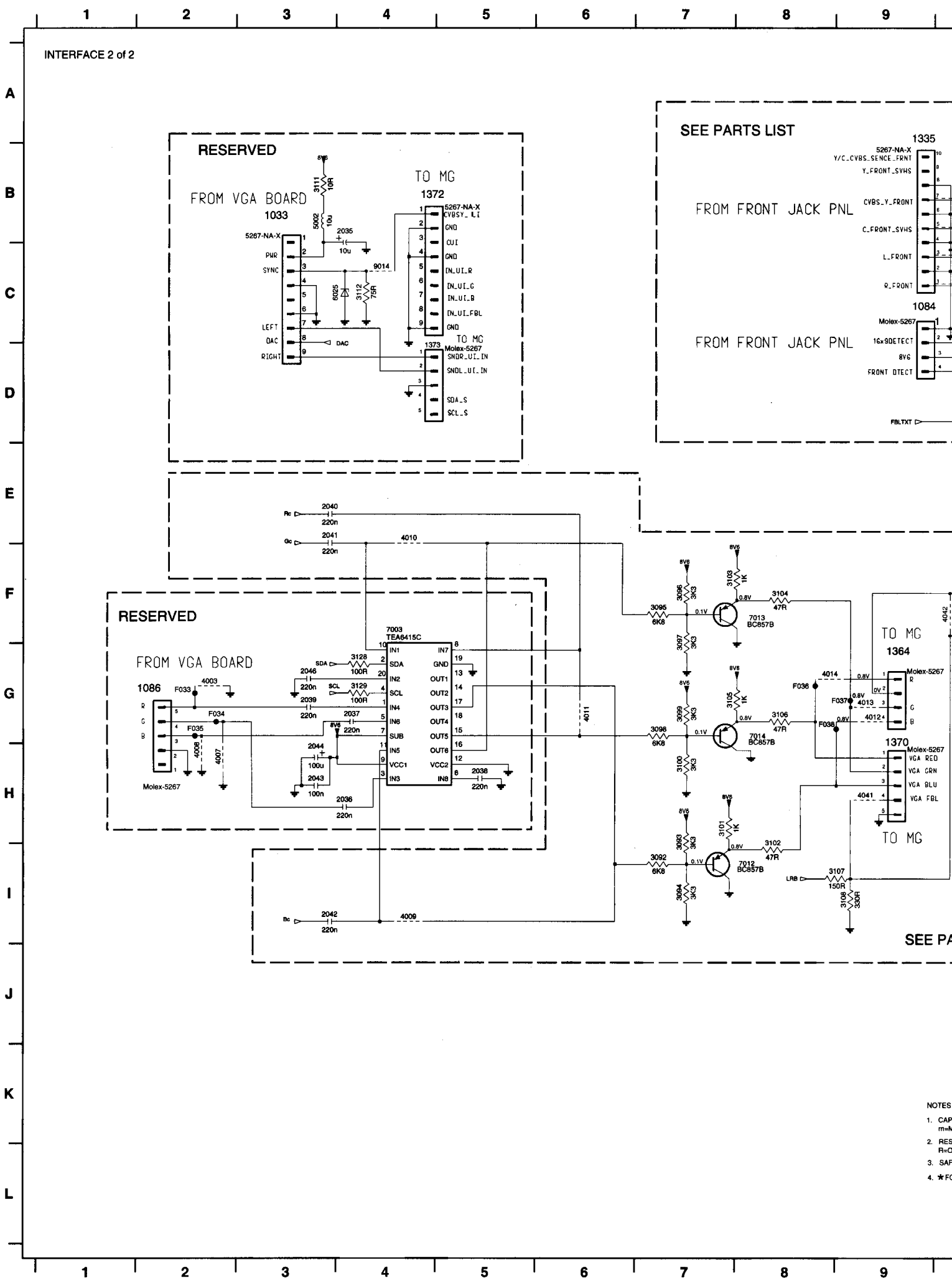




1000 B2	3091 K10
1007 A2	3113 B14
1083 B17	3114 B16
1301 I14	3115 J13
1302 C2	3116 J13
1305 I2	3117 E13
1308 A8	3118 F13
1309 J2	3131 B5
1313 D17	3132 B5
1315 J4	3133 I9
1328 K9	3134 J7
1340 A9	3135 J7
1341 A3	3136 J7
1360 I2	3137 I6
1375 H2	3138 I6
1377 G2	3139 J6
2000 E4	3140 J6
2001 E3	3141 J2
2005 E3	3142 J2
2003 E4	4000 L2
2004 E4	4001 G13
2005 F5	4002 J12
2006 L5	4004 D16
2007 L2	4039 F2
2008 B5	6040 K3
2008 D7	5000 D4
2010 A15	5001 E5
2011 C15	5007 D3
2012 A14	6000 D16
2013 D14	4002 G5
2014 G11	6003 G5
2015 G9	6004 H5
2016 G9	6006 C7
2017 G10	6006 C7
2018 H11	9007 D6
2018 H11	6008 D6
2020 H11	6009 D7
2021 H2	6010 D7
2022 J9	9007 D6
2023 J9	6012 D7
2024 G12	6013 D7
2025 G13	6014 E13
2026 J11	6015 E13
2027 J10	6023 F4
2028 J9	6017 K12
2029 K11	6018 G3
2030 I12	6019 G4
2031 J12	6020 G4
2032 L11	6021 H12
2033 L15	6024 J5
2045 L6	7000 E4
2051 D3	7001 A6
2052 F16	7002-A G10
2053 J7	7002-B H12
3000 E4	7002-C J11
3001 E5	7002-D J10
3002 F5	7005 F3
3003 F3	7006 F3
3004 F3	7007 F3
3005 G3	7008 J3
3006 G3	7009 I4
3007 G4	7010 H9
3008 G4	7011 K9
3009 H4	7015 A14
3010 I3	7016 B15
3011 I3	7017 B14
3012 J4	7018 C13
3013 J3	7019 C15
3014 J4	7020 C14
3015 J3	7021 J13
3016 L6	7022 D12
3017 K6	7023 D13
3018 L6	7024 D7
3019 H5	7025 D15
3020 H5	7026 D15
3021 H5	7030 K5
3022 C6	7031 D14
3023 C6	7032 F7
3024 C6	7033 J6
3025 C6	7034 J5
3026 D7	9001 K13
3027 B13	9006 B8
3028 B13	9007 F13
3029 B13	9008 I10
3030 A14	9009 J8
3031 B14	9018 C16
3032 B15	F001 E4
3033 B15	F002 F5
3034 C16	F003 B8
3035 C16	F004 B8
3036 C16	F005 B9
3037 C15	F006 B10
3038 D17	F007 D10
3039 C13	F008 B10
3040 C13	F009 D2
3041 C14	F010 D2
3042 C15	F011 D3
3043 C15	F012 D3
3044 D12	F013 E3
3045 D12	F014 G2
3046 E12	F015 G2
3047 D12	F016 G2
3048 D12	F017 H2
3049 D13	F018 I2
3050 E12	F019 I2
3051 E12	F020 J2
3052 E13	F021 J5
3053 F13	F022 K7
3054 E13	F023 J8
3055 D13	F024 K8
3056 E14	F025 K8
3057 D14	F026 H3
3058 D15	F027 H3
3059 D15	F028 J13
3060 E16	F029 B16
3061 D16	F030 C16
3062 G9	F031 C16
3063 G9	F032 F17
3064 G11	
3065 G11	
3066 G12	
3067 G12	
3068 G10	
3069 G10	
3070 G9	
3071 H10	
3072 H10	
3073 H11	
3074 H10	
3075 H11	
3076 J11	
3077 J11	
3078 G13	
3079 I9	
3080 J10	
3081 J12	
3082 J11	
3083 J10	
3084 K11	
3085 K11	
3086 J9	
3087 J9	
3088 K10	
3089 K10	
3090 J12	

NOTES
 1. CAPACITANCE VALUES ARE IN FARADS:
 m=MICRO n=NANO p=PICO l=FEMTO
 2. RESISTANCE VALUES ARE IN OHMS:
 R=OHM K=KILO M=MEGA G=GIGA T=TERA
 3. SAFETY TRIANGLE REPRESENTS PCEC REPLACEMENT PART ONLY.
 4. * FOR VALUE SEE PARTS LIST.

Interface panel

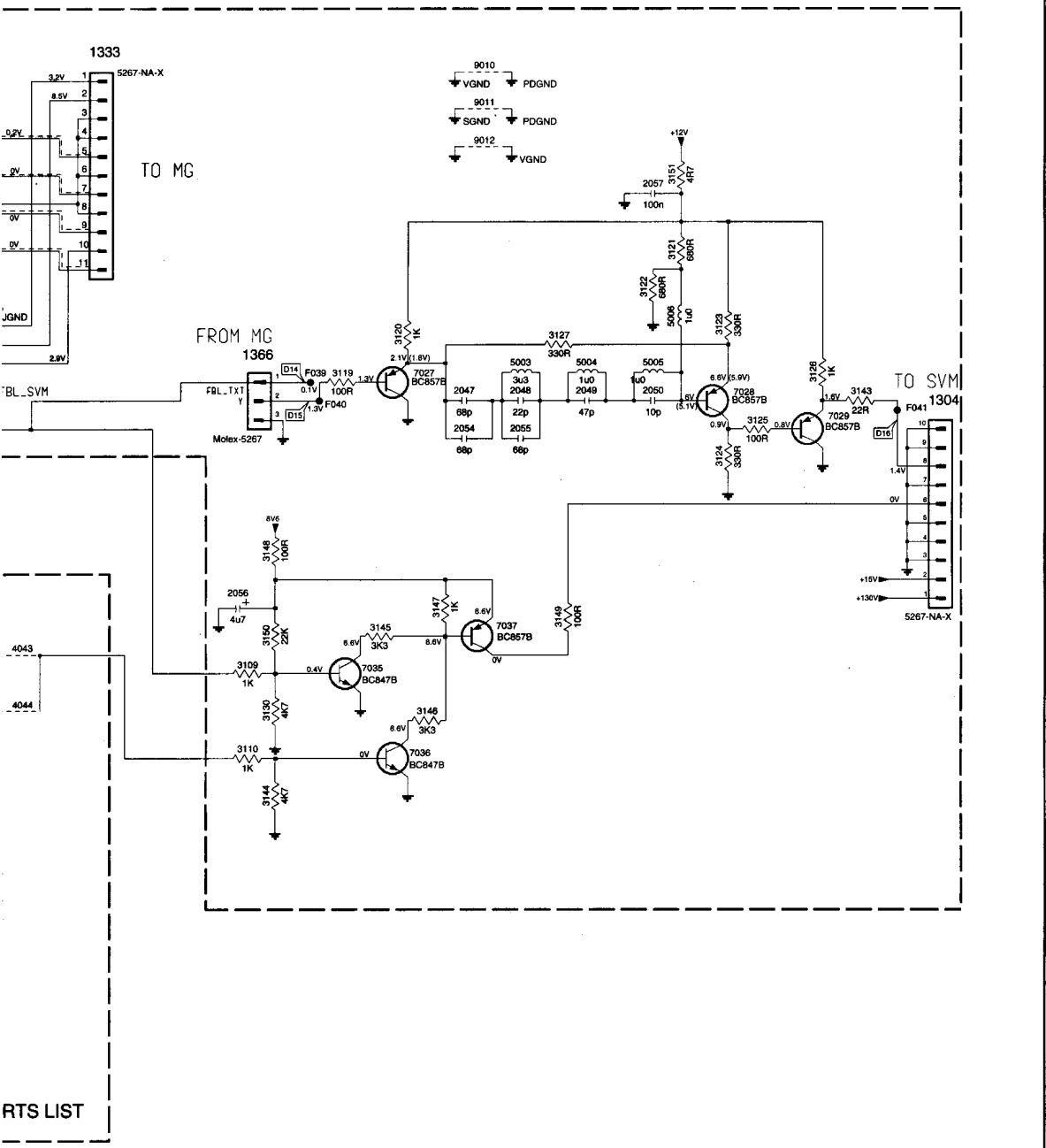


- NOTES
1. CAP#
 - m=MI
 2. RES#
 - R=Oh
 3. SAFE
 4. *FO

10 11 12 13 14 15 16 17

A
B
C
D
E
F
G
H
I
J
K
L

1033 B3
1084 C10
1086 G2
1304 D17
1333 A10
1335 A8
1384 G8
1386 D12
1370 H9
1372 B4
1373 D4
2035 B4
2036 H4
2037 G4
2038 H5
2039 G3
2040 E3
2041 E3
2042 I3
2043 H8
2044 H3
2046 G3
2047 D13
2048 D14
2049 D14
2050 D15
2054 D13
2055 D14
2056 F12
2057 B15
3092 I7
3093 H7
3094 I7
3095 F7
3096 F7
3097 F7
3098 G7
3099 G7
3100 H7
3101 H7
3102 I8
3103 F7
3104 F8
3105 G7
3106 G8
3107 I9
3108 I9
3109 F12
3110 G12
3111 B3
3112 C4
3119 D12
3120 D13
3121 C15
3122 C15
3123 C15
3124 D15
3125 D15
3126 D16
3127 D14
3128 C4
3129 G4
3130 F12
3143 D16
3144 D12
3145 F13
3146 F13
3147 F13
3148 E12
3149 F14
3150 F12
3151 B15
4003 G2
4007 H2
4008 H2
4009 H
4010 E4
4011 G6
4012 G9
4013 G9
4014 G8
4041 H9
4042 F10
4043 F10
4044 F10
5002 B3
5003 D14
5004 D14
5005 D15
5006 C15
6025 C4
7003 F4
7012 I8
7013 F8
7014 G8
7027 D13
7028 D15
7029 D18
7035 F12
7036 G13
7037 F13
9010 B13
9011 B13
9012 B13
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F036 G8
F037 G8
F038 G8
F039 D12
F040 D12
F041 D17

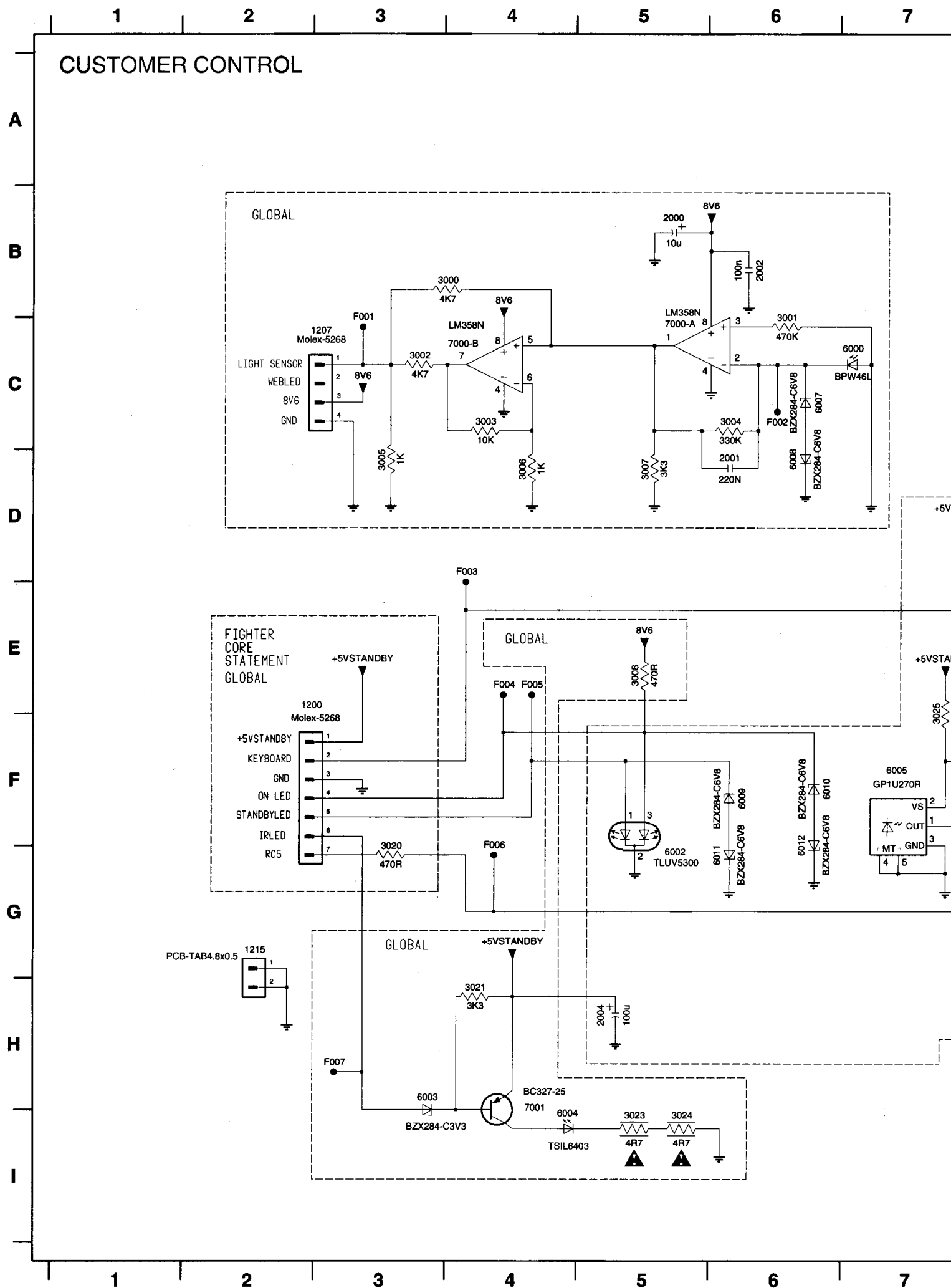


RTS LIST

CAPITANCE VALUES ARE IN FARADS:
 U=MICRO n=NANO p=PICO f=FEMTO
 STANCE VALUES ARE IN OHMS:
 K=KILO M=MEGA G=GIGA T=TERA
 *TY TRIANGLE REPRESENTS PCEO REPLACEMENT PART ONLY.
 † VALUE SEE PARTS LIST.

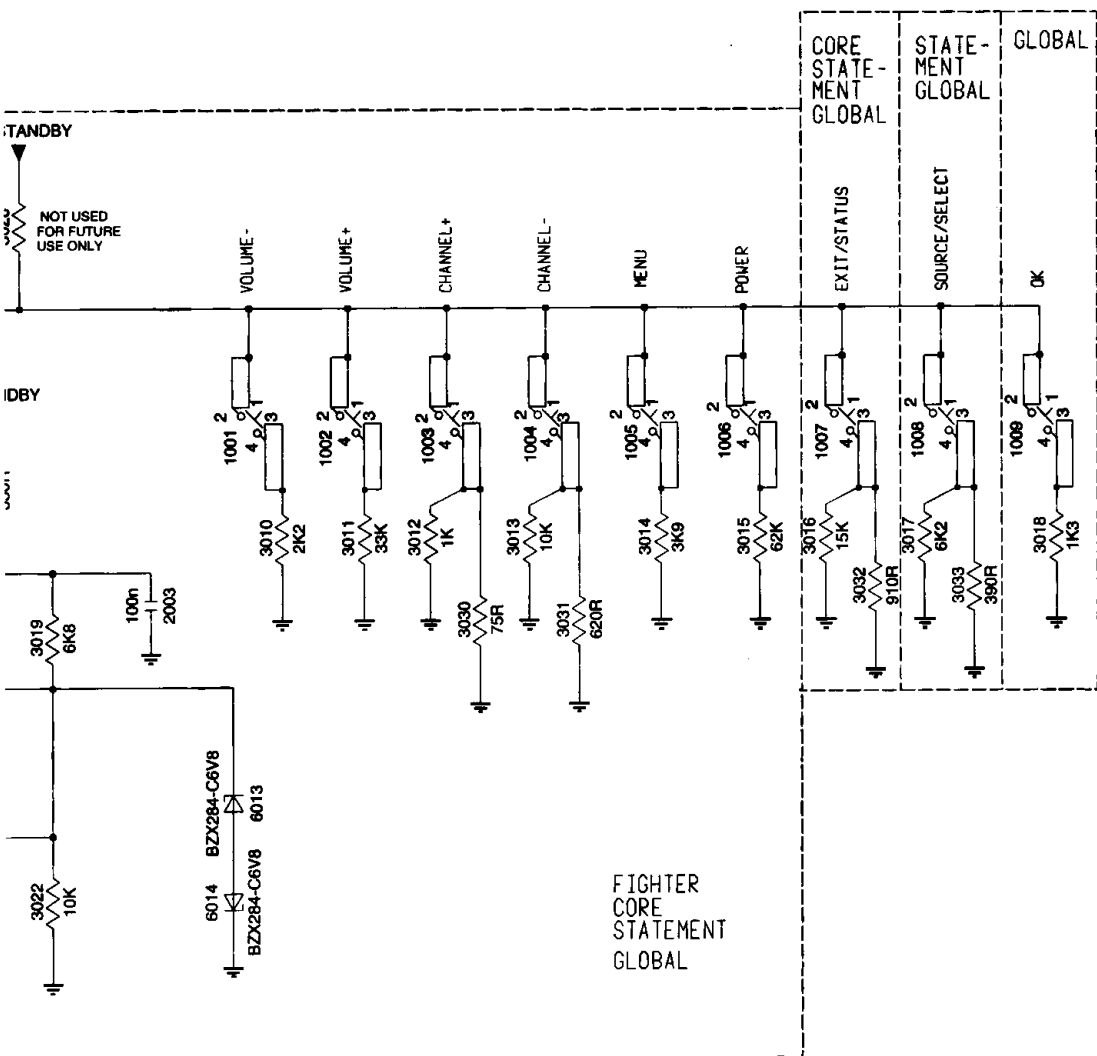
10 11 12 13 14 15 16 17

Customer control panel



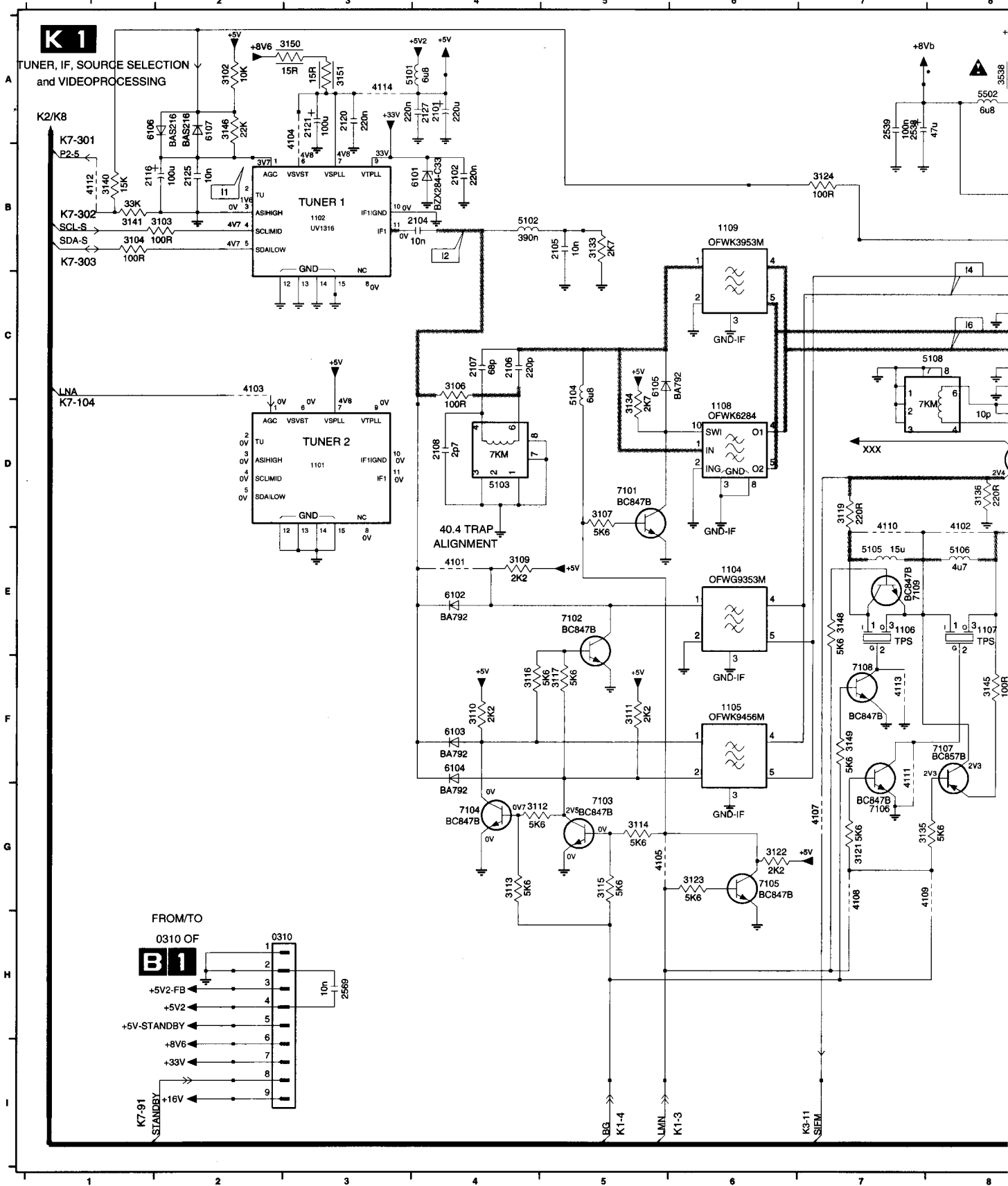
A
B
C
D
E
F
G
H
I

1001 E8
 1002 E9
 1003 E9
 1004 E10
 1005 E10
 1006 E10
 1007 E11
 1008 E11
 1009 E12
 1200 E2
 1207 C3
 1215 G2
 2000 B5
 2001 D6
 2002 B6
 2003 F8
 2004 H5
 3000 B4
 3001 C6
 3002 C3
 3003 C4
 3004 C6
 3005 D3
 3006 D4
 3007 D5
 3008 E5
 3010 F9
 3011 F9
 3012 F9
 3013 F10
 3014 F10
 3015 F11
 3016 F11
 3017 F11
 3018 F12
 3019 F8
 3020 G3
 3021 H4
 3022 G8
 3023 I5
 3024 I5
 3025 E7
 3026 D7
 3030 F9
 3031 F10
 3032 F11
 3033 F12
 6000 C7
 6002 G5
 6003 H3
 6004 I4
 6005 F7
 6007 C6
 6008 D6
 6009 F6
 6010 F6
 6011 G6
 6012 F6
 6013 G8
 6014 G8
 7000-A C5
 7000-B C4
 7001 H4
 F001 C3
 F002 C6
 F003 D4
 F004 E4
 F005 E4
 F006 G4
 F007 H3

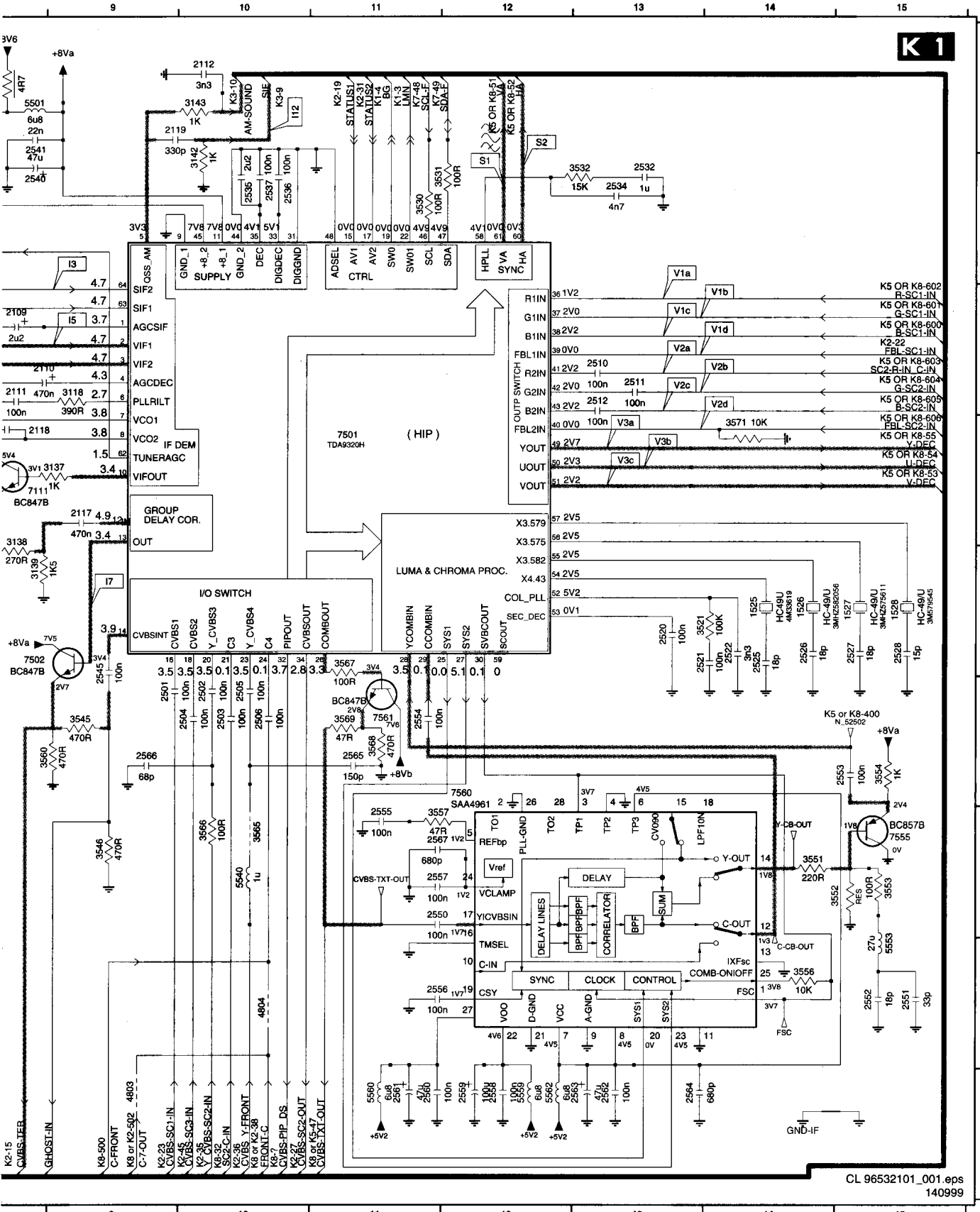


SSP panel

0310 H2	1108 D6	2102 B4	2110 C8	2120 A3	2504 F10	2521 E13	2534 B13	2541 A8	2555 G11	2562 I13	3102 A2	3111 F5	3118 C9	3134 D5	3141 B1	3150 A3	3545 F9
1101 D3	1109 B6	2104 B4	2111 C8	2121 A3	2505 F10	2522 E14	2535 B10	2545 E9	2556 H11	2563 I13	3103 B2	3112 G4	3119 D7	3135 G7	3142 B10	3151 A3	3546 G9
1102 B3	1525 E14	2105 B5	2112 A10	2125 B2	2506 F10	2525 E14	2536 B10	2550 G11	2557 G11	2564 I13	3104 B1	3113 G4	3121 G7	3136 D8	3143 A10	3521 E13	3551 G14
1104 E6	1526 E14	2106 C4	2116 B1	2127 A4	2510 C13	2526 E14	2537 B10	2551 H15	2558 H12	2565 F11	3106 C4	3114 G5	3122 G6	3137 D9	3145 F8	3530 B11	3552 G15
1105 F6	1527 E15	2107 C4	2117 D9	2501 F9	2511 C13	2527 E15	2538 A7	2552 H15	2559 H12	2566 F9	3107 D5	3115 G5	3123 G6	3138 D8	3146 A2	3531 B11	3553 G15
1106 E7	1528 E15	2108 D4	2118 D8	2502 F10	2512 C13	2528 E15	2539 A7	2553 F15	2560 I11	2567 G11	3109 E4	3116 F4	3124 B7	3139 E8	3148 E7	3532 B13	3554 F15
1107 E8	2101 A4	2109 C8	2119 A9	2503 F10	2520 E13	2532 B13	2540 B8	2554 F11	2561 I11	2569 H3	3110 F4	3117 F5	3133 B5	3140 B1	3149 F7	3538 A8	3556 H14



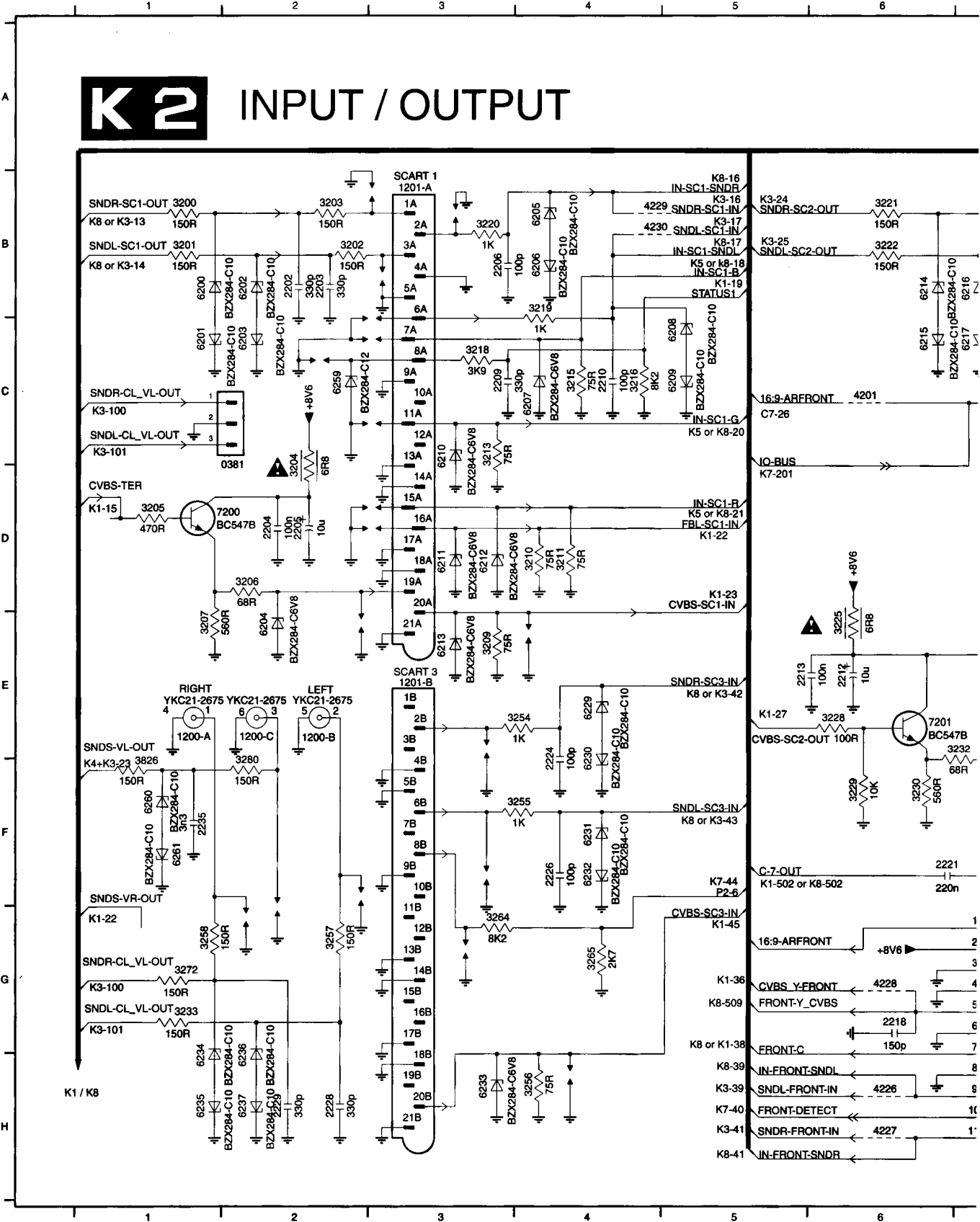
3557 G11	3571 D14	4107 G7	4114 A3	5105 E7	5559 I12	6105 C5	7105 G6	7502 E8
3560 F8	3999 A6	4108 G7	4803 I9	5106 E8	5560 I11	6106 A1	7106 G7	7555 G15
3565 G10	4101 E4	4109 G8	4804 H10	5108 C7	5562 I12	6107 A2	7107 F8	7560 F12
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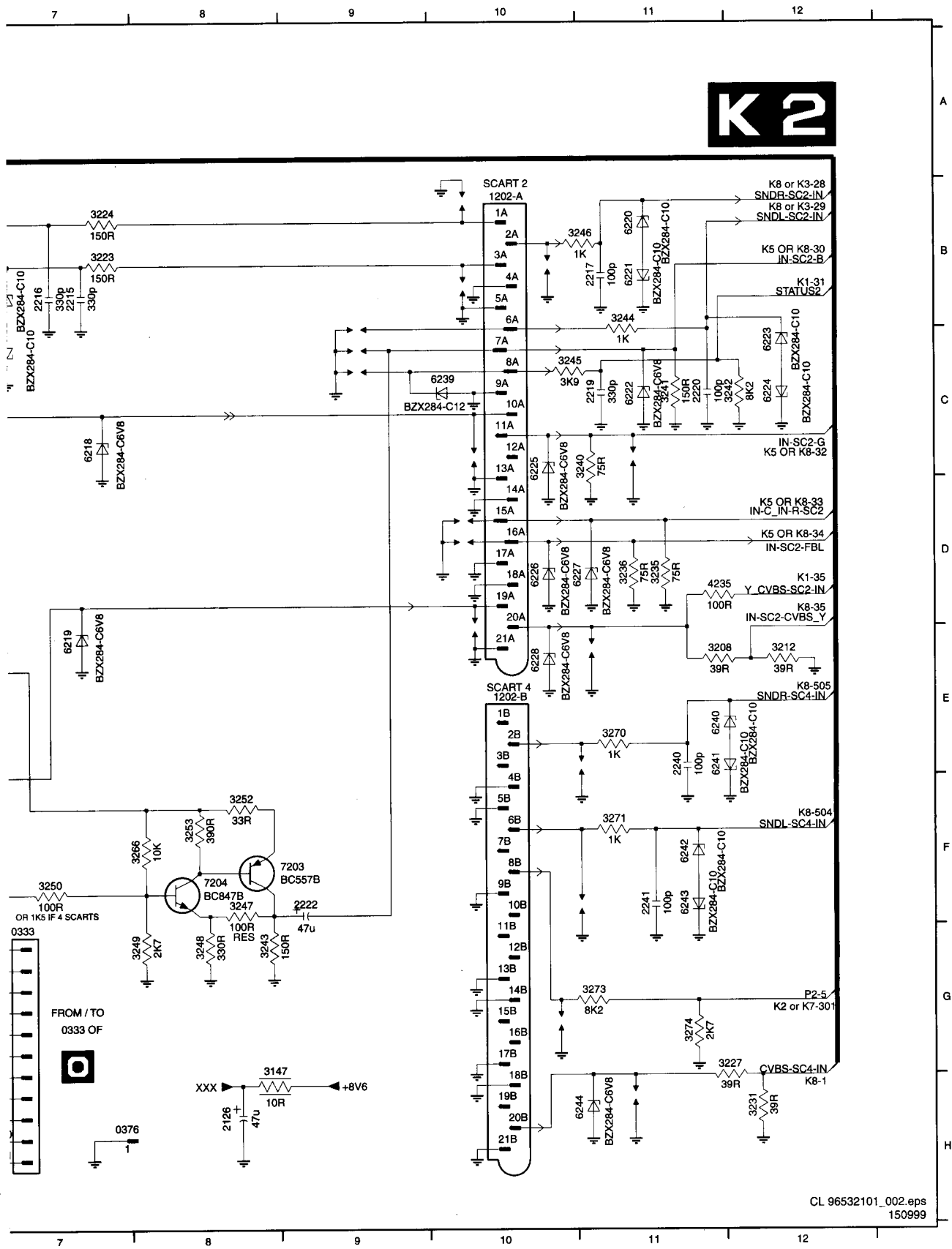
K 1

SSP panel

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0376 H8	2126 H9	2213 E5	2224 F4	3201 B1	3210 D4	3221 B6	3231 H12	3244 B11	3254 E4	3271 F11	4228 G6	6205 B4	621
0381 C1	2202 B2	2215 B7	2226 F4	3202 B2	3211 D4	3222 B6	3232 E7	3245 C10	3255 F4	3272 G1	4229 B4	6206 B4	621
1200-A E1	2203 B2	2216 B7	2228 H2	3203 B2	3212 E12	3223 B7	3233 G1	3246 B11	3256 H4	3273 G11	4230 B4	6207 C4	621
1200-B E2	2204 D2	2217 B11	2229 H2	3204 D2	3213 C3	3224 B7	3234 D11	3247 F8	3257 G2	3274 G11	4235 D11	6208 C5	621
1200-C E2	2205 D2	2218 G6	2235 F1	3205 D1	3215 C4	3225 E6	3236 D11	3248 G8	3258 G1	3280 F2	6200 B1	6209 C5	621
1201-A B3	2206 B3	2219 C11	2240 E11	3206 D2	3216 C4	3227 G12	3240 C11	3249 G8	3264 G3	3826 F1	6201 C1	6210 C3	621
1201-B E3	2209 C3	2220 C11	2241 F11	3207 E1	3218 C3	3228 E6	3241 C11	3250 F7	3265 G4	4201 C6	6202 B2	6211 D3	622
1202-A B10	2210 C4	2221 F6	3147 H8	3208 E11	3219 B4	3229 F6	3242 C12	3252 F8	3266 F8	4226 H6	6203 C2	6212 D3	622



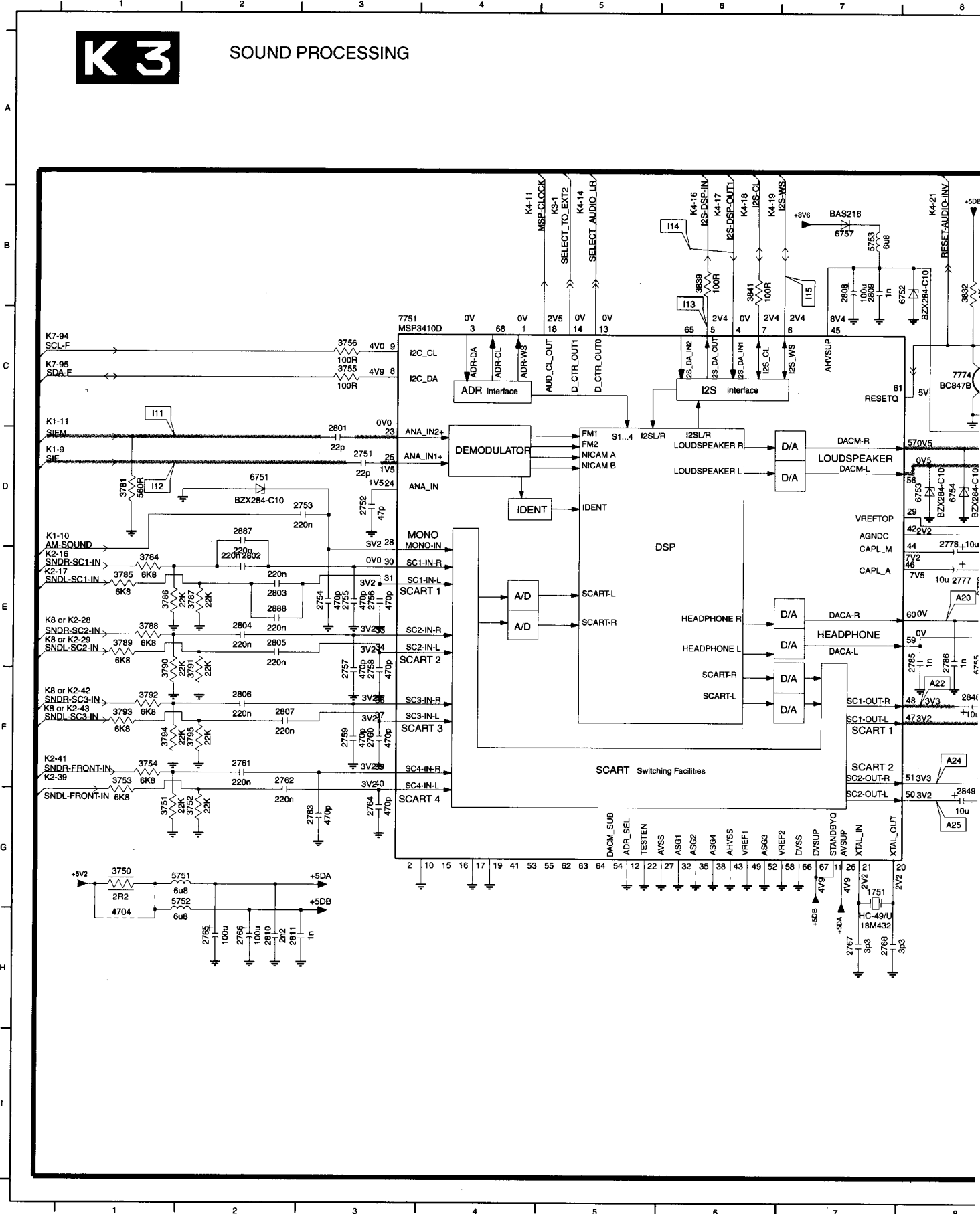
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6 B7	6225 C10	6234 H1	6244 H11	
7 C7	6226 D10	6235 H1	6259 C2	
8 C7	6227 D11	6236 H2	6260 F1	
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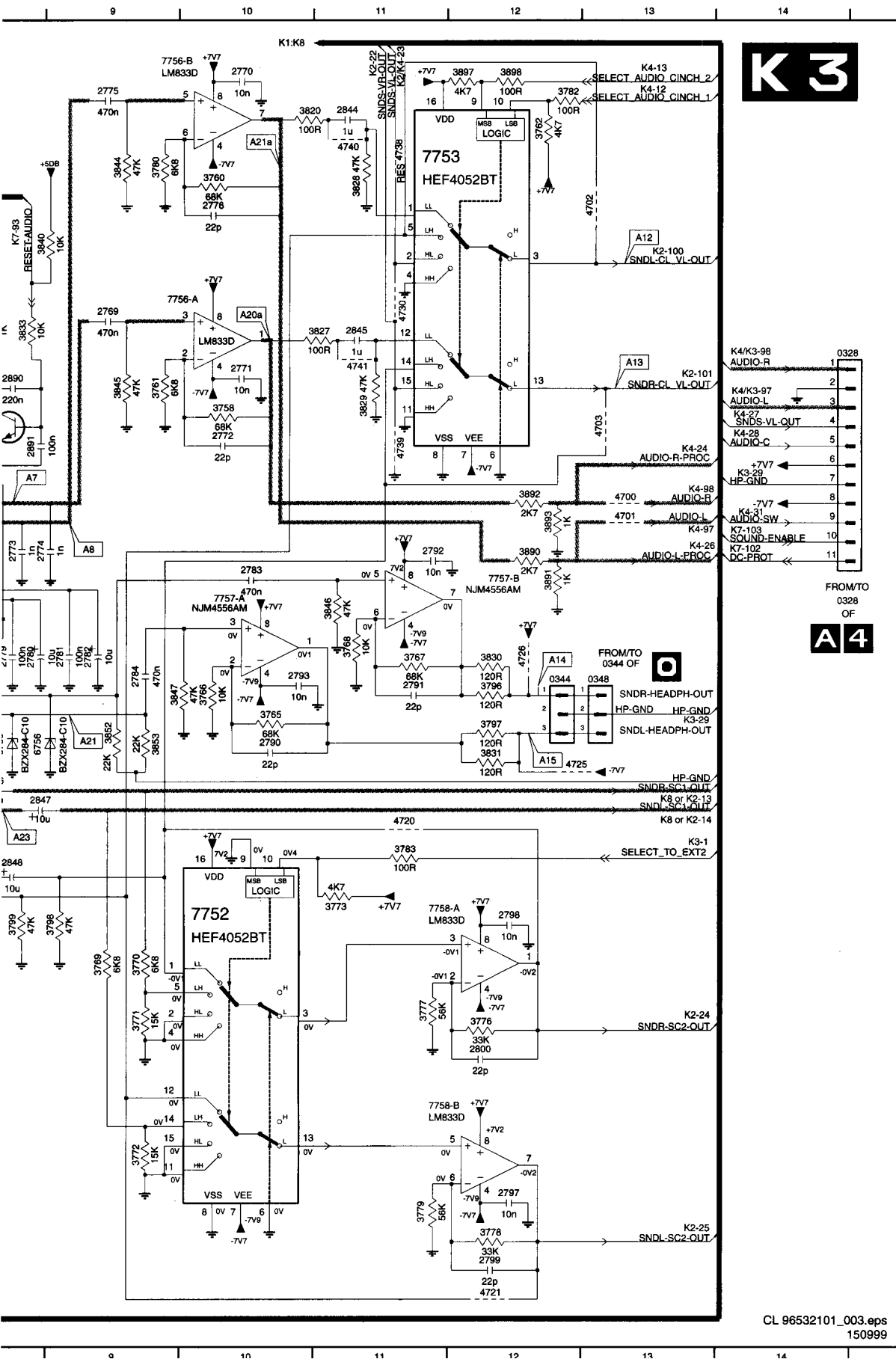


SSP panel

K 3

SOUND PROCESSING



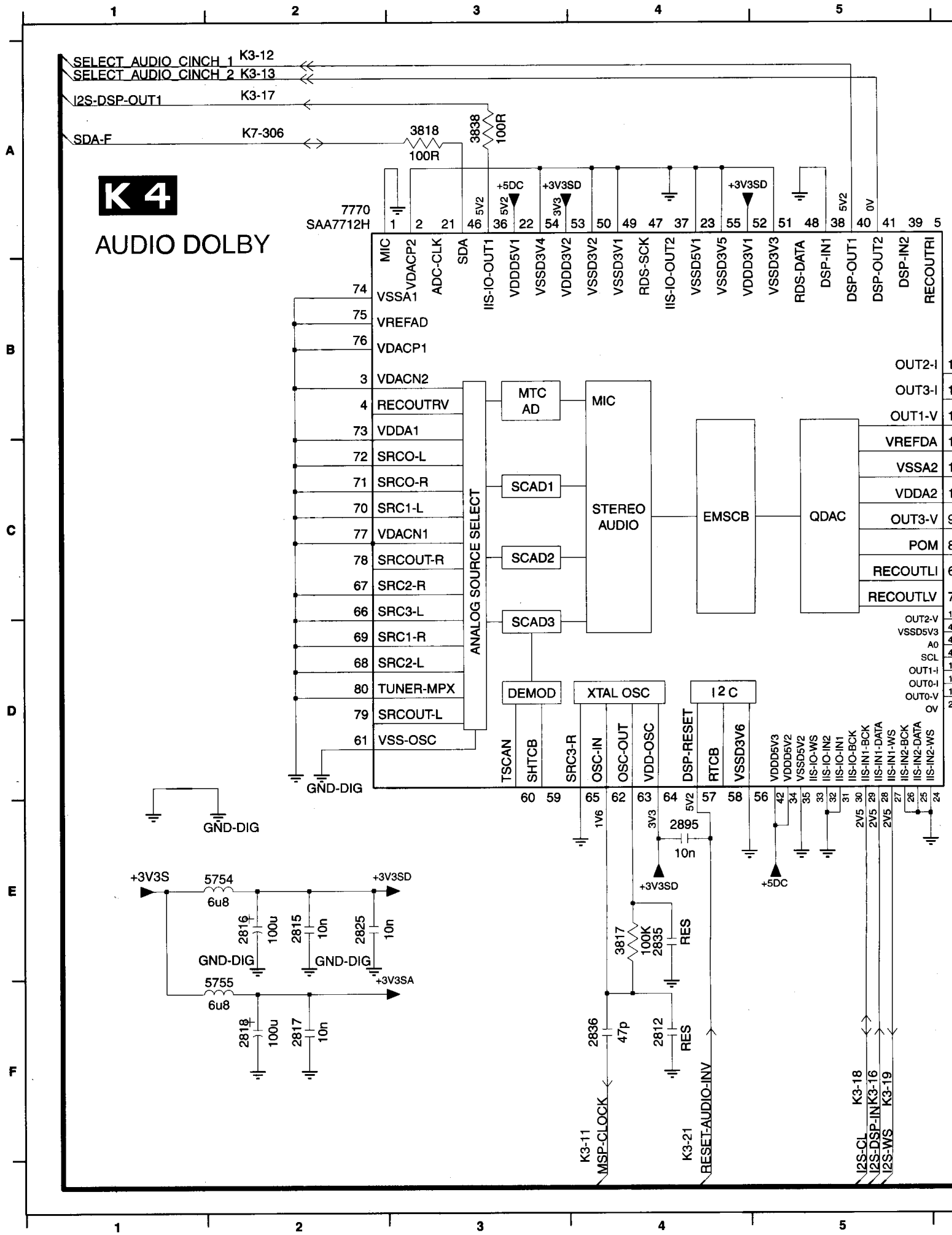


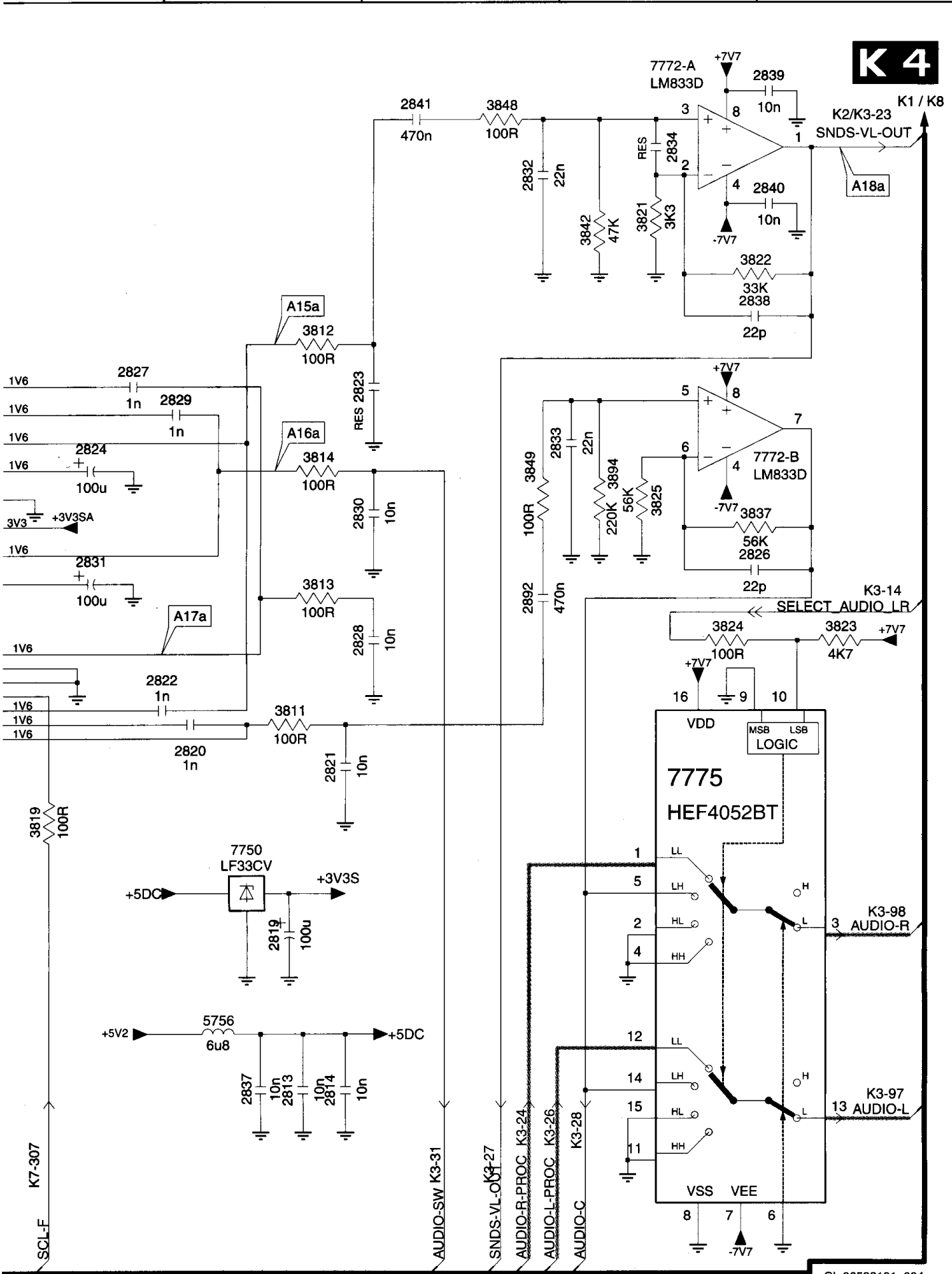
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2753 D3	3840 B8
2754 E3	3841 B6
2755 E3	3844 A9
2756 E3	3845 C9
2757 F3	3846 D11
2758 F3	3847 E9
2759 F3	3852 E9
2760 F3	3853 E9
2761 F2	3890 D12
2762 F2	3891 D12
2763 G3	3892 D12
2764 G3	3893 D12
2765 H2	3897 E12
2766 H2	3898 A12
2767 H7	4700 D13
2768 H7	4701 D13
2769 B9	4702 A13
2770 A10	4703 C13
2771 C10	4704 H11
2772 C10	4720 F11
2773 D8	4721 I12
2774 D8	4725 F12
2775 A9	4726 E12
2776 A10	4730 B11
2777 E8	4736 A11
2778 D8	4739 C11
2779 E8	4740 A11
2780 E8	4741 C11
2781 E9	5751 G2
2782 E9	5752 G2
2783 D10	5753 B7
2784 E9	6751 D2
2785 E8	6752 B8
2786 E8	6753 D8
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2791 E11	6755 E8
2792 D11	6756 E8
2793 E10	6757 B7
2797 I12	7751 C3
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2799 I12	7753 A11
2800 H12	7756-A B9
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3792 F1	
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3828 A11	

K3

A4

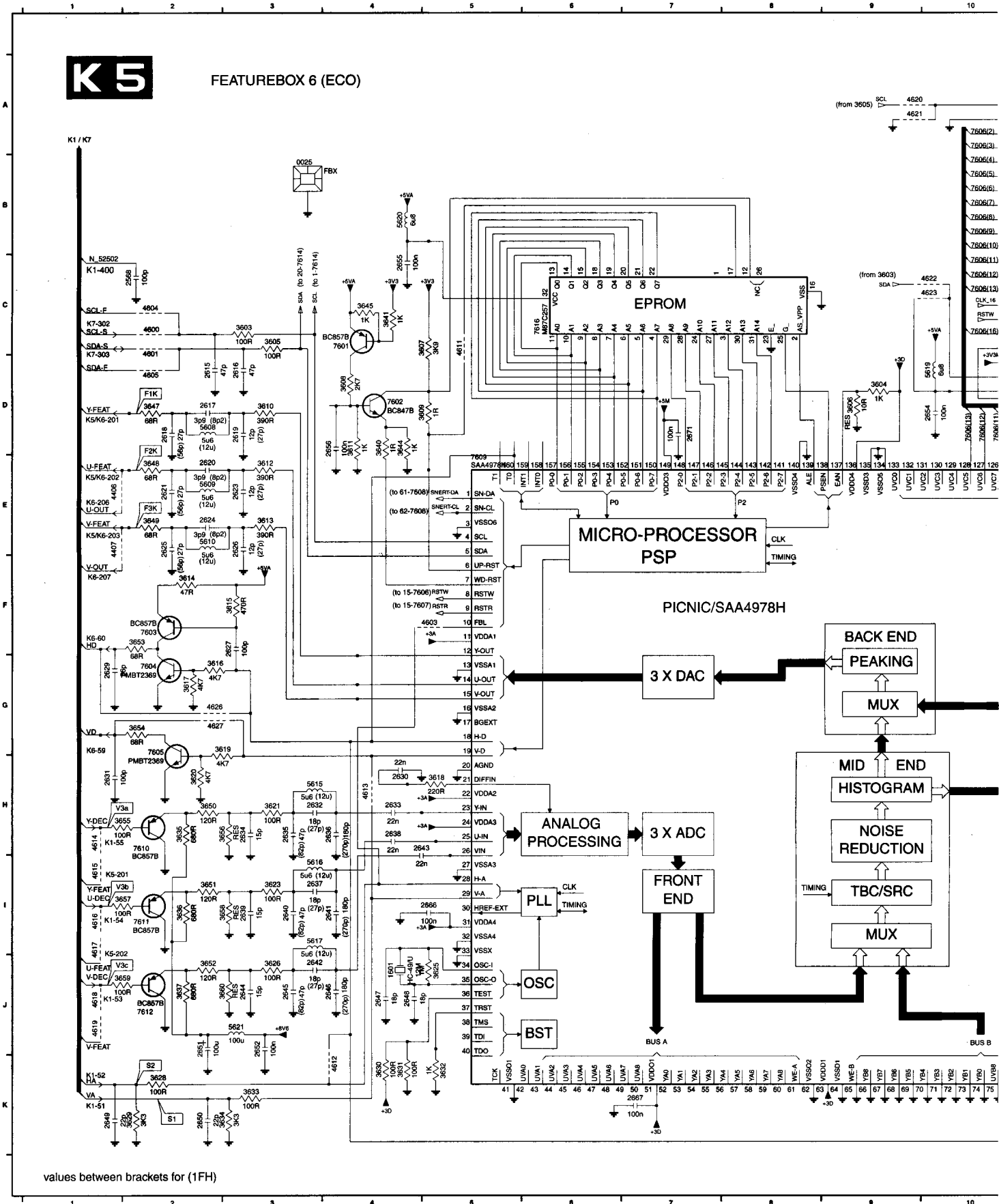
SSP panel

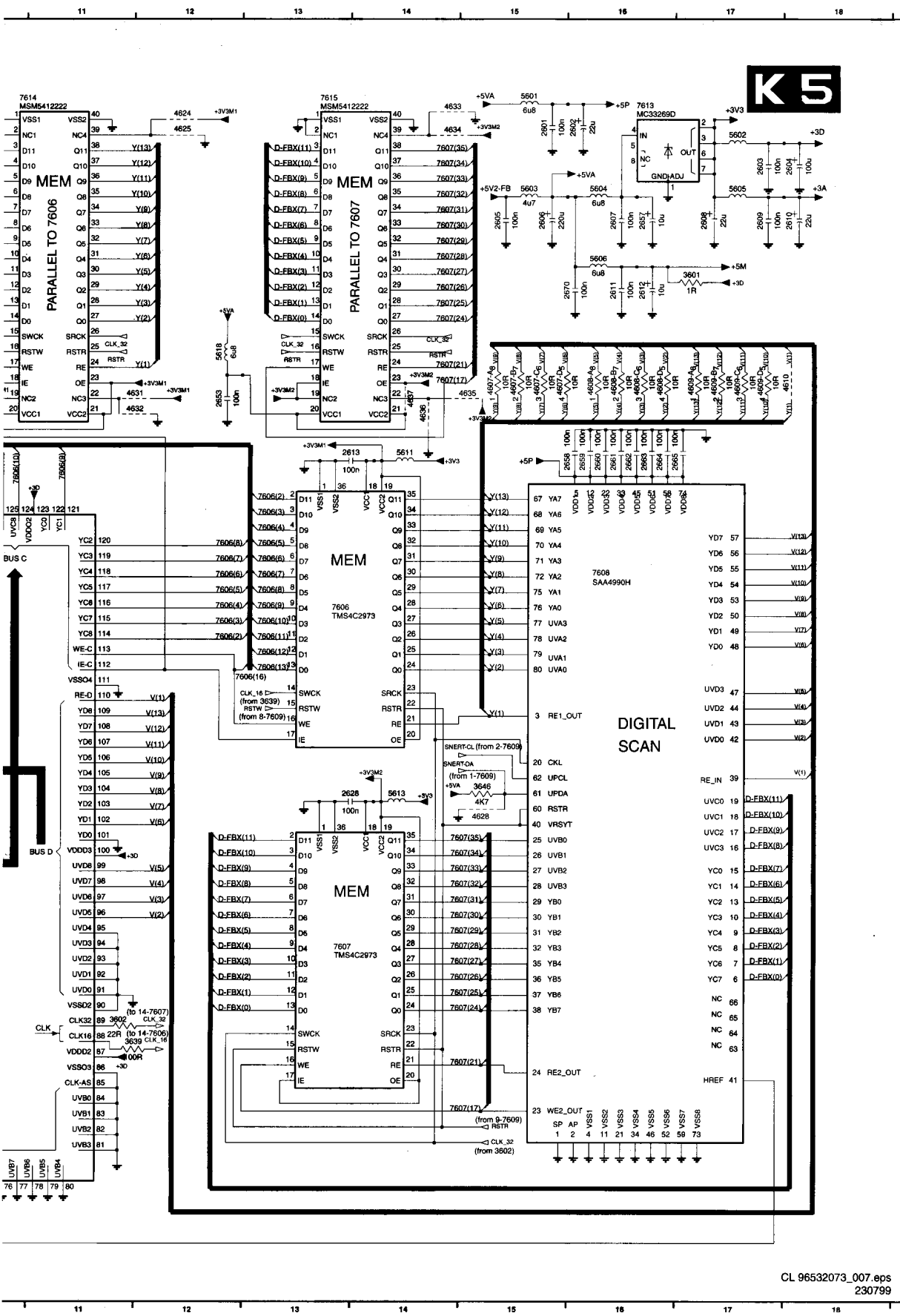




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 2822 D6
 2823 B8
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 2825 E2
 2826 C9
 2827 B6
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 2829 B7
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 2831 C6
 2832 A8
 2833 B9
 2834 A9
 2835 E4
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 2837 F7
 2838 B9
 2839 A10
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 3813 C7
 3814 C7
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 3849 C8
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SSP panel



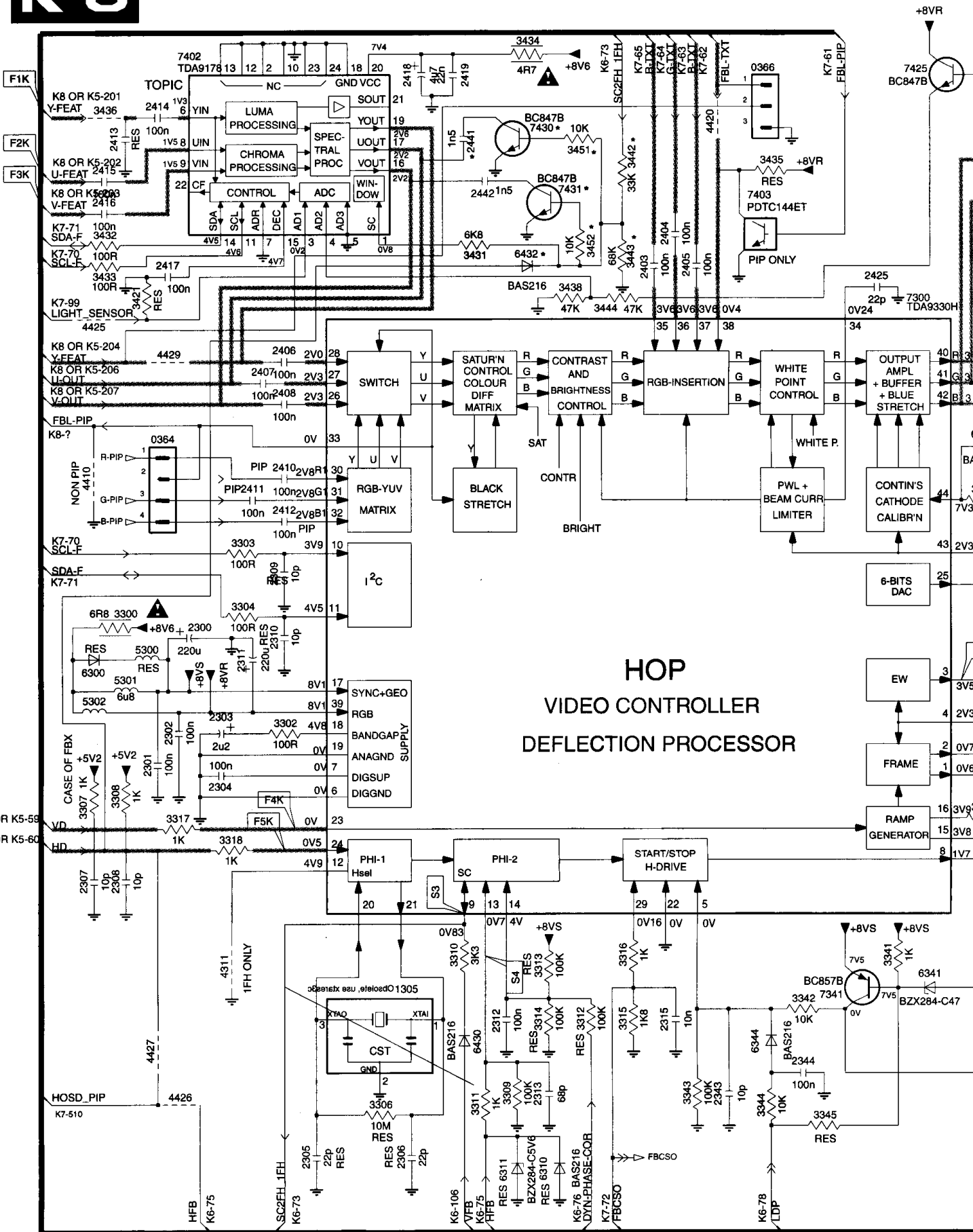


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- 2613 D13
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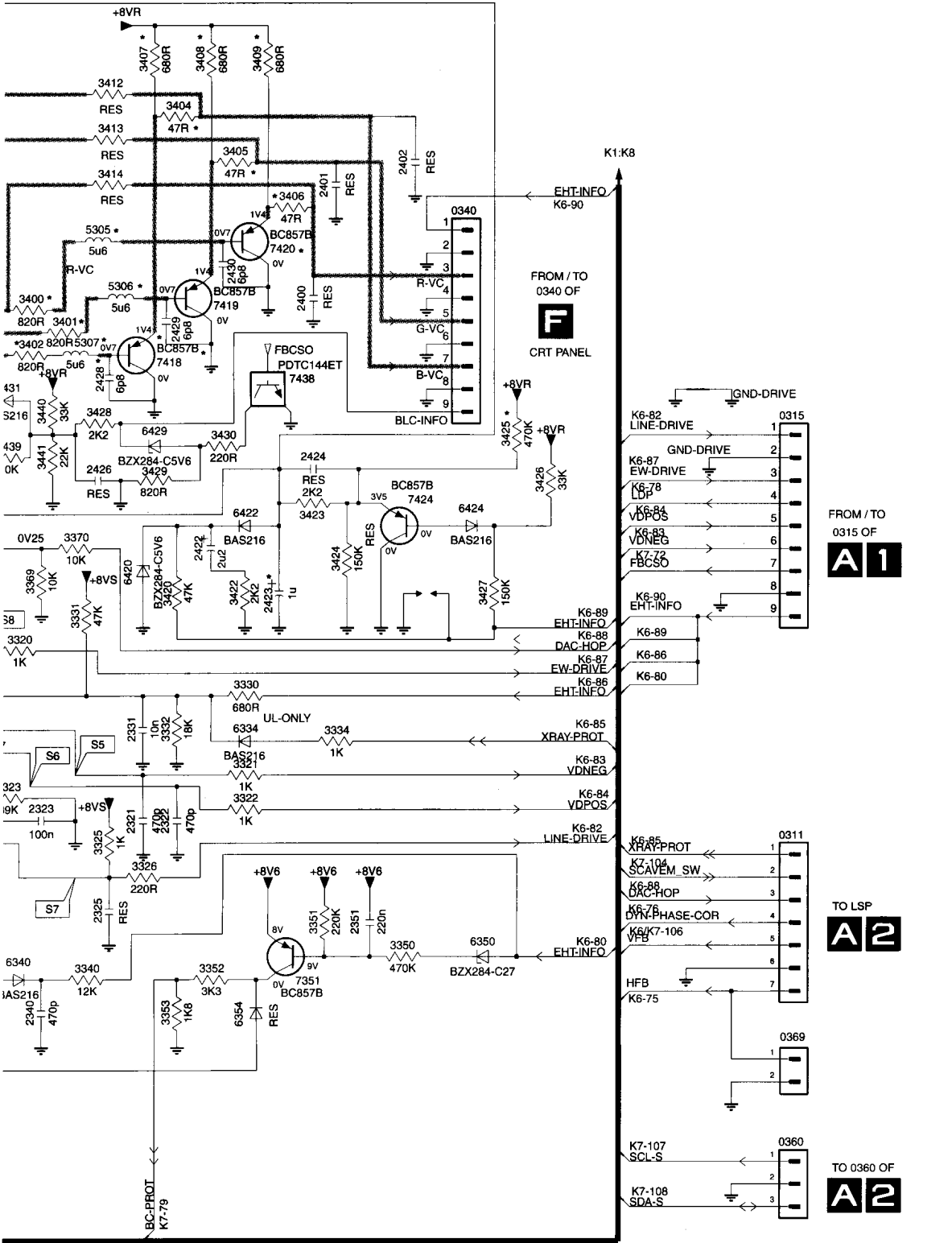
SSP panel

K6

VIDEO CONTROL & GEOMETRY



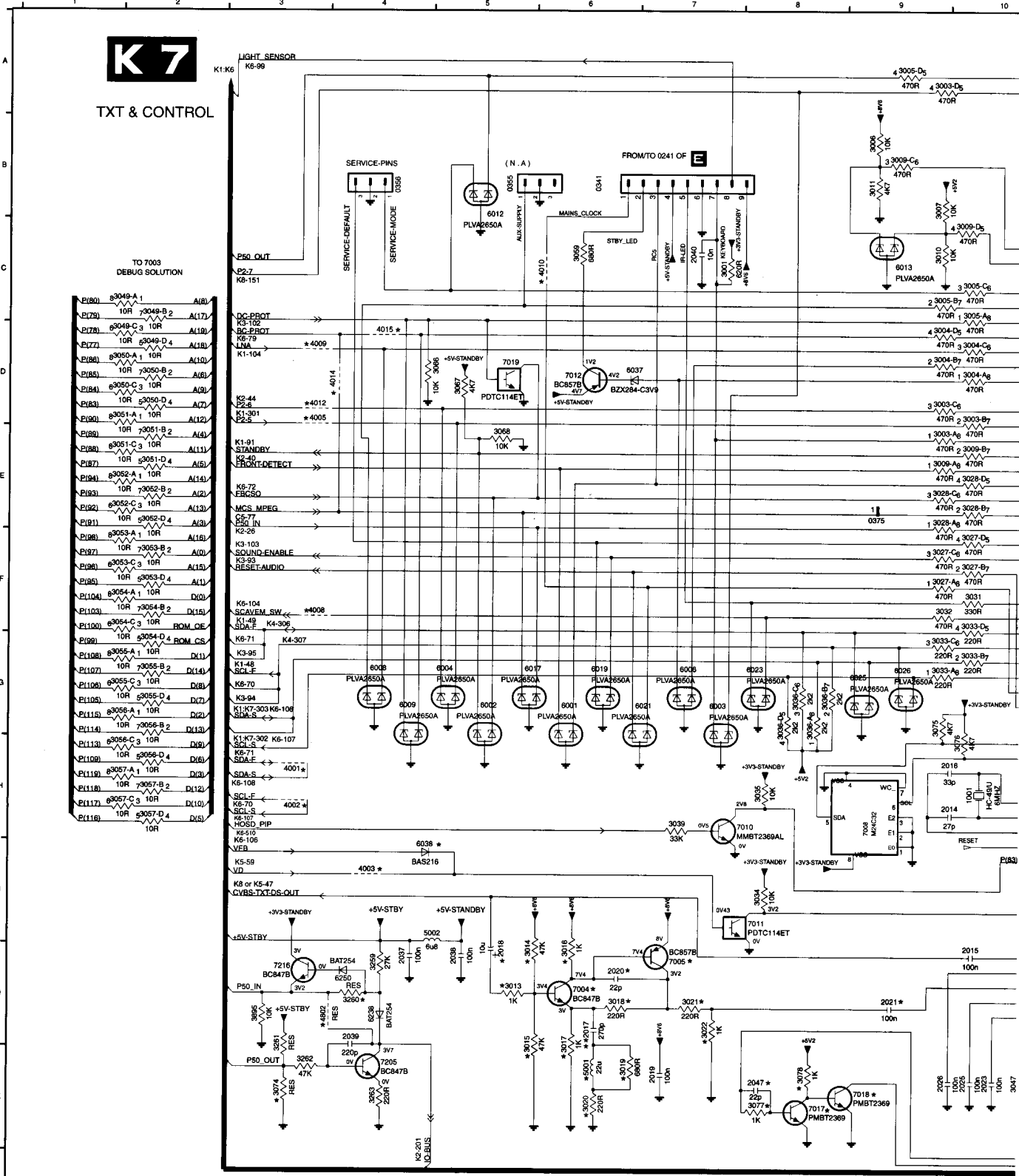
K 6



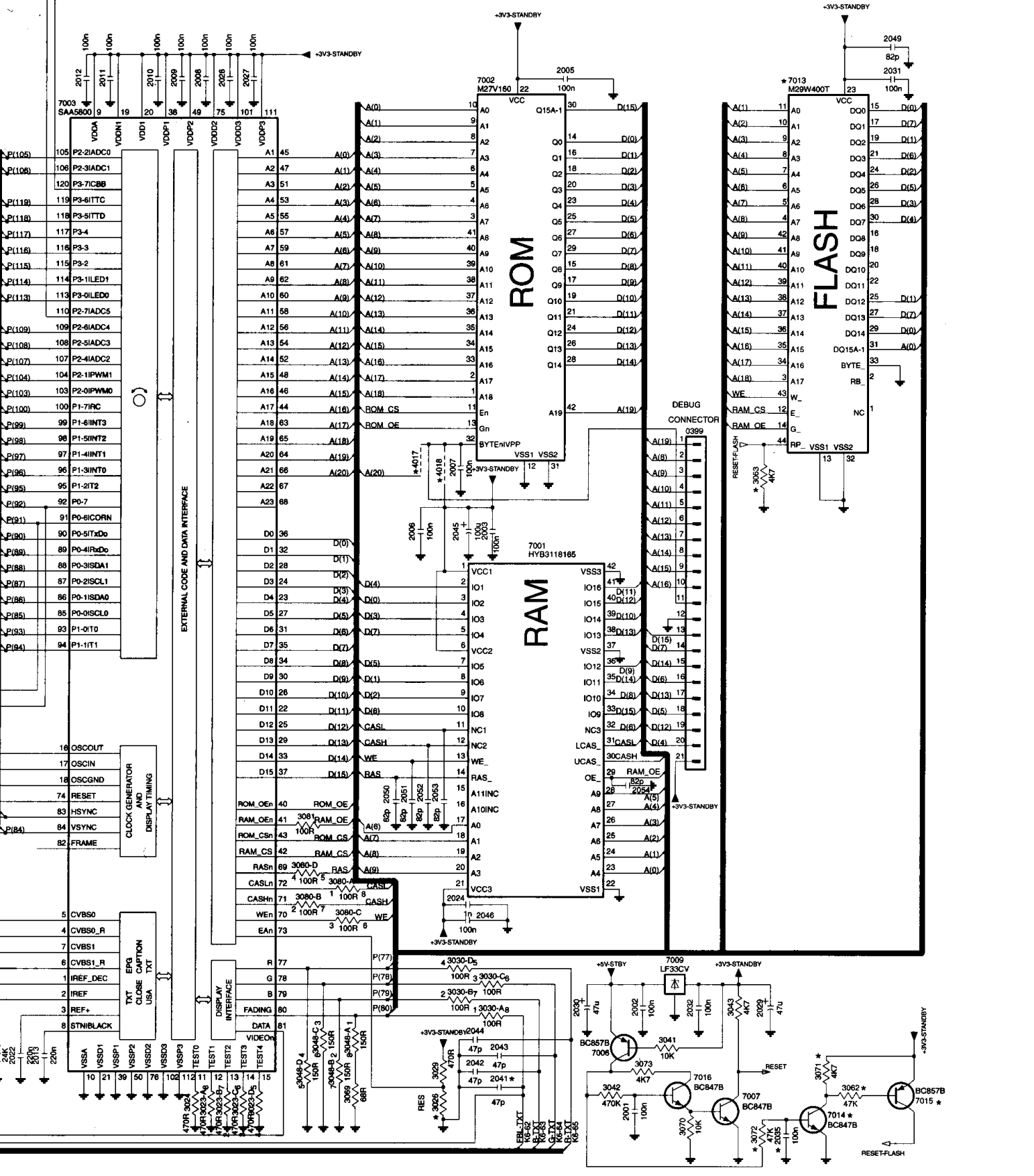
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0364 D2	3341 G7	7420 C9
0366 A6	3342 H6	7424 E10
0369 H12	3343 H6	7425 A7
1305 H4	3344 H6	7430 B5
2300 E2	3345 H6	7431 B5
2301 F2	3350 G10	7438 D9
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2303 F2	3352 H9	
2304 F2	3353 H9	
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2309 E3	3402 D8	
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3312 H5	6341 H7	
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3318 G2	6424 E10	
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SSP panel

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0355 B5	2005 B15	2013 K11	2021 J8	2029 J17	2040 C7	2049 B18	3003-B D10	3005-B C8	3009-D C10	3018 J6	3024-K12	3028-C E9	3032-F9	3036-B G8	3044 K10	3049-D D2	3051-D E2	3053-D F2	3055-D G2
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2001 K16	2010 B12	2018 J5	2026 K9	2037 J4	2045 F14	2054 H16	3004-C D10	3009-A E9	3015 J6	3023-A K12	3027-C F9	3030-B J14	3033-D F10	3041 K16	3049-A C2	3051-A D2	3053-A F2	3055-A G2	3057-A H2
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3057-C H2	3069 K13	3077 K8	3260 J4	4005 D3	4018 F14	6006 G7	6023 G8	7002 B15	7010 H7	7018 K9
3057-D H2	3070 K16	3078 K8	3261 J3	4008 F3	4802 J3	6008 G4	6025 G9	7003 B11	7011 I8	7019 D5
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3063 F17	3073 K16	3080-C J13	3885 J3	4012 D3	6001 G6	6013 C9	6038 I4	7006 K18	7014 K18	
3066 D5	3074 K3	3080-D I13	4001 H3	4014 D3	6002 G5	6017 G6	6238 J4	7007 K17	7015 K18	
3067 D5	3075 G9	3081 I13	4002 H3	4015 D4	6003 G7	6019 G6	6250 J4	7008 H9	7016 K16	
3088 E5	3076 H10	3259 J4	4003 I4	4017 E14	6004 G5	6021 G7	7001 F15	7009 J16	7017 K8	



8. Electrical alignments

8.1 General alignment conditions

All electrical alignments should be made under the following conditions:

- Power supply voltage: 220-240V 10%; 50-60 Hz 5%.
- Warm-up time >15 minutes.
- Voltages and oscillograms are measured in relation to tuner earth (with exception to the voltages on the primary side of the power supply). Never use the cooling fins/plates as ground.
- Test probe: $R_i > 10 \text{ MOHM}$, $C_i < 20 \text{ pF}$.

8.2 Alignments on the Power supply panel

8.2.1 +130Vdc supply voltage

- Connect the positive lead of a voltmeter to the 130Vdc source (at the junction of 5304 and 5305).
- Connect the negative lead to the isolated "cold" ground.
- Using potentiometer R3322 adjust the 130Vdc supply voltage to +130Vdc 0V5.

8.3 Alignments on the Large Signal Panel

8.3.1 High Voltage Adjustment

Exercise extreme caution when adjusting high voltage.

Note: The following test equipment must be used:

High voltage probe

Digital multimeter with 1% (or better) dc accuracy and an input impedance of 10 Megohms 10%.

Initial settings:

- Turn the PTV on.
- Confirm that the 130V source (at the junction of 5304 and 5305) is 130V 0V5.
- Perform the 130Vdc adjustment if the voltage is not within specified limits.
- Select a non-used AUX input for a black picture.
- Turn the PTV off.

With the PTV off and unplugged, connect a Fluke Model 80K-40 (or equivalent) high voltage probe as follows and adjust the high voltage.

1. Connect the ground lead to the chassis ground.
2. Connect the high voltage probe to the digital multimeter.
3. Set the digital multimeter to measure dc volts.
4. Remove one of the CRT anode connections from the high voltage splitter.

Note: Make sure that 3973 is turned fully clockwise.

1. Insert the probe tip into the open CRT anode connection of the high voltage splitter
2. Turn the set on.
3. Adjust 3973, High Voltage Adjust, on the Large Signal Panel for a reading of 30kV 200V.
4. Turn the set off.
5. Remove the high voltage probe.
6. Reinstall the CRT anode connector.
7. Turn the set on and confirm proper operation.

8.3.2 High Voltage Frequency Adjustment

1. Turn the set off and disconnect the ac-input power.
2. Disable the high voltage by shorting the collector of 7952 to ground.
3. Disable the sync input to 7900 by shorting the base of 7952 to ground.
4. Connect a frequency counter to pin 1 of 7900.

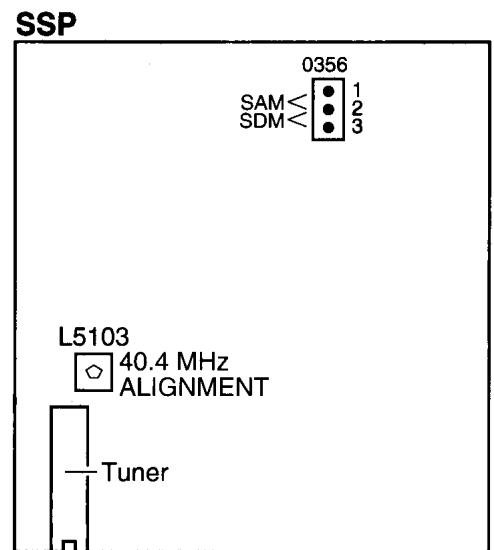
5. Turn the set on and adjust 3902 to obtain a reading of 31.25kHz on the frequency counter.
6. Turn the set off and remove the short circuits and the frequency counter.

Note: Some frequency counters may be too sensitive at one attenuation level and not sensitive enough at another. In this case, an oscilloscope may be used. Adjust 3902 to obtain a delay of 63.5S from the leading edge of the first main pulse to the leading edge of the second main pulse.

8.4 Alignments on the small signal panel (SSP)

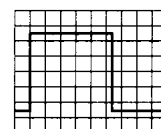
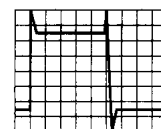
8.4.1 40.4 MHz neighbour-channel sound trap

- Tune to a checker board test-pattern (system BG - and with a carrier frequency of 475.25 MHz).
- Connect an oscilloscope (trigger line frequent) to pin 19 (CVBS out) of the scart1 connection.
- Align the coil L5103 (diagram K1) completely downwards (see Fig. 8.1).
- Align the coil upwards till under- and overshoot arise at the black/white and white/black transitions in the video signal (Fig. 8.2).
- Align the coil downwards again till above mentioned under- and overshoot is just disappeared.



CL 86532057_004a.AI
240798

Figure 8-1



CL 86532057_006.AI
170798

Figure 8-2

8.5 Alignments needing SAM-mode + measuring equipment

(These alignments could be of interest when ICs (7501, TDA9320H), or the EAROM (7008, ST24E16) are exchanged on the SSP.)

8.5.1 'IF AFC' (navigation to this menu item via Alignment --> General --> IF AFC)

- During the 'IF AFC'-parameter adjustment one can see OSD feedback on the screen.
- The OSD feedback can give 4 kind of messages:

AFC-window	AFC-frequency versus reference
Out	High
In	High
In	Low
Out	Low

The first item (in or out) informs you whether you are in or out the AFC-window

The second item (high/low) informs you about whether the AFC-frequency is to high or to low

- First you must align the 'IF AFC'-parameter such that you come into the AFC-window (= 'in')
- Then you must look for the point where the 'IF AFC'-parameter influences the high/low message. This level is the value you are looking for.

Service-tip: If you do not trust the accuracy of the frequency of your Service-generator, first 'measure' with 'Fine tune'-line (manual install-menu) of a good set your Service generator.

8.5.2 'Tuner AGC'

Supply a TV-signal, with a frequency of 475.25 MHz and a signal-strength of about 2 mV. Measure the DC-voltage on pin 1 of the Tuner (position 1102). With the 'Tuner AGC'-alignment in the SAM-menu, this voltage can be aligned. Alignment is correct when DC-voltage is just below 3.8 V

8.6 Alignments and settings in the Service Alignment Menu

8.6.1 General

Entering the SAM can be done in 2 ways:

- Briefly shorting the service pins 'SERVICE ALIGNMENT MODE' on the front side of the SSP (pins 1 and 2 of connector 0356) or:
- Pressing the key on the Dealer Service Tool (DST) (RC7150), followed by keying in the password "3140" and then pressing the key.

The Service Alignment Mode menu will now appear on the screen. The following information is now displayed:

1. The software date ('Date') and version ('ID.') of the ROM (Example: MG51E11.0_01501). (This software-code stands for MG51 (chassis), E for Europe, 1-language, 1.0 software version, xxxxx latest 5 digits of 12nc code software.)
2. The accumulated total of operation hours ('Operation Hours').
3. ('Errors') followed by maximal 10 errors. The most recent error is displayed at the upper left. For explanation errors see chapter 5 (table 5.1).
4. ('Defect. Module'). Here the module that generates the error is displayed. (If there are multiple errors in the buffer that have not all been generated by a single module, there

is probably another defect. The message 'Unknown' will then be displayed here).

5. ('Reset Error Buffer'). The error buffer can be reset by pressing the key.
6. ('Functional Test'). All devices are tested via the key. Eventual errors are displayed in the error buffer. The error buffer is not erased, the contents return when the Functional Test is terminated.
7. ('Alignments'). This enables the Alignments sub-menu to be called up.

The following alignments can be selected:

'General':

- 'Drive'
- 'Luminance Delays'
- 'EHT Compensation'
- 'Soft Clipper'
- 'Luma Gain'
- 'IF AFC'
- 'Tuner AGC'
- 'Blend Intensity'
- 'Adjust Peak White Limiter'
- 'Vg2 Test Pattern'
- 'G2 Setup'
- 'AKB'

'Normal Geometry':

- General geometry alignments.

'Super wide geometry': (only valid for widescreen sets)

- Geometry alignments for the 'Super Wide' position in 16:9 sets (only valid for wide screen sets; alignments can be performed, however, it is better to set values as mentioned below).

'Options':

- Setting the initialisation codes in the set via text.

'Option number':

- All options together, expressed in two long numbers. The original factory setting for these numbers can be found on the picture tube sticker on the inside of the set.

'Store':

- Store all alignments.

The alignments are explained now in the sequence of the sub-menu:

8.6.2 General alignments in Service Alignment Menu:

- Once all alignments/settings have been completed the item 'Store' must be selected to record all the values in the permanent memory of the set.
- If the option codes have been changed and stored, the set has to be switched on and off using the mains switch to activate the new settings (when switching on and off via Standby, the option code settings are NOT read by the microprocessor).
- If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed default (standard) values.
- A built-in test pattern can be called up in various sub-menus. The test pattern generator can be switched on using the item 'Test pattern on/off'. The test pattern only appears AFTER the specific alignment has been selected. The test patterns are generated by the teletext-IC.

'Drive'

1. Remove the Light Barrier in order to view the Main Lens Output from each tube.

Note: Any dust should be removed from the Output Lenses, Mirror and backside of the Screen with a soft cloth.

1. Apply a Black Level video pattern to the antenna input.
2. Turn all the G2 controls counterclockwise.
3. While looking directly into the tubes, set each G2 control to produce a barely visible picture on the CRT.
4. Set "Cathode" to 6.
5. Select "Green" and set the value to 32.

6. Select "Tint" and switch this to normal.
7. Apply a Gray scale pattern to the antenna input.
8. Adjust the Red and Blue drives to obtain the correct Gray scale.
9. Reset the "Tint" to Warm.
10. Add 4 to the value of the "Red" and subtract 7 from the value of the "Blue".
11. Reset "Tint" to Cool.
12. Subtract 3 from the value of the "Red" and add 3 to the value of the "Blue".
13. Return to the "Alignments" menu and "Store" the new settings.

Tint-settings:

In table below an indication of the three tint settings 'Normal', 'Warm' and 'Cool' is given.

	Cool	Normal	Warm
R	10	13	17
G	32	32	32
B	17	14	7

'Luminance delays'

With the 'Luminance delays' alignment the luminance information is placed on the chrominance information (brightness is pushed onto the colour). Use a colour bar/grey scale pattern as test signal.

- Lum. Delay Pal: Apply a PAL colour bar/grey scale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.
- Lum. Delay Secam: Apply a SECAM colour bar/grey scale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.
- Lum. Delay Bypass: Apply a NTSC colour bar/grey scale pattern as a test signal. Adjust 'Lum. Delay Bypass' until the transients of the colour part and black and white part of the test pattern are at the same position.

'EHT compensation'

Fixed value: 0

'Soft clipper'

Fixed setting: 'Pwl+0%'

'Luma gain'

Fixed value: 1

'IF AFC'

See chapter 8.5.1. The SAM-mode is needed to make alignment, a test generator to make signal, an oscilloscope to measure at SCART-output and the Install-menu to check fine-tuning-value.

'Tuner AGC'

See chapter 8.5.2. The SAM-mode is needed to make alignment, a test generator to make signal, a DC-Voltmeter to measure at pin 1 of Tuner.

'Blend intensity'

(This alignment could be used when micro controller or HOP-IC has been replaced).

It aligns the level of transparency of the menu-picture blended into the main-picture.

- Position the brightness-, contrast- and colour-setting in the middle-position. (picture-menu).
- Apply a signal with a 100 % white video-pattern
- Connect an oscilloscope to pin 3 of connector 0340 of the CRT panel and measure the Red output level

- Align 'blending intensity'-parameter such that the blended signal is 65 % of the black-white amplitude. Practically this will be about 1.3 V (blended signal) versus 2 V (full white signal).
- The parameter can be adjusted in between 0 and 31.

'Peak White Limiter'

The next value for 'Peak White Limiter' must be entered: 10

'VG2 Test Pattern'

Not applicable

'G2 Setup'

Not applicable

'AKB'

Select AKB and switch to "ON".

8.6.3 Geometry alignments 'Normal Geometry' in the Service Alignment Menu

Warning:

At this moment the INTERNAL test pattern of the set will lead to a misaligned geometry of the picture. Please do not use internal test pattern. When using a service generator with a geometry-pattern (e.g. a crosshatch-pattern), the set can be aligned without problems.

Note: First defeat the Convergence drive by shorting the two pins on connector 1033 on the Convergence Panel.

Typical values for the Normal Geometry alignments are:

V Slope36

V. Shift32

V. Amplitude46

V S-Correction12

H. Shift24

H. Amplitude20

East/West Parabola40

East/West Corner13

East/West Trapezium24

Horizontal Parallelogram30

Vertical amplitude and centring

Select 'Test Pattern ON' and set the begin conditions:

- Vertical S-correction value on 12.

The boundary-stripes of the test pattern should be positioned on the edge of the picture tube.

1. Align 'V slope' (when aligning the below half of the picture is blanked). The middle line of the test pattern must be matched with the edge of this blanking/picture transient in the middle of the picture. Pushing button again, gives you previous menu again. (This alignment is meant to align the zero-crossing of the frame-deflection to the mechanical middle of the picture tube.)
2. Align the vertical amplitude using 'V amplitude' so that the test pattern is fully visible.
3. Align the vertical centring using 'V shift' so that the test pattern is located vertically in the middle.
4. If necessary repeat the alignment of 'V amplitude', in order to get 'V shift' OK.

Vertical S correction

Select 'Test pattern on'.

Align the vertical S correction using 'V S-correction' so that the vertical amplitude at the top of the picture is equal to the amplitude in the middle of the picture.

Horizontal centring and amplitude

Select 'Test pattern on'.

1. Using 'H amplitude' align the horizontal amplitude so that the entire test pattern is visible.

2. Use an external test signal, with a centre-reference from a service-generator. Use 'H shift' to align the picture horizontally in the middle.
3. Repeat the 'H amplitude' alignment if necessary.

East/west alignment

Select 'Test pattern on'.

1. Use 'East/West Parabola' to align the vertical lines until straight.
2. Use 'East/West Corner' to align the vertical lines in the corners until straight.
3. Use 'East/West Trapezium' to align for a rectangular.
4. Use 'Horizontal Parallelogram' to align for straight vertical lines if necessary.
5. If necessary select 'East/West Corner' and align as required.
6. Repeat steps 1 to 4 if necessary.

8.6.4 Geometry alignments 'Super wide geometry' in the Service Alignment Menu

Only applicable to 16:9 sets.

Typical values for the Super Wide Geometry alignments are:

V. Shift 32

V. Amplitude 28

V S-Correction 12

H. Correction 18

East/West Parabola 40

The header of this paragraph and also the menu's are misleading. We only need to set the following values, if the normal geometry alignment has been performed correctly.

- Vertical S correction: enter value here of normal geometry.
- East/west parabola: enter value here or normal geometry.

8.7 Option menu

Introduction:

The microprocessor communicates with a large number of I2C-ICs in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which ICs have to be addressed. The presence of specific ICs or functions is made known by means of the option codes.

All options codes can be manipulated using both the option numbers and/or the Option menu.

All hardware related options are incorporated under the heading 'Options' of the 'Alignments' sub-menu of the 'Service Alignment Mode'. All software related options that are incorporated under the heading 'Dealer Options' of the 'Service Alignment Mode', can also be reached directly via the 'button of the DST.

8.8 Options in the Service Alignment Mode

Menu-item	Subjects	Options	Physically in the set
Dual screen/PIP	Aux type	None	
		Video Dual Screen	
		PIP	
	Text dual screen	Yes	Text dual screen present (only valid for 16:9 sets)
		No	Text dual screen not present
Teletext/EPG	TXT	Yes	Teletext present
		No	Teletext not present
	NextView present	Yes	NextView set
		No	NextView not set
	NextView type	Flashram	IC7013 present on SSP (diagram K7)
		No Flashram	IC 7013 not present on SSP (diagram K7)
Communication	Easylink Plus	Yes	Easylink Plus set
		No	Easylink Plus not set
Picture tube	CRT Type	4:3	4:3 picture tube
		16:9	16:9 picture tube
		Picture Rotation (only for 16:9)	Yes
No	Frame rotation circuitry not present (IC7440 diagram A3)		
	Dynamic Focus	Yes	Dynamic focus picture tube present
		No	Dynamic focus picture tube not present
Video Repro	Feature box type	Eco	IC7606 present on SSP (diagram K5)
		Prozonic	IC7606 and IC7607 present on SSP (diagram K5)
		Falconic	
	Field memories (only with falconic)	2	
		3	
	Lightsensor	Yes	
		No	

Menu-item	Subjects	Options	Physically in the set
	PALplus	Yes	
		No	
	Combfiler	Yes	IC7560 present on SSP (diagram K1)
		No	IC7560 not present on SSP (diagram K1)
	Picture improvement	Yes	
		No	
	Picnic AGC	Yes	In normal operation: Yes
		No	During 'Drive' alignments: No
	Signalling bits	Yes	
		No	
Source Selection	External 3	Yes	3rd EURO connector present
		No	No 3rd EURO connector present
	External 4	Yes	4th EURO connector present
		No	No 4th EURO connector present
Audio Repro	Dolby	None	
		Pro Logic	
		Digital	MCS-module present
	Rear speakers	Corded	
Virtual			
	Cordless	Active surroundbox present	
Acoustic system	FL7	FL7	Applicable for sets with subwoofer
		FL8	Applicable for sets without subwoofer
		FL9	Monitor look
Miscellaneous	Heatsink Present	Yes	Heatsinks present on CRT/Scavem panel (diagram F)
		No	Heatsinks not present on CRT/Scavem panel (diagram F)

8.9 Dealer Options in the Service Alignment Mode

Menu name	Subjects	Options	Physically in set
Picture options	CTI	Yes	CTI enabled
		No	CTI disabled
Personal	Blue Mute	Yes	Blue mute active in case no picture detected
		No	Noise in case of no picture detected
	Virgin Mode	Yes	TV starts up once with language selection menu after mains switch on for the first time (virgin mode)
		No	TV does not starts up once with language selection menu after mains switch on for the first time (virgin mode)
	Auto store mode	None	Autostore mode disabled (not in installation menu)
		PDC-VPS	Autostore mode via ATS (PDC/VPS) enabled
		TXT page	Autostore mode via ACI enabled
		PDC-VPS-TXT	Autostore mode via ACI or ATS enabled
	Demo Mode Enable	Yes	Demo mode enable
		No	Demo mode disable
	Auto TV	Yes	Auto TV mode enabled
		No	Auto TV mode disabled
Teletext	TXT Preference	TOP	Preference to TOP teletext
		FLOF	Preference to FLOF teletext
	East/West TXT	West	TXT characters for non -/58 sets
East		TXT characters for -/58 sets	

- After the option(s) have been changed, they must be stored via the STORE command.
- The new option is only active after the TV is switched off and then back on again using the mains switch (the EAROM is then read out again).

8.10 'Option number'

In case the EAROM has to be replaced, all the options will also require resetting. To be certain that the factory settings are reproduced exactly, both option numbers have to be set. These numbers can be found on a sticker on the picture tube.

Option number 46PP9105 and 55PP9105 is:

00713 12678 04545 00016

12343 00001 00000 00000

8.11 Convergence Alignment

Warm the set up for at least 20 minutes prior to making any Geometry or Convergence adjustments.

Sit directly in front of and at least 2 to 3 meter away from the front of the screen while performing convergence alignments. Also ensure that you are always at eye level with the area of the screen you are adjusting.

Digital Convergence alignments are interactive. A change in one quadrant will affect adjacent areas of the screen. Several passes through the convergence sequence may be necessary. When performing convergence alignments, it is advised to always follow the sequence pattern when going from one adjustment location to another. Pressing the Cursor Right key will sequence the Icon through the preloaded pattern.

A convergence board severely out of convergence will not necessarily have perfect Icon shapes.

A Complete in-depth Convergence will be required if the Convergence module or Convergence Memory IC has been replaced.

The correct signal for the mode being adjusted must be applied to the set when performing Geometry or Convergence alignments. Convergence alignments must be performed twice, one time for an NTSC signal, and then for PAL or SECAM. The NTSC signal can only be applied through the External inputs.

8.11.1 Screen centering

1. Apply a PAL, SECAM, or NTSC signal to the set (NTSC Signal can only be applied to the External inputs).
2. Put the picture in the 16:9 mode.
3. Select the "Convergence Mode" in the alignment menu.
4. Select "Convergence Selection" in the Convergence menu.
5. Select "Green" in the Convergence Selection Menu.
6. Defeat the Convergence drive by shorting the two Pins on connector 1033 located on the Convergence panel.
7. Place the Convergence Template over the screen.
 - 46": 3122 785 90002
 - 55": 3122 785 90003
8. Using the Centering rings on the Green CRT, center the convergence pattern onto the center point of the Convergence Template.
9. Return to the Convergence Selection menu.
10. Select "Red to Green" in the service menu.
11. Center the Red pattern onto the Green pattern for each quadrant of the screen.
12. Return to the Convergence Select Menu.
13. Select "Blue to Green" in the service menu.
14. Center the Blue pattern onto the Green pattern.
15. Remove the jumper from connector 1033.
16. Return to the Convergence Selection
17. Menu.

8.11.2 Green Geometry

Green Geometry

1. Make sure the set is placed in 16:9 mode. Ensure that the proper signal (PAL, SECAM, or NTSC) for the mode being tested is applied to the set.

2. Perform the procedure for PAL or SECAM, repeating the convergence procedure for NTSC will then be required.

Note: Do not repeat Screen Centering. It is necessary to perform Screen Centering for one mode only.

1. Select "Convergence Selection" in the Convergence Mode Menu.
2. Select "Green" in the "Convergence Selection" Menu.
3. Press the "OK" button on the DST or the Menu Select button on the consumer remote to adjust the Icon.

Note: Move the Icon toward the adjustment point on the Template for no more than 4 seconds in any direction.

1. When you are satisfied with the current location of the Icon, press the "OK" button or the Menu Select button.
2. Then press the Cursor Right Button or Outer Menu Ring to the right to move the Icon to the next adjustment point.

Note: This adjustment is highly interactive. Therefore it is advised to follow the pattern programmed into the set by pressing the Outer Menu Ring toward the right. However when performing minor touch up adjustments, it is possible to move the Icon up, down, right or left by pressing the Outer Menu Ring in that direction, until the Icon is positioned in the area requiring adjustment.

1. Follow the pattern and make corrections until the Convergence Crosshatch pattern matches the pattern on the screen template.
2. Remove the screen template.

8.11.3 Red Convergence

Red Convergence

1. Select "Red to Green" in the Convergence Selection menu.
2. Adjust the Red crosshatch pattern onto the green pattern in the same manner that the Green was adjusted to the template.

8.11.4 Blue Convergence

Blue Convergence

Select "Blue to Green" in the Convergence Selection menu. Adjust the Blue crosshatch pattern onto the green pattern in the same manner that the Red was adjusted to the Green.

8.11.5 Focus/White balance

Focus/White Balance

1. Set the Picture, Sharpness, Brightness and Tint (NTSC) to their midrange position.
2. Set Color to minimum.

8.11.6 Electrical Focus

Electrical Focus

1. Connect a crosshatch pattern to the antenna input.
2. Cover the screen with a dark cloth.
3. Cover two of the CRT's Output Lenses with an 18-cm x 18-cm piece of cardboard.
4. Observe the magnified reflections of the individual picture tubes on the backside of the viewing screen.
5. Adjust the respective Focus control (top row of the HV/Focus distribution block) for optimum mid-screen focus.
6. Confirm the correct focus by viewing the screen from the front of the unit.
7. Repeat steps 2 through 6 to focus the remaining two CRT's.

8.11.7 Mechanical Focus

Mechanical Focus

1. As with Electrical Focus, connect a crosshatch pattern to the antenna input.
2. Cover the screen with a dark cloth.

3. Cover two of the CRT's Output Lenses with an 18-cm x 18-cm piece of cardboard.
4. Carefully loosen the lens retaining wing nuts on the CRT output lens.
5. Move the Wing nut post in the slot to obtain optimum focus while viewing the screen from the rear of the set.

6. Tighten the wing nut.
7. Confirm correct focus by viewing the screen from the front of the unit.
8. Repeat steps 2 through 7 for the two remaining Output Lenses.

9. Circuit description

For the circuit description see Training Manual MG5.1E (3122 785 10053)

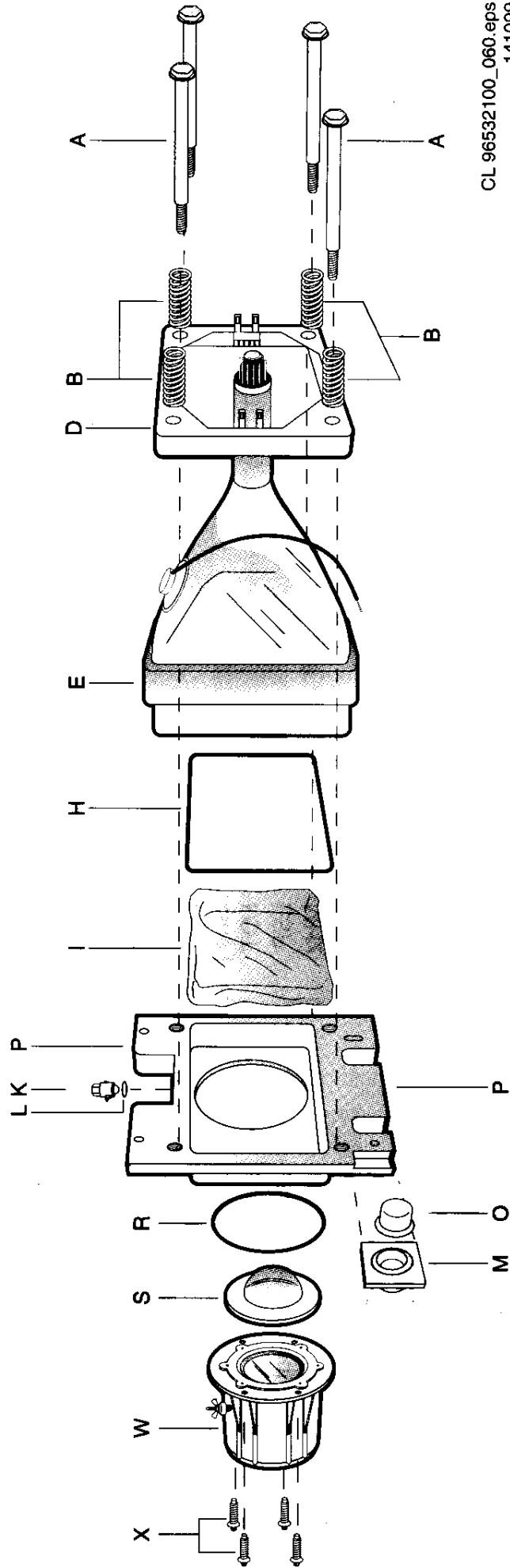
9.1 List of abbreviations

uC	Micro Computer
2CS	Two Carrier System stereo
2fcs	2 x colour subcarrier frequency
3,58	Colour subcarrier frequency (3.58 MHz)
4,43	Colour subcarrier frequency (4.43 MHz)
AF	Sound IF signal from sound IF detector
AFC	Automatic Frequency Control
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control
Aquadag	Earth from the CRT-tube
Audio/CVBS	Sound IF signal (Intercarrier sound)
AV	Audio/Video
AVS	Automatic Voltage Switching
BCI	Beam Current Info
BG/I/DK/MN	IF Sound systems BG/I/DK/MN
BL	Beam Current limitation
BS	Broadcasting satellite
BTSC	Broadcast Television System Committee (L-R and L+R)
C	Chrominance
C-out	Chroma out
CRT	Picture Tube
CTI	Colour Transient Improvement
CVBS	Colour Video Blanking Sync
CVBS-PIP	CVBS for PIP panel
CVBS-Y	CVBS for luminance signal
DAC	Digital Analogue Converter
DC	Direct Current
East/west	East/west Correction signal
EEPROM	Electrical Erasable and Programmable Read Only Memory
EHT	Extra High Tension (25kV)
EN	Enable
EXT	External inputs (audio and video cinches)
FB	Fast blanking
Flyback	Flyback signal
FM	Frequency Modulation
Frame drive	Frame drive
Geometry	Geometry signal for 60Hz frame
H-shift	Horizontal-shift
Heater	Heater current for filament
HOR	Horizontal
HUE	Tint adjustment for NTSC system
I/O-expander	Input/Output expander
I-deg	Degaussing current
I2C	Inter IC data bus
IDENT	Identification signal from synchronisation IC
IF	Intermediate Frequency
Int-CVBS	Internal CVBS signal

INT-L	Internal audio L
INT-R	Internal audio R
L-in	Left audio in
L-out	Left audio out
LED	Light Emitting Diode
Line drive	Line drive
Line prot	Line protection signal
LOT	Line Output Transformer
LSP	Large Signal Panel
MHz	Mega Hertz
MPX	Multiplexed BTSC signal
NICAM	Near Instantaneous Companding Audio Multiplex
NIL	Non Interlace
NILS	Non Interlace Signal
NTSC	National Television System Committee
OSD	On Screen Display (in diagrams Display On Screen)
PAL	Phase Alternating Line
PIP	Picture In Picture
PLL	Phase Locked Loop
POR	Power On Reset
PP	Personal Preference
Prot	Protection signal
PTC	Positive Temperature Coefficient (increasing resistance at increasing temperature)
PWM	Pulse Width Modulation
QPSK	Quadrature Phase Shift Keying
R-in	Right audio in
R-out	Right audio out
RAM	Random Access Memory
RC5	Remote Control 5 system
REF	Reference
RGB	Red Green Blue
ROM	Read Only Memory
SAP	Second Audio Program
SAP_AVAIL	Status signal; pulled "low" by BTSC panel, SAP is available
SAW	Surface Acoustic Wave
SC	Sand Castle signal
SCL	Clock of the I2C-bus
SDA	Data if the I2C-bus
SDM	Service Default Mode
SECAM	Sequential Couleur a Memoire
Sif	Sound IF signal front end tuner
SM	Service Mode
SMPS	Switched Mode Power Supply (frequency and duty cycle controlled)
SQ	Squeeze mode
SSP	Small Signal Panel
Std-by	Stand by
SVHS	Super Video Home System
SYNC	Synchronisation
TINT	PWM control signal for hue control
TP1	Test Point 1
TRANS_ID	Status signal
TXT	Teletext
U	R-Y

V	4:3	Aspect Ratio of Picture Tube (4 equals height, 3 equals width)
VERT	16:9	Aspect Ratio of Picture Tube (16 equals height, 9 equals width)
Vfb	14:9	Aspect Ratio of Picture Tube (14 equals height, 9 equals width)
VG1		
VG2		
Vref		
Y		
B-Y		
Vertical		
Vertical feedback voltage		
VG1 Voltage		
VG2 Voltage		
V-Reference		
Luminance part of the video signal		

9.2 Optical assembly replacement



CL 96532100_060.eps
141099

Figure 9-1

For optical assembly replacement parts see Spare parts list at the end of this manual.

10. Spare parts list

Power Supply Panel

Various

0103	3135 011 02331	Clip for transistor
0104	3135 010 02911	Insulator
0104	3135 011 02331	Clip for transistor
0301	3135 010 02911	Insulator
0301	3135 011 01511	Spring
0320	3135 014 09181	Support
0600	3135 011 02331	Clip for transistor
1000	4822 253 30474	Fuse 5A
1004	2422 093 00027	Fuse 1A
1202	2422 025 16081	11P board
1203	2422 025 15914	4P board
1205	4822 265 11507	4P
1210	2422 025 15516	9P board
1212	4822 267 10889	6P male
1220	4822 267 10966	2P
1221	4822 267 10966	2P
1222	4822 267 10966	2P
1223	4822 267 10973	1P
1224	4822 267 10973	1P
1225	4822 267 10973	1P
1276	4822 265 11518	10P male v
1300	2422 093 00031	Fuse 2A
1301	2422 086 10786	Fuse 4A
1302	2422 086 10786	Fuse 4A
1305	2422 132 07314	Relay

-H-

2000	4822 121 43819	0.68µF 10% 250V
2001	4822 121 43819	0.68µF 10% 250V
2002	2020 554 90173	2.2nF 20% 250V
2003	2020 554 90173	2.2nF 20% 250V
2004	4822 252 60151	Surge prot. DSP-501N-A21F
2005	4822 121 10512	275V 220nF 20%
2006	2020 558 90557	1nF 10% 1KV
2007	2020 558 90557	1nF 10% 1KV
2008	2020 558 90557	1nF 10% 1KV
2009	2020 558 90557	1nF 10% 1KV
2104	4822 121 10512	275V 220nF 20%
2105	4822 122 50116	470pF 10% 1KV
2107	4822 126 11382	1nF 10% 1KV
2108	4822 126 11382	1nF 10% 1KV
2109	4822 122 50116	470pF 10% 1KV
2110	2020 021 91323	470µF 20% 400V
2111	2222 479 90014	220nF 5% 250V
2112	4822 121 42868	220nF 5% 50V
2113	4822 124 40255	100µF 20% 63V
2114	4822 121 42729	1.5nF 1% 250V
2115	2020 308 90121	330pF 5% 50V
2116	4822 121 70654	2.2nF 10% 50V
2117	5322 124 41381	22µF 20% 50V
2118	4822 124 21913	1µF 20% 63V
2119	4822 121 10711	100nF 20% 275V
2119	4835 121 47646	2200pF 5% 50V
2120	4822 126 13337	220pF 10% 1KV
2203	2020 554 90173	2.2nF 20% 250V
2206	4822 124 80144	220µF 20% 25V
2208	4822 122 31211	100pF 10% 500V
2209	4822 124 40207	100µF 20% 25V
2213	4822 124 81144	1000µF 16V
2214	4822 124 11508	22µF 20% 250V
2215	4822 124 11508	22µF 20% 250V
2226	4822 122 30103	22nF 80% 63V
2228	4822 122 31211	100pF 10% 500V
2269	4822 122 31211	100pF 10% 500V
2270	4822 124 40207	100µF 20% 25V
2282	4822 124 22651	1.0µF 20% 50V
2283	4822 124 40433	47µF 20% 25V
2284	4822 122 30043	10nF 80% 63V
2285	4822 122 30043	10nF 80% 63V
2300	2020 021 91323	470µF 20% 400V
2301	4822 126 11382	1nF 10% 1KV
2302	4822 122 50116	470pF 10% 1KV
2303	4822 124 40207	100µF 20% 25V
2304	2020 558 90554	330pF 10% 1KV
2305	5322 122 32311	470pF 10% 100V
2306	4822 124 21913	1µF 20% 63V
2307	5322 122 32261	4.7nF 10% 100V
2308	5322 122 32261	4.7nF 10% 100V
2309	4822 122 31237	82pF 2% 100V
2310	4822 126 13461	680pF 10% 50V

2311	5322 122 32331	1nF 10% 100V
2312	4822 122 50116	470pF 10% 1KV
2313	2020 021 91321	470µF 20% 200V
2314	4822 124 11508	22µF 20% 250V
2315	4822 122 50116	470pF 10% 1KV
2316	3198 026 51020	1000µF 20% 50V
2317	3198 026 51020	1000µF 20% 50V
2318	5322 121 42386	100nF 5% 63V
2319	4822 122 50116	470pF 10% 1KV
2320	3198 026 51020	1000µF 20% 50V
2321	3198 026 51020	1000µF 20% 50V
2322	5322 121 42386	100nF 5% 63V
2323	4822 122 50116	470pF 10% 1KV
2324	2020 021 91374	2200µF 20% 25V
2325	5322 121 42386	100nF 5% 63V
2326	5322 121 42386	100nF 5% 63V
2327	2020 021 91376	470µF 20% 35V
2328	4822 124 21913	1µF 20% 63V
2329	4822 122 50116	470pF 10% 1KV
2330	2020 021 91376	470µF 20% 35V
2331	5322 121 42386	100nF 5% 63V
2332	5322 121 42386	100nF 5% 63V
2333	5322 122 32818	2.2nF 10% 100V
2334	5322 121 42489	33nF 5% 250V
2335	4822 124 81151	22µF 50V
2336	5322 121 42386	100nF 5% 63V
2337	4822 124 81151	22µF 50V
2338	4822 124 80061	1000µF 20% 25V
2339	5322 121 42386	100nF 5% 63V
2340	4822 122 30043	10nF 80% 63V
2341	5322 121 42386	100nF 5% 63V
2342	5322 122 32311	470pF 10% 100V
2343	5322 122 32331	1nF 10% 100V
2344	4822 124 80061	1000µF 20% 25V
2345	4822 122 30043	10nF 80% 63V
2346	5322 121 42386	100nF 5% 63V
2347	4822 124 21913	1µF 20% 63V
2348	4822 124 21913	1µF 20% 63V
2349	4822 122 30043	10nF 80% 63V
2350	4822 122 50116	470pF 10% 1KV
2351	4822 122 30103	22nF 80% 63V
2352	4822 124 80061	1000µF 20% 25V
2353	5322 122 32334	220pF 10% 100V
2354	4822 124 40433	47µF 20% 25V
2355	5322 122 32311	470pF 10% 100V
2356	2020 021 91376	470µF 20% 35V

□

3000	4822 053 21475	4M7 5% 0.5W
3001	4822 053 21475	4M7 5% 0.5W
3003	4822 117 12181	470Ω 20% 0.5W
3004	4822 053 20335	3M3 5% 0.25W
3005	4822 053 20335	3M3 5% 0.25W
3006	4822 116 52285	470k 5% 0.5W
3007	4822 116 83961	6k8 5%
3008	4822 050 21003	10k 1% 0.6W
3009	2322 253 41228	2.2Ω 5% 10W
3011	4822 116 21217	VDR 1mA/423V 800V
3105	2120 106 90522	6.8Ω 5% 2W
3107	4822 053 10689	68Ω 5% 1W
3108	4822 053 21335	3M3 5% 0.5W
3109	4822 116 83884	47k 5% 0.5W
3110	4822 116 83882	39k 5% 0.5W
3111	4822 117 10118	1M 5% 0.5W
3112	4822 053 21225	2M2 5% 0.5W
3113	4822 116 52245	150k 5% 0.5W
3114	4822 116 52195	47Ω 5% 0.5W
3115	4822 116 52195	47Ω 5% 0.5W
3116	4822 050 26803	68k 1% 0.6W
3117	4822 050 21003	10k 1% 0.6W
3118	4822 116 83881	390Ω 5% 0.5W
3119	4822 053 21335	3M3 5% 0.5W
3120	4822 116 52289	5k6 5% 0.5W
3121	4822 116 52264	27k 5% 0.5W
3123	4822 116 52249	1k8 5% 0.5W
3124	4822 116 52272	330k 5% 0.5W
3125	4822 050 11002	1k 1% 0.4W
3126	4822 116 83884	47k 5% 0.5W
3127	4822 116 52251	18k 5% 0.5W
3128	4822 116 52249	1k8 5% 0.5W
3130	2120 106 90565	0.1Ω 5% 2W
3131	2120 106 90565	0.1Ω 5% 2W
3132	2120 106 90565	0.1Ω 5% 2W
3133	2120 106 90565	0.1Ω 5% 2W
3134	4822 053 21474	470k 5% 0.5W

3212	4822 050 21003	10k 1% 0.6W
3213	4822 050 21003	10k 1% 0.6W
3214	4822 116 52234	100k 5% 0.5W
3215	4822 050 11002	1k 1% 0.4W
3216	4822 052 10109	10Ω 5% 0.33W
3223	4822 116 52195	47Ω 5% 0.5W
3239	4822 050 22402	2k4 1% 0.6W
3241	4822 116 83961	6k8 5%
3244	4822 050 23303	33k 1% 0.6W
3246	4822 050 22402	2k4 1% 0.6W
3247	4822 116 52213	180Ω 5% 0.5W
3287	4822 116 83883	470Ω 5% 0.5W
3288	4822 050 21003	10k 1% 0.6W
3289	4822 050 21003	10k 1% 0.6W
3300	4822 117 12076	22k 5% 5W
3301	2322 257 41102	1k 5% 5W
3302	2322 257 41102	1k 5% 5W
3303	4822 116 52234	100k 5% 0.5W
3304	4822 050 11002	1k 1% 0.4W
3305	4822 050 21003	10k 1% 0.6W
3306	4822 116 52176	100Ω 5% 0.5W
3307	4822 116 52191	33Ω 5% 0.5W
3308	3198 012 21070	0.1Ω 5% 2W
3309	3198 012 14770	0.47Ω 5% 1W
3310	4822 116 83883	470Ω 5% 0.5W
3311	4822 050 24708	4.7Ω 1% 0.6W
3312	4822 116 52201	75Ω 5% 0.5W
3313	4822 050 21003	10k 1% 0.6W
3314	4822 116 52304	82k 5% 0.5W
3315	4822 116 52244	15k 5% 0.5W
3316	4822 050 11002	1k 1% 0.4W
3317	4822 116 52244	15k 5% 0.5W
3318	4822 116 52245	150k 5% 0.5W
3319	4822 116 52244	15k 5% 0.5W
3322	4822 101 11383	470Ω 30% LIN
3323	2120 105 93474	2.7k.5% 1W
3324	3198 012 11040	100k 5% 1W
3325	4822 050 21003	10k 1% 0.6W
3326	4822 116 52283	4k7 5% 0.5W
3327	4822 116 52175	100Ω 5% 0.5W
3328	4822 116 52175	100Ω 5% 0.5W
3329	4822 116 52219	330Ω 5% 0.5W
3330	4822 053 10223	22k 5% 1W
3331	4822 053 10223	22k 5% 1W
3332	4822 052 10108	1Ω 5% 0.33W
3333	3198 012 21070	0.1Ω 5% 2W
3334	4822 050 11002	1k 1% 0.4W
3335	4822 116 52234	100k 5% 0.5W
3336	4822 116 52175	100Ω 5% 0.5W
3337	4822 116 83881	390Ω 5% 0.5W
3338	4822 050 21003	10k 1% 0.6W
3339	4822 116 52269	3k3 5% 0.5W
3340	4822 116 83874	220k 5% 0.5W
3341	3198 012 23390	0.33Ω 5% 2W
3342	3198 012 23390	0.33Ω 5% 2W
3343	4822 050 21003	10k 1% 0.6W
3344	4822 050 21003	10k 1% 0.6W
3345	2322 251 41471	470Ω 5% 5W
3346	2322 251 41471	470Ω 5% 5W
3347	4822 116 52283	4k7 5% 0.5W
3350	3198 012 14730	47k 5% 1W

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5000	3121 218 61371	Transformer
5001	3121 218 61491	Transformer
5211	4822 157 50964	100µH
5214	4822 157 50964	100µH
5233	4822 157 11411	Bead 100MHz
5234	4822 157 71736	10µH 5%
5235	4822 157 71736	10µH 5%
5301	4822 157 11411	Bead 100MHz
5302	4822 157 11411	Bead 100MHz
5303	4822 157 11411	Bead 100MHz
5304	4822 157 11411	Bead 100MHz
5305	4822 157 71736	10µH 5%
5306	4822 157 11411	Bead 100MHz
5307	4822 157 71736	10µH 5%
5308	4822 157 11411	Bead 100MHz
5309	4822 157 71736	10µH 5%
5310	4822 157 11411	Bead 100MHz
5311	4822 157 71736	10µH 5%
5312	4822 157 71736	10µH 5%
5313	4822 157 11411	Bead 100MHz
5314	4822 157 71736	10µH 5%
5315	4822 157 71736	10µH 5%

Table with 3 columns: Part Number, Description, and Value. Includes parts like 4822 157 71736 10µH 5% and 4822 130 83147 DF06M.



Table with 3 columns: Part Number, Description, and Value. Includes parts like 4822 130 40959 BC547B and 4822 209 16121 L4981A.

High Voltage Scan Module

Various

Table with 3 columns: Part Number, Description, and Value. Includes items like 'Clip for transistor', 'Spring', '4P', '5P male', '3P male v 2.5', '7P male', '6P male', 'EHT res/cap', 'Fuse 1A', 'Fuse 1A', and 'Highvoltage cable'.



Table with 3 columns: Part Number, Description, and Value. Includes parts like 2020 012 92648 2.2µF 20% 50V and 4822 121 51252 470nF 5% 63V.

Large table with 3 columns: Part Number, Description, and Value. Contains a wide range of electronic components such as capacitors (1µF 20% 63V), resistors (100nF 5% 63V), and diodes (1N4148).



Table with 3 columns: Part Number, Description, and Value. Includes parts like 4822 051 20478 4.07 5% 0.1W and 4822 051 20478 4.07 5% 0.1W.

Large table with 3 columns: Part Number, Description, and Value. Contains a wide range of electronic components including resistors (100Ω 5% 0.5W), capacitors (100µF 20% 35V), and various other passive components.

3946	4822 116 83933	15k 1% 0.1W
3948	4822 050 11002	1k 1% 0.4W
3949	4822 116 52226	560Ω 5% 0.5W
3950	2322 251 41339	33Ω 5% 5W
3951	4822 117 10833	10k 1% 0.1W
3952	4822 116 52176	10Ω 5% 0.5W
3954	4822 116 83882	39k 5% 0.5W
3955	4822 053 10333	33k 5% 1W
3957	4822 116 52243	1k5 5% 0.5W
3959	4822 050 11002	1k 1% 0.4W
3960	4822 052 10101	100Ω 5% 0.33W
3961	4822 053 10689	68Ω 5% 1W
3962	4822 116 52175	100Ω 5% 0.5W
3963	4822 116 52219	330Ω 5% 0.5W
3964	4822 116 52176	10Ω 5% 0.5W
3965	4822 116 83866	1M 5% 0.5W
3967	4822 051 20471	470Ω 5% 0.1W
3968	4822 116 52257	22k 5% 0.5W
3969	4822 116 83884	47k 5% 0.5W
3971	4822 116 52234	100k 5% 0.5W
3973	4822 116 52304	82k 5% 0.5W
3975	4822 052 10101	100Ω 5% 0.33W
3980	4822 117 12473	4k7 5% 5W
3981	4822 051 20683	68k 5% 0.1W
3982	4822 051 20683	68k 5% 0.1W
3983	4822 116 52228	680Ω 5% 0.5W
3989	4822 116 52228	680Ω 5% 0.5W
3990	4822 116 52249	1k8 5% 0.5W
3991	4822 050 11002	1k 1% 0.4W
3993	4822 116 52206	120Ω 5% 0.5W
3994	4822 116 83884	47k 5% 0.5W
3995	4822 050 11203	12k 1% 0.4W
3996	4822 050 11002	1k 1% 0.4W
3997	4822 050 11002	1k 1% 0.4W
3998	4822 116 52182	15Ω 5% 0.5W
3999	4822 051 20154	150k 5% 0.1W
4xxx	4822 051 10008	0Ω jumper 1206
4xxx	4822 051 20008	0Ω jumper 0805

5800	3121 218 31331	Hor. driver transf.
5801	2422 531 02386	Switchmode transf.
5802	2422 549 43513	Switchmode transf.
5803	2422 535 94987	Bridge coil 97μH
5804	2422 535 94991	Linearuty corr.
5805	4822 526 10704	Bead 100MHz
5806	4822 157 11086	47μH 10%
5900	3122 138 38641	L.O.T. CML17
5901	3121 218 31201	Hor. signal driver transf.
5902	2422 535 94603	22μH 10%
5903	4822 157 11086	47μH 10%
5904	4822 157 11411	Bead 100MHz
5910	4822 157 71387	Bead 100MHz

6500	4822 130 10794	BZX284-C10
6501	4822 130 83757	BAS216
6502	4822 130 83757	BAS216
6503	4822 130 83757	BAS216
6504	4822 130 42488	BYD33D
6505	4822 130 83757	BAS216
6550	5322 130 31938	BYV27-200
6552	4822 130 34278	BZX79-B6V8
6801	4822 130 42606	BYD33J
6802	5322 130 31938	BYV27-200
6803	5322 130 31938	BYV27-200
6806	3135 011 01511	Spring, clip
6806	4822 130 83812	BY459-1500
6808	3135 011 01511	Spring, clip
6808	9319 001 63671	DD50R
6809	4822 130 83757	BAS216
6810	4822 130 83757	BAS216
6830	4822 130 32896	BYD33M
6850	4822 130 42606	BYD33J
6900	4822 130 30621	1N4148
6901	4822 130 42488	BYD33D
6902	4835 130 37115	BY328
6904	4822 130 34121	BAX18
6906	4822 130 42488	BYD33D
6907	4822 130 34121	BAX18
6909	4822 130 30842	BAV21
6910	4822 130 41602	BYW95C
6915	4822 130 42488	BYD33D
6917	4822 130 34278	BZX79-B6V8
6918	9338 873 00673	BZX55-F27
6919	9338 872 20673	BZX55-F12
6950	4822 130 34278	BZX79-B6V8
6951	4822 130 83757	BAS216



7501	5322 130 60845	BC807-25
7502	4822 130 42804	BC817-25
7503	4822 130 42804	BC817-25
7550	4822 209 15255	TDA4861/V3
7551	5322 130 60159	BC846B
7552	4822 130 41589	2SC1473NQC
7553	5322 130 60159	BC846B
7590	5322 130 60159	BC846B
7800	5322 130 60159	BC846B
7801	4822 130 42159	BF819
7802	4822 130 63817	BU2520AF
7803	4822 130 44568	BC557B
7804	4822 130 42804	BC817-25
7830	4835 130 47893	2SC3675
7900	4822 209 72804	MC1391P
7901	4822 209 81397	TL431CLPST
7902	4835 209 87838	SC78130P1
7903	4822 130 44568	BC557B
7904	4822 130 60373	BC856B
7905	4822 130 42804	BC817-25
7906	4822 130 63817	BU2520AF
7907	4822 130 40959	BC547B
7908	4822 130 44568	BC557B
7909	4822 130 60373	BC856B
7952	4822 130 60578	2SC2482
7953	5322 130 60845	BC807-25

Mains Switch Panel

Various

1000	4822 267 10966	2P
1001	4822 276 14024	Mains switch 2P 4/128A
1002	4822 267 10966	2P
BKT1	3135 011 01367	Bracket for mains switch

Digital Convergence Panel

Various

1033	2422 025 02496	2P	
1034	2422 038 00173	Board connector	
1035	4822 267 10888	5P male	
1045	4822 267 10888	5P male	
1053	2422 025 05897	Board connector	
BKT30	0	3135 021 02481	Bracket
BKT30	1	3135 021 02481	Bracket
F300	4822 071 51002	Fuse 1A	
F301	2422 086 10786	Fuse 4A	
F302	2422 086 10786	Fuse 4A	
F303	4822 071 51002	Fuse 1A	
F304	4822 071 51002	Fuse 1A	
P300	3135 011 03221	IC clip	
P301	3135 011 03221	IC clip	

—II—

C100	4822 126 14585	100nF 10% 50V
C101	4822 126 14585	100nF 10% 50V
C102	4822 126 14585	100nF 10% 50V
C103	4822 122 33575	220pF 5% 63V
C104	4822 122 33575	220pF 5% 63V
C105	5322 122 32335	330pF 10% 100V
C107	4822 126 14585	100nF 10% 50V
C108	4822 126 14585	100nF 10% 50V
C109	4822 126 14585	100nF 10% 50V
C110	5322 122 31647	1nF 10% 63V
C111	4822 122 33177	10nF 20% 50V
C112	4822 126 14585	100nF 10% 50V
C113	4822 126 14585	100nF 10% 50V
C114	5322 122 32531	100pF 5% 50V
C115	4822 126 14585	100nF 10% 50V
C116	5322 122 32531	100pF 5% 50V
C117	4822 126 14585	100nF 10% 50V
C118	4822 126 14585	100nF 10% 50V
C119	5322 122 32531	100pF 5% 50V
C120	5322 122 32531	100pF 5% 50V
C121	5322 122 32531	100pF 5% 50V
C122	5322 122 32531	100pF 5% 50V
C126	4822 124 22652	2.2μF 20% 50V
C127	4822 124 22652	2.2μF 20% 50V
C128	5322 122 32448	10pF 5% 63V

C129	4822 124 41584	100μF 20% 10V
C130	4822 124 40248	10μF 20% 63V
C132	4822 126 14585	100nF 10% 50V
C200	4822 124 21913	1μF 20% 63V
C201	4822 126 14585	100nF 10% 50V
C202	4822 126 14043	1μF 20% 16V
C203	5322 122 32268	470pF 10% 50V
C205	4822 124 21913	1μF 20% 63V
C206	4822 126 14043	1μF 20% 16V
C207	4822 126 14585	100nF 10% 50V
C208	5322 122 32268	470pF 10% 50V
C210	4822 124 21913	1μF 20% 63V
C211	4822 126 14043	1μF 20% 16V
C212	4822 126 14585	100nF 10% 50V
C214	5322 122 32268	470pF 10% 50V
C215	5322 122 32268	470pF 10% 50V
C216	5322 122 32268	470pF 10% 50V
C217	5322 122 32268	470pF 10% 50V
C218	5322 122 32531	100pF 5% 50V
C219	5322 122 32531	100pF 5% 50V
C221	4822 126 14585	100nF 10% 50V
C222	5322 122 32531	100pF 5% 50V
C223	5322 122 32531	100pF 5% 50V
C224	4822 126 14585	100nF 10% 50V
C225	4822 126 14585	100nF 10% 50V
C226	5322 122 32531	100pF 5% 50V
C227	5322 122 32531	100pF 5% 50V
C228	4822 126 14585	100nF 10% 50V
C229	5322 122 32531	100pF 5% 50V
C231	5322 122 32531	100pF 5% 50V
C232	5322 122 32531	100pF 5% 50V
C233	5322 122 32531	100pF 5% 50V
C234	4822 126 14585	100nF 10% 50V
C235	4822 126 14585	100nF 10% 50V
C237	5322 122 32531	100pF 5% 50V
C238	5322 122 32531	100pF 5% 50V
C239	4822 124 40207	100μF 20% 25V
C240	4822 124 40207	100μF 20% 25V
C241	4822 124 40207	100μF 20% 25V
C242	4822 124 40207	100μF 20% 25V
C243	4822 124 40207	100μF 20% 25V
C244	4822 124 40207	100μF 20% 25V
C260	4822 126 14585	100nF 10% 50V
C261	4822 126 14585	100nF 10% 50V
C262	4822 126 14585	100nF 10% 50V
C263	4822 126 14585	100nF 10% 50V
C264	4822 126 14585	100nF 10% 50V
C265	4822 126 14585	100nF 10% 50V
C300	4822 126 14585	100nF 10% 50V
C301	4822 124 22651	1.0μF 20% 50V
C302	4822 126 14585	100nF 10% 50V
C303	4822 124 22651	1.0μF 20% 50V
C304	4822 126 14585	100nF 10% 50V
C305	4822 124 22651	1.0μF 20% 50V
C306	4822 126 14585	100nF 10% 50V
C307	4822 124 22651	1.0μF 20% 50V
C308	4822 124 80061	1000μF 20% 25V
C309	4822 124 80061	1000μF 20% 25V
C310	3198 026 51020	1000μF 20% 50V
C311	3198 026 51020	1000μF 20% 50V
C312	4822 124 80061	1000μF 20% 25V
C313	4822 124 80061	1000μF 20% 25V
C314	4822 124 80061	1000μF 20% 25V
C315	4822 124 80061	1000μF 20% 25V
C316	4822 124 40255	100μF 20% 63V
C317	5322 121 42386	100nF 5% 63V
C318	5322 122 33538	150pF 2% 63V
C319	5322 122 33538	150pF 2% 63V
C320	5322 122 33538	150pF 2% 63V
C321	4822 124 40255	100μF 20% 63V
C322	5322 121 42386	100nF 5% 63V
C323	4822 124 22652	2.2μF 20% 50V
C324	5322 122 33538	150pF 2% 63V
C325	5322 122 33538	150pF 2% 63V
C326	5322 122 33538	150pF 2% 63V
C327	4822 124 40255	100μF 20% 63V
C328	5322 121 42386	100nF 5% 63V
C329	4822 124 40255	100μF 20% 63V
C330	5322 121 42386	100nF 5% 63V
C331	4822 124 22652	2.2μF 20% 50V
C332	3198 026 51020	1000μF 20% 50V
C333	3198 026 51020	1000μF 20% 50V
C334	4822 124 41751	47μF 20% 50V



BR2	4822 051 20008	0Ω jumper 0805
R102	4822 117 10833	10k 1% 0.1W
R103	4822 117 11139	1k5 1% 0.1W
R104	4822 051 20101	100Ω 5% 0.1W

R105	4822 117 11503	220Ω 1% 0,1W
R106	4822 117 12955	2k7 1% 0,1W 0805
R107	4822 116 52283	4k7 5% 0,5W
R108	4822 052 10101	100Ω 5% 0,33W
R109	4822 050 11002	1k 1% 0,4W
R110	4822 052 10101	100Ω 5% 0,33W
R111	4822 051 20472	4k7 5% 0,1W
R112	4822 051 20472	4k7 5% 0,1W
R113	4822 117 10833	10k 1% 0,1W
R114	4822 117 10833	10k 1% 0,1W
R115	4822 051 20333	33k 5% 0,1W
R116	4822 116 52269	3k3 5% 0,5W
R117	4822 117 10833	10k 1% 0,1W
R118	4822 116 52256	2k2 5% 0,5W
R119	4822 117 10833	10k 1% 0,1W
R121	4822 116 52175	100Ω 5% 0,5W
R123	4822 051 20472	4k7 5% 0,1W
R124	4822 051 20101	100Ω 5% 0,1W
R125	4822 116 52175	100Ω 5% 0,5W
R126	4822 117 11449	2k2 1% 0,1W
R127	4822 116 83933	15k 1% 0,1W
R128	4822 117 11507	6k8 1% 0,1W
R129	4822 116 52256	2k2 5% 0,5W
R130	4822 117 10833	10k 1% 0,1W
R131	4822 116 52175	100Ω 5% 0,5W
R132	4822 116 52175	100Ω 5% 0,5W
R133	4822 116 52175	100Ω 5% 0,5W
R134	4822 116 52175	100Ω 5% 0,5W
R135	4822 116 83883	470Ω 5% 0,5W
R136	4822 116 83883	470Ω 5% 0,5W
R137	4822 116 83883	470Ω 5% 0,5W
R138	4822 116 52175	100Ω 5% 0,5W
R139	4822 051 20101	100Ω 5% 0,1W
R140	4822 051 20101	100Ω 5% 0,1W
R142	4822 051 20472	4k7 5% 0,1W
R143	4822 051 20332	3k3 5% 0,1W
R144	4822 117 10837	100k 1% 0,1W
R145	4822 050 21003	10k 1% 0,6W
R146	4822 051 20472	4k7 5% 0,1W
R147	4822 117 10833	10k 1% 0,1W
R148	4822 117 11449	2k2 1% 0,1W
R149	4822 051 20223	22k 5% 0,1W
R150	4822 116 83933	15k 1% 0,1W
R151	4822 117 11449	2k2 1% 0,1W
R152	4822 051 20333	33k 5% 0,1W
R153	4822 051 10102	1k 2% 0,25W
R154	4822 050 11002	1k 1% 0,4W
R155	4822 051 10102	1k 2% 0,25W
R156	4822 051 10102	1k 2% 0,25W
R157	4822 051 10102	1k 2% 0,25W
R158	4822 051 20472	4k7 5% 0,1W
R159	4822 051 20101	100Ω 5% 0,1W
R200	4822 051 20109	10Ω 5% 0,1W
R201	4822 116 52176	10Ω 5% 0,5W
R202	4822 116 83883	470Ω 5% 0,5W
R203	4822 051 20472	4k7 5% 0,1W
R204	4822 117 10833	10k 1% 0,1W
R207	4822 051 20223	22k 5% 0,1W
R208	4822 051 20392	3k9 5% 0,1W
R209	4822 116 52176	10Ω 5% 0,5W
R210	4822 052 10101	100Ω 5% 0,33W
R211	4822 116 83883	470Ω 5% 0,5W
R212	4822 117 10834	47k 1% 0,1W
R214	4822 117 10833	10k 1% 0,1W
R216	4822 051 20223	22k 5% 0,1W
R217	4822 116 52276	3k9 5% 0,5W
R218	4822 051 20109	10Ω 5% 0,1W
R219	4822 052 10101	100Ω 5% 0,33W
R220	4822 052 10101	100Ω 5% 0,33W
R222	4822 117 10833	10k 1% 0,1W
R224	4822 051 20223	22k 5% 0,1W
R225	4822 117 10834	47k 1% 0,1W
R226	4822 116 52276	3k9 5% 0,5W
R227	4822 116 83883	470Ω 5% 0,5W
R228	4822 052 10101	100Ω 5% 0,33W
R229	4822 116 52176	10Ω 5% 0,5W
R230	4822 051 20109	10Ω 5% 0,1W
R231	4822 051 20223	22k 5% 0,1W
R232	4822 117 10834	47k 1% 0,1W
R233	4822 116 83883	470Ω 5% 0,5W
R234	4822 117 10833	10k 1% 0,1W
R237	4822 051 20223	22k 5% 0,1W
R238	4822 117 10834	47k 1% 0,1W
R239	4822 116 52276	3k9 5% 0,5W
R240	4822 116 83883	470Ω 5% 0,5W
R241	4822 052 10101	100Ω 5% 0,33W
R243	4822 117 10833	10k 1% 0,1W
R245	4822 052 10101	100Ω 5% 0,33W
R246	4822 116 52176	10Ω 5% 0,5W
R247	4822 051 20109	10Ω 5% 0,1W
R248	4822 051 20223	22k 5% 0,1W

R249	4822 117 10834	47k 1% 0,1W
R250	4822 116 83883	470Ω 5% 0,5W
R252	4822 117 10833	10k 1% 0,1W
R254	4822 100 12156	4k7 30%
R255	4822 100 12156	4k7 30%
R256	4822 100 12156	4k7 30%
R257	4822 100 12156	4k7 30%
R258	4822 100 12156	4k7 30%
R259	4822 100 12156	4k7 30%
R300	4822 051 20332	3k3 5% 0,1W
R301	4822 053 10688	6Ω8 5% 1W
R302	4822 053 10688	6Ω8 5% 1W
R303	4822 053 10221	220Ω 5% 1W
R304	4822 053 10688	6Ω8 5% 1W
R305	4822 053 10688	6Ω8 5% 1W
R306	4822 051 20332	3k3 5% 0,1W
R307	4822 053 10221	220Ω 5% 1W
R308	4822 051 20332	3k3 5% 0,1W
R309	4822 051 20332	3k3 5% 0,1W
R310	4822 053 10688	6Ω8 5% 1W
R311	4822 053 10688	6Ω8 5% 1W
R312	4822 053 10221	220Ω 5% 1W
R313	4822 116 52269	3k3 5% 0,5W
R314	4822 116 52269	3k3 5% 0,5W
R315	4822 051 20273	27k 5% 0,1W
R316	4822 051 20472	4k7 5% 0,1W
R317	4822 053 10688	6Ω8 5% 1W
R318	4822 053 10688	6Ω8 5% 1W
R319	4822 053 10688	6Ω8 5% 1W
R320	4822 053 10688	6Ω8 5% 1W
R321	4822 051 20332	3k3 5% 0,1W
R322	4822 053 10221	220Ω 5% 1W
R323	4822 051 20332	3k3 5% 0,1W
R324	4822 051 20332	3k3 5% 0,1W
R325	4822 051 20332	3k3 5% 0,1W
R326	4822 053 10688	6Ω8 5% 1W
R327	4822 053 10688	6Ω8 5% 1W
R328	4822 053 10221	220Ω 5% 1W
R329	4822 051 20332	3k3 5% 0,1W
R330	4822 053 10221	220Ω 5% 1W
R331	4822 051 20332	3k3 5% 0,1W
R332	4822 051 20273	27k 5% 0,1W
R333	4822 051 20472	4k7 5% 0,1W
R334	2120 105 92509	15Ω 5% 3W

F100	2422 549 43268	Coil var. 7.96MHz
L100	4822 157 11518	5,6μH 5%
L101	4822 157 11518	5,6μH 5%
L102	4822 157 11518	5,6μH 5%
L103	4822 157 11518	5,6μH 5%
L104	4822 157 11518	5,6μH 5%
L105	4822 157 11518	5,6μH 5%
L106	4822 157 11518	5,6μH 5%
L107	4822 157 11518	5,6μH 5%
L112	4822 157 11525	6,8μH 5%
L300	4822 157 50961	22μH
L301	2422 535 96613	22μH 10%
L302	2422 535 96613	22μH 10%
L303	4822 157 50961	22μH
L304	4822 157 50961	22μH

D100	4822 130 83757	BAS216
D101	4822 130 83757	BAS216
D102	4822 130 83757	BAS216
D103	4822 130 83757	BAS216
D104	4822 130 83757	BAS216
D105	4822 130 83757	BAS216
D154	4822 130 10654	BAT254
D300	4822 130 83757	BAS216
D301	4822 130 83757	BAS216
D302	4822 130 83757	BAS216
D303	4822 130 83757	BAS216
V101	9340 332 80135	BB148
Z100	4822 130 34233	BZX79-B5V1
Z101	4822 130 34197	BZX79-B12
Z102	4822 130 61219	BZX79-B10

Q107	5322 130 60159	BC846B
Q108	5322 130 60159	BC846B
Q109	5322 130 60159	BC846B
Q110	5322 130 60159	BC846B
Q300	4822 130 40959	BC547B
Q301	4822 130 40959	BC547B
IC100	4822 209 83163	LM833nF
IC101	4822 209 16977	M24C32-WBN6
IC102	4835 209 88475	UPD65654GF
IC103	5322 209 11322	74HC08nF
IC200	4822 209 83163	LM833nF
IC201	4822 209 83163	LM833nF
IC202	4822 209 83163	LM833nF
IC203	4822 209 33562	TDA1313T
IC204	4822 209 33562	TDA1313T
IC205	4822 209 33562	TDA1313T
IC300	4822 209 80817	L7805CV
IC301	4822 209 80817	L7805CV
IC302	4822 209 73492	L7912CV
IC303	4822 209 81726	MC7812CT
IC304	9322 123 44682	ICSTK392-120
IC305	9322 123 44682	ICSTK392-120

Scavem Module

Various

1801	2422 025 11954	2P male v 2.50
1802	2422 025 11954	2P male v 2.50
1804	4822 265 11518	10P male v
1805	4822 267 10973	1P

-H-

2000	4822 121 41857	10nF 5% 250V
2001	4822 124 41751	47μF 20% 50V
2003	4822 124 41751	47μF 20% 50V
2004	4822 124 41751	47μF 20% 50V
2005	5322 121 42386	100nF 5% 63V
2006	4822 121 70162	10nF 5% 400V
2007	4822 121 51473	470nF 20% 63V
2010	4822 121 41857	10nF 5% 250V
2012	2020 012 93545	47μF 20% 160V
2013	4822 126 13512	330pF 10% 50V
2015	2020 557 90707	15pF 10% 500V
2016	4822 121 70162	10nF 5% 400V
2017	4822 126 12726	47pF 5% 50V
2019	4822 122 32027	56pF 2% 100V
2020	4822 122 32027	56pF 2% 100V
2021	4822 122 31822	4.7pF 0.25pF 100V
2024	4822 124 42336	47μF 20% 160V
2031	4822 121 41857	10nF 5% 250V

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3002	4822 117 12622	330Ω 5% 5W
3003	2120 105 90177	33Ω 5% 1W
3007	2120 106 90293	3.3Ω 5% 1W
3030	2120 106 90293	3.3Ω 5% 1W
3032	2120 105 92645	68Ω 5% 3W
3038	2120 105 90177	33Ω 5% 1W
3042	2120 105 92645	68Ω 5% 3W

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7000	4822 130 40959	BC547B
7001	4822 130 40981	BC337-25
7002	4822 130 63634	2SA1837Y
7003	4822 130 40959	BC547B
7004	4822 130 40959	BC547B
7005	4822 130 40959	BC547B
7006	4822 130 10941	2SC4793
7007	4822 130 40959	BC547B
7008	4822 130 44568	BC557B
7009	4822 130 40854	BC327

CRT Panel Red

Various

1000	4822 267 10691	1P yellow
1701	2422 500 80051	10P
1702	4822 252 60151	Surge protect DSP-501N-A21F
1871	4822 267 10541	10P
1873	4822 265 11551	Push-on terminal



Q100	5322 130 60159	BC846B
Q101	5322 130 60159	BC846B
Q103	5322 130 60159	BC846B
Q104	4822 130 44237	BF450
Q105	5322 130 60159	BC846B
Q106	5322 130 60159	BC846B

1874 4822 267 10691 1P yellow

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2701 4822 121 70162 10nF 5% 400V
 2702 4822 121 70162 10nF 5% 400V
 2705 4822 126 14053 1nF 10% 2KV
 2717 4822 124 12386 10μF 350V
 2720 4822 124 40248 10μF 20% 63V
 2721 5322 121 42386 100nF 5% 63V
 2722 2020 557 90147 560pF 10% 500V
 2750 4822 126 13499 220pF 5% 50V
 2751 2020 300 90647 1.2nF 5% 100V
 2752 2020 558 90585 1nF 20% 1KV

□

3701 2120 105 92799 0.27Ω 5% 0.5W
 3703 4822 116 52175 100Ω 5% 0.5W
 3710 4822 117 12516 680Ω 2% 0.5W
 3716 2120 103 90057 100Ω 20% 0.5W
 3718 2120 103 07223 22k 20% 0.5W
 3719 2120 106 90531 5.6Ω 5% 0.5W
 3720 2120 106 90531 5.6Ω 5% 0.5W
 3730 2322 257 41332 3.3k 5% 5W
 3731 4822 117 12618 2k2 5% 5W
 3733 4822 053 20106 10M 5% 0.25W
 3735 4822 116 52175 100Ω 5% 0.5W
 3737 2120 103 11272 2.7k 5% 0.25W
 3738 4822 116 52234 100k 5% 0.5W
 3740 4822 050 11002 1k 1% 0.4W
 3742 4822 050 21002 1k 1% 0.6W
 3743 4822 050 22201 220Ω 1% 0.6W
 3745 4822 050 26809 68Ω 1% 0.6W
 3750 4822 116 52175 100Ω 5% 0.5W
 3751 4822 050 21009 10Ω 1% 0.6W
 3752 2120 103 90012 10k 10% 0.25W
 3753 2120 101 90213 43Ω 5% 0.25W
 3755 4822 050 24709 47Ω 1% 0.6W
 3756 4822 050 26809 68Ω 1% 0.6W

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5701 4822 157 52333 100μH
 5702 4822 157 50965 15μH
 5703 4822 157 11517 10μH 5%
 5704 4822 157 11517 10μH 5%
 5705 4822 157 50965 15μH

→↑

6701 9322 019 69683 MUR140
 6702 9331 668 30133 BZX79-B6V2
 6705 9322 019 69683 MUR140
 6706 9322 019 69683 MUR140



7701 0061 060 00003 2SC3790E
 7702 9322 122 61686 SPS7350
 7703 9322 103 08678 2SC2383-0
 7705 9334 311 90126 MPSA92

CRT Panel Green**Various**

1000 4822 267 10691 1P yellow
 1001 4822 267 10691 1P yellow
 1801▲ 2422 500 80051 10P
 1802▲ 4822 252 60151 Surge protect DSP-501N-A21F
 1881 4822 267 10541 10P
 1882 4822 267 10542 4P
 1883 4822 267 10541 10P
 1884 4822 267 10541 10P
 1886 4822 265 11551 Push-on terminal
 1887 4822 265 11551 Push-on terminal

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2801 4822 121 70162 10nF 5% 400V
 2805▲ 4822 126 14053 1nF 10% 2KV
 2807 4822 121 70162 10nF 5% 400V
 2817 4822 124 12386 10μF 350V
 2820 4822 124 40248 10μF 20% 63V

2821 5322 121 42386 100nF 5% 63V
 2822 2020 557 90147 560pF 10% 500V
 2850 4822 126 13499 220pF 5% 50V
 2851 2020 300 90647 1.2nF 5% 100V
 2852 2020 558 90585 1nF 20% 1KV

□

3801▲ 2120 105 92799 0.27Ω 5% 0.5W
 3803 4822 116 52175 100Ω 5% 0.5W
 3810▲ 4822 117 12516 680Ω 2% 0.5W
 3816 2120 103 90057 100Ω 20% 0.5W
 3818▲ 2120 103 07223 22k 20% 0.5W
 3819▲ 2120 106 90531 5.6Ω 5% 0.5W
 3820▲ 2120 106 90531 5.6Ω 5% 0.5W
 3825 4822 116 83874 220k 5% 0.5W
 3826 4822 116 52234 100k 5% 0.5W
 3830▲ 2322 257 41332 3.3k 5% 5W
 3831▲ 4822 117 12618 2k2 5% 5W
 3833 4822 053 20106 10M 5% 0.25W
 3835 4822 116 52175 100Ω 5% 0.5W
 3837 2120 103 11272 2.7k 5% 0.25W
 3838 4822 116 52234 100k 5% 0.5W
 3840 4822 050 11002 1k 1% 0.4W
 3842 4822 050 21002 1k 1% 0.6W
 3843 4822 050 22201 220Ω 1% 0.6W
 3845 4822 050 26809 68Ω 1% 0.6W
 3850 4822 116 52175 100Ω 5% 0.5W
 3851 4822 050 21009 10Ω 1% 0.6W
 3852 2120 103 90012 10k.10% 0.25W
 3853 2120 101 90213 43Ω 5% 0.5W
 3855 4822 050 24709 47Ω 1% 0.6W
 3856 4822 050 26809 68Ω 1% 0.6W
 3857 4822 050 21003 10k 1% 0.6W

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5801 4822 157 52333 100μH
 5802 4822 157 50965 15μH
 5803 4822 157 11517 10μH 5%
 5804 4822 157 11517 10μH 5%
 5805 4822 157 50965 15μH

→↑

6802 9331 668 30133 BZX79-B6V2
 6805 9322 019 69683 MUR140
 6806 4822 130 34441 BZX79-B22



7801 0061 060 00003 2SC3790E
 7802 9322 122 61686 SPS7350
 7803 9322 103 08678 2SC2383-0
 7805 9334 311 90126 MPSA92

CRT Panel Blue**Various**

1000 4822 267 10691 1P yellow
 1894 4822 267 10541 10P
 1896 4822 265 11551 Push-on terminal
 1897 4822 267 10691 1P yellow
 1901▲ 2422 500 80051 10P
 1902▲ 4822 252 60151 Surge protect DSP-501N-A21F

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2901 4822 121 70162 10nF 5% 400V
 2902 4822 121 70162 10nF 5% 400V
 2905▲ 4822 126 14053 1nF 10% 2KV
 2917 4822 124 12386 10μF 350V
 2920 4822 124 40248 10μF 20% 63V
 2921 5322 121 42386 100nF 5% 63V
 2922 2020 557 90147 560pF 10% 500V
 2950 4822 126 13499 220pF 5% 50V
 2951 2020 300 90647 1.2nF 5% 100V
 2952 2020 558 90585 1nF 20% 1KV

□

3901▲ 2120 105 92799 0.27Ω 5% 0.5W
 3903 4822 116 52175 100Ω 5% 0.5W
 3910▲ 4822 117 12516 680Ω 2% 0.5W

3916 2120 103 90057 100Ω 20% 0.5W
 3918▲ 2120 103 07223 22k 20% 0.5W
 3919▲ 2120 106 90531 5.6Ω 5% 0.5W
 3920▲ 2120 106 90531 5.6Ω 5% 0.5W
 3930▲ 2322 257 41332 3.3k 5% 5W
 3931▲ 4822 117 12618 2k2 5% 5W
 3933 4822 053 20106 10M 5% 0.25W
 3935 4822 116 52175 100Ω 5% 0.5W
 3937 2120 103 11272 2.7k 5% 0.25W
 3938 4822 116 52234 100k 5% 0.5W
 3940 4822 050 11002 1k 1% 0.4W
 3942 4822 050 21002 1k 1% 0.6W
 3943 4822 050 22201 220Ω 1% 0.6W
 3945 4822 050 26809 68Ω 1% 0.6W
 3950 4822 116 52175 100Ω 5% 0.5W
 3951 4822 050 21009 10Ω 1% 0.6W
 3952 2120 103 90012 10k 10% 0.25W
 3953 2120 101 90213 43Ω 5% 0.5W
 3955 4822 050 24709 47Ω 1% 0.6W
 3956 4822 050 26809 68Ω 1% 0.6W

~

5901 4822 157 52333 100μH
 5902 4822 157 50965 15μH
 5903 4822 157 11517 10μH 5%
 5904 4822 157 11517 10μH 5%
 5905 4822 157 50965 15μH

→↑

6901 9322 019 69683 MUR140
 6902 9331 668 30133 BZX79-B6V2
 6905 9322 019 69683 MUR140
 6906 9322 019 69683 MUR140



7901 0061 060 00003 2SC3790E
 7902 9322 122 61686 SPS7350
 7903 9322 103 08678 2SC2383-0
 7905 9334 311 90126 MPSA92

Audio Amplifier Panel**Various**

1201 2422 086 10889 Fuse 4A
 1302 3135 011 03221 IC clip
 1304 3135 011 02481 Bracket
 1400 2422 025 15875 4P
 1401 4822 267 10537 5P
 1403 4822 492 62076 Clip for transistors
 1418 4822 267 10542 4P
 1449 2422 025 15832 5P

-||-

2201 4822 124 21913 1μF 20% 63V
 2202 4822 122 30043 10nF 80% 63V
 2203 4822 122 30043 10nF 80% 63V
 2208 4822 124 40248 10μF 20% 63V
 2301 4822 122 10182 100pF 5% 50V
 2302 4822 122 10182 100pF 5% 50V
 2303 5322 121 42386 100nF 5% 63V
 2304 5322 121 42386 100nF 5% 63V
 2305 2020 012 92615 100μF 20% 63V
 2306 4822 124 40433 47μF 20% 25V
 2307 4822 124 40433 47μF 20% 25V
 2308 4822 124 40433 47μF 20% 25V
 2309 3198 026 51020 1000μF 20% 50V
 2310 3198 026 51020 1000μF 20% 50V
 2311 4822 124 40433 47μF 20% 25V
 2312 4822 124 40433 47μF 20% 25V
 2313 5322 121 42386 100nF 5% 63V
 2314 5322 121 42386 100nF 5% 63V
 2401 2020 558 90557 1nF 10% 1KV
 2402 4822 124 80532 220pF 20% 400V
 2403 2020 558 90555 470pF 10% 1KV
 2404 4822 124 40248 10μF 20% 63V
 2405 5322 122 32331 1nF 10% 100V
 2406 4822 122 30043 10nF 80% 63V
 2407 4822 121 10863 4700pF 2% 63V
 2408 5322 122 32331 1nF 10% 100V
 2409 4822 122 31211 100pF 10% 500V
 2410 4822 124 40207 100μF 20% 25V
 2411 4822 124 12423 4700μF 20% 63V

2412	5322 121 42386	100nF 5% 63V
2413	2020 558 90557	1nF 10% 1KV
2414	4822 124 41747	680µF 20% 35V
2415	4822 124 40248	10µF 20% 63V
2416	5322 121 42386	100nF 5% 63V
2417	2020 558 90557	1nF 10% 1KV
2418	5322 121 42386	100nF 5% 63V
2423	4822 124 40433	47µF 20% 25V
2425	4822 122 10182	100pF 5% 50V
2501	5322 121 42386	100nF 5% 63V
2502	4822 124 40433	47µF 20% 25V



3000	4822 116 83884	47k 5% 0.5W
3001	4822 116 52257	22k 5% 0.5W
3003	4822 116 83874	220k 5% 0.5W
3202	4822 116 83884	47k 5% 0.5W
3204	4822 116 52257	22k 5% 0.5W
3208	4822 116 83884	47k 5% 0.5W
3260	4822 116 52257	22k 5% 0.5W
3261	4822 116 52257	22k 5% 0.5W
3301	4822 116 52234	100k 5% 0.5W
3302	4822 116 52234	100k 5% 0.5W
3303	4822 116 52234	100k 5% 0.5W
3304	4822 116 52234	100k 5% 0.5W
3305	4822 116 52175	100Ω 5% 0.5W
3306	4822 116 83878	270k 5% 0.5W
3307	4822 116 52234	100k 5% 0.5W
3309	2322 187 53123	12k 5% 0.5W
3310	2322 187 53123	12k 5% 0.5W
3311	4822 050 21002	1k 1% 0.6W
3312	4822 050 21002	1k 1% 0.6W
3313	4822 116 81753	4Ω7 5% 0.5W
3314	4822 116 81753	4Ω7 5% 0.5W
3403	2120 105 92596	470Ω 5% 3W
3404	4822 050 25101	510Ω 1% 0.6W
3405	4822 050 21001	100Ω 1% 0.6W
3406	4822 116 83874	220k 5% 0.5W
3410	4822 050 23012	3k01 1% 0.6W
3411	4822 116 52175	100Ω 5% 0.5W
3412	2120 105 92596	470Ω 5% 3W
3413	4822 116 52253	2k 5% 0.5W
3414	4822 116 83883	470Ω 5% 0.5W
3415	2120 105 92806	0.47Ω 5% 0.5W
3416	4822 116 83881	390Ω 5% 0.5W
3418	4822 116 83883	470Ω 5% 0.5W
3419	4822 116 52263	2k7 5% 0.5W
3420	4822 117 12169	1Ω 5% 1W
3421	4822 116 81753	4Ω7 5% 0.5W
3422	4822 116 80176	1Ω 5% 0.5W



5401	4822 157 71387	Bead 100MHz
5402	4822 157 71387	Bead 100MHz
5403	4822 157 71387	Bead 100MHz
5404	4822 157 10432	10µH 10%
5405	4822 157 71387	Bead 100MHz
5407	4822 157 71387	Bead 100MHz
5409	4822 157 71387	Bead 100MHz
5410	4822 157 71387	Bead 100MHz
5411	2422 531 02241	Switch mode transf.
5501	4822 157 71387	Bead 100MHz



6202	4822 130 30621	1N4148
6203	4822 130 30621	1N4148
6401	4822 130 30842	BAV21
6402	4835 130 37491	MUR860
6404	9322 019 68683	MUR120
6405	4822 130 41487	BYV95C
6406	4822 130 41487	BYV95C
6407	9331 214 60133	1N4150
6408	4822 130 34382	BZX79-B8V2



7202	4822 130 40959	BC547B
7203	9340 053 00116	J175
7204	9340 053 00116	J175
7207	9340 053 00116	J175
7208	9340 053 00116	J175
7301	9322 121 65682	ICSTK4432
7401	9322 013 35682	UC3845N
7403	9322 113 00687	MTW7N80E

Rear Switch Module

Various

1000	2422 015 19072	Connector
1002	2422 127 00485	Slide switch 4PGF642B
1319	4822 265 11517	1P male
1320	4822 265 11517	1P male
1321	4822 265 11557	5P
1349	2422 025 15779	5P

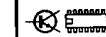
Front Jack panel



3001	4822 117 11927	75Ω 1% 0.1W
3002	4822 117 11927	75Ω 1% 0.1W
3006	4822 051 20223	22k 5% 0.1W
3009	4822 051 20223	22k 5% 0.1W
3011	4822 051 20392	3k9 5% 0.1W
3013	4822 051 20562	5k6 5% 0.1W 0805
3014	4822 117 11449	2k2 1% 0.1W
3016	4822 117 10833	10k 1% 0.1W
3017	4822 051 20332	3k3 5% 0.1W
3018	4822 117 10833	10k 1% 0.1W
3026	4822 117 10833	10k 1% 0.1W
3027	4822 117 10833	10k 1% 0.1W



6001	4822 130 10852	BZX284-C6V8
6003	4822 130 10852	BZX284-C6V8
6004	4822 130 10852	BZX284-C6V8
6005	4822 130 10852	BZX284-C6V8
6006	4822 130 10852	BZX284-C6V8
6010	4822 130 10852	BZX284-C6V8
6012	4822 130 10852	BZX284-C6V8



7000	4822 130 60373	BC856B
7001	4822 130 60373	BC856B

Interface Panel

Various

1000	4822 267 10933	7P male
1007	4822 265 11507	4P
1083	4822 265 11518	10P male v
1084	4822 265 11507	4P
1301	4822 267 10888	5P male
1302	2422 025 16081	11P
1304	4822 265 11518	10P male v
1305	2422 025 11143	3P male v
1308	4822 267 31673	3P male v
1309	2422 025 15516	9P
1313	4822 267 10973	1P
1315	2422 025 15516	9P
1328	2422 025 16081	11P
1333	2422 025 16081	11P
1335	4822 265 11518	10P male v
1340	2422 025 15516	9P
1341	2422 025 15516	9P
1360	4822 267 31673	3P male v
1364	4822 265 11507	4P
1366	4822 267 31673	3P male v
1375	4822 267 10888	5P male
1377	2422 025 15516	9P



2000	4822 124 40207	100µF 20% 25V
2001	4822 124 81151	22µF 50V
2002	4822 126 13838	100nF 50V 20%
2003	4822 124 40248	10µF 20% 63V
2004	4822 122 33177	10nF 20% 50V
2006	4822 124 40433	47µF 20% 25V
2007	4822 124 81151	22µF 50V
2008	4822 126 13838	100nF 50V 20%
2009	4822 121 51252	470nF 5% 63V
2010	4822 126 13838	100nF 50V 20%
2011	4822 126 13838	100nF 50V 20%
2012	4822 124 40433	47µF 20% 25V

2013	4822 126 13838	100nF 20% 50V
2025	4822 124 21913	1µF 20% 63V
2030	4822 124 21913	1µF 20% 63V
2033	4822 126 13691	27pF 1% 63V
2040	4822 121 42408	220nF 5% 63V
2041	4822 121 42408	220nF 5% 63V
2042	4822 121 42408	220nF 5% 63V
2045	4822 126 13838	100nF 20% 50V
2047	4822 126 13694	68pF 1% 63V
2048	4822 126 13694	68pF 1% 63V
2049	4822 126 13692	47pF 1% 63V
2050	5322 122 32448	10pF 5% 63V
2051	4822 124 40207	100µF 20% 25V
2054	4822 126 13694	68pF 1% 63V
2055	5322 122 32658	22pF 5% 50V
2056	4822 124 40769	4.7µF 20% 100V
2057	4822 124 40769	4.7µF 20% 100V



3000	2120 105 92524	10Ω 5% 3W
3007	4822 117 13577	330Ω 1% 1.25W 0805
3008	4822 117 13577	330Ω 1% 1.25W 0805
3009	4822 117 13577	330Ω 1% 1.25W 0805
3010	4822 117 10834	47k 1% 0.1W
3011	4822 051 20822	8k2 5% 0.1W
3012	4822 117 10834	47k 1% 0.1W
3013	4822 117 10834	47k 1% 0.1W
3014	4822 117 10834	47k 1% 0.1W
3015	4822 051 20822	8k2 5% 0.1W
3017	4822 117 11449	2k2 1% 0.1W
3018	4822 117 11449	2k2 1% 0.1W
3019	4822 117 13577	330Ω 1% 1.25W 0805
3020	4822 117 13577	330Ω 1% 1.25W 0805
3021	4822 117 13577	330Ω 1% 1.25W 0805
3022	4822 051 10102	1k 2% 0.25W
3023	4822 051 10102	1k 2% 0.25W
3024	4822 051 10102	1k 2% 0.25W
3025	4822 051 10102	1k 2% 0.25W
3026	4822 117 11449	2k2 1% 0.1W
3027	4822 051 20391	390Ω 5% 0.1W
3028	4822 051 20472	4k7 5% 0.1W
3029	4822 051 20122	1k2 5% 0.1W
3030	4822 116 83883	470Ω 5% 0.5W
3031	4822 051 20101	100Ω 5% 0.1W
3032	4822 051 20391	390Ω 5% 0.1W
3033	4822 051 20479	47Ω 5% 0.1W
3037	4822 051 10102	1k 2% 0.25W
3039	4822 051 20101	100Ω 5% 0.1W
3040	4822 116 83883	470Ω 5% 0.5W
3041	4822 051 20101	100Ω 5% 0.1W
3042	4822 051 20479	47Ω 5% 0.1W
3043	4822 051 20391	390Ω 5% 0.1W
3044	4822 117 10833	10k 1% 0.1W
3045	4822 051 20561	560Ω 5% 0.1W
3046	4822 051 20471	470Ω 5% 0.1W
3047	4822 117 11449	2k2 1% 0.1W
3048	4822 051 20101	100Ω 5% 0.1W
3049	4822 051 10102	1k 2% 0.25W
3050	4822 051 20561	560Ω 5% 0.1W
3051	4822 051 20332	3k3 5% 0.1W
3052	4822 117 11503	220Ω 1% 0.1W
3053	4822 117 13577	330Ω 1% 1.25W 0805
3054	4822 051 10102	1k 2% 0.25W
3055	4822 051 20561	560Ω 5% 0.1W
3056	4822 051 10102	1k 2% 0.25W
3057	4822 051 20101	100Ω 5% 0.1W
3058	4822 116 83883	470Ω 5% 0.5W
3059	4822 051 20101	100Ω 5% 0.1W
3060	4822 051 20391	390Ω 5% 0.1W
3061	4822 051 20479	47Ω 5% 0.1W
3092	4822 117 11507	6k8 1% 0.1W
3094	4822 051 20332	3k3 5% 0.1W
3095	4822 117 11507	6k8 1% 0.1W
3097	4822 051 20332	3k3 5% 0.1W
3098	4822 117 11507	6k8 1% 0.1W
3100	4822 051 20332	3k3 5% 0.1W
3101	4822 051 10102	1k 2% 0.25W
3102	4822 051 20479	47Ω 5% 0.1W
3103	4822 051 10102	1k 2% 0.25W
3104	4822 051 20479	47Ω 5% 0.1W
3105	4822 051 10102	1k 2% 0.25W
3106	4822 051 20479	47Ω 5% 0.1W
3107	4822 117 10353	150Ω 1% 0.1W
3108	4822 117 13577	330Ω 1% 1.25W 0805
3109	4822 051 10102	1k 2% 0.25W
3110	4822 051 10102	1k 2% 0.25W
3113	4822 051 20101	100Ω 5% 0.1W
3117	4822 051 10102	1k 2% 0.25W
3118	4822 117 11503	220Ω 1% 0.1W

Table with 2 columns: Part Number and Description. Includes items like 3847 4822 117 12925 47k 1% 0.063W 0603 and 4xxx 4822 051 20008 0Ω jumper 0805.

Table with 2 columns: Part Number and Description. Includes items like 5001 4822 157 11828 22μH 20% 0805 and 5756 4822 157 11775 6.8μH 5%.

Table with 2 columns: Part Number and Description. Includes items like 6001 4822 130 11422 PLVA2650A and 6205 4822 130 10794 BZX284-C10.

Table with 2 columns: Part Number and Description. Includes items like 6206 4822 130 10794 BZX284-C10 and 6757 4822 130 83757 BAS216.



Table with 2 columns: Part Number and Description. Includes items like 7001 9322 136 53668 MSM51V18165D-60JS and 7438 4822 130 10255 MMUN2213.

Table with 2 columns: Part Number and Description. Includes items like 7501 4822 209 17487 TDA9320AH/N1 and 7774 4822 130 60511 BC847B.

Optical Assembly Replacement Parts List

(See fig 9.1)

Table with 2 columns: Part Number and Description. Includes items like A 3135 010 02590 Shoulder Screw 1/4-20 (CRT To Coupler) (x12) and M 3135 014 02680 Cap, Coupler (Diaphragm Cover) (x3).