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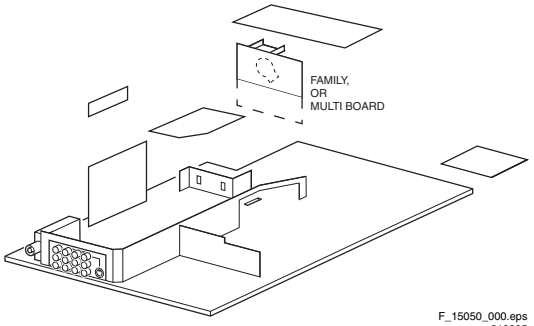

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Service Manual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

Notes:

- Described specifications are valid for the *whole* product range.
- Figures below can deviate slightly from the actual situation, due to different set executions.

1.1 Technical Specifications

1.1.1 Reception

Display type	:	CRT-DV-SF
Screen size	:	29"; 4:3
	:	34"; 4:3
	:	28"; 16:9
	:	32"; 16:9
Tuning system	:	PLL
Color systems	:	NTSC M (3.58 - 4.5)
	:	PAL M
	:	PAL N
Sound systems	:	BTSC
Channel selections	:	181, full cable
IF picture carrier	:	45.75 MHz
Aerial input	:	75 ohm, F-type
A/V Connections	:	PAL B/G

1.1.2 Miscellaneous

Audio output:	:	2 x 10 W
Power supply:		
- Mains voltage range	:	100 - 250 V_{AC}
- Mains frequency	:	50 / 60 Hz
Ambient conditions:		
- Temperature range	:	+5 to +45 °C
- Maximum humidity	:	90% R.H.
Power consumption:		
- Normal operation	:	from 119 W
	:	to 133 W
- Standby	:	< 1 W

1.2 Connections

Note: The following connector color abbreviations are used (according to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, Ye= Yellow.

1.2.1 Top Control and Front / Side Connections

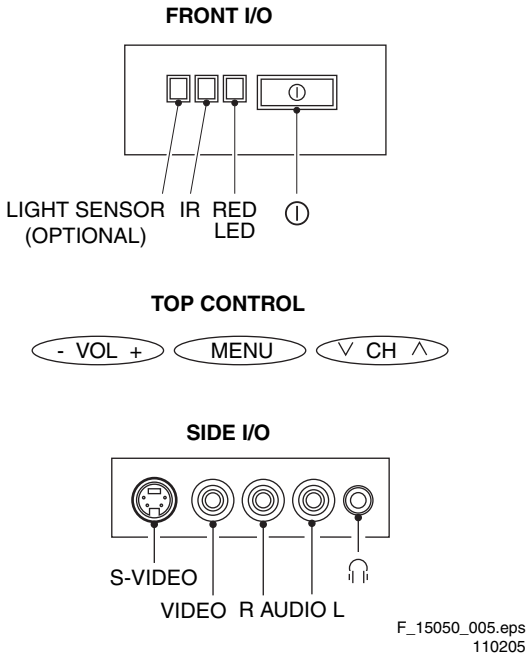

Figure 1-1 Top control and Front / Side connections

Hosiden: S-Video In

1	- GND	Ground
2	- GND	Ground
3	- Y	1 V_{PP} / 75 ohm
4	- C	0.3 V_{PP} / 75 ohm

Audio / Video In

Ye	- Video (CVBS)	1 V_{PP} / 75 ohm
Wh	- Audio - L	0.2 V_{RMS} / 10 kohm
Rd	- Audio - R	0.2 V_{RMS} / 10 kohm
Bk	- Headphone	8 - 600 Ohm / 4 mW

1.2.2 Rear Connections

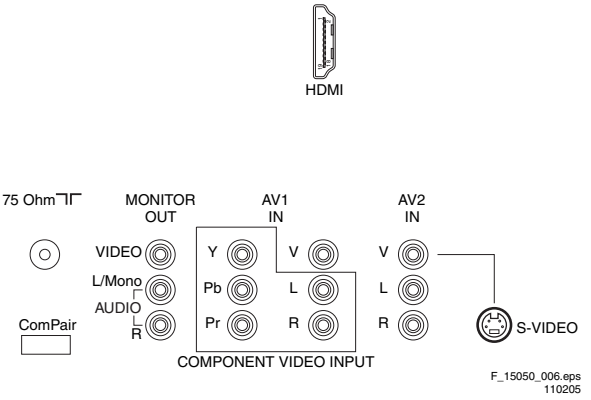

Figure 1-2 Rear connections

Aerial In

- F-type	Coax, 75 ohm	

Monitor Out

Ye - Video (CVBS)	1 V_{PP} / 75 ohm	
Wh - Audio - L	0.5 V_{RMS} / 1 kohm	
Rd - Audio - R	0.5 V_{RMS} / 1 kohm	

YUV In

Bu - U	0.7 V_{PP} / 75 ohm	
Rd - V	0.7 V_{PP} / 75 ohm	
Gn - Y	0.7 V_{PP} / 75 ohm	

AV1 In

Ye - Video (CVBS)	1 V_{PP} / 75 ohm	
Wh - Audio - L	0.5 V_{RMS} / 10 kohm	
Rd - Audio - R	0.5 V_{RMS} / 10 kohm	

AV2 In

Ye - Video (CVBS)	1 V_{PP} / 75 ohm	
Wh - Audio - L	0.5 V_{RMS} / 10 kohm	
Rd - Audio - R	0.5 V_{RMS} / 10 kohm	

AV2 In (S-Video)

1 - Ground	GND	

1.3 Chassis Overview

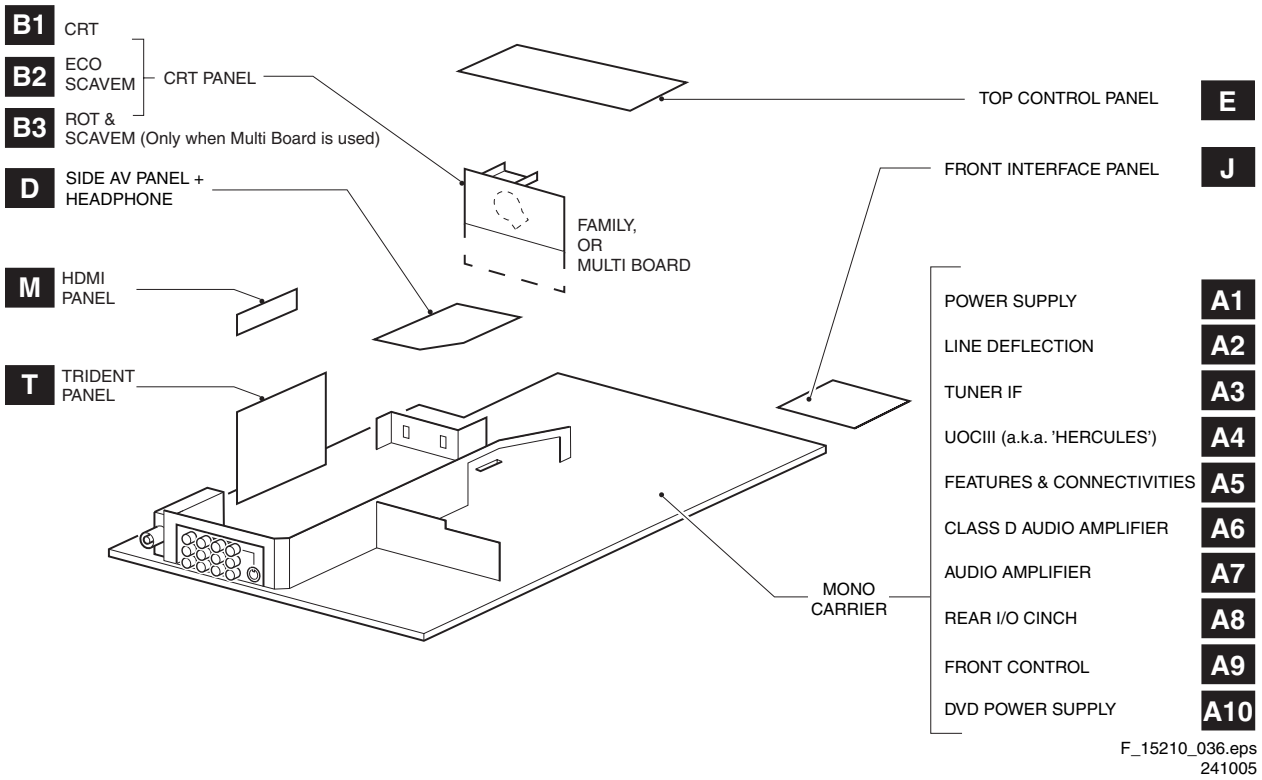

Figure 1-3 PWB location

4. Mechanical Instructions

Index of this chapter:

Note: Figures below can deviate slightly from the actual situation, due to different set executions.

4.1 Set Disassembly

Warning: Be sure to disconnect the AC power from the set before opening it.

4.1.1 Rear Cover

1. Remove all screws. If you do not remove them, you cannot access the clips.
2. Tilt the set a little forward, so that you can release the two clickfit clamps that are located at the bottom plate of the set.
3. Four openings (1) can be found at the top. The openings are very small (2).
   Note: Some sets only have the two inner openings.
4. Underneath every opening there is a clip. Push this clip down with a very thin piece of metal (3), until you hear a click.
   Caution: do **not** use a screwdriver, this will damage the cabinet.
5. When all four clips are pushed down, the back cover can be removed.

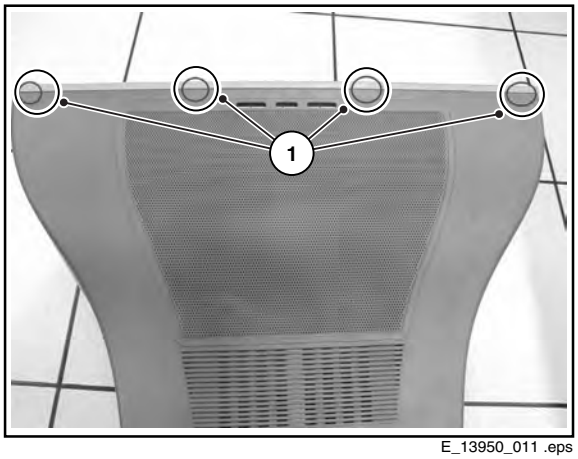

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Figure 4-1 Rear cover (for FL13 styling)

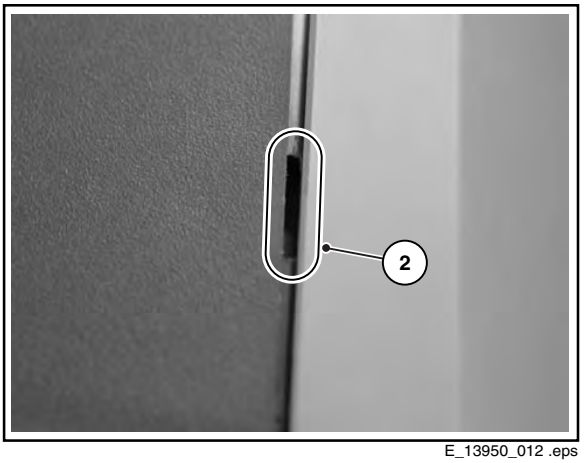

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Figure 4-2 Opening

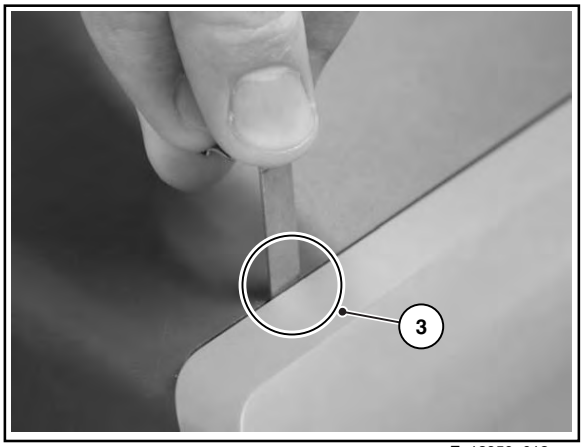

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Figure 4-3 Pushing clips down

4.2 Service Position

Before placing the Mono Carrier in its service position, remove the Front Interface assy/panel (see paragraph “Front Interface Assy/Panel”) and the Side AV assy/panel (see paragraph “Side AV Assy/Panel”).

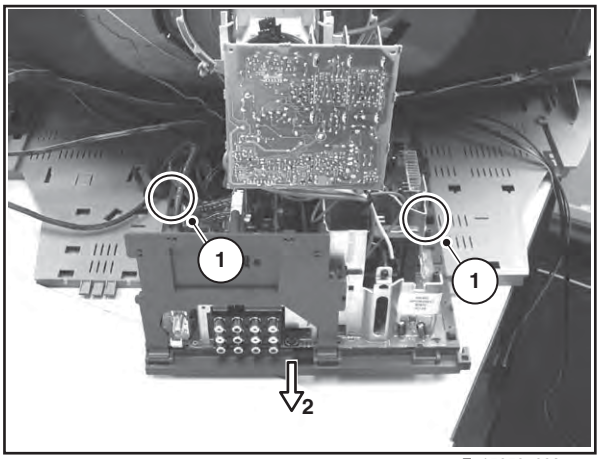

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Figure 4-4 Mono Carrier

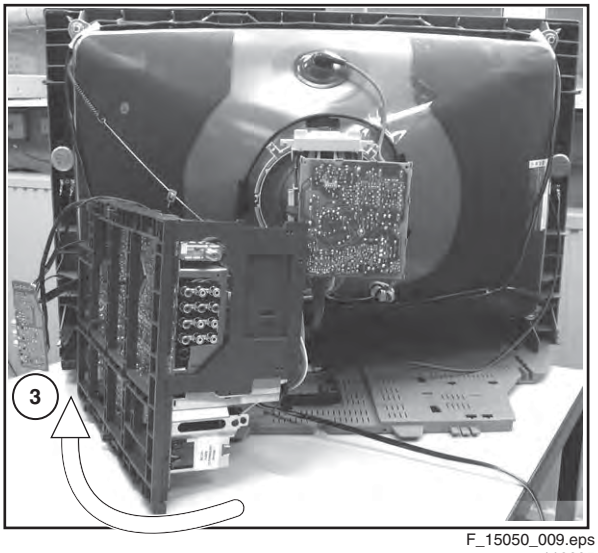

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Figure 4-5 Service position Mono Carrier

1. Disconnect the degaussing coil.
2. Release the two fixation clamps [1] (at the mid left and mid right side of the bracket), and remove the bracket from the bottom tray, by pulling it backwards [2].
3. Move the panel bracket somewhat to the left and flip it 90 degrees [3], with the components towards the CRT.
4. Turn the panel bracket with the rear I/O toward the CRT.

4.3 Assy/Panel Removal

4.3.1 Front Interface Assy/Panel

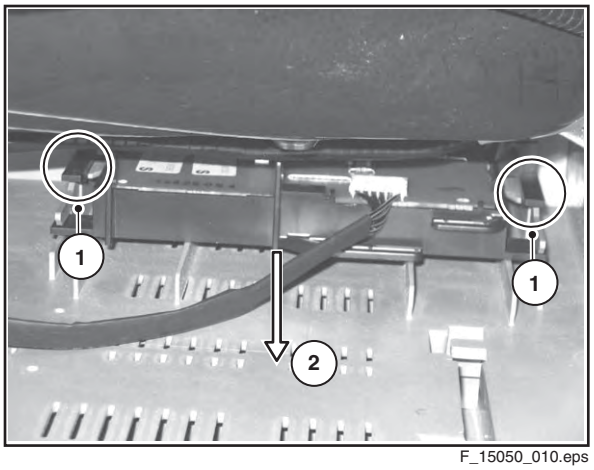

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Figure 4-6 Front interface assy/panel removal

1. Remove the two fixation screws.
2. Remove the complete module from the bottom plate, by pulling the two fixation clamps upward [1], while sliding the module away from the CRT [2].
3. Release the two fixation clamps at the side of the bracket, and lift the panel out of the bracket (it hinges at one side).

4.3.2 Side AV Assy/Panel

1. Remove the fixation screw, and remove the complete Side AV assembly.
2. Release the two fixation clamps, and lift the panel out of the bracket.

4.3.3 HDMI Interface Panel

To remove the HDMI Interface panel from the Mono Carrier, unscrew the fixation screw at the back of the assy.

4.3.4 Trident Panel

1. Remove all cables.
2. Pull the panel upwards out of the connectors.

4.3.5 Top Control Assy/Panel

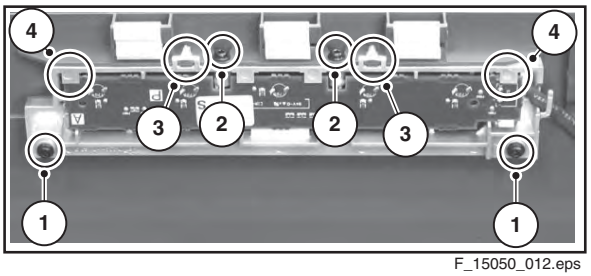

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Figure 4-7 Top Control assy/panel removal

1. Remove the two fixation screws at the bottom [1] and the two fixation screws at the front of the assy [2].
2. Release the two fixation clamps [3] to lift out the assy.
3. Release the two fixation clamps [4] to lift the panel out of the assy.

4.4 Set Re-assembly

To re-assemble the whole set, do all processes in reverse order.

Note: before you mount the rear cover, perform the following checks:

- Check whether the AC power cord is mounted correctly in its guiding brackets.
- Check whether all cables are replaced in their original position

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

This chassis is equipped with test points in the service printing. In the schematics test points are identified with a rectangle box around Fxxx or Ixxx. These test points are specifically mentioned in the “Test Point Overview” as “half moons” with a dot in the center.

Table 5-1 Test point overview

Test point	Circuit	Diagr.
F508, F535, F536, F537, F552, F561, F563, F573, F664, I513, I518, I519, I524, I531, I533, I546	Power supply	A1
F401, F412, F413, F414, F418, F452, F453, F455, F456, F458, F459, F460, F461, I408, I416, I417, I420, I462, I468	Line & Frame Deflection	A2
F003, F004, I001, I002	Tuner IF	A3
F201, F203, F205, F206	UOCIII	A4
F240, F241, F242	Features & Connectivities	A5
F952, F955, I951, I952	Audio Amplifier	A7
F692	Front Control	A9
F331, F332, F333, F338, F339, F341, F351, F353, F354	CRT Panel	B1
F361, F362, F381, F382	ECO Scavem	B2

Perform measurements under the following conditions:
- Television set in Service Default Alignment Mode.
- Video input: Color bar signal.
- Audio input: 3 kHz left channel, 1 kHz right channel.

5.2 Service Modes

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

This chassis also offers the option of using ComPair, a hardware interface between a computer and the TV chassis. It offers the abilities of structured troubleshooting, error code reading, and software version readout for all chassis.
Minimum requirements for ComPair: a Pentium processor, a Windows OS, and a CD-ROM drive (see also paragraph "ComPair").

5.2.1 Service Default Mode (SDM)

Purpose
- To create a predefined setting for measurements to be made.
- To override software protections.
- To start the blinking LED procedure.

Specifications
- Tuning frequency: 61.25 MHz (channel 3).
- Color system: PAL M.
- All picture settings at 50% (brightness, color contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled. The service unfriendly modes are:
  – Timer / Sleep timer.
  – Child / parental lock.
  – Blue mute.
  – Hotel / hospital mode.
  – Auto shut off (when no “IDENT” video signal is received for 15 minutes).
  – Skipping of non-favorite presets / channels.
  – Auto-storage of personal presets.
  – Auto user menu time-out.
  – Auto Volume Leveling (AVL).

How to Enter
To enter SDM, use one of the following methods:
- Press the following key sequence on the remote control transmitter: “**062596**” directly followed by the MENU button (do not allow the display to time out between entries while keying the sequence).
- Short the jumper wire 9252 with a cold ground on the family board (for example the tuner casing) and apply AC power. Then press the power button (remove the short after start-up).
  Caution: Entering SDM by shorting wire 9252 with ground will override the +8V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could damage the television set.
- Or via ComPair.

After entering SDM, the following screen is visible, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Mode.

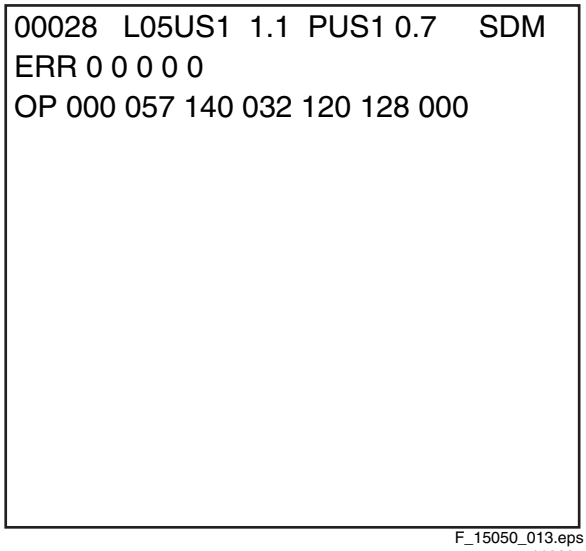

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Figure 5-1 SDM menu

How to Navigate

Use one of the following methods:

- When you press the MENU button on the remote control, the set will switch on the normal user menu in the SDM mode.
- On the TV, press and hold the VOLUME DOWN and press the CHANNEL DOWN for a few seconds, to switch from SDM to SAM and reverse.

How to Exit

Switch the set to STANDBY by pressing the POWER button on the remote control transmitter or the television set.
If you turn the television set off by removing the AC power (i.e., unplugging the television) without using the POWER button, the television set will remain in SDM when AC power is re-applied, and the error buffer is not cleared.

5.2.2 Service Alignment Mode (SAM)

Purpose

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

Specifications

- Operation hours counter (maximum five digits displayed).
- Software version, Error codes, and Option settings display.
- Error buffer clearing.
- Option settings.
- AKB switching.
- Software alignments (Tuner, White Tone, Geometry & Audio).
- NVM Editor.
- ComPair Mode switching.

How to Enter

To enter SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: "**062596**" directly followed by the OSD/ STATUS button (do not allow the display to time out between entries while keying the sequence).
- Or via ComPair.

After entering SAM, the following screen is visible, with SAM in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

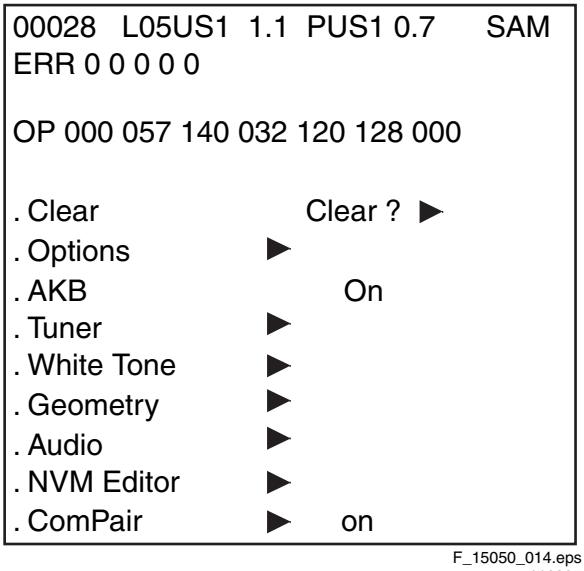

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Figure 5-2 SAM menu

Menu Explanation

1. **LLLLL.** This represents the run timer. The run timer counts normal operation hours, but does not count standby hours.
2. **AAABCD-x.y.** This is the software identification of the main microprocessor:
   - **A**= the project name (= L05).
   - **B**= the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
   - **C**= the software diversity:
     - **Europe:** T= 1 page TXT, F= Full TXT, V= Voice control.
     - **LATAM and NAFTA:** N= Stereo non-dBx, S= Stereo dBx.
     - **Asian Pacific:** T= TXT, N= non-TXT, C= NTSC.
     - **ALL regions:** M= mono, D= DVD, Q= Mk2.
   - **D**= the language cluster number.
   - **x**= the main software version number (updated with a major change that is incompatible with previous versions).
   - **y**= the sub software version number (updated with a minor change that is compatible with previous versions).
3. **EFFG-x.y.** This is the software identification of the Trident microprocessor.
   - **P**= indication of the Trident processor.
   - **FF**= the region: US=Nafta.
   - **G**= the language cluster number.
   - **x**= the main software version number (updated with a major change that is incompatible with previous versions).
   - **y**= the sub software version number (updated with a minor change that is compatible with previous versions).
4. **SAM.** Indication of the Service Alignment Mode.
5. **Error Buffer.** Shows all errors detected since the last time the buffer was erased. Five errors possible.
6. **Option Bytes.** Used to set the option bytes. See "Options" in the Alignments section for a detailed description. Seven codes are possible.
7. **Clear.** Erases the contents of the error buffer. Select the CLEAR menu item and press the MENU RIGHT key. The content of the error buffer is cleared.
8. **Options.** Used to set the option bits. See "Options" in the Alignments section for a detailed description.
9. **AKB.** Used to disable (Off) or enable (On) the "black current loop" (AKB= Auto Kine Bias).
10. **Tuner.** Used to align the tuner. See "Tuner" in the Alignments section for a detailed description.
11. **White Tone.** Used to align the white tone. See "White Tone" in the Alignments section for a detailed description.
12. **Geometry.** Used to align the geometry settings of the television. See "Geometry" in the Alignments section for a detailed description.
13. **Audio.** No audio alignment is necessary for this television set.
14. **NVM Editor.** Can be used to change the NVM data in the television set. See table "NVM data" further on.
15. **ComPair.** Can be used to switch on the television to In System Programming (ISP) mode, for software uploading via ComPair. **Caution:** When this mode is selected without ComPair connected, the TV will be blocked. Remove the AC power to reset the TV.

How to Navigate

- In SAM, select menu items with the MENU UP/DOWN keys on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, use the MENU UP/DOWN keys to display the next / previous menu items.
- With the MENU LEFT/RIGHT keys, it is possible to:
  - Activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected submenu.
- In SAM, when you press the MENU button twice, the set will switch to the normal user menus (with the SAM mode

still active in the background). To return to the SAM menu press the MENU or STATUS/EXIT button.
- When you press the MENU key in while in a submenu, you will return to the previous menu.

How to Store SAM Settings
To store the settings changed in SAM mode, leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set.

How to Exit
Switch the set to STANDBY by pressing the POWER button on the remote control transmitter or the television set.
If you turn the television set “off” by removing the AC power (i.e., unplugging the television) without using the POWER button, the television set will remain in SAM when AC power is re-applied, and the error buffer is not cleared.

5.2.3 Customer Service Mode (CSM)

Purpose
The Customer Service Mode shows error codes and information on the TV’s operation settings. The call center can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps the call center to diagnose problems and failures in the TV set before making a service call.
The CSM is a read-only mode; therefore, modifications are not possible in this mode.

How to Enter
To enter CSM, press the following key sequence on the remote control transmitter: “**123654”** (do not allow the display to time out between entries while keying the sequence).

Upon entering the Customer Service Mode, the following screen will appear:

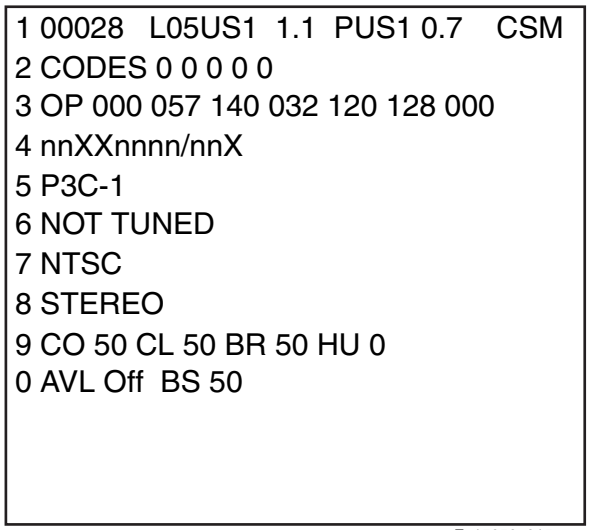

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Figure 5-3 CSM menu

Menu Explanation
1. Indication of the decimal value of the operation hours counter, Software identification of the main and Trident microprocessor (see "Service Default or Alignment Mode" for an explanation), and the service mode (CSM= Customer Service Mode).
2. Displays the last five errors detected in the error code buffer.
3. Displays the option bytes.
4. Displays the type number version of the set.
5. Reserved item for P3C call centers.
6. Indicates the television is receiving an "IDENT" signal on the selected source. If no "IDENT" signal is detected, the display will read "NOT TUNED"
7. Displays the detected Color system (e.g. PAL/NTSC).
8. Displays the detected Audio (e.g. stereo/mono).
9. Displays the picture setting information.
10. Displays the sound setting information.

How to Exit
To exit CSM, use one of the following methods:
- Press the MENU, STATUS/EXIT, or POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.3 Problems and Solving Tips Related to CSM

5.3.1 Picture Problems

Note: The problems described below are all related to the TV settings. The procedures used to change the value (or status) of the different settings are described.

Picture too Dark or too Bright

If:
- The picture improves when you have press the AUTO PICTURE button on the remote control transmitter, or
- The picture improves when you enter the Customer Service Mode,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys (if necessary) to select BRIGHTNESS.
6. Press the MENU LEFT/RIGHT keys to increase or decrease the BRIGHTNESS value.
7. Use the MENU UP/DOWN keys to select PICTURE.
8. Press the MENU LEFT/RIGHT keys to increase or decrease the PICTURE value.
9. Press the MENU button on the remote control transmitter twice to exit the user menu.
10. The new PERSONAL preference values are automatically stored.

White Line around Picture Elements and Text

If:
The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select SHARPNESS.
6. Press the MENU LEFT key to decrease the SHARPNESS value.

7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Snowy Picture

Check CSM line 6. If this line reads “Not Tuned”, check the following:

- Antenna not connected. Connect the antenna.
- No antenna signal or bad antenna signal. Connect a proper antenna signal.
- The tuner is faulty (in this case line 2, the Error Buffer line, will contain error number 10). Check the tuner and replace/ repair the tuner if necessary.

Black and White Picture

If:

- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:

1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select COLOR.
6. Press the MENU RIGHT key to increase the COLOR value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Menu Text not Sharp Enough

If:

- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:

1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select PICTURE.
6. Press the MENU LEFT key to decrease the PICTURE value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

5.4 ComPair

5.4.1 Introduction

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

- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the Force/SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

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.
For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector(s).

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

- Automatic (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C/UART level. ComPair can access the I2C/UART bus of the television. ComPair can send and receive I2C/UART commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C/UART buses of the TV-set.
- Manually (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions (e.g. *Does the screen give a picture? Click on the correct answer: YES / NO*) and showing you examples (e.g. *Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope*). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the fault finding process.

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

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

- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- Emulation of the (European) Dealer Service Tool (DST).
- If both ComPair and Force/SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink.
  Example: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Mono-carrier.*
  – Click on the “Panel” hyperlink to automatically show the PWB with a highlighted capacitor C2568.
  – Click on the “Schematic” hyperlink to automatically show the position of the highlighted capacitor.

5.4.3 How to Connect

This is described in the chassis fault finding database in ComPair.

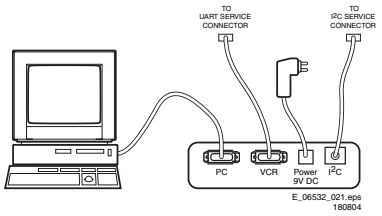


Figure 5-4 ComPair interface connection

5.4.4 How to Order

ComPair order codes (EU/AP/LATAM):
- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.
- ComPair interface (excl. transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (update): 3122 785 60070 (year 2002), 3122 785 60110 (year 2003 onwards).
- SearchMan32 CD (update): 3122 785 60080 (year 2002), 3122 785 60120 (year 2003), 3122 785 60130 (year 2004).
- ComPair firmware upgrade IC: 3122 785 90510.
- Transformer (non-UK): 4822 727 21632.
- Transformer UK: 4822 727 21633.
- ComPair interface cable: 3122 785 90004.
- ComPair interface extension cable: 3139 131 03791.
- ComPair UART interface cable: 3122 785 90630

ComPair order codes (US):
- ComPair Software: ST4191.
- ComPair Interface Box: 4822 727 21631.
- AC Adapter: T405-ND.
- ComPair Quick Start Guide: ST4190.
- ComPair interface extension cable: 3139 131 03791.
- ComPair UART interface cable: 3122 785 90630

Note: If you encounter any problems, contact your local support desk.

5.5 Error Codes

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

5.5.1 How to Read the Error Buffer

You can read the error buffer in 3 ways:
- On screen via the SAM (if you have a picture). **Examples:**
  - ERROR: 0 0 0 0 0 : No errors detected
  - ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error
  - ERROR: 9 6 0 0 0 : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See “The Blinking LED Procedure”.
- Via ComPair.

5.5.2 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:
- By using the CLEAR command in the SAM menu:
  - To enter SAM, press the following key sequence on the remote control transmitter: “**062596**” directly followed by the OSD/STATUS button (do not allow the display to time out between entries while keying the sequence).
  - Make sure the menu item CLEAR is highlighted. Use the MENU UP/DOWN buttons, if necessary.
  - Press the MENU RIGHT button to clear the error buffer. The text on the right side of the “CLEAR” line will change from “CLEAR?” to “CLEARED”
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the AC power from the television set, the error buffer is not reset.

5.5.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.

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

Table 5-2 Error code overview

Error	Device	Error description	Check item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray/Over-voltage protection (US only)	2411, 2412, 2413, 6404, 6411, 6412	A2
2	Not applicable	High beam (BCI) protection	3412, 7405	A2
3	Not applicable	Vertical guard protection	3466, 7451	A2
4	Not applicable	-	-	-
5	Not applicable	+5v protection	7604, 7605	A5
6	I2C bus	General I2C error	7200, 3207, 3214	A4
7	Not applicable	-	-	-
8	Not applicable	-	-	-
9	24C16	I2C error while communicating with the EEPROM	7601, 3604, 3605	A5
10	Tuner	I2C error while communicating with the PLL tuner	1000, 5001	A3
11	TDA6107/A	Black current loop instability protection	7330, 3351, CRT	B1
12	Not applicable	-	-	-
13	Not applicable	-	-	-
14	Not applicable	-	-	-
15	Not applicable	-	-	-
16	Not applicable	-	-	-
17	Not applicable	-	-	-
18	Not applicable	-	-	-
19	TDA1200x	I2C error while communicating with sound decoder in UOCIII IC	7200	A4
20	TDA1200x	I2C error while communicating with video cosmic in UOCIII IC	7200	A4
21	DPTVSVP	I2C error while communicating with the 3D Processor	7201, 3223, 3224	T1
22	TDA9332	I2C error while communicating with the HOP	7221, 3244, 3629, 7226, 7227	T5
23	SAA5565	I2C error while communicating with the Painter uProcessor	7206, 3254, 3256	T2
24	AD9883	I2C error while communicating with the ADC	7210, 3268, 3270	T3
25	Not applicable	No communication possible with Trident module	-	T
26	SII9993	I2C error while communicating with the HDMI receiver	7002, 3016, 3019	M1

5.6 The Blinking LED Procedure

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

When the SDM is entered, the front LED will blink the contents of the error-buffer:
- When all the error-codes are displayed, the sequence finishes with a LED blink of 1.5 seconds,
- The sequence starts again.

Example of error buffer: **12 9 6 0 0**
After entering SDM, the following occurs:
- 1 long blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blink of 1.5 seconds to finish the sequence,
- The sequence starts again at 12 short blinks.

5.7 Protections

If a fault situation is detected, an error code will be generated; and, if necessary, the television set will go into protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases, the microprocessor does not put the set in protection mode. The error codes of the error buffer and the blinking LED procedure can be read via the Service Default Menu (SDM), or via ComPair.

To get a quick diagnosis the chassis has three service modes implemented:
- The Customer Service Mode (CSM).
- The Service Default Mode (SDM).
- The Service Alignment Mode (SAM).

For a detailed mode description, see the relevant sections.

5.8 Fault Finding and Repair Tips

Notes:
- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

5.8.1 NVM Editor

In some cases, it can be handy if one directly can change the NVM contents. This can be done with the “NVM Editor” in SAM mode. In the next table, the default NVM values are given.

Table 5-3 NVM default values for LATAM-region

Item	Address (dec)	Default values (hex)									
		32PW8422/78	34PT8422/78	34PT8422/77	32PW8422/77	32PW8422/44	29PT8422/78	29PT8422/77	29PT8422/44	28PW8422/78	28PW8422/77
EW (EW Width)	19	16	2A	2A	16	16	2E	2E	2E	29	29
PW (EW Parabola Width)	20	09	2F	2F	09	09	28	28	28	16	16
HS (Horizontal Shift)	21	26	28	28	26	26	26	26	26	26	2A
HP (Horizontal Parallelogram)	22	07	07	07	07	07	07	07	07	07	07
HB (Horizontal Bow)	23	07	07	07	07	07	07	07	07	07	07
UCP (EW Upper Corner Parabola)	24	20	20	20	20	20	20	20	20	20	20
LCP (EW Lower Corner Parabola)	25	20	20	20	20	20	20	20	20	20	20
TC (EW Trapezium)	26	1F	1D	1D	1F	1F	14	14	14	1C	1C
VS (Vertical Slope)	27	25	26	26	25	25	28	28	28	1D	1D
VA (Vertical Amplitude)	28	1B	2D	2D	1B	1B	18	18	18	1F	1F
SC (S-Correction)	29	20	20	20	20	20	20	20	20	20	20
VSH (Vertical Shift)	30	20	1E	1E	20	20	23	23	23	1C	1C
VX (Vertical Zoom)	31	19	19	19	19	19	19	19	19	19	19
VSL (Vertical Scroll)	32	20	20	20	20	20	20	20	20	20	20
EHTC (Vertical Linearity)	33	14	19	19	14	14	19	19	19	19	19
BLOR (Black Level Offset - Red)	34	08	08	08	08	08	08	08	08	08	08
BLOG (Black Level Offset - Green)	35	08	08	08	08	08	08	08	08	08	08
AGC (AGC Takeover)	36	14	14	14	14	14	14	14	14	14	14
OIF (IF-PLL Offset)	37	26	26	26	26	26	26	26	26	26	26
Vertical Wait	38	0F	0F	0F	0F	0F	0F	0F	0F	0F	0F
H60 and V60	39	09	09	09	09	09	09	09	09	09	09
60 Hz Vertical Amplitude	42	30	30	30	30	30	30	30	30	30	30
YD & CL	43	06	06	06	06	06	06	06	06	06	06
RGB amplitude for full teletext mode	46	00	00	00	00	00	00	00	00	00	00
NVM_TABLE_VERSION	60	10	10	10	10	10	10	10	10	10	10
OPTION_TABLE_VERSION	61	01	01	01	01	01	01	01	01	01	01
CVI_BLOR	62	08	08	08	08	08	08	08	08	08	08
CVI_BLOG	63	08	08	08	08	08	08	08	08	08	08
TXT Brightness	64	17	17	17	17	17	17	17	17	17	17
V60 offset (60Hz Vertical Amplitude)	66	FE	FE	FE	FE	FE	FE	FE	FE	FE	FE
FOAB, CHSE	139	03	03	03	03	03	03	03	03	03	03
NVM_SOC_SMD	142	10	10	10	10	10	10	10	10	10	10
NVM_FMWS	149	03	03	03	03	03	03	03	03	03	03
NVM_ASD_SC1_THR	150	10	10	10	10	10	10	10	10	10	10
NVM_CRYSTALALIGN	208	3F	3F	3F	3F	3F	3F	3F	3F	3F	3F
Last Brightness (VID PP others)	264	30	30	30	30	30	30	30	30	30	30
Last Colour (VID PP others)	265	28	28	28	28	28	28	28	28	28	28
Last Contrast (VID PP others)	266	55	55	55	55	55	55	55	55	55	55
Last Sharpness (VID PP others)	267	05	05	05	05	05	05	05	05	05	05
Last Hue (VID PP others)	268	35	35	35	35	35	35	35	35	35	35
Last Colour Temperature (VID PP others)	269	1D	1D	1D	1D	1D	1D	1D	1D	1D	1D
White-D Cool Red	294	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD
White-D Cool Green	295	00	00	00	00	00	00	00	00	00	00
White-D Cool Blue	296	05	05	05	05	05	05	05	05	05	05
White-D Normal Red	297	21	21	21	21	21	21	21	21	21	21
White-D Normal Green	298	17	17	17	17	17	17	17	17	17	17
White-D Normal Blue	299	17	17	17	17	17	17	17	17	17	17
White-D Warm Red	300	02	02	02	02	02	02	02	02	02	02
White-D Warm Green	301	00	00	00	00	00	00	00	00	00	00
White-D Warm Blue	302	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA
Last Smart Sound	342	00	00	00	00	00	00	00	00	00	00
Last Volume	343	14	14	14	14	14	14	14	14	14	14
Last Balance	344	32	32	32	32	32	32	32	32	32	32
Last Treble (AUD PP others)	345	32	32	32	32	32	32	32	32	32	32
Last Bass (AUD PP others)	346	32	32	32	32	32	32	32	32	32	32

5.8.2 Power Supply

Set Not Working

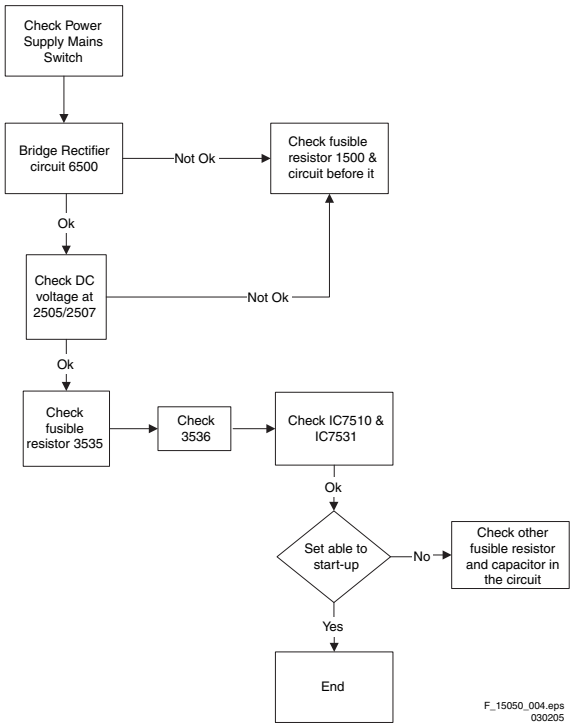


Figure 5-5 Fault finding tree "Set not working"

Set Does Not Start Up

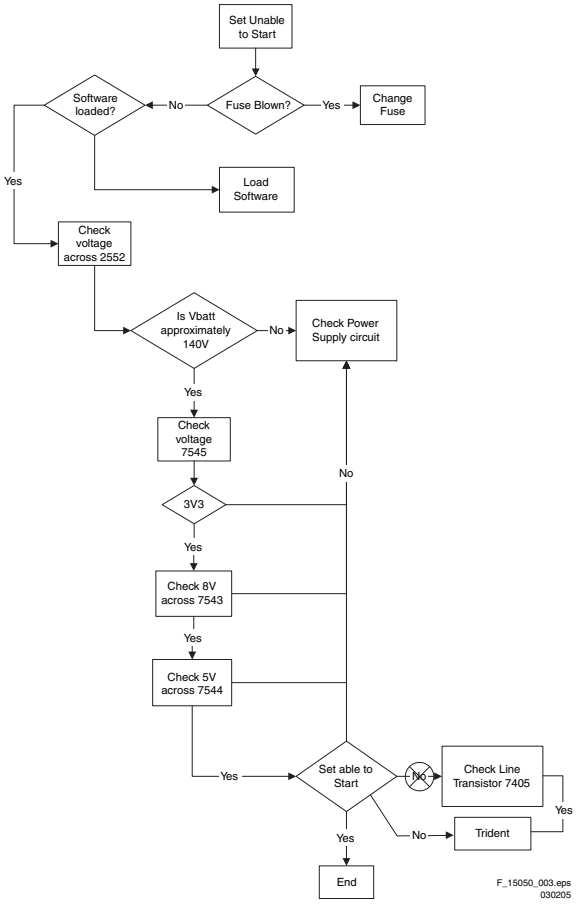


Figure 5-6 Fault finding tree "Set does not start up"

5.8.3 Deflection

One Thin Vertical Line

Quick check:

- Set in protection mode.
- LED blinking with error "3".

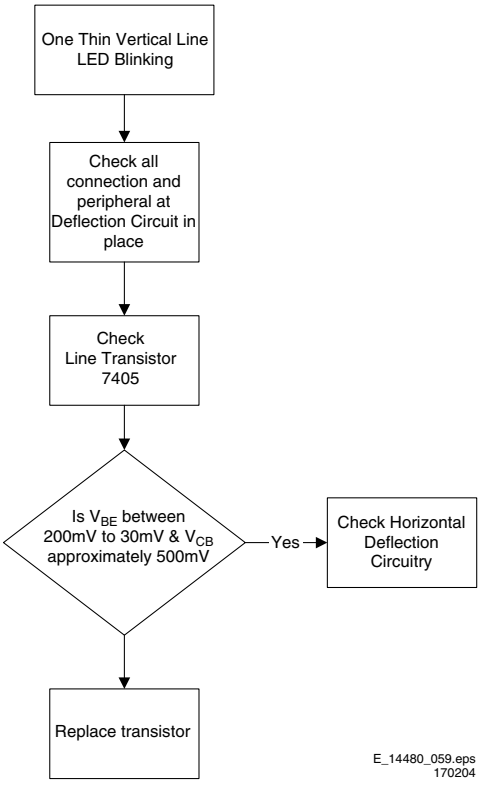


Figure 5-7 Fault finding tree "One thin vertical line"

One Thin Horizontal Line

Quick check:

- Set in protection mode.
- LED blinking with error "2".

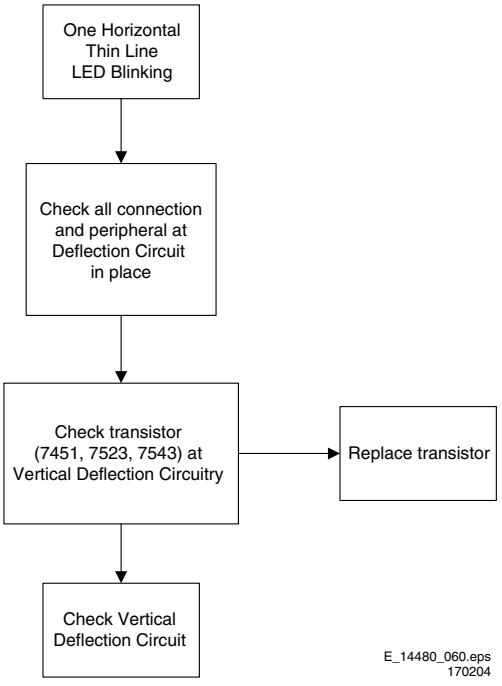


Figure 5-8 Fault finding tree "One thin horizontal line"

Blank Screen

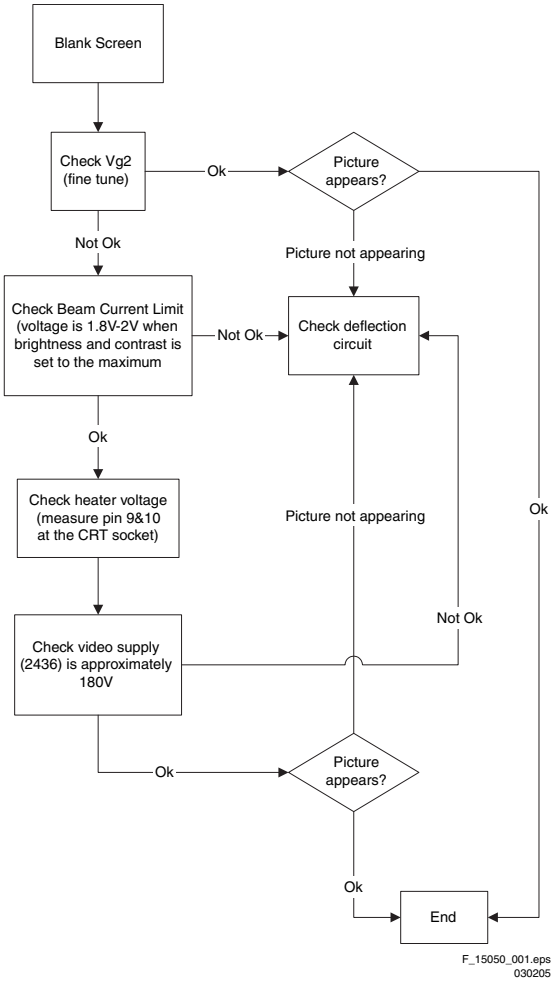


Figure 5-9 Fault finding tree "Blank screen"

5.8.4 Source Selection

Set is not able to go into AV or any missing AV is encountered

E.g. AV1 is available but not able to enter to AV1: Check if the option setting is correct.

Set is able to go to AV, but no audio is heard.

1. Check that continuity of signal is there from the SCART/ Cinch input to the input of the UOCIII.
2. If continuity is there and still no audio, check that option settings are correct.
3. If logic setting is correct and still no audio, proceed to Audio Decoder/Processor troubleshooting section.

Set is able to go into AV but no video is available:

1. Check continuity from AV input to UOCIII depending on the input.
2. If continuity is available and yet no video, proceed to Video Processor troubleshooting section.

5.8.5 Tuner and IF

No Picture

1. Check that the Option settings are correct.
2. If correct, check that supply voltages are there.
3. If supply voltages are present, check whether picture is present in AV.
4. If picture is present in AV, check with the scope the Tuner IF output signal by manual storage to a known channel.
5. If IF output is present, Tuner is working fine. If no IF output, I2C data lines may be open, check continuity of I2C lines. If I2C lines are ok, Tuner may be defect, replaced Tuner.
6. If Tuner IF is present and yet still no picture in RF mode, go to Video Processing troubleshooting section.

No Picture, No Sound

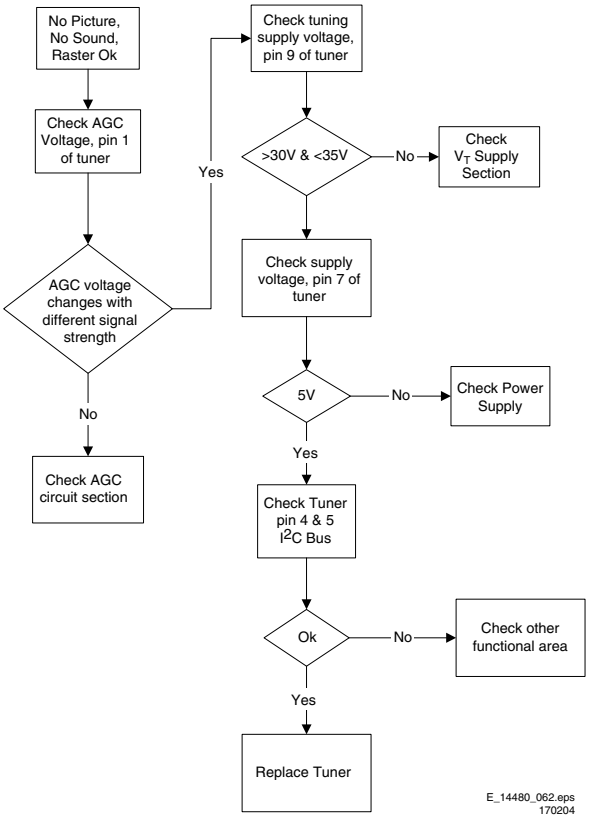


Figure 5-10 Fault finding tree "No picture, no sound"

Picture Ok, No Sound

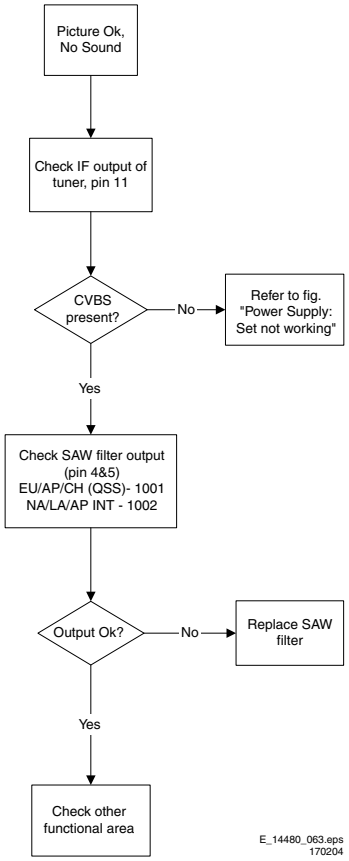


Figure 5-11 Fault finding tree "Picture ok, no sound"

Unable to Perform Tuning

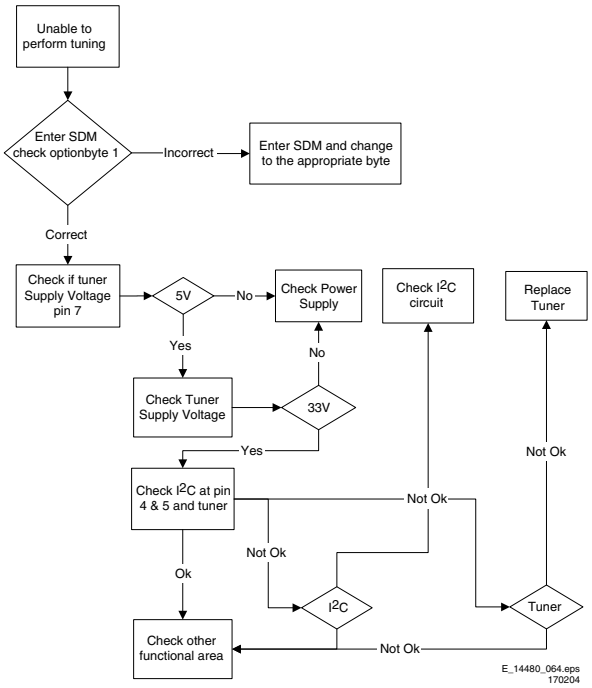


Figure 5-12 Fault finding tree "Unable to perform tuning"

5.8.6 Controller

Below are some guidelines for troubleshooting of the Micro Controller function. Normally Micro Controller should be checked when there is a problem of startup.

1. Check that both +3.3 V_{DC} and +1.8 V_{DC} are present.
2. Check that crystal oscillator is working.
3. Check that Power Good signal is at "high" logic, normal operation.
4. Check that UOCIII is not in standby mode. Pin 15 of UOCIII should be 0 V_{DC}.
5. Make sure H-drive pulse is there. This can be checked at resistor R3239. If H-drive does not exist, remove resistor R3239 to check if there is loading.

Note: When the set shuts down after a few second after power "on", the main cause is that Vg2 not aligned properly, try adjusting Vg2 during the few seconds of power "on".

5.8.7 Video Processing

No Picture

When "no picture in RF", first check if the microprocessor is functioning ok in section "Controller". If that is ok, follow the next steps.
When "no picture in AV", first check if the video source selection is functioning ok in section "Source Selection". If that is ok, follow the next steps.

1. Check that normal operating conditions are met.
2. Check that there is video signal at pin 81. If no video, demodulator part of the UOCIII is faulty, replace with new UOCIII.
3. If video signal is available at pin 81, check pin 56, 57, and 58 for the RGB signal.
4. If signal is not available, try checking the BRIGHTNESS and/or CONTRAST control, and make sure it is not at zero.
5. If still with the correct settings and no video is available, proceed to the CRT/RGB amplifier diagram.

For sets with TDA9178, follow steps below:

1. Put Option Byte 2 bit 4 to "0"; if video signal is not available, then check fault finding section "Controller", Section "Source Selection", and steps above.
2. If video is available but not correct, put Option Byte 2 bit 4 to "1", then check if LTI panel is present. If not, put LTI panel in the main chassis (connector 1221).
3. If LTI panel is in main chassis, check cable between LTI panel and main chassis (position is 1206). If it is connected, then the LTI panel is faulty, replace it.

5.8.8 Audio Processing

No Sound

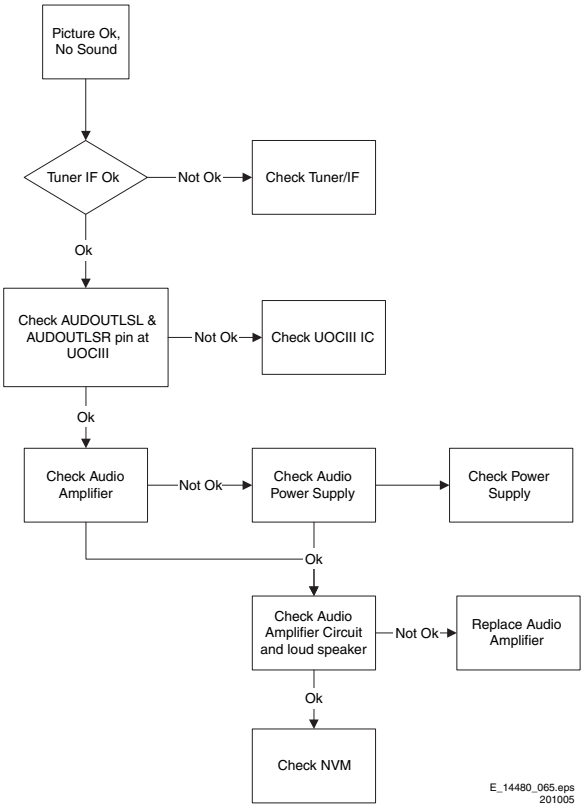


Figure 5-13 Fault finding tree "No sound"

No RF Audio for QSS/Inter-Carrier Stereo Sets.

1. Check pin 99 and 100 for SIF signal (for QSS) or pin 104 and 105 for video with SIF (for Inter-Carrier)
2. If signal is not present, check for the QSS/FMI bit settings. Check also the NVM data.
3. If signals are present and still no audio, check the audio supply voltage +8V are present.
4. If still no audio signal at UOCIII output, the UOCIII is faulty.

No AV Audio.

1. Check troubleshooting methods in section "Source Selection".
2. Check the output of the UOCIII to see if there is signal available. If no, check the normal operating condition and also the NVM data.
3. If still no audio signal at UOCIII output, the UOCIII is faulty.

Note: If there is audio signal at UOCIII output and no audio at loudspeaker, proceed to Audio Amplifier troubleshooting methods.

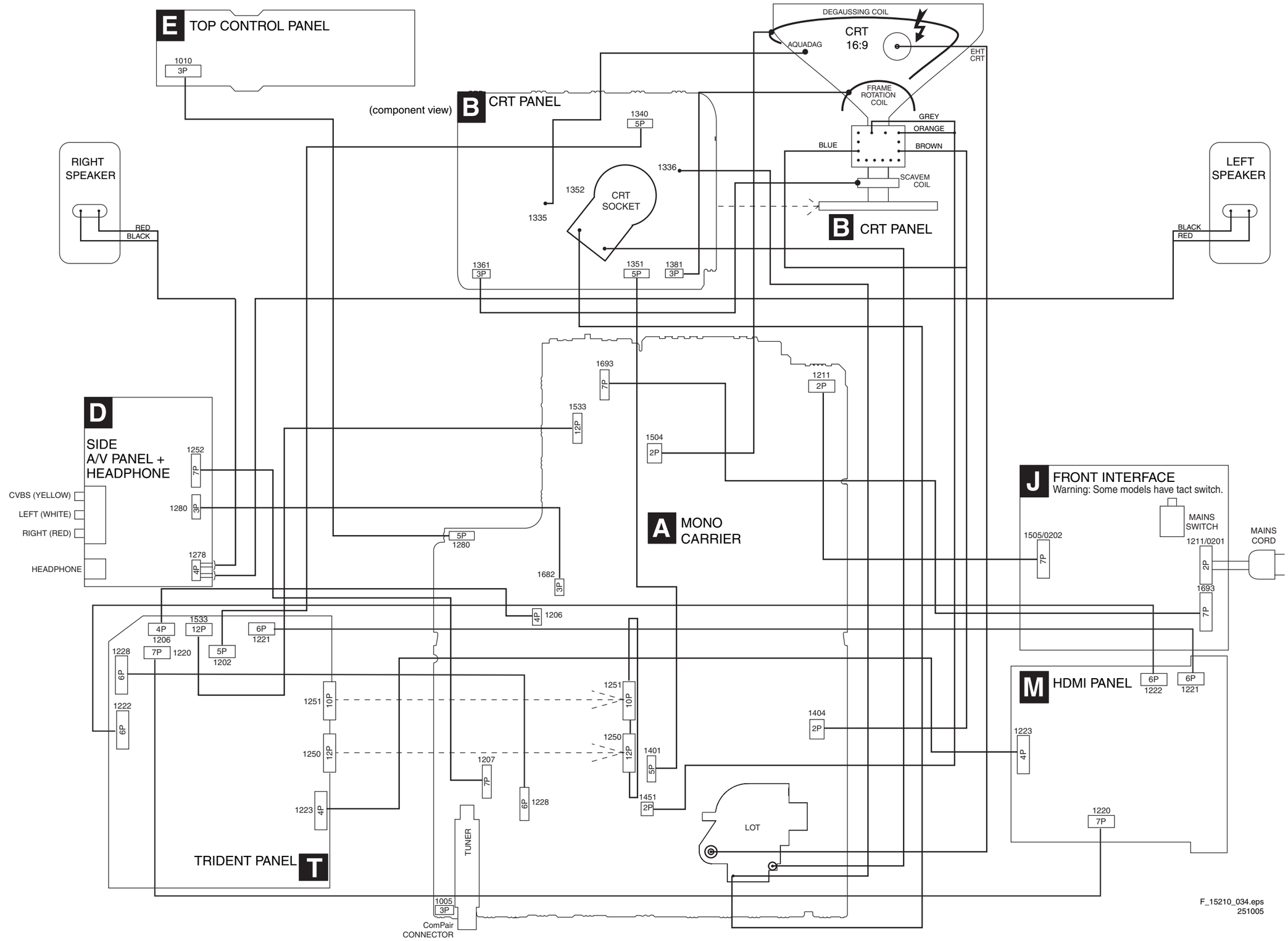
5.8.9 Audio Amplifier

No RF as well as AV Audio at the Loudspeaker:

1. Check that the normal operation condition of the amplifier is met.
2. If normal operation conditions are met, check the continuity from UOCIII output to input of the amplifier.
3. If continuity is there and still no audio, check speaker wire connections. If still no audio, amplifier IC might be faulty.

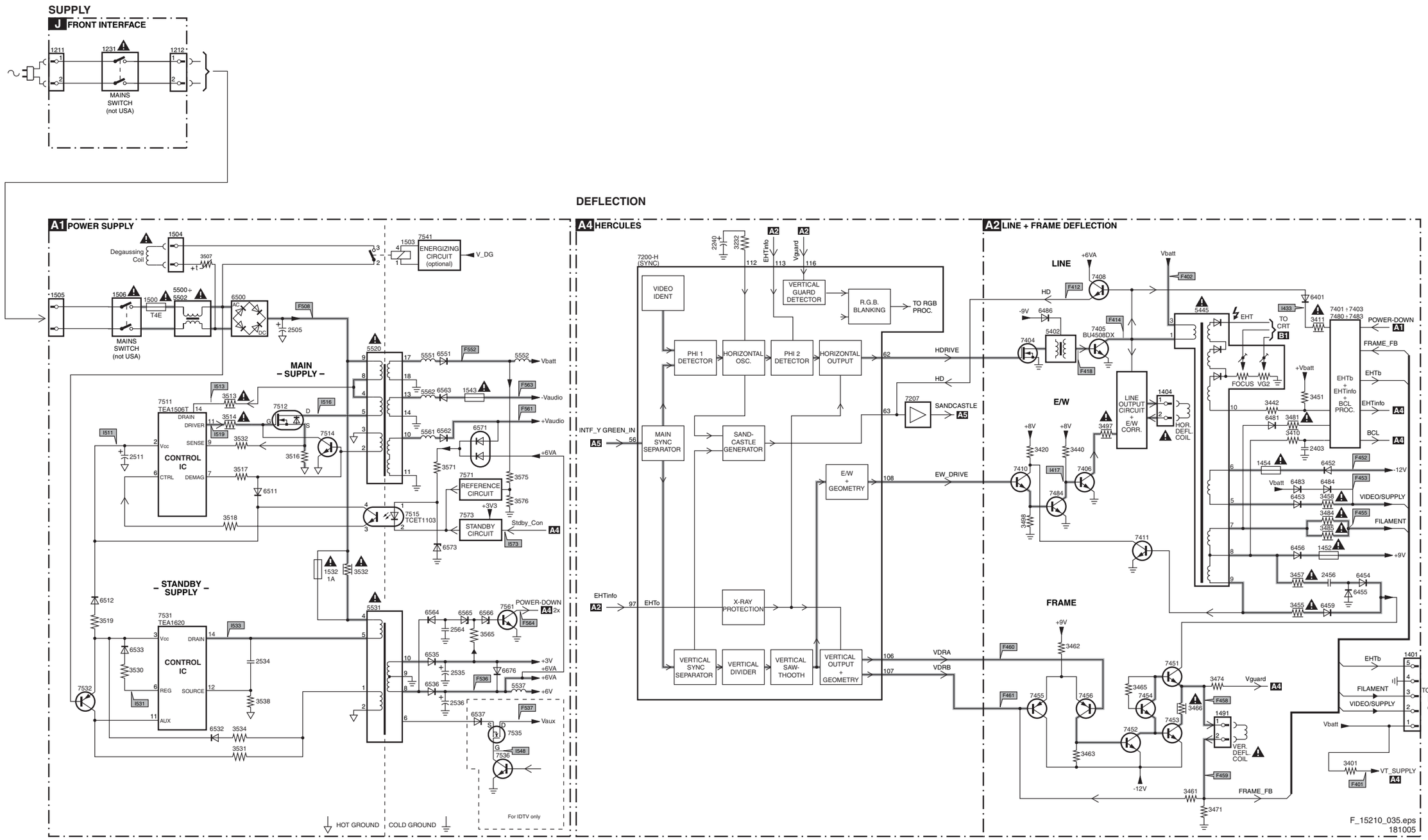
6. Block Diagrams, Testpoint Overviews, and Waveforms

Wiring Diagram



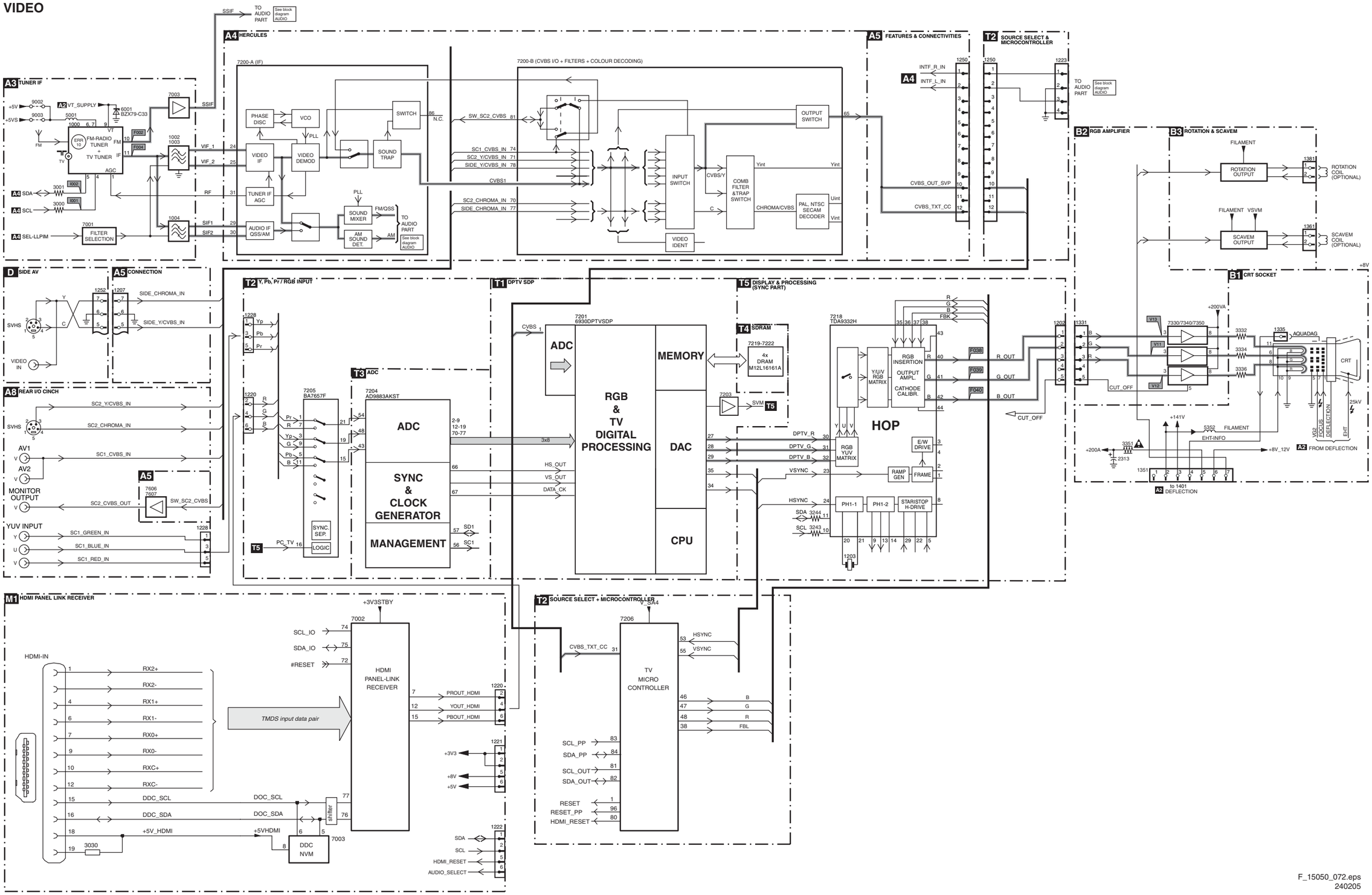
Block Diagram Supply and Deflection

SUPPLY AND DEFLECTION



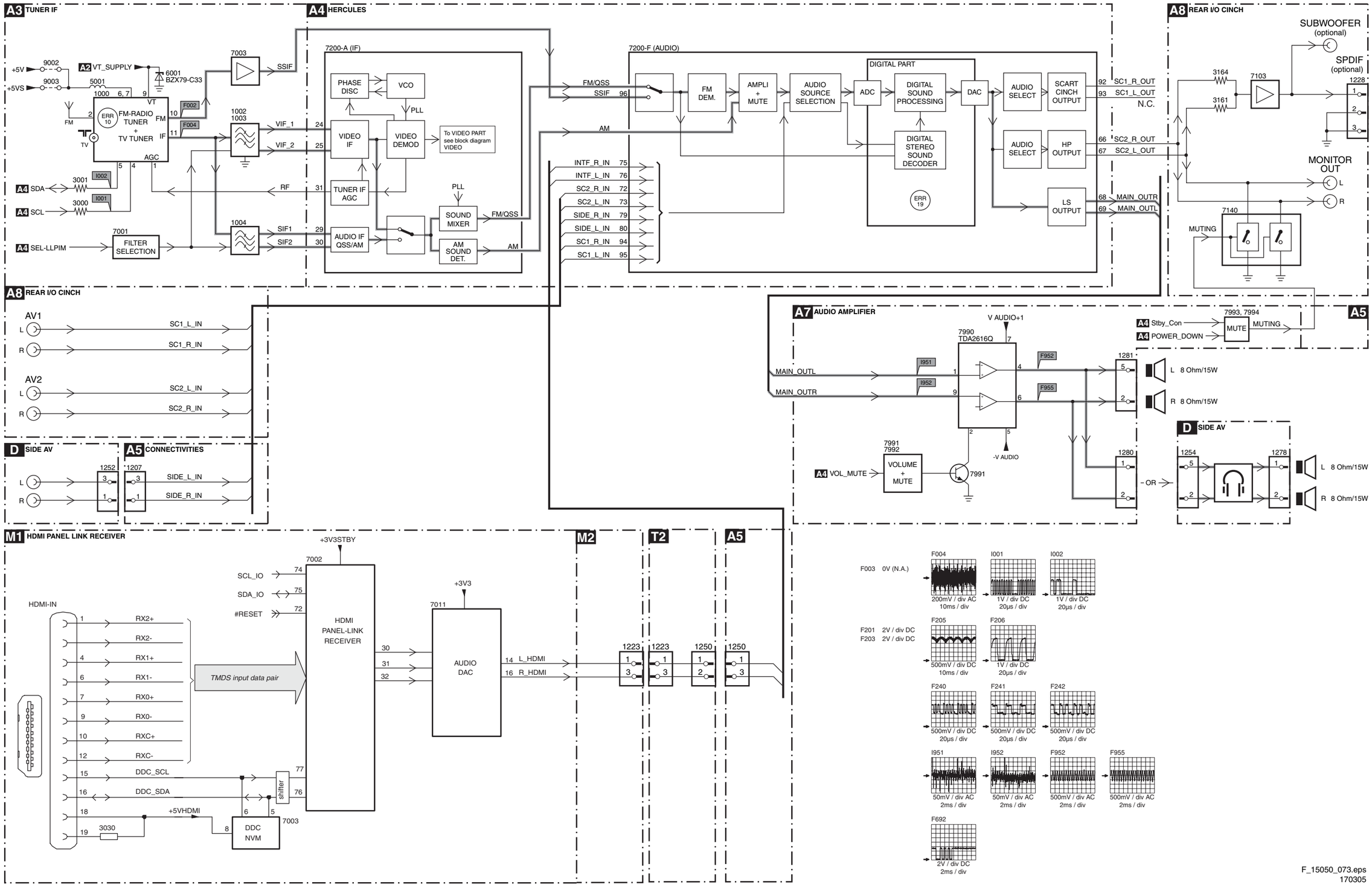
Block Diagram Video

VIDEO



Block Diagram Audio

AUDIO



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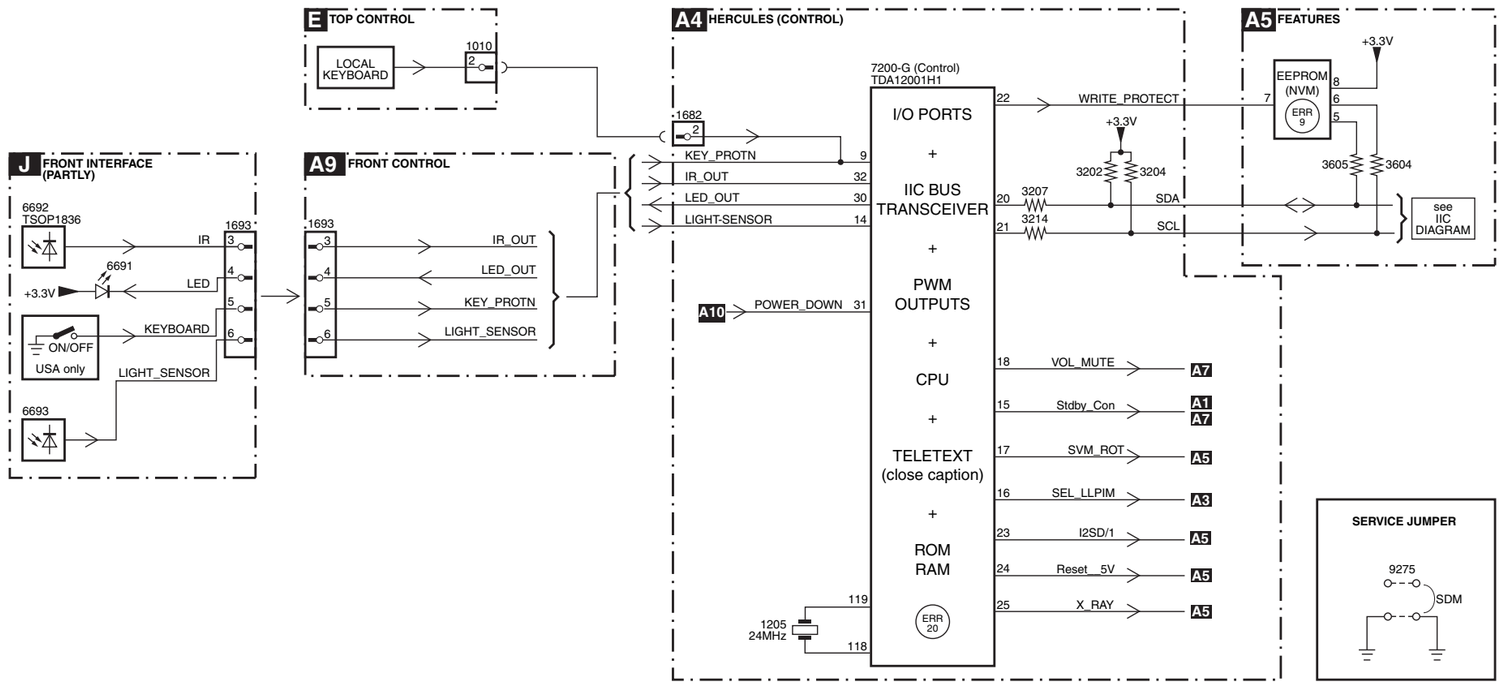
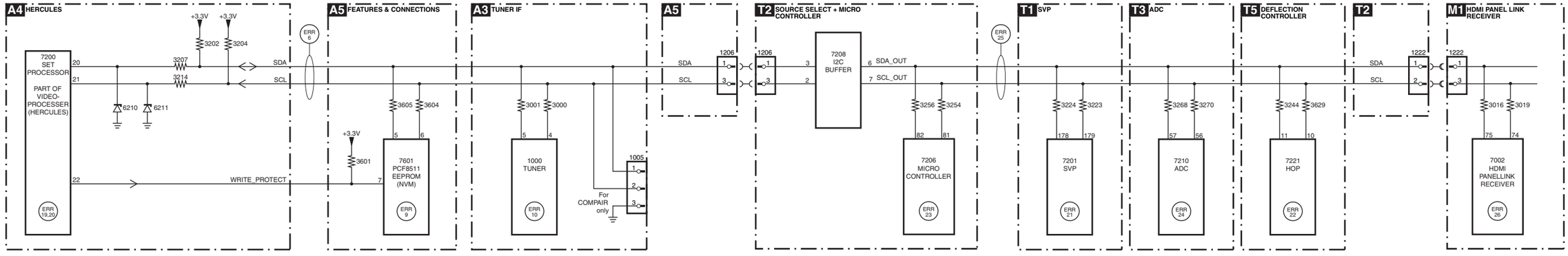
170305

Block Diagram Control & I2C Overview

CONTROL



I2C BUS INTERCONNECTION DIAGRAM



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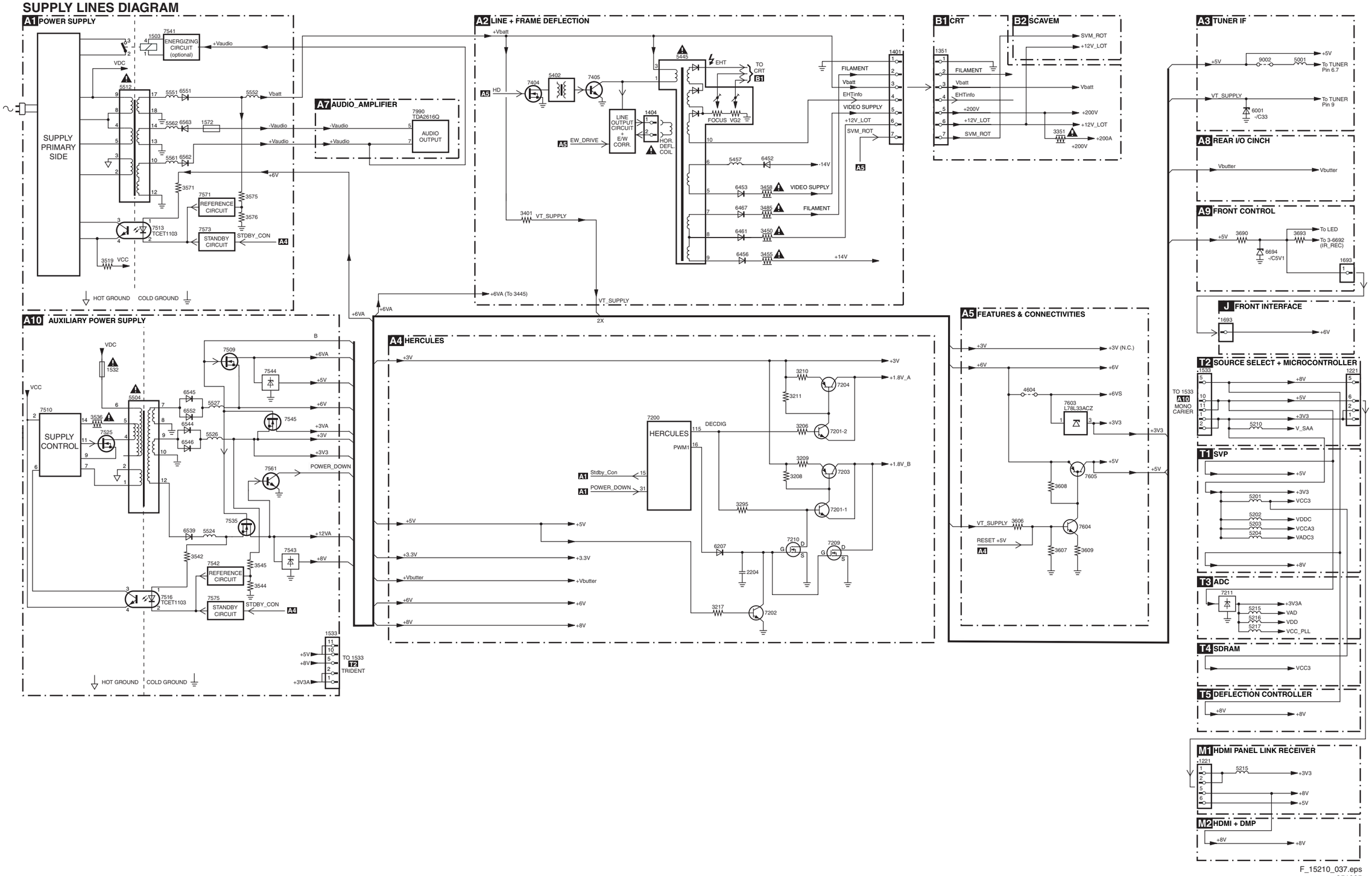
Supply Lines Overview

SUPPLY LINES DIAGRAM



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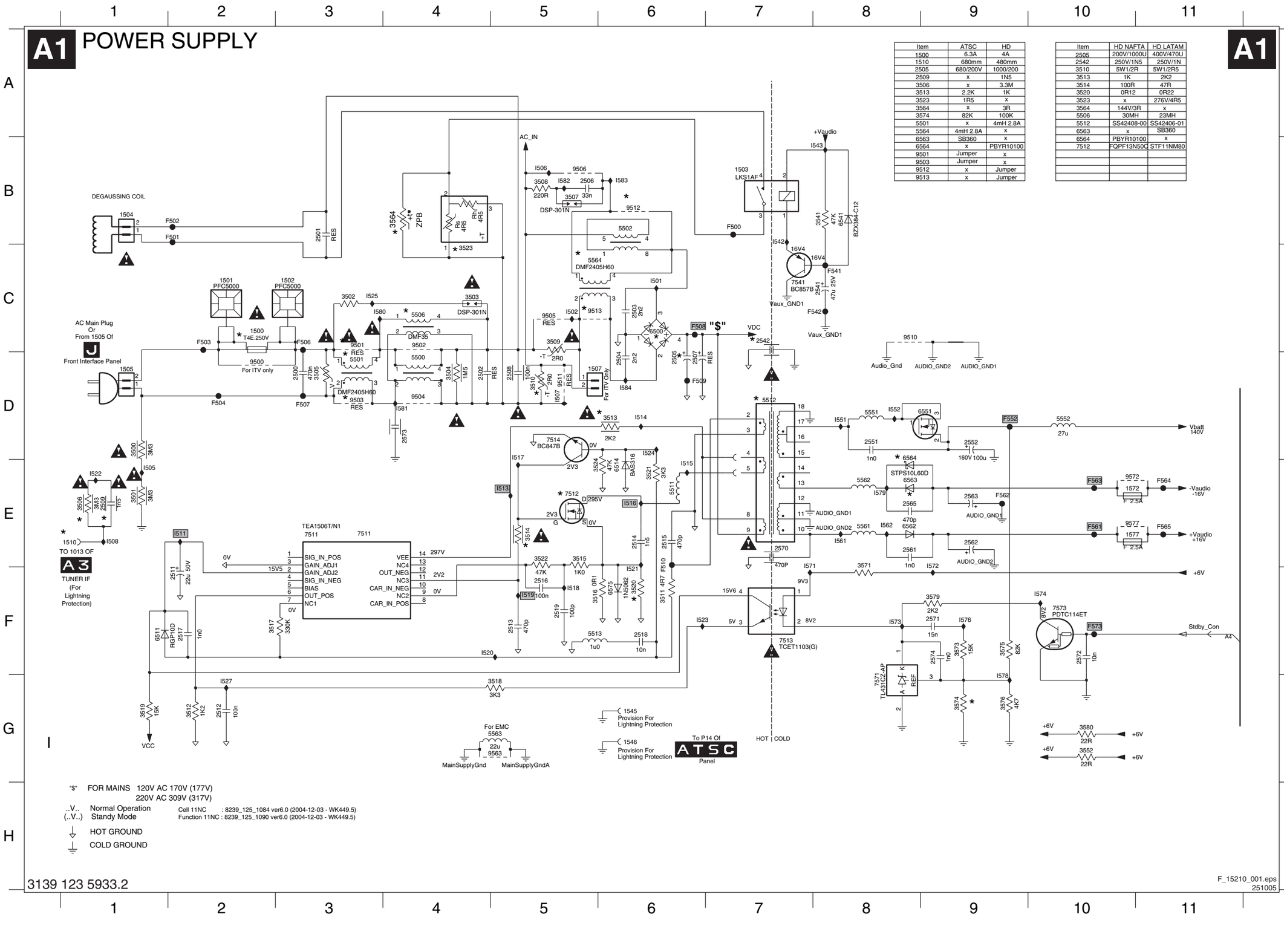
7. Circuit Diagrams and PWB Layouts

Mono Carrier: Power Supply

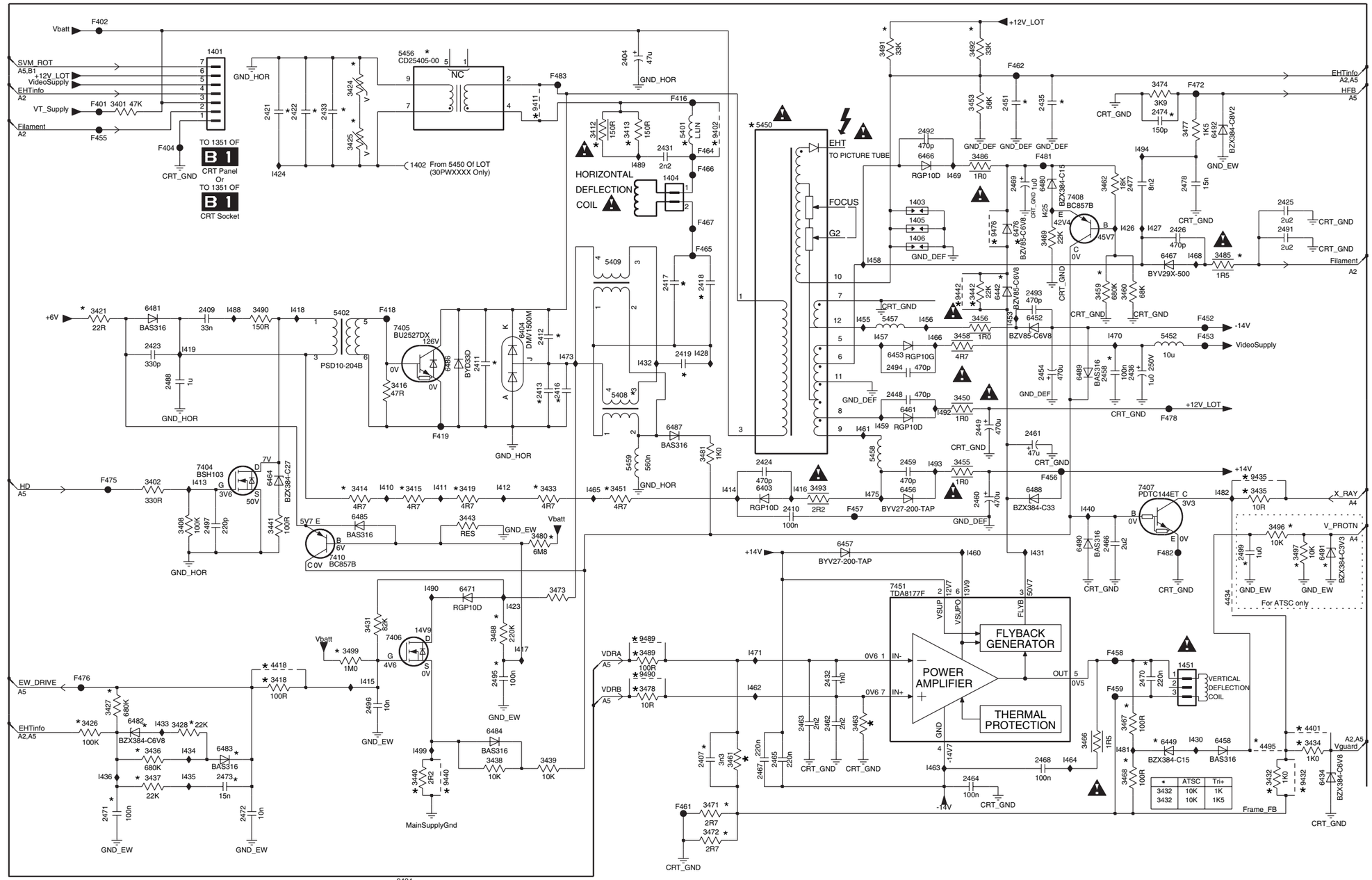


Item	ATSC	HD
1500	6.3A	4A
1510	680mm	480mm
2505	680/200V	1000/200
2509	x	1N5
3506	x	3.3M
3513	2.2K	1K
3523	1R5	x
3564	x	3R
3574	82K	100K
5501	x	4mH 2.8A
5564	4mH 2.8A	x
6563	SB360	x
6564	x	PBYR10100
9501	Jumper	x
9503	Jumper	x
9512	x	Jumper
9513	x	Jumper

Item	HD NAFTA	HD LATAM
2505	200V/1000U	400V/470U
2542	250V/1N5	250V/1N
3510	5W1/2R	5W1/2R5
3513	1K	2K2
3514	100R	47R
3520	0R12	0R22
3523	x	276V/4R5
3564	144V/3R	x
5506	30MH	23MH
5512	SS42408-00	SS42406-01
6563	x	SB360
6564	PBYR10100	x
7512	FQPF13N50C	STF11NM80

Mono Carrier: Deflection

A2 LINE + FRAME DEFLECTION



*	ATSC	Tri+
3432	10K	1K
3432	10K	1K5

FAMILY BOARD 11NC : 3139_123_5932
MAIN CHASSIS 11NC : 3139_123_5933

Cell 11NC : 8239_125_1084 ver6.0 (2004-12-03 - WK449.5)
Function 11NC : 8239_125_1091 ver6.0 (2004-12-03 - WK449.5)

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1401 A2	
1402 B4	
1403 B8	
1404 B6	
1405 C8	
1406 C8	
1451 F10	
2404 A6	
2407 G6	
2409 C2	
2410 E7	
2411 D4	
2412 D5	
2413 D5	
2416 D5	
2417 C6	
2418 C6	
2419 D6	
2421 B3	
2422 B3	
2423 D2	
2424 E7	
2425 B11	
2426 C10	
2431 B6	
2432 F7	
2433 B3	
2435 B9	
2436 D10	
2448 D8	
2449 D8	
2451 B9	
2454 D9	
2458 D9	
2459 E8	
2460 E8	
2461 D9	
2462 G7	
2463 G7	
2464 G8	
2465 G7	
2466 E9	
2467 G7	
2468 G9	
2469 B9	
2470 F10	
2471 G1	
2472 G3	
2473 G2	
2474 B10	
2477 B10	
2478 B10	
2488 D2	
2491 C11	
2492 B8	
2493 C9	
2494 D8	
2495 F5	
2496 F4	
2497 E2	
2499 E10	
3401 B2	
3402 E2	
3408 E2	
3412 B5	
3413 B6	
3414 E3	
3415 E4	
3416 D4	
3418 F3	
3419 E4	
3421 C1	
3424 A3	
3425 B3	
3426 G1	
3427 G1	
3428 G2	
3431 F3	
3432 G11	
3433 E5	
3434 G11	
3435 E11	
3436 G2	
3437 G2	
3438 G5	
3439 G5	
3440 G4	
3441 E3	
3442 C8	
3443 E4	
3450 D8	
3451 E6	
3453 B8	
3455 E8	
3456 C8	
3458 D8	
3459 C9	
3460 C10	
3461 G6	
3462 B9	
3463 G7	
3466 G9	
3467 G10	
3468 G10	
3469 C9	
3471 G6	
3472 G6	
3473 F5	
3474 B10	
3477 B10	
3478 F6	
3480 E5	
3481 D6	
3485 C10	
3486 B8	
3488 F4	
3489 F6	
3490 C3	
3491 A8	
3492 A8	
3493 E7	
3496 E11	
3497 E11	
3499 F3	
4401 G11	
4418 F3	
4434 F10	
4495 G11	
5401 B6	
5402 C3	
5408 D6	
5409 C5	
5450 B7	
5452 D10	
5456 A4	
5457 C8	
5458 D8	
5459 E6	
6403 E7	
6404 C5	
6434 G11	
6442 C9	
6449 G10	
6452 C9	
6453 D8	
6456 E8	
6457 E7	
6458 G10	
6461 D8	
6464 E3	
6466 B8	
6467 C10	
6471 F4	
6476 C9	
6480 B9	
6481 C2	
6482 G2	
6483 G2	
6484 G5	
6485 E3	
6486 D4	
6487 D6	
6488 E9	
6489 D9	
6490 E9	
6491 E11	
6492 B10	
7404 E2	
7405 C4	
7406 F4	
7407 E10	
7408 B9	
7410 E3	
7451 F8	
9402 B6	
9411 B5	
9432 G11	
9435 E11	
9440 G4	
9442 C8	
9476 C9	
9484 H4	
9489 F6	
9490 F6	
F401 B1	
F402 A1	
F404 B2	
F416 B6	
F418 C4	
F419 D4	
F452 C10	
F453 D10	
F455 B1	
F456 E9	
F457 E7	
F458 F9	
F459 F9	
F461 G6	
F462 A9	
F464 B6	
F465 C6	
F466 B6	
F467 C6	
F472 B10	
F475 E1	
F476 F1	
F478 D10	
F481 B9	
F482 E10	
F483 A5	
I410 E4	
I411 E4	
I412 E5	
I413 E2	
I414 E6	
I415 F4	
I416 E7	
I417 F5	
I418 C3	
I419 D2	
I423 F5	
I424 B3	
I425 C9	
I426 C10	
I427 C10	
I428 D6	
I430 G10	
I431 E9	
I432 D6	
I433 G2	
I434 G2	
I435 G2	
I436 G1	
I440 E9	
I453 C9	
I455 C7	
I456 C8	
I457 D8	
I458 C8	
I459 D8	
I460 E8	
I461 D7	
I462 F7	
I463 G8	
I464 G9	
I465 E5	
I466 D8	
I468 C10	
I469 B8	
I470 C9	
I471 F7	
I473 D5	
I475 E8	
I481 G10	
I482 E10	
I488 C2	
I489 B6	
I490 F4	
I492 D8	
I493 E8	
I494 B10	
I499 G4	

Mono Carrier: Diversity Table Deflection

DIVERSITY TABLE FOR A2 LINE + FRAME DEFLECTION

Item No	27RF HD	30WSRF-HD	30WS ATSC	27RF ATSC	32RF ATSC	26WS ATSC	32WR HD	29RF HD	34RF HD	28PW HD
2407	---	---	50V 330P	50V 330P	50V 330P	50V 330P	---	---	---	---
2411	2KV 820P	2KV 220P	2KV 220P	2KV 820P	2KV 330P	2KV 1N	2KV 470P	2KV 1N5	2KV 470P	2KV 1N
2412	1K6 12N	1K6 12N	1K6 12N	1K6 12N	1K6 12N	1K6 12N	1K6 12N	1K6 12N	1K6 10N	1K6 12N
2413	630V 27N	630V 27N	630V 33N	630V 27N	630V 27N	630V 27N	630V 27N	630V 27N	630V 27N	400V 33N
2416	---	---	---	---	---	---	---	---	---	---
2417	---	---	---	---	---	---	---	---	---	---
2418	250V 390N	250V 330N	250V 330N	250V 390N	250V 330N	250V 330N	250V 360N	250V 430N	250V 330N	250V 360N
2419	250V 560N	250V 1U2	250V 1U2	250V 560N	250V 560N	250V 560N	250V 1U2	250V 560N	250V 560N	250V 560N
2421	---	2KV 220P	2KV 220P	---	---	---	2KV 220P	---	---	---
2422	---	2KV 220P	2KV 220P	---	---	---	2KV 220P	---	---	---
2433	---	---	---	---	---	---	---	---	---	---
2435	---	---	---	---	---	---	---	---	---	---
2451	100V 220N	100V 100N	250V 68N	250V 68N	250V 68N	250V 68N	100V 100N	100V 220N	100V 220N	250V 68N
2458	250V 100N	250V 100N	---	---	---	---	250V 100N	250V 100N	250V 100N	---
2470	100V 100N	250V 47N	100V 100N	100V 100N	100V 100N	100V 100N	---	---	---	---
2471	16V 100N	16V 100N	---	---	---	---	16V 100N	16V 100N	16V 100N	16V 100N
2473	50V 15N	50V 15N	---	---	---	---	50V 15N	50V 15N	50V 15N	50V 15N
2474	50V 150P	50V 150P	---	---	---	---	50V 150P	50V 150P	50V 150P	50V 150P
2495	50V 100N	50V 100N	---	---	---	---	50V 100N	50V 100N	50V 100N	50V 100N
2499	---	---	16V 2U2	16V 2U2	16V 2U2	16V 2U2	---	---	---	---
3412	---	---	---	---	---	---	---	---	---	---
3413	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K
3414	4R7	4R7	4R7	4R7	6R8	4R7	4R7	4R7	6R8	4R7
3415	4R7	4R7	4R7	4R7	6R8	4R7	4R7	4R7	6R8	4R7
3418	100R	100R	---	---	---	---	100R	100R	100R	100R
3419	4R7	4R7	4R7	4R7	6R8	4R7	4R7	6R8	6R8	4R7
3421	22R	22R	4R7	4R7	4R7	4R7	47R	47R	47R	47R
3424	---	1mA612V	1mA612V	---	---	---	1mA612V	---	---	---
3425	---	1mA612V	1mA612V	---	---	---	1mA612V	---	---	---
3426	100K	100K	---	---	---	---	100K	100K	100K	100K
3427	680K	680K	---	---	---	---	680K	680K	680K	680K
3428	22K	22K	---	---	---	---	22K	22K	22K	22K
3432	---	---	---	---	---	---	---	---	---	---
3433	4R7	4R7	4R7	4R7	10R	4R7	4R7	6R8	10R	4R7
3434	5K6	3K9	---	---	---	---	---	---	---	---
3435	---	---	---	---	---	---	---	---	---	---
3436	680K	680K	---	---	---	---	680K	680K	680K	680K
3437	22K	22K	---	---	---	---	22K	22K	22K	22K
3440	2R2	2R2	2R2	2R2	2R2	2R2	2R2	2R2	2R2	2R2
3442	---	---	---	---	---	---	---	---	---	---
3451	4R7	4R7	4R7	4R7	10R	4R7	4R7	6R8	10R	4R7
3459	820K	470K	470K	820K	680K	820K	---	---	---	---
3461	1K5	1K5	27K	27K	27K	27K	---	---	---	---
3463	1K5	1K5	3K3	3K3	3K3	3K3	---	---	---	---
3467	220R	220R	100R	100R	100R	100R	---	---	---	---
3468	220R	220R	100R	100R	100R	100R	---	---	---	---
3471	1R	2R2	2R2	1R	2R2	2R2	---	---	---	---
3472	1R2	1R5	1R5	1R2	1R2	1R2	---	---	---	---
3478	100R	100R	33K	33K	33K	33K	---	---	---	---
3480	4M7	4M7	---	---	---	---	4M7	4M7	---	---
3485	0R47	0R47	0R47	0R47	1R	0R47	0R47	0R47	1R	0R47
3488	220K	220K	---	---	---	---	220K	220K		
3489	100R	100R	10K	10K	10K	10K	---	---	---	---
3491	12K	12K	8K2	10K	8K2	10K	12K	12K	12K	12K
3492	18K	18K	12K	22K	47K	22K	18K	18K	18K	18K
3496	---	---	100K	100K	100K	100K	---	---	---	---
3497	---	---	56K	56K	56K	56K	---	---	---	---
3499	1M	1M	470K	470K	470K	470K	1M	1M	1M	1M
4401	---	---	JMP	JMP	JMP	JMP	---	---	---	---
4418	---	---	JMP	JMP	JMP	JMP	---	---	---	---
4495	JMP	JMP	---	---	---	---	---	---	---	---
5401	3U9	3U9	3U9	3U9	5U5	5U5	5UH0	4UH7	3UH9	4UH7
5408	W7132-004	W7131-001	W7131-001	W7132-004	W7132-004	W7132-004	W7131-003B	W7131-004	W7131-004	W7131-004
5450	JF0101-85039	JF0101-85038	JF0101-85038	JF0101-85039	JF0101-85040	JF0101-85039	JF0101-85039	JF0101-85040	JF0101-85040	JF0101-85040
5456	---	SD20417-07	SD20417-07	---	---	---	SD20417-07	---	---	---
6442	---	---	BZV85-C10	BZV85-C10	BZV85-C10	BZV85-C10	---	---	BZV85-C10	---
6449	BZX384-C15	BZX384-C15	BZX384-C12	BZX384-C12	BZX384-C12	BZX384-C12	---	---	---	---
6476	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8	BZV85-C6V8
6482	BZX384-C6V8	BZX384-C6V8	---	---	---	---	BZX384-C6V8	BZX384-C6V8	BZX384-C6V8	BZX384-C6V8
6483	BAS316	BAS316	---	---	---	---	BAS316	BAS316	BAS316	BAS316
6491	---	---	BZX384-C3V3	BZX384-C3V3	BZX384-C3V3	BZX384-C3V3	---	---	---	---
9402	---	---	---	---	---	---	---	---	---	---
9411	JMP	---	---	JMP	JMP	JMP	---	JMP	JMP	JMP
9432	---	---	JMP	JMP	JMP	JMP	---	---	---	---
9435	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP
9440	---	---	---	---	---	---	---	---	---	---
9442	JMP	JMP	---	---	---	---	JMP	JMP	---	JMP
9476	---	---	---	---	---	---	---	---	---	---
9489	---	---	---	---	---	---	---	---	---	---
9490	---	---	---	---	---	---	---	---	---	---

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Mono Carrier: Diversity Table Hercules

DIVERSITY TABLE FOR A4 HERCULES

	HD set	ATSC set
2251	150n	10n
2293	1n	470p
2294	5n6	
2295	1n	
3238		10K
3246		100R
3252		10K
3262		100R
3265		100R
3266		100R
3279		4K7
3280		4K7
3282	4K7	
3291		4K7
4201		0R
4299		0R
5214	100MHz, 120R	

Region: NAFTA	HD		L05 ATSC	
Size	27V RF	30WSRF	27V RF	27V RF
2251	50V 150N	50V 150N	50V 10N	50V 10N
2293	25V 1N	25V 1N	50V 470N	50V 470N

Region	NAFTA			
Size	26WSRF-ATSC	30WSRF-ATSC	27VRF-ATSC	32VRF-ATSC
3246	100R	100R	100R	100R
3255	---	---	---	---
3256	---	---	---	---
9601	---	---	---	---
9602	---	---	---	---

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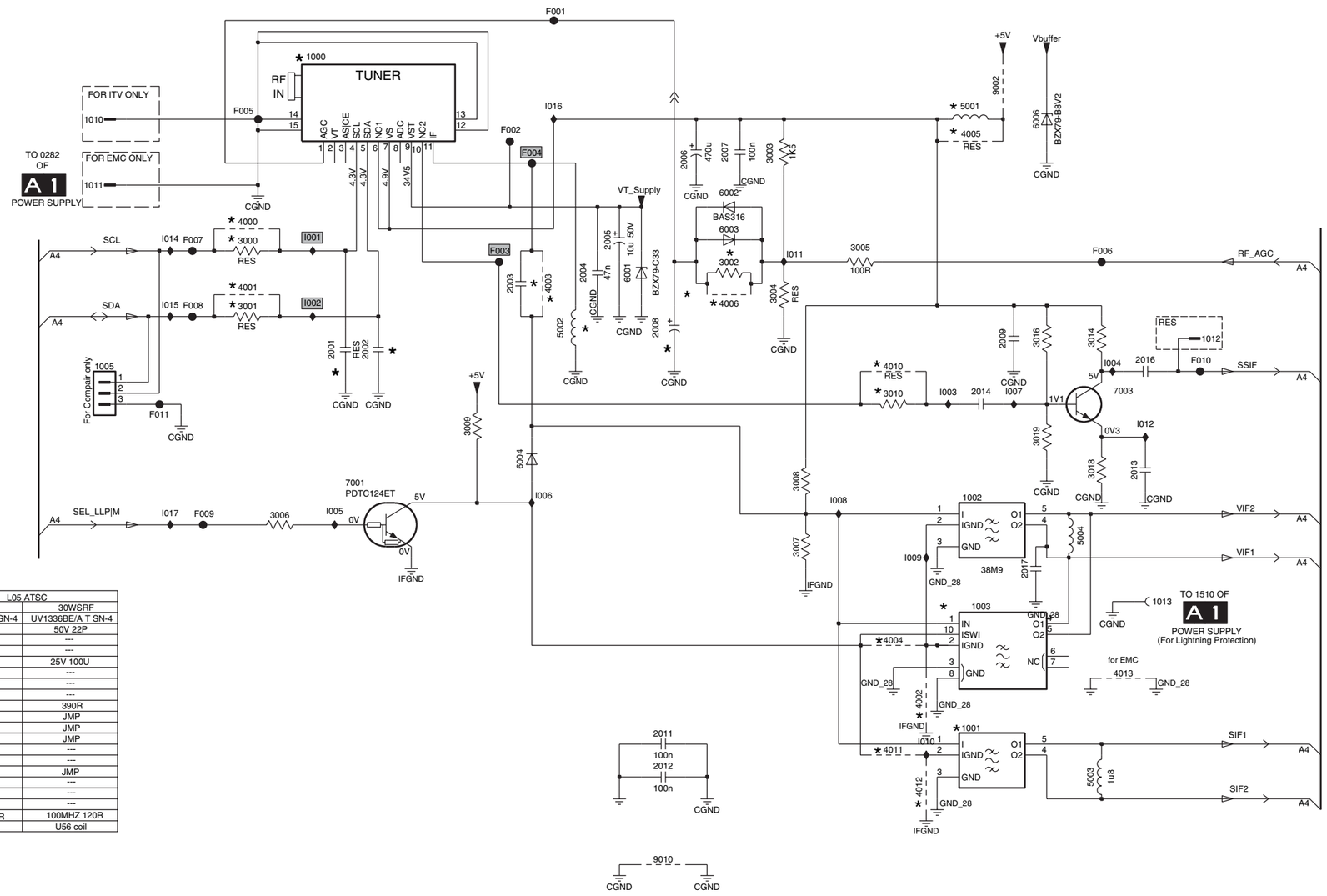
Mono Carrier: Tuner IF

A3 TUNER IF



ITEM NO	HD		L05 ATSC	
SIZE	27VRF	30WSRF	27VRF	30WSRF
1000	V+U PLL F MN	V+U PLL F MN	UV1336BE/A T SN-4	UV1336BE/A T SN-4
2001	50V 22P	50V 22P	50V 22P	50V 22P
2002	---	---	---	---
2003	---	---	---	---
2008	25V 100U	25V 100U	25V 100U	25V 100U
3000	---	---	---	---
3001	---	---	---	---
3002	---	---	---	---
3010	390R	390R	390R	390R
4000	JMP	JMP	JMP	JMP
4001	JMP	JMP	JMP	JMP
4003	JMP	JMP	JMP	JMP
4004	---	---	---	---
4005	---	---	---	---
4006	JMP	JMP	JMP	JMP
4010	---	---	---	---
4011	---	---	---	---
4012	---	---	---	---
5001	100MHZ 120R	100MHZ 120R	100MHZ 120R	100MHZ 120R
5002	U39 coil	U39 coil	U56 coil	U56 coil

FAMILY BOARD 11 NC : 3139_123_5932
MAIN CHASSIS 11 NC : 3139_123_5933

Cell 11NC : 8239_125_1092 ver6.0 (2004-12-03 - WK449.5)
Function 11NC : 8239_125_1085 ver6.0 (2004-12-03 - WK449.5)

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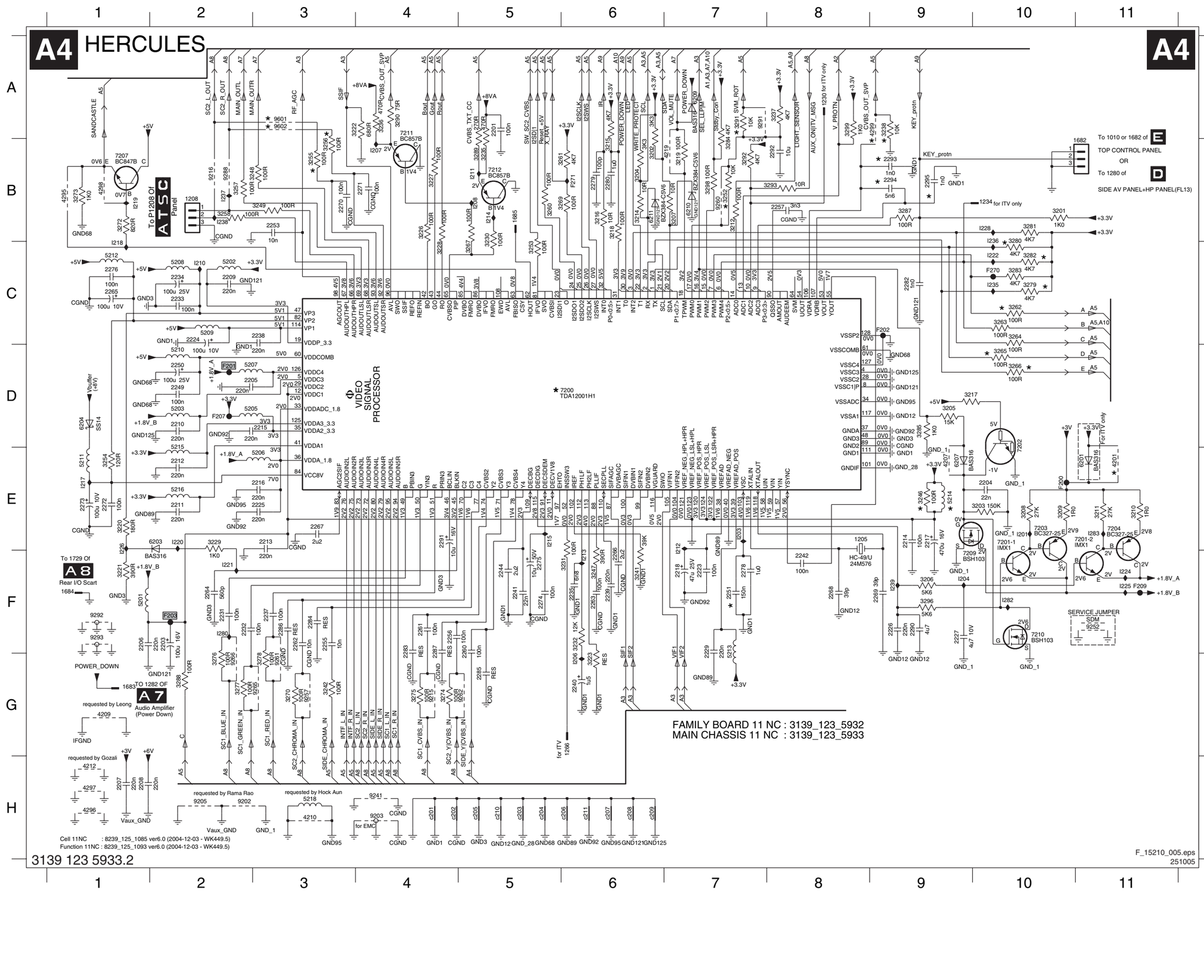
Mono Carrier: Hercules

A4 HERCULES



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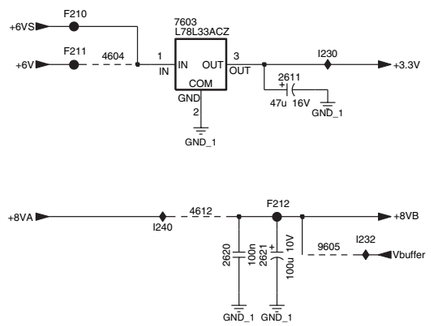
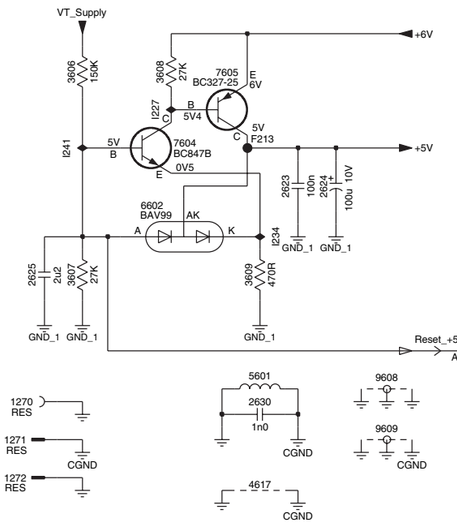
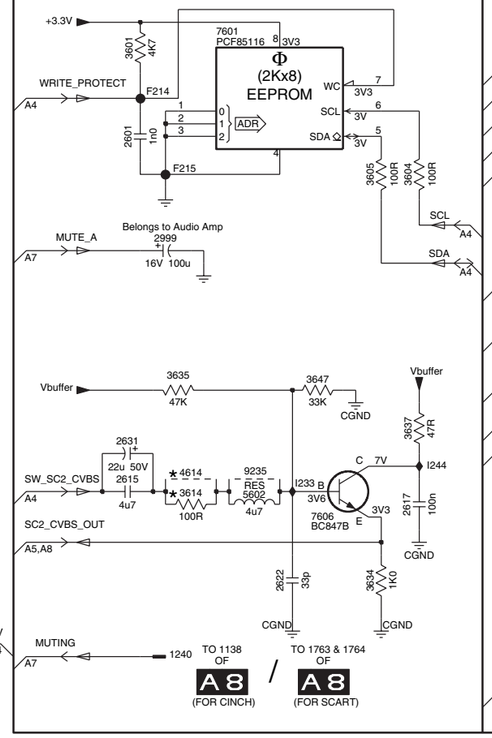
1205 E8	3216 B6	6209 A7
1208 B2	3217 D9	6210 B7
1230 A8	3218 B6	6211 B6
1234 B10	3219 B7	7200 D6
1266 G6	3220 E1	7201-1 E10
1682 B11	3221 F1	7201-2 E10
1683 G1	3222 A4	7202 D10
1684 F1	3223 G6	7203 E10
1685 B5	3226 B4	7204 E11
2201 A5	3227 B4	7207 B1
2203 F2	3228 C4	7209 F9
2204 E10	3229 E2	7210 F10
2205 D2	3230 B5	7211 A4
2206 F1	3231 F6	7212 B5
2207 H1	3232 F6	9202 H2
2208 H1	3235 B5	9203 H4
2209 C2	3236 A4	9205 H2
2210 D2	3237 A8	9215 G4
2211 E2	3238 A9	9216 B2
2212 E2	3241 F6	9241 H4
2213 E3	3242 G3	9257 G3
2214 E9	3246 E9	9260 B7
2215 D3	3247 F6	9261 G3
2216 E3	3248 B3	9262 G5
2217 E9	3249 B3	9265 G3
2218 F7	3252 B7	9266 G2
2223 F7	3253 C5	9288 B2
2224 C2	3254 E1	9291 A7
2225 E3	3255 B3	9292 F1
2226 F9	3256 B3	9293 F1
2227 F9	3257 B2	9601 A3
2229 F7	3258 B2	9602 A3
2231 F2	3260 B5	F200 E10
2232 F2	3261 B6	F201 D2
2233 C2	3262 C10	F202 C9
2234 C2	3263 C10	F203 F2
2235 F6	3264 C10	F207 D2
2237 F3	3265 D10	F209 F11
2238 C3	3266 D10	F270 C10
2239 F6	3267 C5	F271 B6
2240 G6	3269 B6	I201 E10
2241 F5	3270 G3	I203 E7
2242 F8	3272 B1	I204 F9
2244 F5	3273 B1	I206 G6
2249 D2	3274 G4	I207 B4
2250 D2	3275 G4	I208 B5
2251 F7	3276 G2	I210 C2
2253 B3	3277 G2	I211 B5
2255 F3	3278 G3	I212 E7
2256 F4	3279 C10	I213 F6
2257 B8	3280 C10	I214 B5
2260 F5	3281 B10	I215 E5
2261 F4	3282 C10	I217 E1
2262 F3	3283 C10	I218 C1
2263 F6	3284 B7	I219 B1
2264 F2	3285 D9	I220 E2
2265 C1	3287 B9	I221 F2
2266 F6	3288 G2	I222 C10
2267 E3	3289 B5	I224 F11
2268 F8	3290 A4	I225 F11
2269 F9	3291 A7	I226 E1
2270 B3	3292 B7	I228 B10
2271 B4	3293 B8	I235 C10
2272 E1	3296 F9	I236 B10
2273 E1	3298 B7	I237 B2
2274 F5	3299 A8	I238 B2
2275 F5	4201 E11	I239 F9
2276 C1	4207 E9	I280 F2
2278 F7	4209 G1	I282 F10
2279 B6	4210 H3	I283 E11
2280 B6	4212 H1	c201 H4
2282 C9	4219 B7	c202 H4
2283 F4	4295 B1	c203 H5
2284 F3	4296 H1	c204 H5
2285 G5	4297 H1	c205 H5
2286 F3	4298 B1	c206 H6
2287 F4	4299 A9	c207 H6
2290 F9	5201 F1	c208 H6
2291 E4	5202 C2	c209 H6
2292 B8	5203 D2	c210 H5
2293 B9	5205 D2	c211 H6
2294 B9	5206 E3	
2295 B9	5207 D2	
3201 B10	5208 C2	
3202 B6	5209 C2	
3203 E10	5210 D2	
3204 B6	5211 E1	
3205 D9	5212 C1	
3206 F9	5213 F7	
3207 B7	5214 E9	
3208 E10	5215 E2	
3209 E10	5216 E2	
3210 E11	5218 H3	
3211 E11	6201 E11	
3212 B7	6203 E2	
3214 B6	6204 D1	
3215 B6	6207 E9	

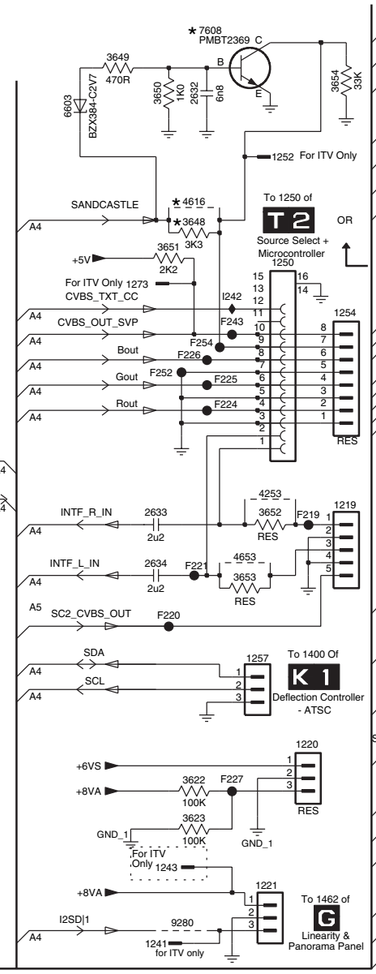
Mono Carrier: Features & Connectivities

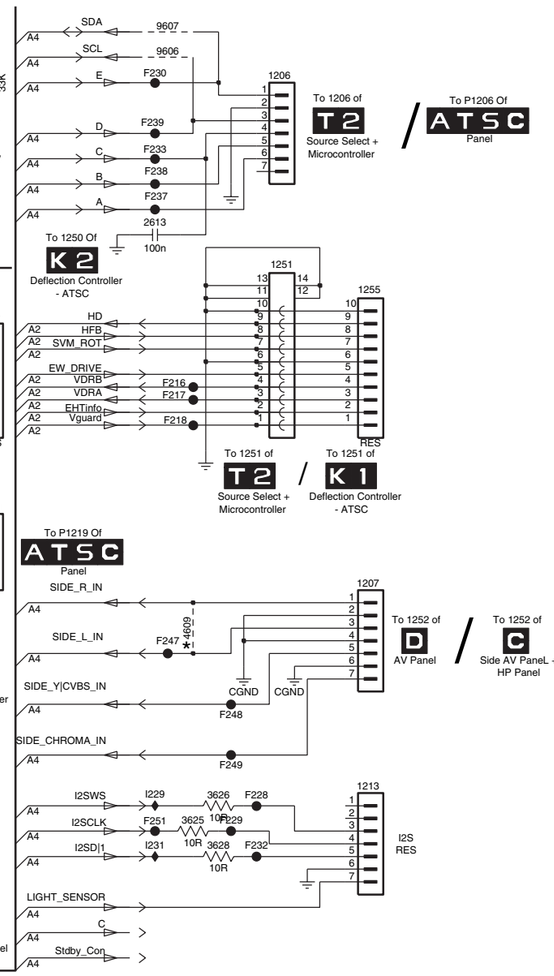
A5 FEATURES & CONNECTIVITIES











REGION	NAFTA	
SIZE	27VRF-HD	30WSRF-HD
3614	470R	470R
3648	2K2	2K2
4609	---	---
4614	---	---
4616	---	---

FAMILY BOARD 11 NC : 3139_123_5932
MAIN CHASSIS 11 NC : 3139_123_5933

3139 123 5933.2

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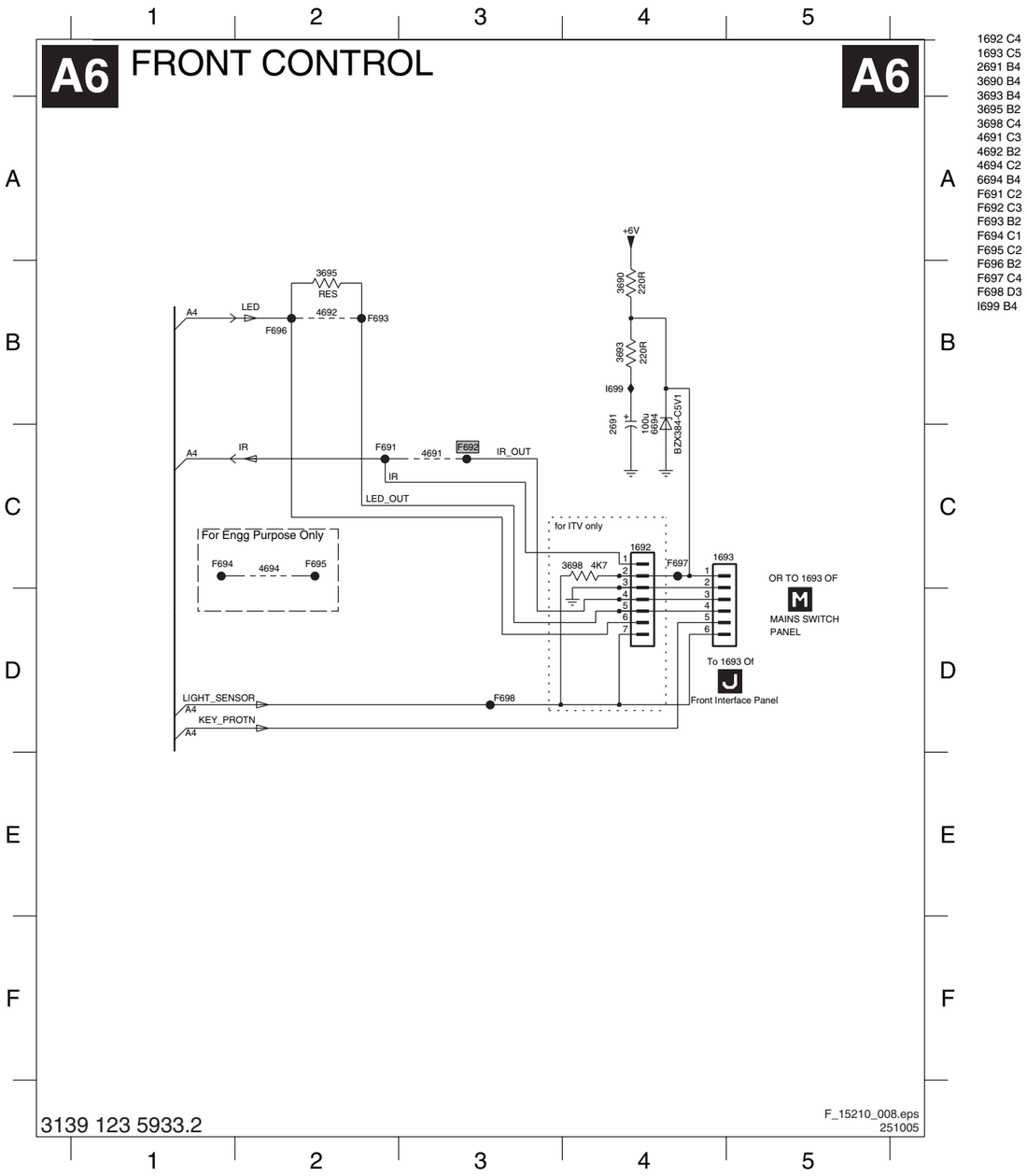
171005

1206 A10
1207 D10
1213 E10
1219 D8
1220 E8
1221 F8
1240 F5
1241 F7
1243 F7
1250 B8
1251 B10
1252 B8
1254 C8
1255 C10
1257 E8
1270 F1
1271 F1
1272 G1
1273 C7
2601 C4
2611 B3
2613 B9
2615 E4
2617 E6
2620 C3
2621 C3
2622 F5
2623 E3
2624 E3
2625 E1
2630 F3
2631 E4
2632 A7
2633 D7
2634 D7
2999 D5
3601 C4
3604 C6
3605 C6
3606 D2
3607 E2
3608 D2
3609 E3
3614 E5
3622 E7
3623 F7
3625 F9
3626 E10
3628 F10
3634 F6
3635 D5
3637 E6
3647 D6
3648 B7
3649 A7
3650 A7
3651 B7
3652 D8
3653 D8
3654 A8
4253 D8
4604 B2
4609 D9
4612 C2
4614 E5
4616 B7
4617 G3
4653 D8
5601 F3
5602 E5
6602 E2
6603 B7
7601 B5
7603 B2
7604 E2
7605 D2
7606 E5
7608 A7
9235 E5
9280 F7
9605 C3
9606 A9
9607 A9
9608 F3
9609 F3
F210 B2
F211 B2
F212 C3
F213 E3
F214 C5
F215 C5
F216 C9
F217 C9
F218 C9
F219 D8
F220 D7
F221 D7
F224 C8
F225 C8
F226 C7
F227 E8
F228 E10
F229 F10
F230 A9
F232 F10
F233 B9
F237 B9
F238 B9
F239 B9
F243 C8
F247 E9
F248 E10
F249 E10
F251 F9
F252 C7
F254 C7
I227 E2
I229 E9
I230 B3
I231 F9
I232 C3
I233 E5
I234 C2
I240 C2
I241 E1
I242 C8
I244 E6

Mono Carrier: Front Control



1692 C4
1693 C5
2691 B4
3690 B4
3693 B4
3695 B2
3698 C4
4691 C3
4692 B2
4694 C2
6694 B4
F691 C2
F692 C3
F693 B2
F694 C1
F695 C2
F696 B2
F697 C4
F698 D3
I699 B4

3139 123 5933.2

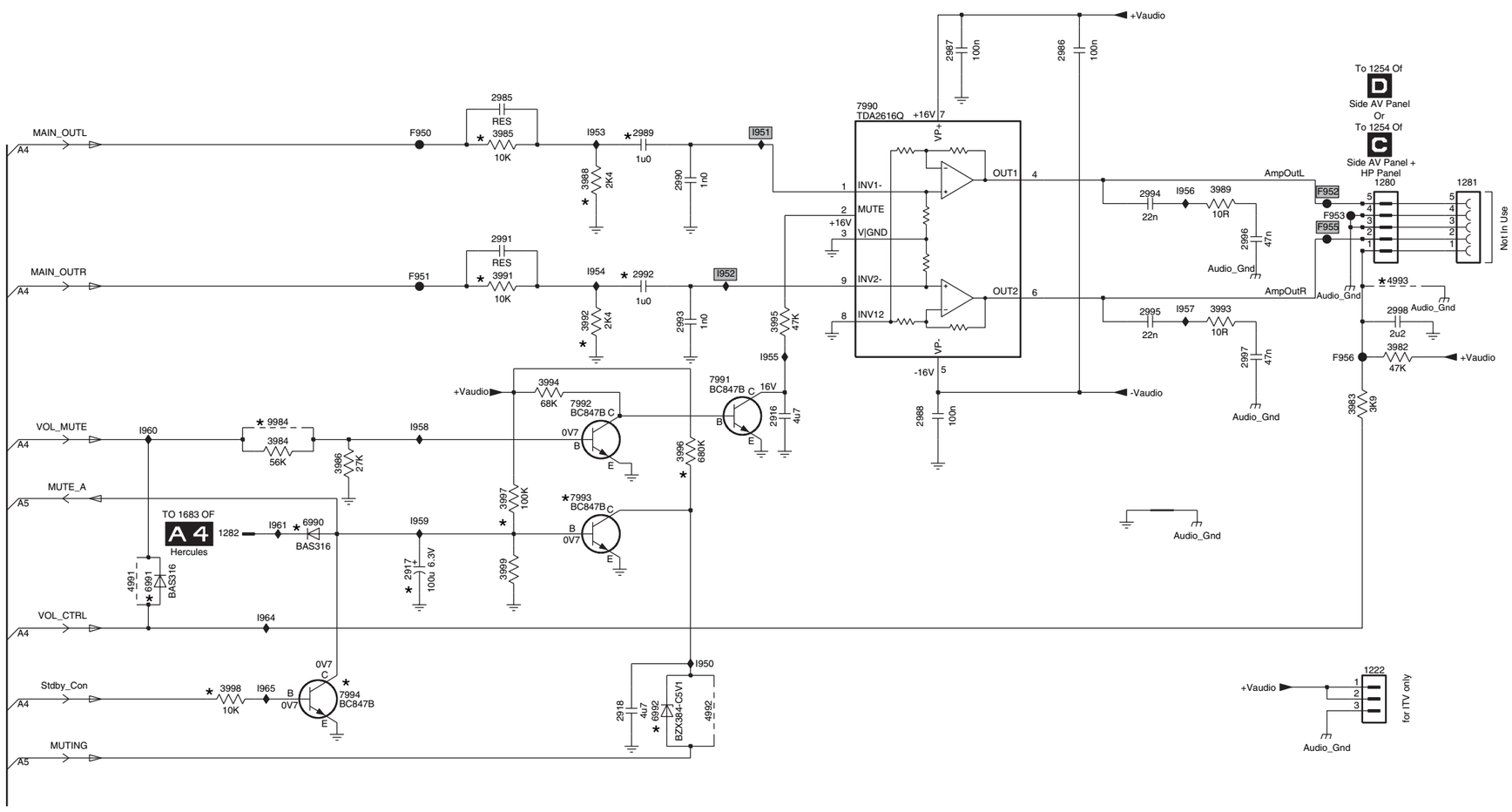
F_15210_008.eps
251005

Personal Notes:

E_06532_012.eps
131004

Mono Carrier: Audio Amplifier

A7 AUDIO AMPLIFIER



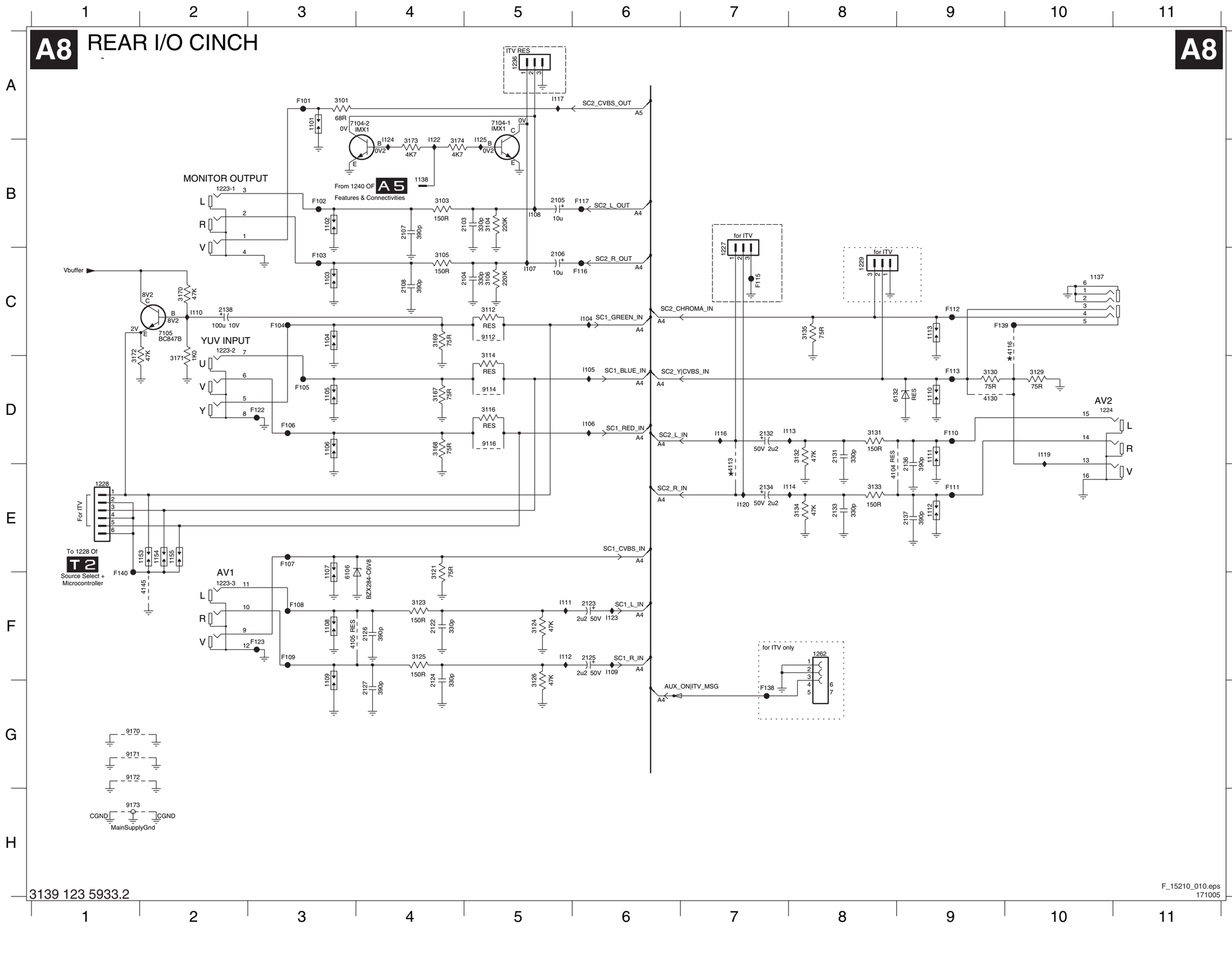
REGION	NAFTA			
SIZE	26WSRF-ATSC	30WSRF-ATSC	27VSRF-ATSC	32VSRF-ATSC
6991	---	---	---	---
6992	---	---	---	---
9984	---	---	---	---
3998	---	---	---	---
7994	---	---	---	---
6990	---	---	---	---
2917	---	---	---	---
3997	---	---	---	---
7993	---	---	---	---
3996	---	---	---	---
3985	22K	22K	22K	22K
3991	22K	22K	22K	22K
3988	5K6	5K6	5K6	5K6
3992	5K6	5K6	5K6	5K6
2989	2U2	2U2	2U2	2U2
2992	2U2	2U2	2U2	2U2
4993	JMP	JMP	JMP	JMP

FAMILY BOARD 11NC : 3139_123_5932
MAIN CHASSIS 11NC : 3139_123_5933

F_15210_009.eps
251005

Mono Carrier: Rear I/O Cinch

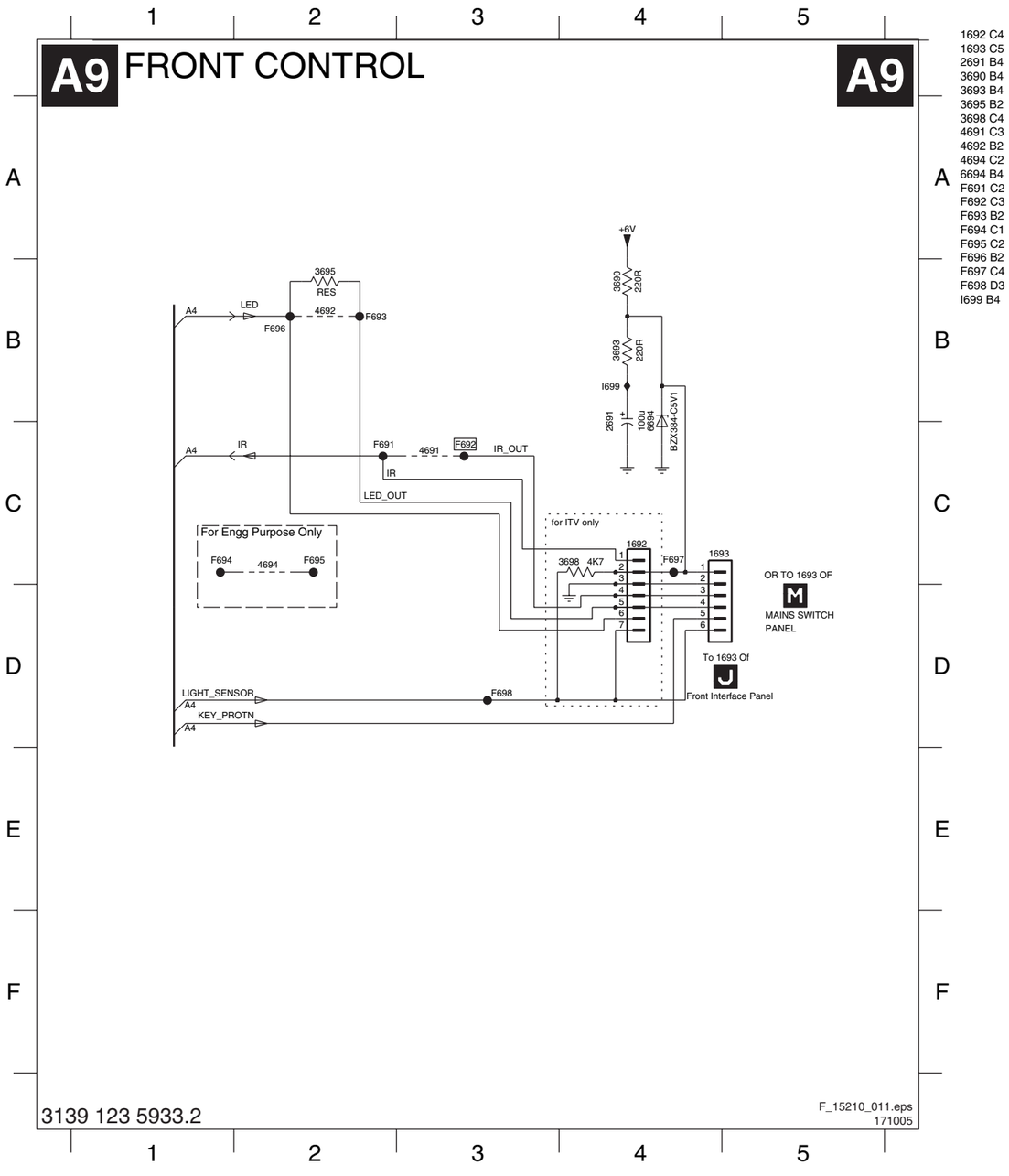
A8 REAR I/O CINCH



1101 A3 F106 D3
1102 B3 F107 E3
1103 C3 F108 F3
1104 C3 F109 F3
1105 D3 F110 D9
1106 D3 F111 E9
1107 F3 F112 C9
1108 F3 F113 D9
1109 G3 F115 C7
1110 D9 F116 C6
1111 D9 F117 B6
1112 E9 F122 D3
1113 C9 F123 F3
1137 C10 F138 G7
1138 B4 F139 C9
1153 E2 F140 F1
1154 E2 I104 C6
1155 E2 I105 D6
1223-1 B2 I106 D6
1223-2 C2 I107 C5
1223-3 F2 I108 B5
1227 B7 I109 F6
1228 E1 I110 C2
1229 C8 I111 F5
1236 A5 I112 F5
1262 F8 I113 D8
2103 B5 I114 E8
2104 C5 I116 D7
2105 B5 I117 A5
2106 C5 I119 D10
2107 B4 I120 E7
2108 C4 I122 B4
2122 F4 I123 F6
2123 F6 I124 B4
2124 G4 I125 B5
2125 F6
2126 F4
2127 G4
2131 D8
2132 D7
2133 E8
2134 E7
2136 E9
2137 E9
2138 C2
3101 A3
3103 B4
3104 B5
3105 C4
3106 C5
3112 C5
3114 D5
3116 D5
3121 F4
3123 F4
3124 F5
3125 F4
3126 G5
3129 D10
3130 D9
3131 D8
3132 D8
3133 E8
3134 E8
3135 C8
3167 D4
3168 D4
3169 C4
3170 C2
3171 D2
3172 D1
3173 B4
3174 B4
4104 E8
4105 F3
4113 E7
4116 C10
4130 D9
4145 F2
6106 F3
6132 D8
7104-1 A5
7104-2 A4
7105 C2
9112 C5
9114 D5
9116 D5
9170 G1
9171 G1
9172 G1
9173 H1
F101 A3
F102 B3
F103 C3
F104 C3
F105 D3

F_15210_010.eps
171005

Mono Carrier: Front Control

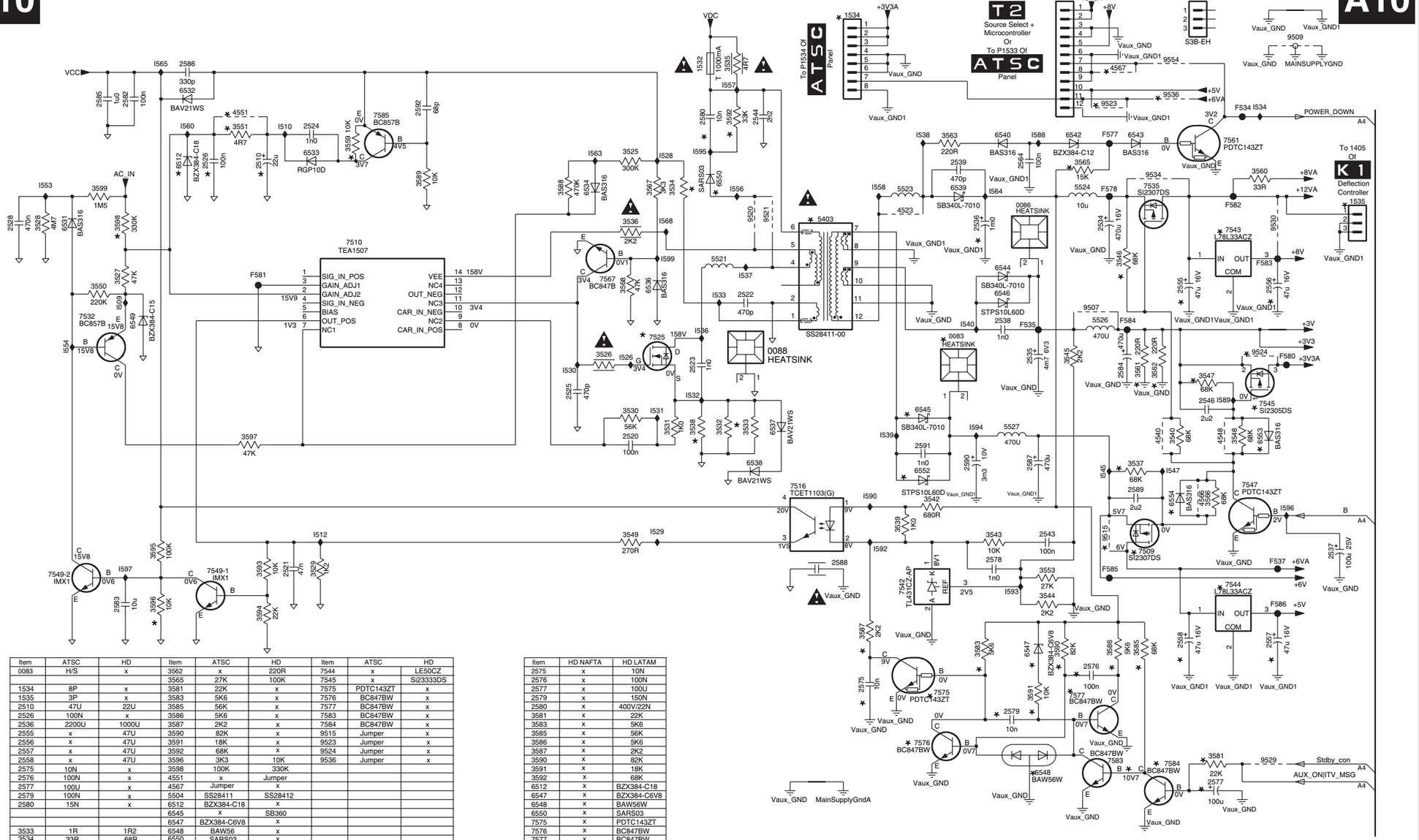


Personal Notes:

E_06532_012.eps
131004

Mono Carrier: AUX Power Supply

A10 AUXILIARY POWER SUPPLY



Item	ATSC	HD	Item	ATSC	HD	Item	ATSC	HD
0083	H/S	x	3562	x	220R	7544	x	LE50CZ
			3565	27K	100K	7545	x	SI23333DS
1534	8P	x	3581	22K	x	7575	PDTC143ZT	x
1535	3P	x	3583	5K6	x	7576	BC847BW	x
2510	47U	22U	3585	56K	x	7577	BC847BW	x
2526	100N	x	3586	5K6	x	7583	BC847BW	x
2536	2200U	1000U	3587	2K2	x	7584	BC847BW	x
2555	x	47U	3590	82K	x	9515	Jumper	x
2556	x	47U	3591	18K	x	9523	Jumper	x
2557	x	47U	3592	68K	x	9524	Jumper	x
2558	x	47U	3596	3K3	10K	9536	Jumper	x
2575	10N	x	3598	100K	330K			
2576	100N	x	4551	x	Jumper			
2577	100U	x	4567	Jumper	x			
2579	100N	x	5504	SS28411	SS28412			
2580	15N	x	6512	BZX384-C18	x			
			6545	x	SB360			
			6547	BZX384-C6V8	x			
3533	1R	1R2	6548	BAW56	x			
3534	33R	68R	6550	SARS03	x			
3537	x	68K	6552	STPS10L25D	x			
3538	1R	x	6553	x	BAS316			
3546	68K	100K	6554	x	BAS316			
3547	x	x	7509	x	SI2307DS			
3551	4R7	x	7525	STP6NK60ZFP	STP5NK80ZFP			
3553	39K	27K	7542	TL431ACZ	TL431ACZ			
3561	x	220R	7543	x	L78L08ACZ			

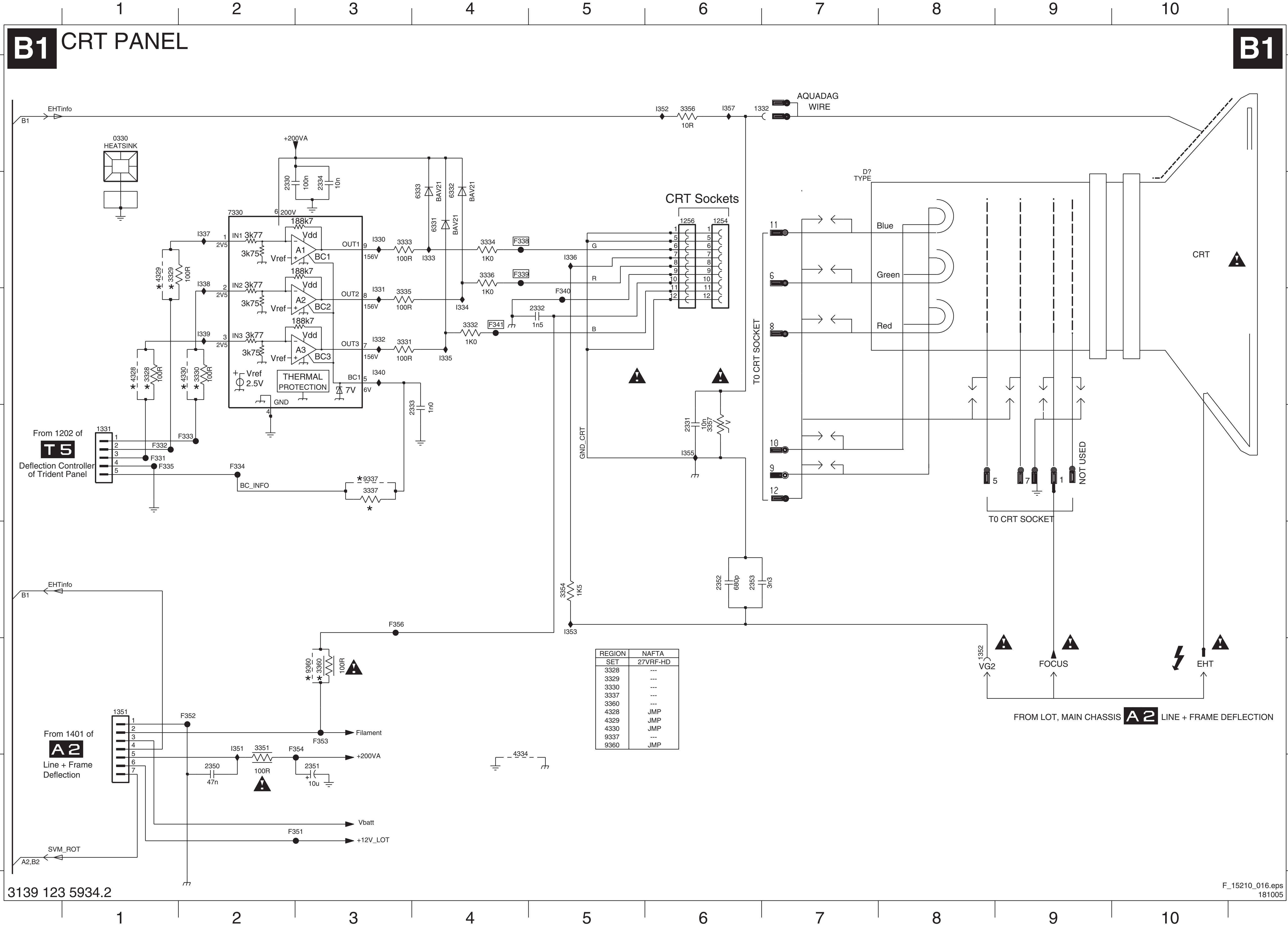
x Layout Jumper

Item	HD NAFTA	HD LATAM
2575	x	10N
2576	x	100N
2577	x	100U
2579	x	150N
2580	x	400V/22N
3581	x	22K
3583	x	5K6
3585	x	56K
3586	x	5K6
3587	x	2K2
3590	x	82K
3591	x	18K
3592	x	68K
6512	x	BZX384-C18
6547	x	BZX384-C6V8
6548	x	BAW56W
6550	x	SARS03
7575	x	PDTC143ZT
7576	x	BC847BW
7577	x	BC847BW
7583	x	BC847BW
7584	x	BC847BW

3139 123 5933.2

0083	C8	3593	E3	I530	C5	2591	D8	7532	C1		
0086	B9	3594	E3	I531	D6	2592	A4	7535	B10		
0088	C7	3595	E2	I532	D6	3525	B6	7542	E8		
1532	A6	3596	E2	I533	C6	3526	C5	7543	B10		
1533	A9	3597	D2	I534	A11	3527	C1	7544	E10		
1534	A7	3598	B1	I536	C6	3528	B1	7545	D11		
1535	B11	3599	B1	I537	C6	3529	E3	7547	D10		
2510	B3	4523	B8	I538	A8	3530	D6	7549-1	E2		
2520	D6	4540	D10	I539	D8	3531	D6	7549-2	E1		
2521	E3	4548	D10	I540	C8	3532	D6	7561	A10		
2522	C6	4551	A2	I545	D9	3533	D6	7567	C5		
2523	C6	4566	D10	I547	D10	3534	B6	7575	F8		
2524	A3	4567	A9	I553	B1	3535	A6	7576	F8		
2525	D5	5403	B7	I554	C1	3536	B6	7577	F9		
2526	B2	5521	B6	I556	B6	3537	D10	7583	F9		
2528	B1	5523	B8	I557	A6	3538	D6	7584	G10		
2534	B9	5524	B9	I558	B8	3539	E8	7585	A3		
2535	C9	5526	C9	I560	A2	3540	D10	9507	C9		
2536	B8	5527	D9	I563	B5	3542	D8	9509	A11		
2537	E11	6512	B2	I564	B8	3543	E8	9515	E9		
2538	C9	6531	B1	I565	A2	3544	E9	9520	B7		
2539	B8	6532	A2	I568	B6	3545	C9	9521	B7		
2543	E9	6533	B3	I588	A9	3546	B9	9523	A9		
2544	A7	6534	B5	I589	D10	3547	C10	9524	C11		
2546	D10	6536	C6	I590	D7	3548	D10	9529	F11		
2555	C10	6537	D7	I592	E8	3549	E6	9530	B11		
2556	C11	6538	D7	I593	E9	3550	C1	9534	B10		
2557	F11	6539	B8	I594	D8	3551	A2	9536	A10		
2558	F10	6540	A9	I595	B6	3553	E9	9554	A10		
2564	B9	6542	A9	I596	D11	3559	B3	9999	A10		
2575	F7	6543	A10	I597	E1	3560	B11	F534	A10		
2576	F9	6544	C9	I599	B6	3561	C10	F535	C9		
2577	G10	6545	D8			3562	C10	F537	E11		
2578	E8	6546	C9			3563	A8	F577	A9		
2579	F9	6547	F9			3566	D10	F578	B9		
2580	A6	6548	G9			3567	B6	F580	C11		
2582	A1	6549	C2			3568	C5	F581	C3		
2583	E1	6550	B6			3581	F10	F582	B10		
2584	C9	6552	D8			3583	F8	F583	B11		
2585	A1	6553	D11			3585	F10	F584	C10		
2586	A2	6554	D10			3586	F9	F585	E9		
2587	D9	7509	E10			3587	E7	F586	E11		
2588	E7	7510	B3			3588	B5	I509	C1		
2589	D10	7516	D7			3589	B4	I512	E3		
2590	D8	7525	C6			3590	F9	I526	C5		
						3591	F9	I528	B6		
						3592	A6	I529	E6		

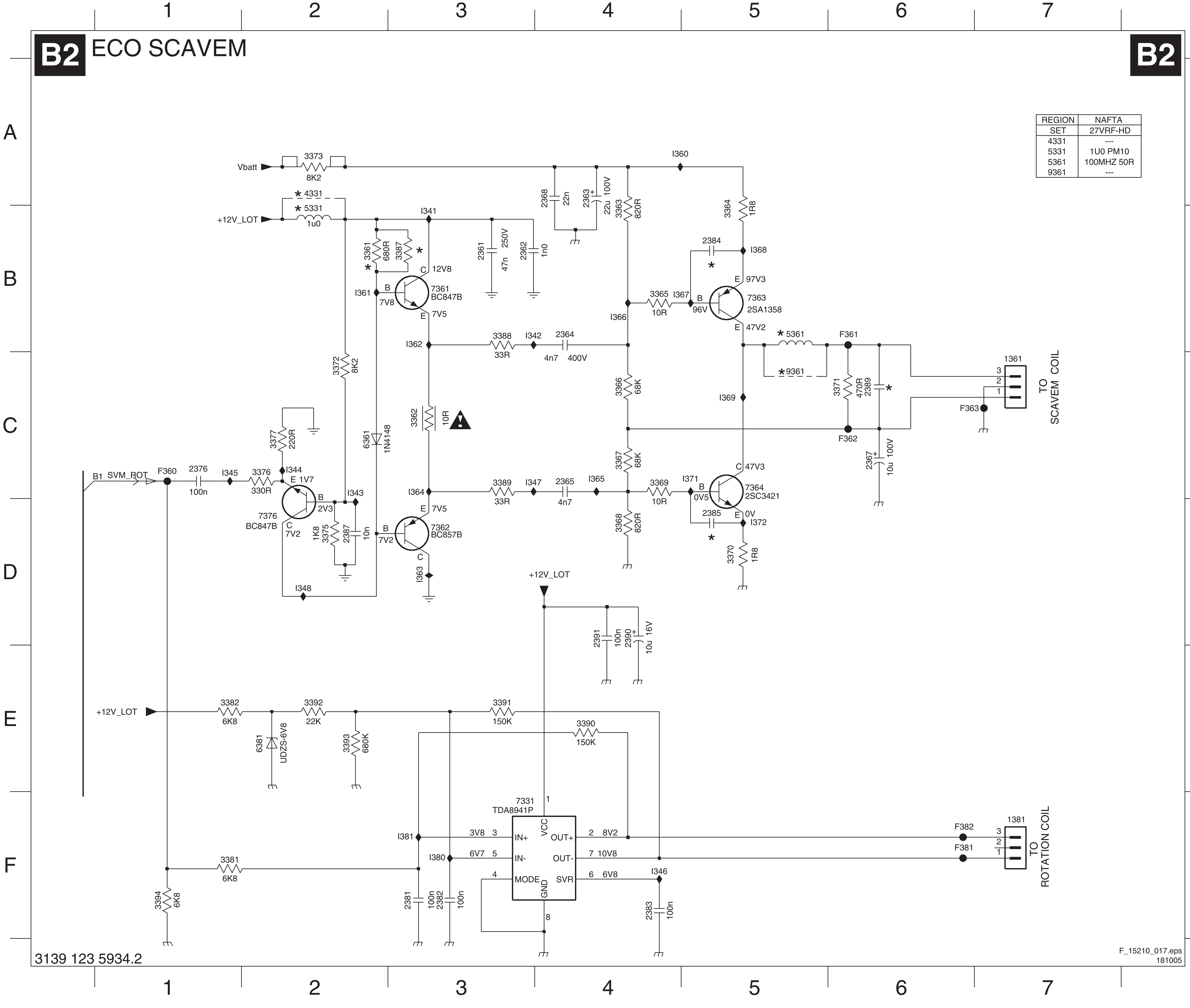
CRT Panel (Family Board)



REGION	NAFTA
SET	27VRF-HD
3328	---
3329	---
3330	---
3337	---
3360	---
4328	JMP
4329	JMP
4330	JMP
9337	---
9360	JMP

D? B7
0330 A1
1254 B6
1256 B6
1331 D1
1332 A7
1351 F1
1352 F8
2330 B2
2331 D6
2332 C5
2333 D4
2334 B3
2350 G2
2351 G3
2352 E6
2353 E6
3328 C1
3329 B1
3330 C2
3331 C3
3332 C4
3333 B3
3334 B4
3335 C3
3336 B4
3337 D3
3351 F2
3354 E5
3356 A6
3357 D6
3360 F3
4328 C1
4329 B1
4330 C2
4334 G4
6331 B4
6332 B4
6333 B4
7330 B2
9337 D3
9360 F3
F331 D1
F332 D1
F333 D2
F334 D2
F335 D1
F338 B4
F339 B4
F340 C5
F341 C4
F351 G3
F352 F2
F353 F3
F354 F3
F356 E3
I330 B3
I331 C3
I332 C3
I333 B4
I334 C4
I335 C4
I336 B5
I337 B2
I338 B2
I339 C2
I340 C3
I351 F2
I352 A6
I353 E5
I355 D6
I357 A6

CRT Panel: Eco Scavem (Family Board)



1361 C7
1381 F7
2361 B3
2362 B3
2363 A4
2364 B4
2365 C4
2367 C6
2368 A4
2376 C1
2381 F3
2382 F3
2383 F4
2384 B5
2385 D5
2387 D2
2389 C6
2390 D4
2391 D4
3361 B2
3362 C3
3363 B4
3364 B5
3365 B4
3366 C4
3367 C4
3368 D4
3369 C4
3370 D5
3371 C6
3372 C2
3373 A2
3375 D2
3376 C2
3377 C2
3381 F1
3382 E1
3387 B3
3388 B3
3389 C3
3390 E4
3391 E3
3392 E2
3393 E2
3394 F1
4331 A2
5331 B2
5361 B5
6361 C2
6381 E2
7331 F3
7361 B3
7362 D3
7363 B5
7364 C5
7376 D2
9361 C5
F360 C1
F361 B6
F362 C6
F363 C6
F381 F6
F382 F6
I341 B3
I342 B3
I343 C2
I344 C2
I345 C1
I346 F4
I347 C3
I348 D2
I360 A4
I361 B2
I362 B3
I363 D3
I364 C3
I365 C4
I366 B4
I367 B4
I368 B5
I369 C5
I371 C5
I372 D5
I380 F3
I381 F3

CRT Panel (Multi Board)

B1 CRT SOCKET

B1

AQUADAG WIRE

F345 — 1335

+200A — 6331 — BAV21WS — 6332 BAV21WS — 6333 BAV21WS

CRT SOCKET 1354

9308 — 3308 — 1K0 — GND_RGB

G — I330 — 3333 — 100R — B2 — I333 — 3334 — 1K0 — F338

R — I331 — 3335 — 100R — B2 — I334 — 3336 — 1K0 — F339

B — I332 — 3331 — 100R — B2 — I335 — 3332 — 1K0 — F341

GND_LS1

TO CRT SOCKET

Blue

Green

Red

CRT

VG1 VG2 STATIC FOCUS DYN FOCUS

TO CRT SOCKET

EHT

FOCUS

FROM LOT, MAIN CHASSIS
A2
LINE + FRAME DEFLECTION

1336 VG2

1351 — 1 F352 I327 — DC_Filament — +141V — EHT-INFO — 200V — +8V_+12V — F331 — GND_LS1

From 1401 of A2 Line + Frame Deflection

SVM_ROT — A2,B3

F383 — 3307 — 3R3 — 9306 — 3306 — 3R3 — I350

F340 — I348 — 3345 — 33R — 5304 — 9328 — I373

F354 — 3351 — 150R — I351 — I323 — +200A

2313 — 47u — I322 — GND_RGB

3390 * — 2321 — 10n — 2319 — 10n — 3391 — 3357 — GND_RGB

GND_LS1 GND_LS1 GND_LS1 GND_RGB

9310 — GND_LS1

I377 — 3347 — 1K5 — F347

2324 — 820p — 2317 — 4n7 RES — F342 — GND_LS1

Item No.	HD	ATSC
3390	---	30PW
6325	BZX79-2V7	BZX79-3V3

+12A1 — 9309 — 5308 — 5u6 — +12A — I336

F397 — 3305 — 1R0 — +8V_+12V — I379 — 2347 — 470u — GND_RGB

5303 — 5u6 — +12V_SVM

+12A1 — I302 — 3325 — 1K8 — I308 — +3V

6325 * — BZX79-C3V3 — GND_RGB

F398 — 3999 — 1K2 — F399

5324 — 9324 — GND_LS1

2320 — 10n 10n — 2357 — GND_LS1 GND_RGB

MULTIPLE BOARD 11NC : 3139_123_5945
SINGLE BOARD 11NC : 3139_123_5946

3139 123 5946.1

F_15210_021.eps
181005

1335 A7
1336 F11
1351 D1
1354 B6
2313 E3
2317 F7
2319 E5
2320 G5
2321 E4
2324 F7
2347 G2
2357 H5
3305 G1
3306 D4
3307 D4
3308 B4
3325 H1
3331 C2
3332 C3
3333 B2
3334 B3
3335 C2
3336 C3
3345 E4
3347 E7
3351 E3
3357 E5
3390 E4
3391 E5
3999 G5
5303 G2
5304 D5
5308 F2
5324 G5
6325 H2
6331 A3
6332 B2
6333 B3
9306 D4
9308 B4
9309 F3
9310 E5
9324 G5
9328 D5
F331 E2
F338 B4
F339 C4
F340 D3
F341 C4
F342 F7
F345 A7
F347 E7
F352 D2
F354 E3
F383 D3
F397 G1
F398 G5
F399 G5
I302 H1
I308 H2
I322 E3
I323 E3
I327 D2
I330 B2
I331 C2
I332 C2
I333 B3
I334 C3
I335 C3
I336 G3
I348 E4
I350 D4
I351 E3
I373 D6
I377 E6
I379 G2

CRT Panel: RGB Amplifier (Multi Board)

B2 RGB AMPLIFIER

B2

R - AMPLIFIER

G - AMPLIFIER

B - AMPLIFIER

7330 TDA6111Q

7340 TDA6111Q

7350 TDA6111Q

MIRROR

V BIAS

DIFFERENTIAL STAGE

CURRENT SOURCE

VIN

VIP

VDDH

VFB

GND

VDDL

VCN

VOC

IOM

+12A

+200A

+12A1

+3V

GND_RGB

CUT_OFF

From 1202 of T5 Deflection Controller of Trident Panel Or To 1404 Of K1 Deflection Controller - ATSC

1 R-CRT
2 G-CRT
3 B-CRT
4 F336
5 CUT OFF

F332 F334 F335 F337 F348

7351 BC847B
7352 BC847B
7353 BC847B

Item No.	HD	ATSC
2335	10P	12P
2337	10P	12P
2341	10P	12P
2369	330P	-
3338	2K2	2K7
3339	2K7	3K3
3342	2K7	3K3
3343	2K2	2K7
3353	2K2	2K7
3354	2K7	3K3

MULTIPLE BOARD 11NC : 3139_123_5945
SINGLE BOARD 11NC : 3139_123_5946

3139 123 5946.1

F_15210_022.eps
181005

0069 A9
0077 F7
0078 C9
1340 C1
2330 A4
2331 C4
2332 B5
2333 B9
2334 E2
2335 A5
2336 C8
2337 C5
2338 A9
2339 C9
2340 F9
2341 F3
2343 D9
2344 E5
2346 E8
2352 G3
2353 F8
2355 A3
2356 H5
2358 D3
2360 D2
2369 B9
3317 B9
3320 B4
3321 A3
3322 A3
3323 D4
3324 C3
3326 C3
3327 D2
3328 E2
3329 F2
3337 A6
3338 A5
3339 B5
3340 B4
3341 C6
3342 D5
3343 C5
3344 E4
3352 F4
3353 F3
3354 F3
3355 G3
4311 C8
4312 D9
4313 F8
4314 F8
4315 H5
6307 C9
6308 B9
7330 A5
7340 D5
7350 F3
7351 A4
7352 C4
7353 E2
9301 B9
9302 B3
9303 D3
9304 E1
F332 A2
F334 C2
F335 C2
F336 C2
F337 D2
F348 H5
I309 A4
I310 A3
I311 C4
I313 E2
I328 G3
I329 F3
I342 B9
I344 E2
I346 E9
I347 G9
I382 C3
I383 C3
I384 D2
I389 A5
I390 A6
I391 B9
I392 B5
I393 C7
I394 D9
I395 C5
I396 E5
I397 F4
I398 F7
I399 A3

CRT Panel: Rot. & SCAVEM (Multi Board)

B3 ROTATION & SCAVEM

SCAVEM

ROTATION

Item No.	HD	ATSC
2364	470P	4n7
2365	470P	4n7
2383	220p	680P
2393	-	220p(30PW)
3366	120k	68k
3367	120k	68k
3371	560R	2K2
3373	1K5	4K7
3378	68R	330R
3380	33K	22K
3381	18K	33K
3384	330K	-
3385	4K7	-
3393	56R	-
9393	-	Jmp

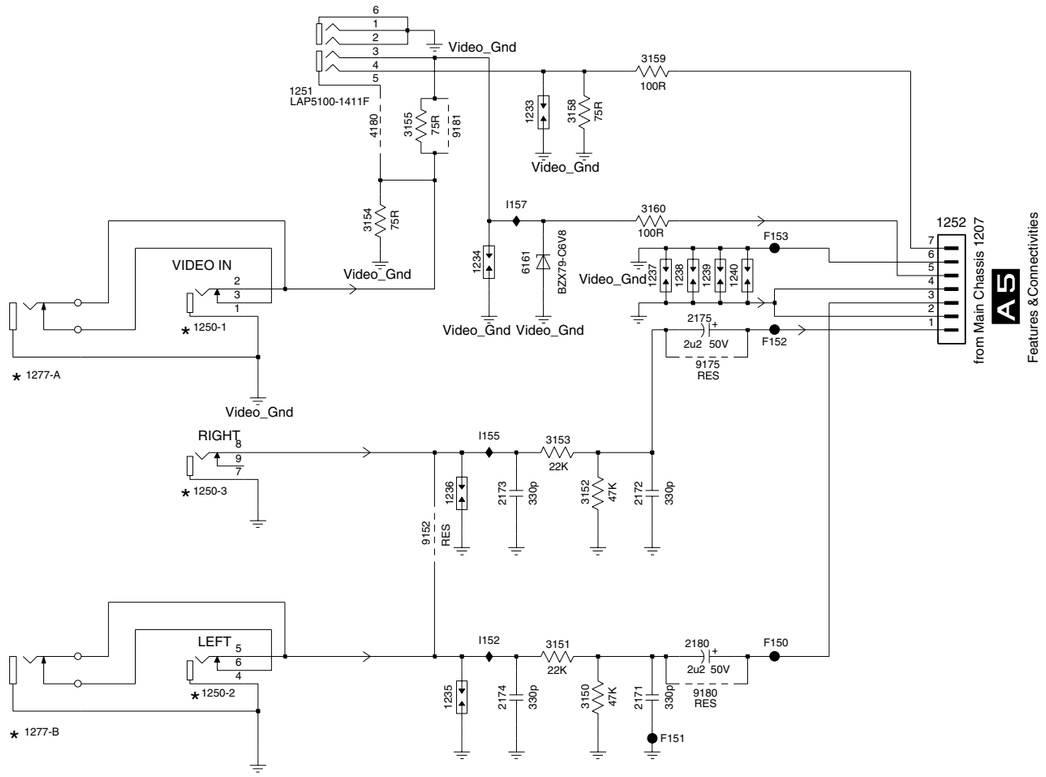
0087 A8 I366 B7
1361 C11 I367 B6
1362 C11 I368 A8
1381 E11 I369 C7
2361 B6 I370 D4
2363 A6 I371 D7
2364 B6 I375 C5
2365 D6 I380 E7
2367 G6 I381 G6
2368 C6 I386 B4
2370 E7 I387 E6
2381 B5
2382 B3
2383 C9
2384 A7
2385 D7
2387 E4
2389 G7
2390 D9
2391 D3
2392 D2
2393 E2
3309 D3
3310 B7
3311 C7
3350 G5
3361 B4
3362 C5
3363 A7
3364 A7
3365 B7
3366 C7
3367 C7
3368 D7
3369 D8
3370 D7
3371 C8
3372 G8
3373 A4
3374 C10
3377 E4
3378 D3
3379 E2
3380 E6
3381 E6
3382 B4
3383 E2
3384 E6
3385 G5
3392 C8
3393 C5
3394 D7
3395 B2
3396 E5
3397 B5
3398 D2
3399 C9
4362 A2
4363 G2
5361 B8
5362 B2
6334 E5
6361 B3
6362 C4
6363 B2
7331 D2
7332 A7
7333 D8
7361 B5
7362 C4
7363 B8
7364 C8
7365 D4
7366 D8
9322 C2
9323 B8
9325 G3
9393 C5
F361 B8
F362 C8
F381 E10
F382 E10
I314 B8
I315 D8
I316 D8
I317 C9
I319 F8
I320 D7
I321 A4
I325 D3
I326 D2
I360 A7
I361 B4
I362 C5
I364 D6
I365 C7

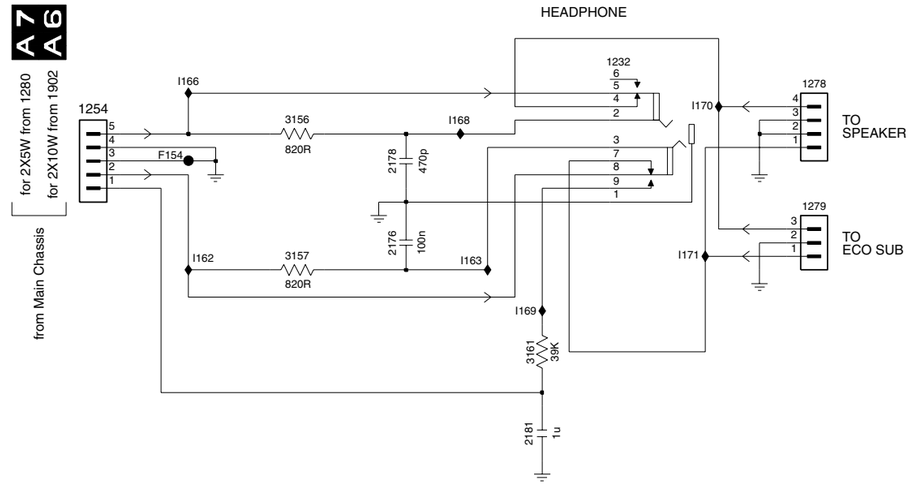
3139 123 5946.1

F_15210_023.eps
251005

Side AV + HP Panel (PV0-2)

SIDE AV PANEL + HP PANEL WIDE





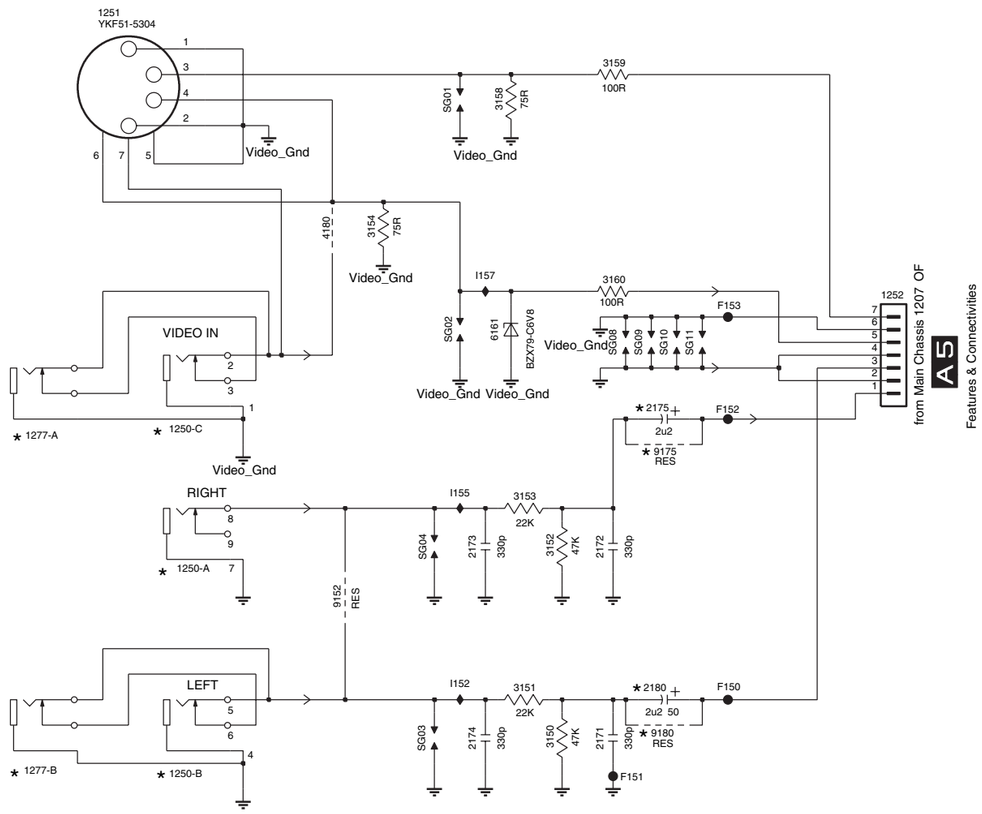
3139 123 5829.2

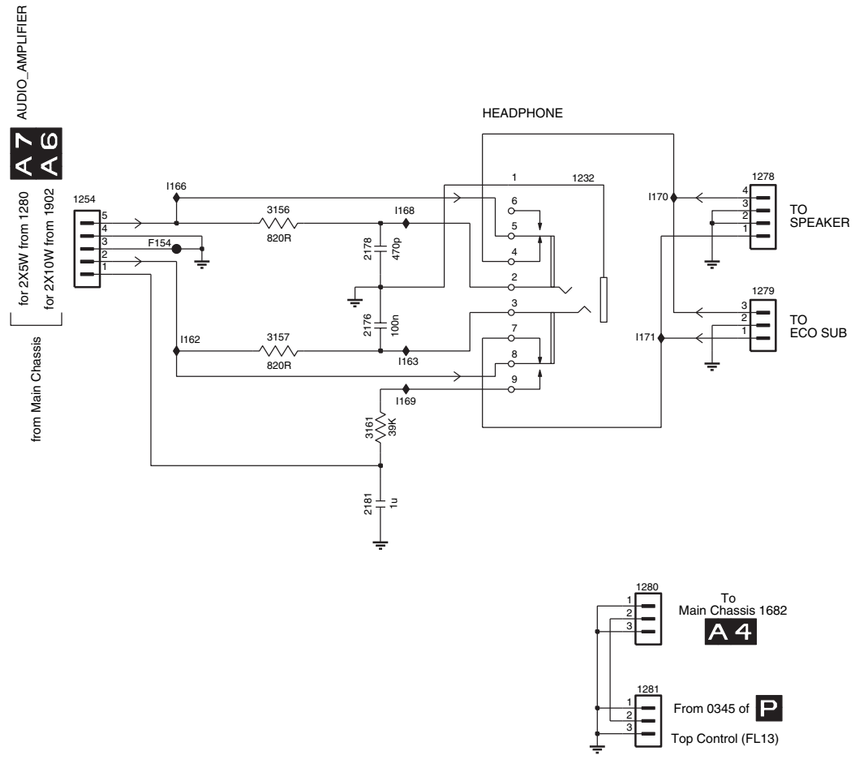
E_14480_098.eps
170504

1232 B9
1233 B3
1234 B3
1235 E3
1236 D3
1237 B4
1238 B4
1239 B4
1240 B4
1250-1 C1
1250-2 E1
1250-3 D1
1251 A2
1252 B5
1254 B6
1277-A C1
1277-B E1
1278 B10
1279 B10
2171 E4
2172 D4
2173 D3
2174 E3
2175 C4
2176 C8
2178 B8
2180 D4
2181 D9
3150 E3
3151 D3
3152 D3
3153 C3
3154 B2
3155 B2
3156 B8
3157 C8
3158 B3
3159 A4
3160 B4
3161 C9
4180 B2
6161 B3
9152 D2
9175 C4
9180 E4
9181 B3
F150 D4
F151 E4
F152 C4
F153 B4
F154 B7
I152 D3
I155 C3
I157 B3
I162 C7
I163 C8
I166 B7
I168 B8
I169 C9
I170 B10
I171 C10

Side AV + HP Panel (FL13)

SIDE AV PANEL + HP PANEL (FL13)



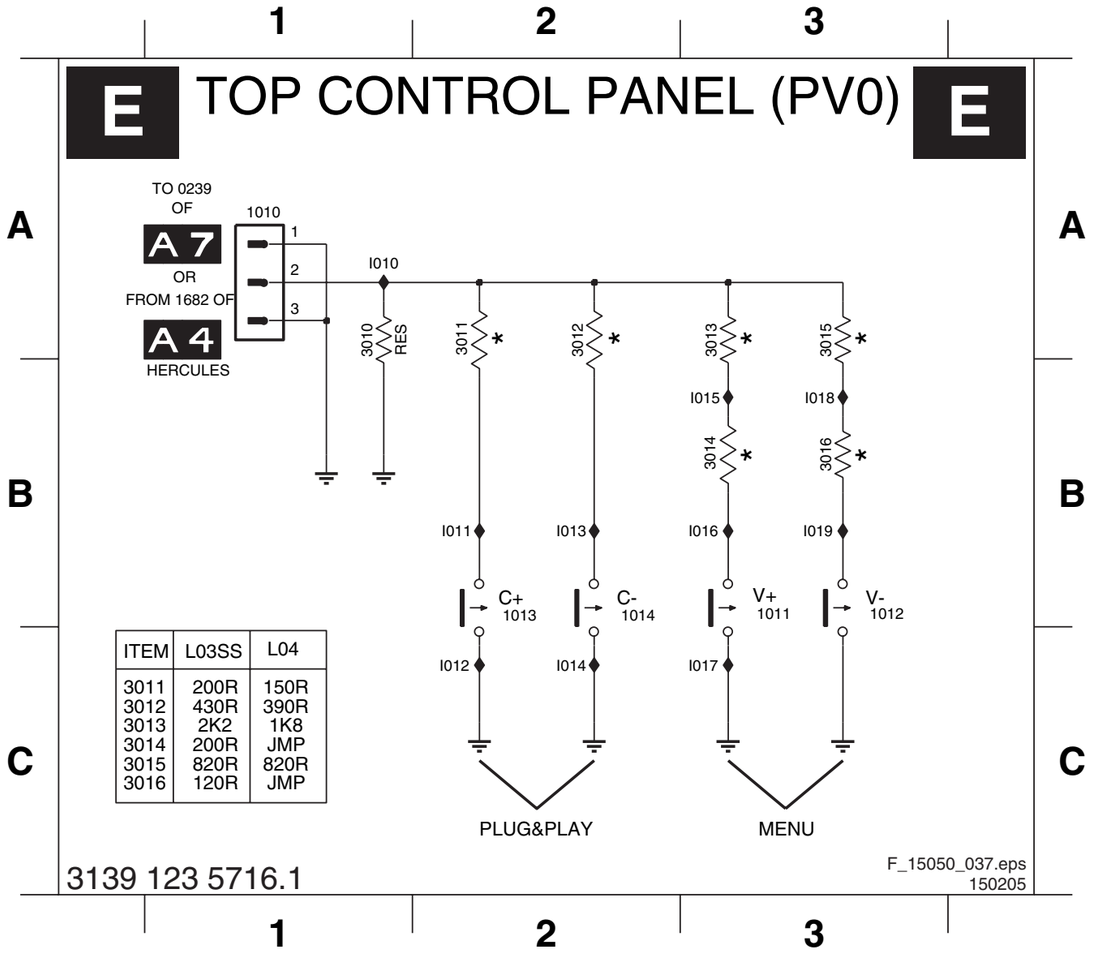


1232 B10
1250-A E2
1250-B F2
1250-C D2
1251 B1
1252 C6
1254 B7
1277-A D1
1277-B F1
1278 B11
1279 C11
1280 E10
1281 E10
2171 F4
2172 E4
2173 E3
2174 F3
2175 D4
2176 C9
2178 C9
2180 E4
2181 D9
3150 F4
3151 E4
3152 E4
3153 D4
3154 C3
3156 B8
3157 C8
3158 B4
3159 B4
3160 C4
3161 D9
4180 C3
6161 C3
9152 E3
9175 D4
9180 F4
F150 E5
F151 F4
F152 D5
F153 C5
F154 C7
I152 E3
I155 D3
I157 C3
I162 C8
I163 C9
I166 B7
I168 B9
I169 D9
I170 B10
I171 C10
SG01 B3
SG02 C3
SG03 F3
SG04 E3
SG08 C4
SG09 C4
SG10 C4
SG11 C5

F_15050_056.eps
160205

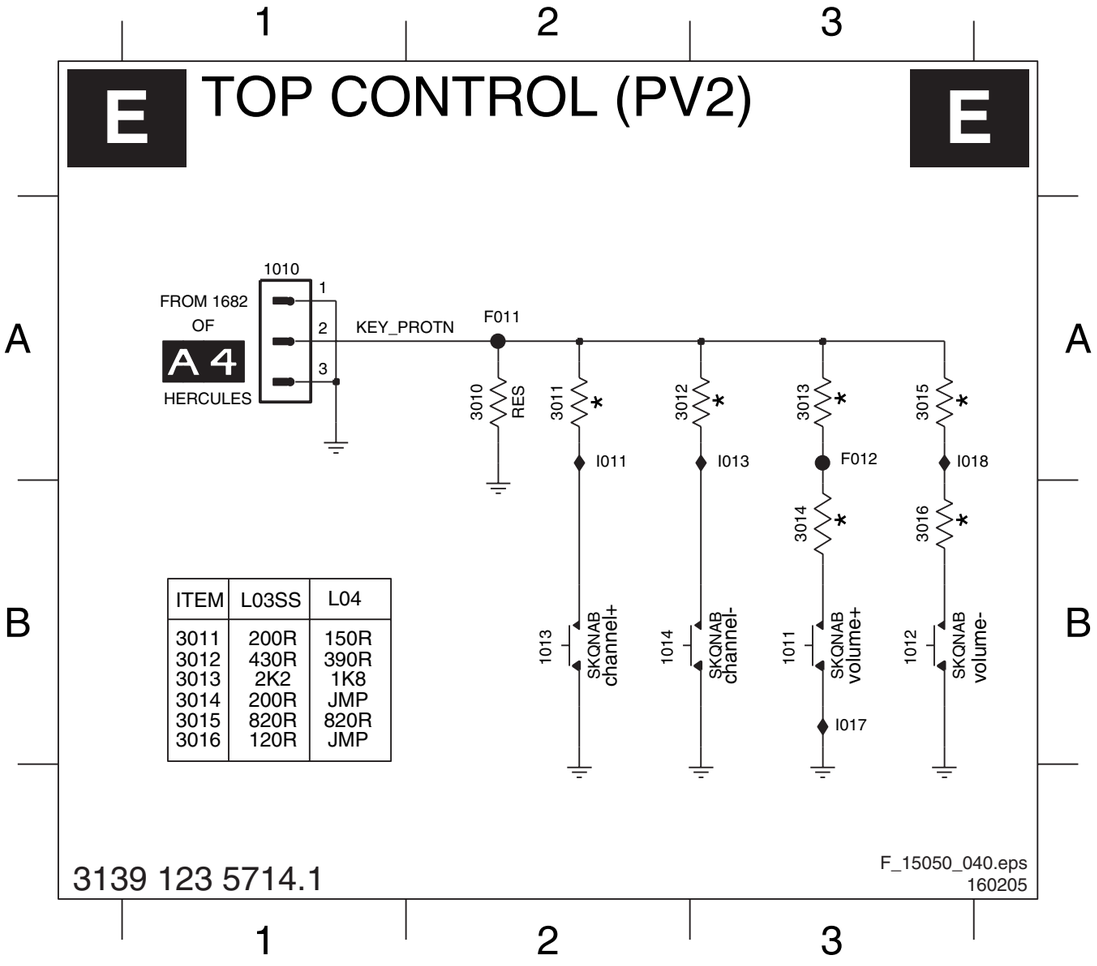
Top Control Panel (PV0)

1010 A1 1013 B2 3011 A2 3014 B3 I010 A1 I013 B2 I016 B3 I019 B3
1011 B3 1014 B2 3012 A2 3015 A3 I011 B2 I014 C2 I017 C3
1012 B3 3010 A1 3013 A3 3016 B3 I012 C2 I015 B3 I018 B3

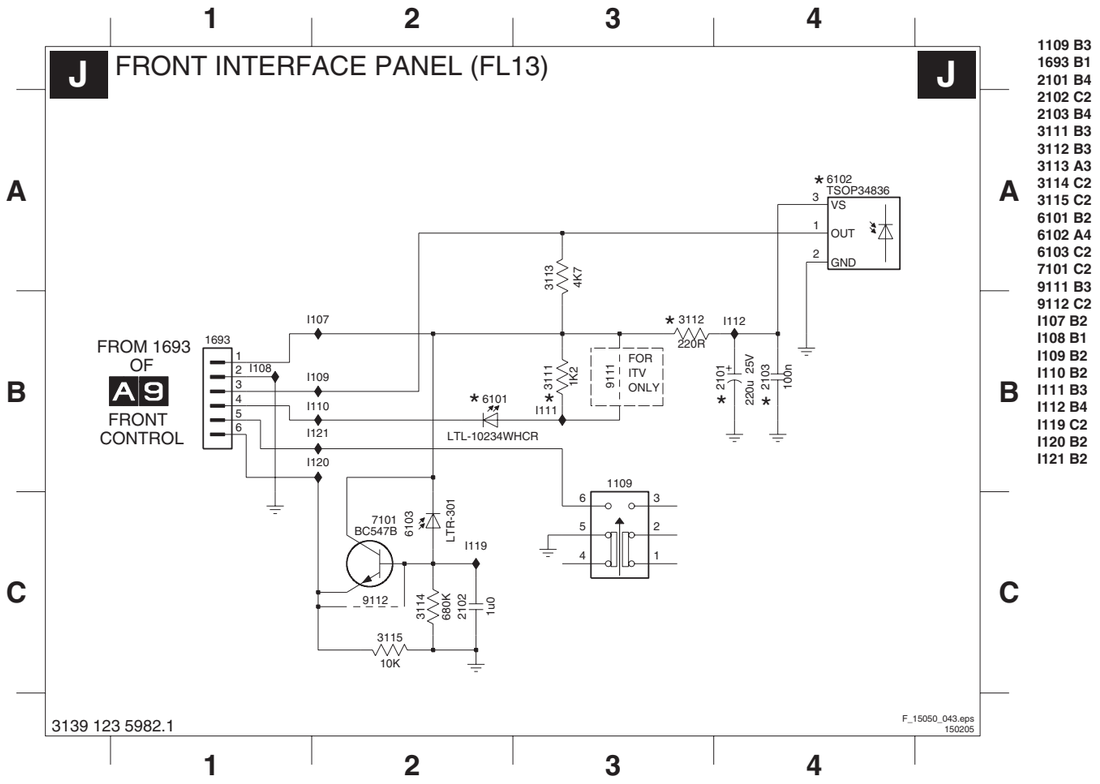


Top Control Panel (PV2)

1010 A1 1013 B2 3011 A2 3014 B3 F011 A2 I013 A3
1011 B3 1014 B2 3012 A2 3015 A3 F012 A3 I017 B3
1012 B3 3010 A2 3013 A3 3016 B3 I011 A2 I018 A3

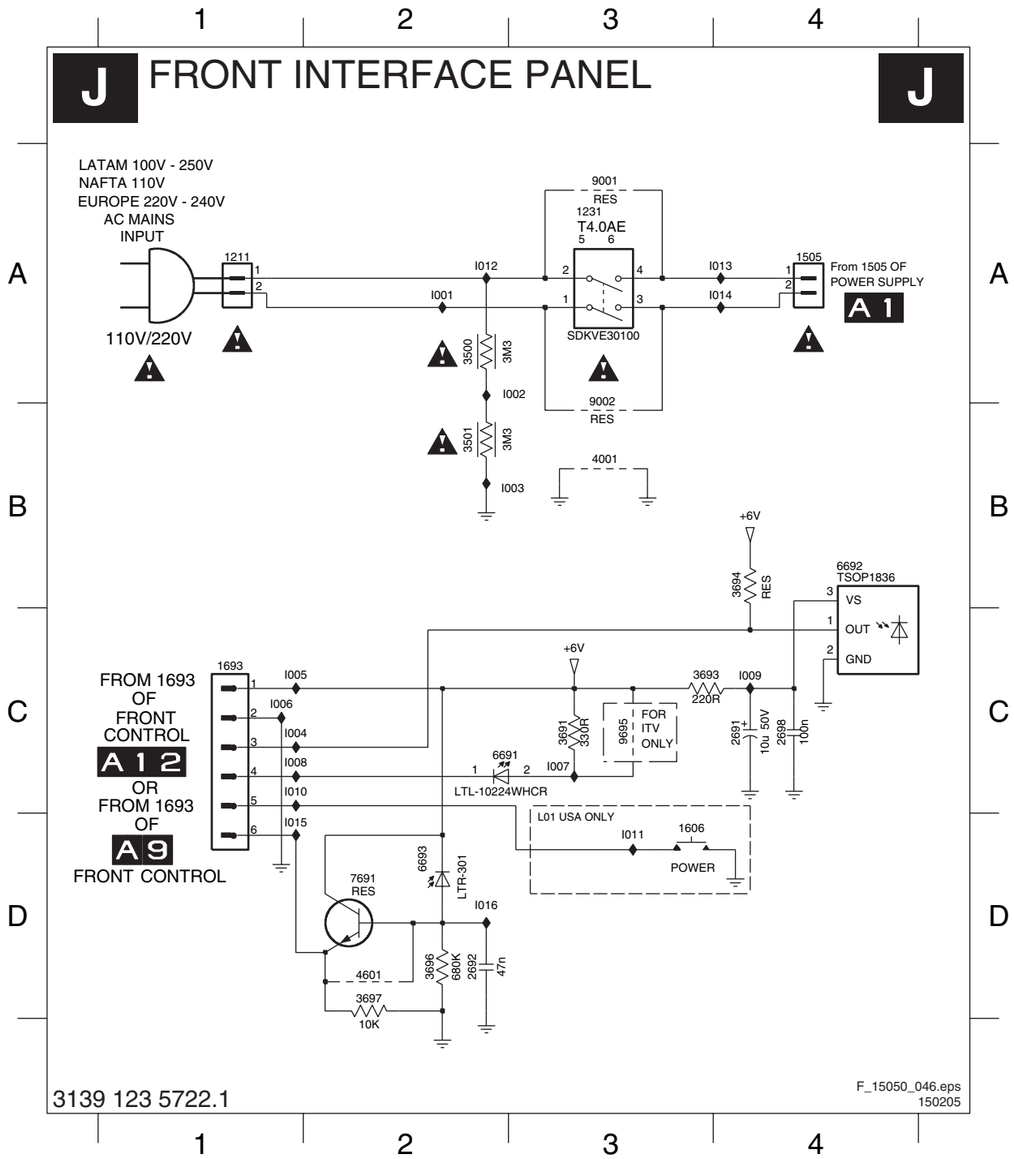


Front Interface Panel (FL13)



1109 B3
1693 B1
2101 B4
2102 C2
2103 B4
3111 B3
3112 B3
3113 A3
3114 C2
3115 C2
6101 B2
6102 A4
6103 C2
7101 C2
9111 B3
9112 C2
I107 B2
I108 B1
I109 B2
I110 B2
I111 B3
I112 B4
I119 C2
I120 B2
I121 B2

Front Interface Panel (PV0-2)



1211 A1
1231 A3
1505 A4
1606 D3
1693 C1
2691 C4
2692 D2
2698 C4
3500 A2
3501 B2
3691 C3
3693 C3
3694 B4
3696 D2
3697 D2
4001 B3
4601 D2
6691 C3
6692 B4
6693 D2
7691 D2
9001 A3
9002 B3
9695 C3
I001 A2
I002 A3
I003 B3
I004 C1
I005 C1
I006 C1
I007 C3
I008 C1
I009 C4
I010 C1
I011 D3
I012 A2
I013 A4
I014 A4
I015 D1
I016 D2

HDMI Link Receiver

M1 HDMI PANEL LINK RECEIVER

M1

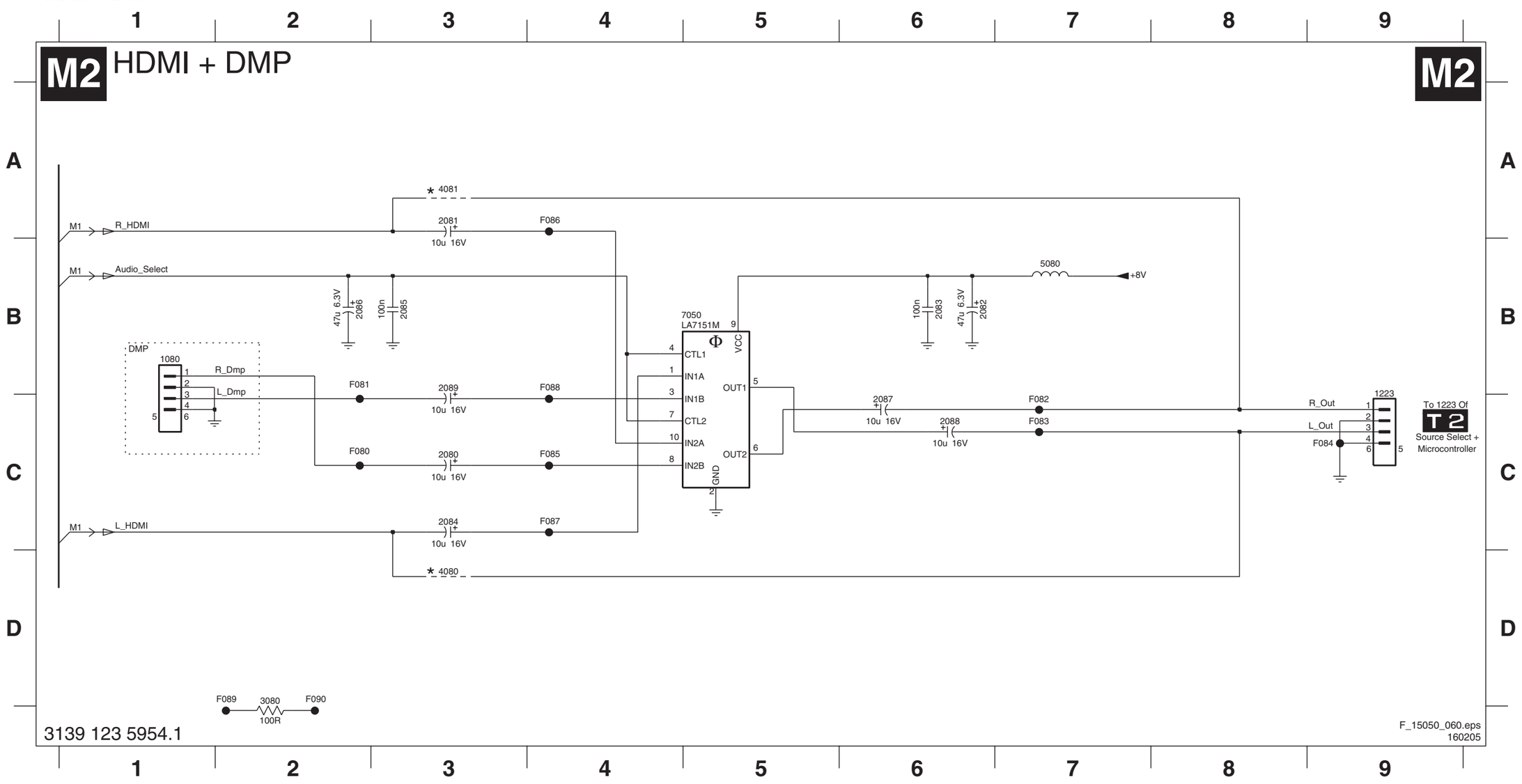
HDMI_Reset
SDA
SCL
7003 M24C02-WMN6 (256x8) EEPROM
3018 4K7
3015 4K7
3017 4K7
2035 100n
3020 100R
3016 100R
3019 100R
F067
F024
F019
2034 1n0
6003 BAV99
6002 BAV99
3026 100R
HDMI CONNECTOR
F056
F055 3027 100R
AV4 1021
RX2+ RX2- RX1+ RX1- RX0+ RX0- RXC+ RXC- CEC DDC_SCL DDC_SDA +5VHDMI HPD
DC1R019JDA
F001
FOR DEV. ONLY
F012
5012
3030 1K0
F027
5010 F013 2044 47u 6.3V 2045 100n 2047 1n0 2046 1n0 2051 1n0 2053 1n0
5031 F015 2031 47u 6.3V 2032 100n 2052 1n0 2033 1n0 2059 1n0 2069 1n0
3033 1K0
5008 F052 2003 10u 16V 2055 100n 2060 1n0
5011 F053 2004 10u 16V 2057 100n 2061 1n0
5009 F014 2037 47u 6.3V 2041 100n 2040 1n0 2039 1n0 2048 1n0 2050 1n0
5049 F016 2049 47u 6.3V 2030 100n 2036 1n0 2043 1n0 2042 1n0 2054 1n0
F065
7002 SII9993CT100
AVCC VCC PVCC1 PVCC2 DACVCC DACVCCR DACVCCG DACVCCB OVCC1
HDMI PANELLINK RECEIVER
RESET MCLKIN MCLKOUT CSCL CSDA DSCL DSDA RXC- RXC+ RX0- RX0+ RX1- RX1+ RX2- RX2+ RSET COMP PLLIN PLLOUT EXT-RES HSYNC VSYNC
3005 33R
3035 3034 3032 3031 4K7
7007 BSN20
7006 BSN20
F031 F032 F034 F035
3037 91R
2023 10u 16V
2027 10n
F023
2026 47n 16V
3014 3K9 NC
2028 10u
3036 390R
F026
NC RSVDL RSVDO SPDIF SDO WS SCK DE ODCK INT ANRPR ANGY ANBPB
F030 F057 F058
3007-1 8 33R 3007-2 7 33R 3007-3 6 33R 3007-4 5 33R
F022
AUDIO DAC
3040 1R0
3041 1R0
2009 47u 6.3V 2010 100n
F020
F021
2011 47u 6.3V 2012 100n
7011 UDA1334BT/N2
VDDA VDDD
BCK WS DATAI SYSCLK MUTE DEEM PCS VOL VOR VSSA VSSD VREF-DAC
DIGITAL INTERFACE
DE-EMPHASIS
INTERPOLATION FILTER
NOISE SHAPER
DAC DAC
SFOR0 SFOR1
2013 1u0 10V
F038
2016 47u 6.3V 2015 100n
F040
2025 1u0 10V
F041
3044 100R
R_HDMI
F036
3045 220K
2008 10n
F051
L_HDMI
3042 100R
3043 220K
2014 10n
5006 1u5
F006
5005 1u5
F005
5004 1u5
F004
3010 75R 2019 33p
3013 75R 2022 33p
3009 75R 2018 33p
3012 75R 2021 33p
3008 75R 2017 33p
3011 75R 2020 33p
F010
F009
F008
To 1220 Of T2 Source Select + Microcontroller
1220
PLLIN
COMP
M2
AGND GND PGND DACGND DACGNDR DACGNDG DACGNDB OGND GND_HS
DMP
1026
DMP_INT
4001
4002
F062 SDA
F063 SCL
F064 HDMI_Reset
F066 Audio_Select
3046 4K7
1222
To 1222 Of T2 Source Select + Microcontroller
5013 100n 2071 470u 6.3V 2070
F059
F060
F061
1221
To 1221 Of T2 Source Select + Microcontroller
7001 LD1117DT33
2001 10u 2005 10u 16V
2002 22u 16V 2000 100n
F011

3139 123 5954.1

F_15050_059.eps 160205

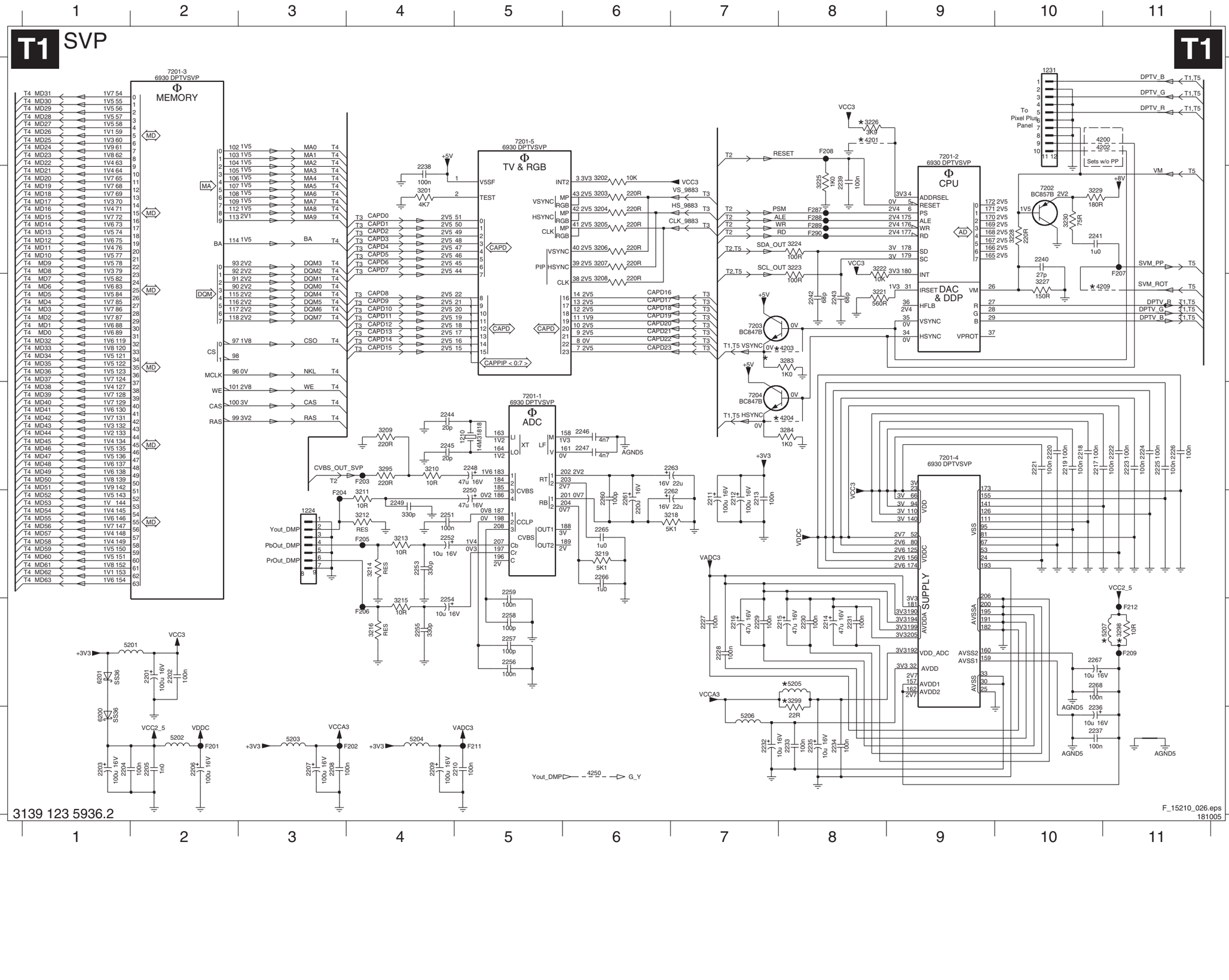
1021 D1	3042 D9
1026 G2	3043 D9
1220 E11	3044 C11
1221 G3	3045 D10
1222 G2	3046 G1
2000 G5	4001 G1
2001 G4	4002 G1
2002 G5	5004 E10
2003 A6	5005 E10
2004 A6	5006 D10
2005 G4	5008 A6
2008 D11	5009 A7
2009 A9	5010 A5
2010 A9	5011 A6
2011 A10	5012 E2
2012 A10	5013 G3
2013 C9	5031 A5
2014 D9	5049 A8
2015 D10	6002 C2
2016 D10	6003 C1
2017 E10	7001 G4
2018 E10	7002 B5
2019 D10	7003 A1
2020 E10	7006 C3
2021 E10	7007 C3
2022 D10	7011 B9
2023 E4	F001 F1
2025 C11	F004 E10
2026 E4	F005 E10
2027 E4	F006 D10
2028 E4	F008 E9
2030 A8	F009 E9
2031 A5	F010 E9
2032 A5	F011 G5
2033 A5	F012 E1
2034 B2	F013 A5
2035 A3	F014 A7
2036 A8	F015 A6
2037 A7	F016 A8
2039 A7	F019 C3
2040 A7	F020 A10
2041 A7	F021 A10
2042 A8	F022 B9
2043 A8	F023 E5
2044 A5	F024 B1
2045 A5	F026 E5
2046 A5	F027 E2
2047 A5	F030 E8
2048 A7	F031 C5
2049 A8	F032 C5
2050 A7	F033 B5
2051 A5	F034 C5
2052 A5	F035 C5
2053 B5	F036 C11
2054 A8	F038 C9
2055 A6	F040 C10
2057 A6	F041 C11
2059 A5	F051 D11
2060 A6	F052 A6
2061 A6	F053 A6
2069 B5	F054 A2
2070 G3	F055 C1
2071 G2	F056 C1
3005 B5	F057 F8
3007-1 C8	F058 F8
3007-2 C9	F059 G3
3007-3 C9	F060 G3
3007-4 C9	F061 G3
3008 E9	F062 G2
3009 E9	F063 G2
3010 D9	F064 G2
3011 E10	F065 B8
3012 E10	F066 G2
3013 D10	F067 B1
3014 E5	
3015 A2	
3016 A2	
3017 A2	
3018 A2	
3019 A2	
3020 A2	
3026 C1	
3027 C2	
3030 E2	
3031 B4	
3032 B4	
3033 A4	
3034 B4	
3035 B3	
3036 F4	
3037 E4	
3040 A10	
3041 A10	

HDMI + DMP



1080 B1
1223 C9
2080 C3
2081 A3
2082 B6
2083 B6
2084 C3
2085 B3
2086 B2
2087 C6
2088 C6
2089 B3
3080 D2
4080 D3
4081 A3
5080 B7
7050 B4
F080 C2
F081 B2
F082 C7
F083 C7
F084 C9
F085 C4
F086 A4
F087 C4
F088 B4
F089 D2
F090 D2

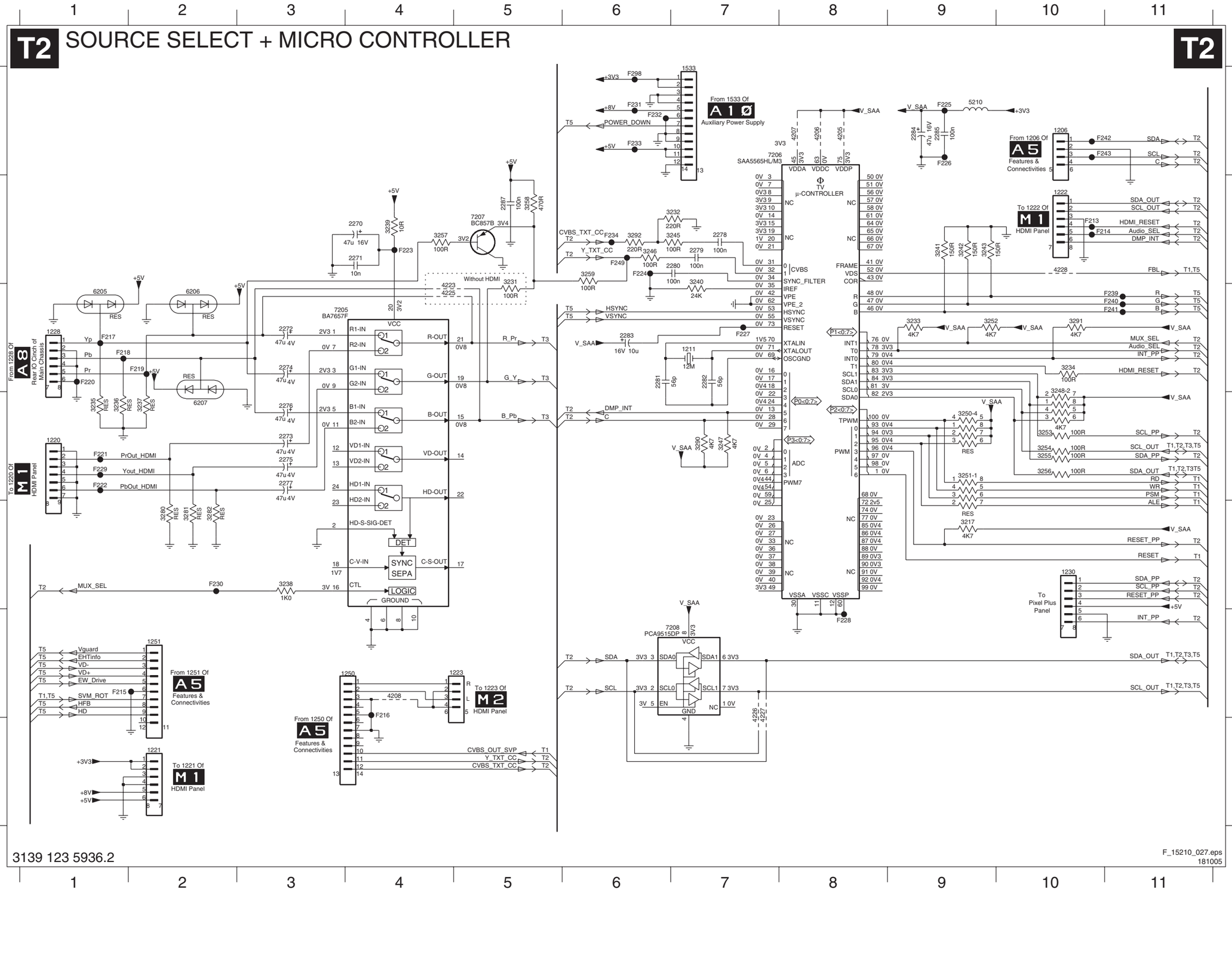
Trident Panel: SVP



1210 D5 3216 F4
1224 E3 3218 E7
1231 A10 3219 E6
2201 F2 3221 C8
2202 F2 3222 B8
2203 G1 3223 B8
2204 G1 3224 B8
2205 G2 3225 B8
2206 G2 3226 A8
2207 G3 3227 C10
2208 G3 3228 B10
2209 G4 3229 B10
2210 G5 3230 B10
2211 E7 3283 C8
2212 E7 3284 D8
2213 E7 3295 D4
2214 F8 3298 F11
2215 F8 3299 F8
2216 F7 4200 A11
2217 D10 4201 A8
2218 D10 4202 A11
2219 D10 4203 C8
2220 D10 4204 D8
2221 D10 4209 C11
2222 D11 4250 G6
2223 D11 5201 F2
2224 D11 5202 G2
2225 D11 5203 G3
2226 D11 5204 G4
2227 F7 5205 F8
2228 F7 5206 G7
2229 F7 5207 F11
2230 F8 6200 G1
2231 F8 6201 F1
2232 G7 7201-1 D5
2233 G8 7201-2 A9
2234 G8 7201-3 A2
2235 G8 7201-4 D9
2236 G10 7201-5 A5
2237 G10 7202 B10
2238 B4 7203 C7
2239 B8 7204 D7
2240 B10 F201 G2
2241 B10 F202 G4
2242 C8 F203 D4
2243 C8 F204 E3
2244 D4 F205 E4
2245 D4 F206 F4
2246 D6 F207 C11
2247 D6 F208 A8
2248 D5 F209 F11
2249 E4 F211 G5
2250 E5 F212 F11
2251 E4 F287 B8
2252 E4 F288 B8
2253 E4 F289 B8
2254 F4 F290 B8
2255 F4
2256 F5
2257 F5
2258 F5
2259 E5
2260 E6
2261 E6
2262 E7
2263 D7
2265 E6
2266 E6
2267 F10
2268 F10
3201 B4
3202 B6
3203 B6
3204 B6
3205 B6
3206 B6
3207 B6
3208 C6
3209 D4
3210 D4
3211 E4
3212 E4
3213 E4
3214 E4
3215 F4

Trident Panel: Source Select & uP

T2 SOURCE SELECT + MICRO CONTROLLER



1206 A10 F227 C7
1211 C7 F228 F8
1220 D1 F229 D1
1221 G2 F230 E2
1222 B10 F231 A6
1223 F5 F232 A6
1228 C1 F233 A6
1230 E10 F234 B6
1250 F4 F239 C11
1251 F2 F240 C11
1533 A7 F241 C11
2270 B4 F242 A10
2271 B4 F243 A10
2272 C3 F249 B6
2273 D3 F298 A6
2274 C3
2275 D3
2276 D3
2277 D3
2278 B7
2279 B7
2280 B7
2281 C6
2282 C7
2283 C6
2284 A9
2285 A9
2287 B5
3217 E9
3231 C5
3232 B7
3233 C9
3234 C10
3235 D1
3236 D1
3237 D2
3238 E3
3239 B4
3240 C7
3241 B9
3242 B9
3243 B9
3245 B7
3246 B6
3247 D7
3248-2 D10
3250-4 D9
3251-1 D9
3252 C9
3253 D10
3254 D10
3255 D10
3256 D10
3257 B4
3258 B5
3259 B6
3280 E2
3281 E2
3282 E2
3290 D7
3291 C10
3292 B6
4205 A8
4206 A8
4207 A8
4208 F4
4223 C4
4225 C4
4226 F7
4227 F7
4228 B10
5210 A9
6205 C1
6206 C2
6207 D2
7205 C4
7206 A8
7207 B5
7208 F7
F213 B10
F214 B10
F215 F1
F216 F4
F217 C1
F218 C1
F219 C2
F220 C1
F221 D1
F222 D1
F223 B4
F224 B6
F225 A9
F226 A9

Trident Panel: ADC

T3 ADC

T3

7210
AD9883AKST

VDD 3V3 11 22 23 69 78 79 VDD
VAD 3V3 26 27 39 42 45 46 51 52 59 62 VD
VCC_PLL 3V3 34 35 PVD

T2 R_Pr 4210 3260 100R 2625 47n 0V 54 RAIN → CLAMP → A/D → 8
3261 RES

T2 G_Y 4211 3262 100R 2626 47n 0V 48 GAIN → CLAMP → A/D → 8
3263 RES 2627 1n0

T2 B_Pb 4212 3264 100R 2628 47n 0V 43 BAIN → CLAMP → A/D → 8
3265 RES

ROUTA0 77 0V CAP_D16 3279-1 22R CAPD16 T1
ROUTA1 76 2V5 CAP_D17 3279-2 22R CAPD17 T1
ROUTA2 75 2V5 CAP_D18 3279-3 22R CAPD18 T1
ROUTA3 74 2V5 CAP_D19 3279-4 22R CAPD19 T1
ROUTA4 73 2V5 CAP_D20 3278-1 22R CAPD20 T1
ROUTA5 72 2V5 CAP_D21 3278-2 22R CAPD21 T1
ROUTA6 71 2V5 CAP_D22 3278-3 22R CAPD22 T1
ROUTA7 70 0V CAP_D23 3278-4 22R CAPD23 T1

GOUTA0 9 2V5 CAP_D0 3277-1 22R CAPD0 T1
GOUTA1 8 2V5 CAP_D1 3277-2 22R CAPD1 T1
GOUTA2 7 2V5 CAP_D2 3277-3 22R CAPD2 T1
GOUTA3 6 2V5 CAP_D3 3277-4 22R CAPD3 T1
GOUTA4 5 2V5 CAP_D4 3276-1 22R CAPD4 T1
GOUTA5 4 2V5 CAP_D5 3276-2 22R CAPD5 T1
GOUTA6 3 2V5 CAP_D6 3276-3 22R CAPD6 T1
GOUTA7 2 2V5 CAP_D7 3276-4 22R CAPD7 T1

BOUTA0 19 2V5 CAP_D8 3275-1 22R CAPD8 T1
BOUTA1 18 2V5 CAP_D9 3275-2 22R CAPD9 T1
BOUTA2 17 2V5 CAP_D10 3275-3 22R CAPD10 T1
BOUTA3 16 2V5 CAP_D11 3275-4 22R CAPD11 T1
BOUTA4 15 2V5 CAP_D12 3274-1 22R CAPD12 T1
BOUTA5 14 2V5 CAP_D13 3274-2 22R CAPD13 T1
BOUTA6 13 2V5 CAP_D14 3274-3 22R CAPD14 T1
BOUTA7 12 2V5 CAP_D15 3274-4 22R CAPD15 T1

0V 37 MIDSCV
2629 100n

0V5 30 HSYNC
0V5 31 VSYNC
0V4 49 SOGIN
0V 38 CLAMP
3V3 29 COAST
3V3 33 FILT
→ SYNC PROCESSING AND CLOCK GENERATION

HSOUT 66 2V4 HS_9883_1 3273 22R HS_9883_2 4213 HS_9883 T1
VSOUT 64 2V4 VS_9883_1 3272 22R VS_9883_2 4214 VS_9883 T1
SOGOUT 65 0V
DATACK 67 2V4 CLK_9883_1 3271 22R CLK_9883_2 4215 CLK_9883 T1

2635 100p 2636 100p 2637 10p

VCC_PLL
2632 82n 2633 8n2 3266 2K7

3V 57 SDA
3V 56 SCL
0V 55 A0
→ SERIAL REGISTER AND PWR MANAGMENT

REF REF-BYPASS 58 1V2 2634 100n

GND
1 10 20 21 24 25 28 32 36 40 41 44 47 50 53 60 61 63 68 80

VDD
2609 100n 2610 100n 2611 100n 2612 100n 2613 100n 2614 100n

VAD
2615 100n 2616 100n 2617 100n 2618 100n 2619 100n 2620 100n 2621 100n 2622 100n 2623 100n 2624 100n

+3V3A
5215 F235 VAD
2601 100n 2602 22u 16V 2603 22u 16V 2604 100n
F236

5216 F237 VDD
2605 22u 16V 2606 100n
3249 10R
5217 RES F238 VCC_PLL
2607 22u 16V 2608 100n

+3V3
3267 RES 3269 RES

T1,T2,T5 SDA_OUT 3268 100R
T1,T2,T5 SCL_OUT 3270 100R

2630 RES 2631 RES

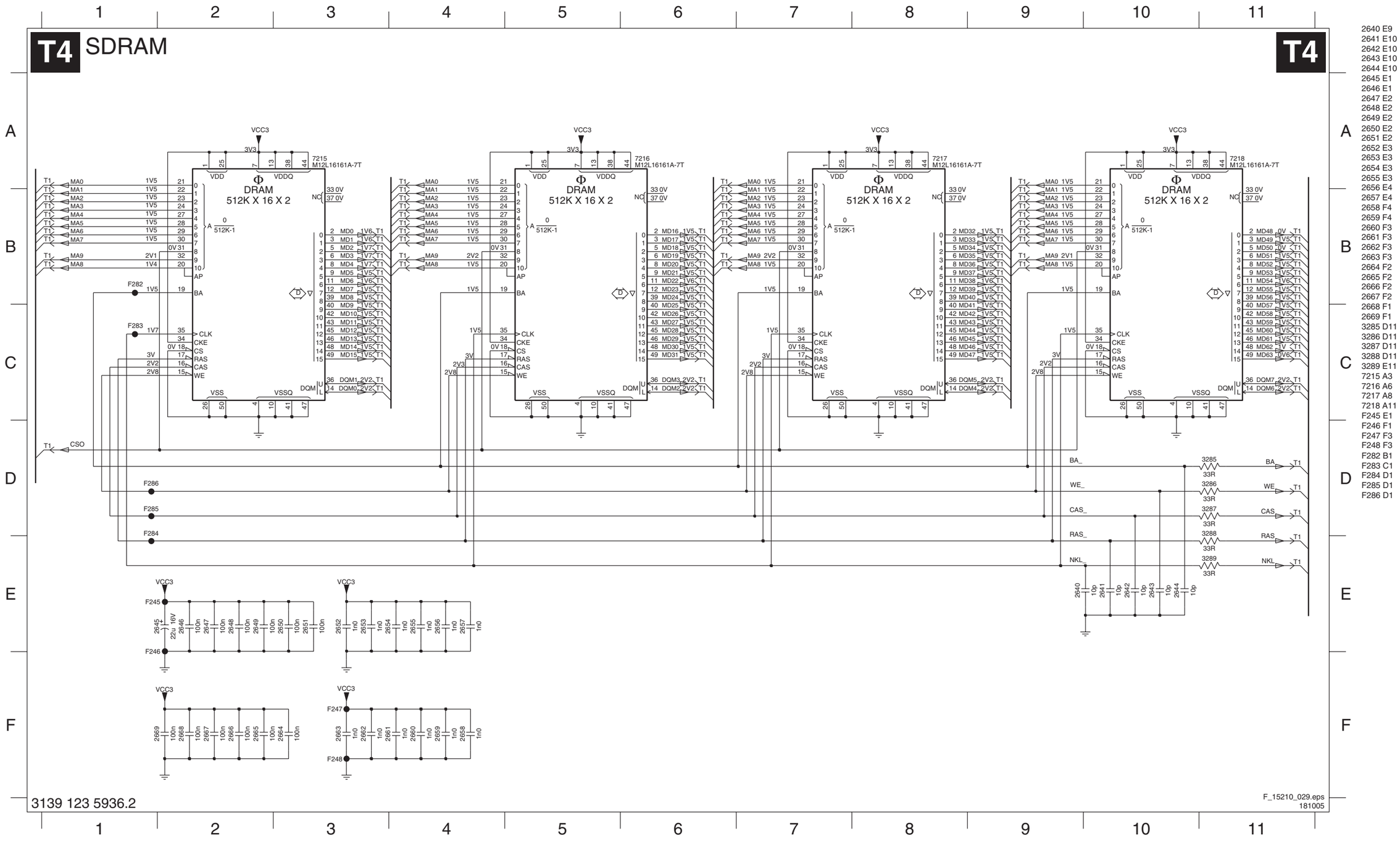
+5V 7211 LD1117DT33 3 IN OUT 2 F295 +3V3A
COM 1
2638 10u 2639 10u 16V

3139 123 5936.2

F_15210_028.eps
181005

2601 E1
2602 E1
2603 E2
2604 E2
2605 E2
2606 E2
2607 F2
2608 F2
2609 F9
2610 F9
2611 F9
2612 F9
2613 F10
2614 F10
2615 G8
2616 G8
2617 G8
2618 G8
2619 G9
2620 G9
2621 G9
2622 G9
2623 G10
2624 G10
2625 A4
2626 C4
2627 C3
2628 D4
2629 D4
2630 G3
2631 G3
2632 E3
2633 E3
2634 G7
2635 E8
2636 E8
2637 E8
2638 G1
2639 G1
3249 F2
3260 A3
3261 B3
3262 C3
3263 C3
3264 D3
3265 D3
3266 E3
3267 F2
3268 G3
3269 F2
3270 G3
3271 E8
3272 E8
3273 E8
3274-1 D9
3274-2 D9
3274-3 D9
3274-4 D9
3275-1 C9
3275-2 D9
3275-3 D9
3275-4 D9
3276-1 C9
3276-2 C9
3276-3 C9
3276-4 C9
3277-1 B9
3277-2 B9
3277-3 B9
3277-4 C9
3278-1 A9
3278-2 B9
3278-3 B9
3278-4 B9
3279-1 A9
3279-2 A9
3279-3 A9
3279-4 A9
4210 A3
4211 C3
4212 D3
4213 E9
4214 E9
4215 E9
5215 D2
5216 E2
5217 F2
7210 A4
7211 G2
F235 D2
F236 E2
F237 E2
F238 F2
F295 G2

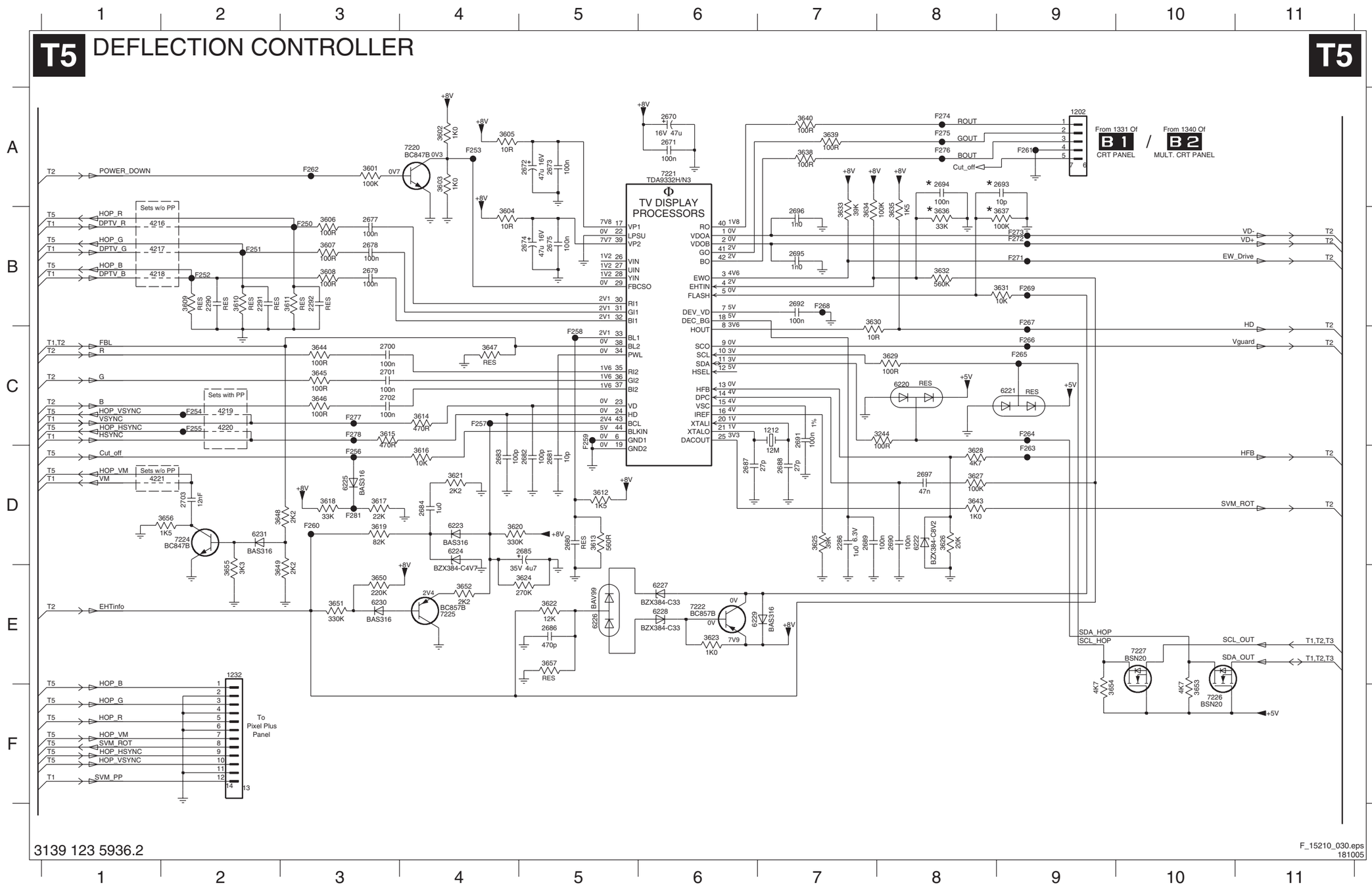
Trident Panel: SDRAM



2640 E9
2641 E10
2642 E10
2643 E10
2644 E10
2645 E1
2646 E1
2647 E2
2648 E2
2649 E2
2650 E2
2651 E2
2652 E3
2653 E3
2654 E3
2655 E3
2656 E4
2657 E4
2658 F4
2659 F4
2660 F3
2661 F3
2662 F3
2663 F3
2664 F2
2665 F2
2666 F2
2667 F2
2668 F1
2669 F1
3285 D11
3286 D11
3287 D11
3288 D11
3289 E11
7215 A3
7216 A6
7217 A8
7218 A11
F245 E1
F246 F1
F247 F3
F248 F3
F282 B1
F283 C1
F284 D1
F285 D1
F286 D1

Trident Panel: Deflection Controller

T5 DEFLECTION CONTROLLER



3139 123 5936.2

F_15210_030.eps 181005

1202	A9	3647	C4
1212	C7	3648	D2
1232	E2	3649	E2
2286	D7	3650	E3
2290	B2	3651	E3
2291	B2	3652	E4
2292	B3	3653	F10
2670	A6	3654	F9
2671	A6	3655	E2
2672	A5	3656	D2
2673	A5	3657	E5
2674	B5	4216	B1
2675	B5	4217	B1
2677	B3	4218	B1
2678	B3	4219	C2
2679	B3	4220	C2
2680	D5	4221	D1
2681	D5	6220	C8
2682	D5	6221	C9
2683	D4	6222	D8
2684	D4	6223	D4
2685	D5	6224	D4
2686	E5	6225	D3
2687	D6	6226	E5
2688	D7	6227	E6
2689	D7	6228	E6
2690	D8	6229	E6
2691	C7	6230	E3
2692	B7	6231	D2
2693	A9	7220	A4
2694	A8	7221	A6
2695	B7	7222	E6
2696	B7	7224	D2
2697	D8	7225	E4
2700	C3	7226	F10
2701	C3	7227	E10
2702	C3	F250	B3
2703	D2	F251	B2
3244	C8	F252	B2
3601	A3	F253	A4
3602	A4	F254	C2
3603	A4	F255	C2
3604	B4	F256	D3
3605	A4	F257	C4
3606	B3	F258	C5
3607	B3	F259	C5
3608	B3	F260	D3
3609	B2	F261	A9
3610	B2	F262	A3
3611	B3	F263	D9
3612	D5	F264	C9
3613	D5	F265	C9
3614	C4	F266	C9
3615	C3	F267	B9
3616	D4	F268	B7
3617	D3	F269	B9
3618	D3	F271	B9
3619	D3	F272	B9
3620	D4	F273	B9
3621	D4	F274	A8
3622	E5	F275	A8
3623	E6	F276	A8
3624	E5	F277	C3
3625	D7	F278	C3
3626	D8	F281	D3
3627	D8		
3628	D8		
3629	C8		
3630	B7		
3631	B9		
3632	B8		
3633	B7		
3634	B7		
3635	B8		
3636	B8		
3637	B9		
3638	A7		
3639	A7		
3640	A7		
3643	D8		
3644	C3		
3645	C3		
3646	C3		

8. Alignments

Index of this chapter:

Note:

- The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5 “Service Modes, ...”.
- Menu navigation is done with the CURSOR UP, DOWN, LEFT, or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- AC voltage and frequency (region dependent):
  - 120 V_{AC} / 60 Hz, or
  - 240 V_{AC} / 50 Hz.
- Connect the set to the AC power (a.k.a. Mains voltage) via an isolation transformer with a low internal resistance.
- Allow the set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use the cooling fins / plates as ground.
- Test probe: R_i > 10 Mohm; C_i < 2.5 pF.
- Use an isolated trimmer / screwdriver to perform the alignments.

8.2 Hardware Alignments

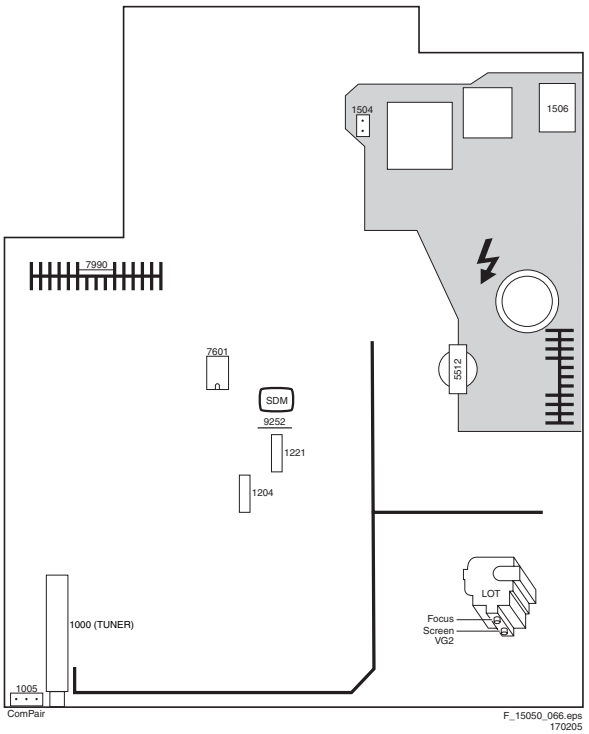


Figure 8-1 Top view family board

8.2.1 Vg2 Adjustment

1. Activate the SAM.
2. Go to the WHITE TONE sub menu.
3. Set the values of NORMAL RED, GREEN and BLUE to “32”.
4. Go, via the MENU key, to the normal user menu and set
5. SATURATION/COLOR to “0”.
6. CONTRAST to “0”.
7. BRIGHTNESS to minimum (OSD just visible).
8. Return to the SAM via the MENU key.
9. Connect the RF output of a pattern generator to the antenna input. Test pattern is a 'black' picture (blank screen on CRT without any OSD info) with a signal strength of 1 V_{PP}.
10. Set the channel of the oscilloscope to 50 V/div and the time base to 0.2 ms (external triggering on the vertical pulse). Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket.
11. Measure the cut off pulse during first full line after the frame blanking (see figure “V_{CUTOFF} waveform”). You will see two pulses, one being the “cut off” pulse and the other being the “white drive” pulse. Choose the one with the lowest value; this is the “cut off” pulse.
12. Select the cathode with the highest V_{DC} value for the alignment. Adjust the V_{CUTOFF} of this gun with the SCREEN potentiometer (see figure “Top view family board”) on the LOT to 160 V_{DC}, except for the 25/28BLD picture tube (Black Line Display, for EU only); this tube must be aligned to 140 V_{DC}.
13. Restore BRIGHTNESS and CONTRAST to normal (= 31).

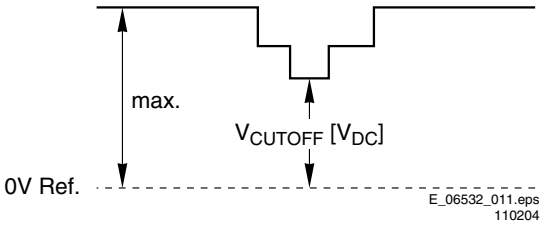


Figure 8-2 V_cutoff waveform

8.2.2 Focusing

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

8.3 Software Alignments and Settings

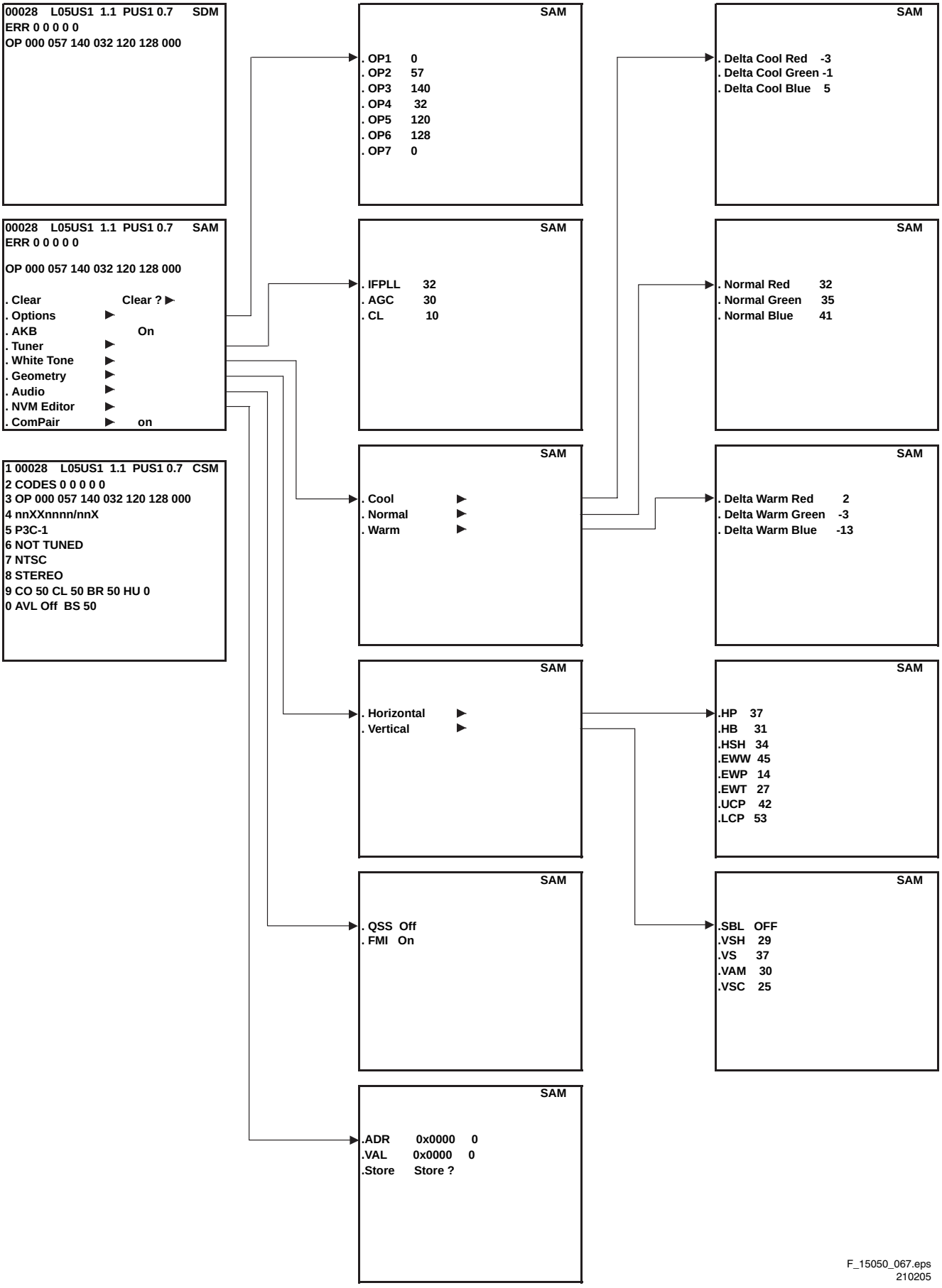


Figure 8-3 Service Mode overview

Enter the Service Alignment Mode (see also chapter 5 “Service Modes, ...”). The SAM menu will now appear on the screen. Select one of the following alignments:

- Options
- Tuner
- White Tone
- Geometry
- Audio

8.3.1 Options

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

How to Change an Option Byte

An Option Byte represents a number of different options. Changing these bytes makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OP1.. OP7) with the MENU UP/ DOWN keys, and enter the new value.

When you leave the OPTION submenu the changes in the Option Byte settings are automatically saved. Some changes will only take effect after the set has been switched “off” and “on” with the AC power switch (cold start).

How to Calculate the Value of an Option Byte

- Calculate an Option Byte value (OP1 .. OP7) in the following way:
- Check the status of the single option bits (OB): are they enabled (1) or disabled (0).
- When an option bit is enabled (1) it represents a certain value (see column “Bit value” in the table below). When an option bit is disabled, its value is 0.
- The total value of an Option Byte (decimal) is formed by the sum of its eight option bits. The factory values are printed on a sticker on the CRT (depends on region).

Table 8-1 Option Byte calculation

Bit (value)	OP1	OP2	OP3	OP4	OP5	OP6	OP7
0 (1)	OB10	OB20	OB30	OB40	OB50	OB60	OB70
1 (2)	OB11	OB21	OB31	OB41	OB51	OB61	OB71
2 (4)	OB12	OB22	OB32	OB42	OB52	OB62	OB72
3 (8)	OB13	OB23	OB33	OB43	OB53	OB63	OB73
4 (16)	OB14	OB24	OB34	OB44	OB54	OB64	OB74
5 (32)	OB15	OB25	OB35	OB45	OB55	OB65	OB75
6 (64)	OB16	OB26	OB36	OB46	OB56	OB66	OB76
7 (128)	OB17	OB27	OB37	OB47	OB57	OB67	OB77
Total:	Sum	Sum	Sum	Sum	Sum	Sum	Sum

Option Bit Assignment

The option bit assignments for all software clusters are as follows:

Table 8-2 Option code overview per model

Option Bit	Option name	32PW8422/78	34PT8422/78	34PT8422/77	32PW8422/77	32PW8422/44	29PT8422/78	29PT8422/77	29PT8422/44	28PW8422/78	28PW8422/77
OP1											
7	Philips Tuner	0	0	0	0	0	0	0	0	0	0
6	FM Radio	0	0	0	0	0	0	0	0	0	0
5	LNA	0	0	0	0	0	0	0	0	0	0
4	HDMI	1	0	0	1	1	0	0	0	0	0
3	YPbPr	1	1	1	1	1	1	1	1	1	1
2	UK PNP	0	0	0	0	0	0	0	0	0	0
1	Virgin Mode	0	0	0	0	0	0	0	0	0	0
0	China	0	0	0	0	0	0	0	0	0	0
	OP1 value (decimal)	24	8	8	24	24	8	8	8	8	8
	OP1 value (hexadecimal)	18	08	08	18	18	08	08	08	08	08
OP2											
7	SC	0	0	0	0	0	0	0	0	0	0
6	Green_UI	0	0	0	0	0	0	0	0	0	0
5	Channel Naming	1	1	1	1	1	1	1	1	1	1
4	LTI	0	0	0	0	0	0	0	0	0	0
3	Tilt	1	1	1	1	1	1	1	1	1	1
2	Fine Tuning	1	1	1	1	1	1	1	1	1	1
1	PIP Philips Tuner	0	0	0	0	0	0	0	0	0	0
0	Hue	1	1	1	1	1	1	1	1	1	1
	OP2 value (decimal)	45	45	45	45	45	45	45	45	45	45
	OP2 value (hexadecimal)	2D	2D	2D	2D	2D	2D	2D	2D	2D	2D
OP3											
7	EW Function	1	1	1	1	1	1	1	1	1	1
6	2 Tuner PIP	0	0	0	0	0	0	0	0	0	0
5	PIP_Splitter	0	0	0	0	0	0	0	0	0	0
4	Splitter	0	0	0	0	0	0	0	0	0	0
3	Virtual Dolby	1	1	1	1	1	1	1	1	1	1
2	Wide Screen	1	0	0	1	1	0	0	0	1	1
1	WSSB(EU)	0	0	0	0	0	0	0	0	0	0
0	Eco_Subwoofer	0	0	0	0	0	0	0	0	0	0

Option Bit	Option name	32PW8422/78	34PT8422/78	34PT8422/77	32PW8422/77	32PW8422/44	29PT8422/78	29PT8422/77	29PT8422/44	28PW8422/78	28PW8422/77
	OP3 value (decimal)	140	136	136	140	140	136	136	136	140	140
	OP3 value (hexadecimal)	8C	88	88	8C	8C	88	88	88	8C	8C
OP4											
7	Compress-16-10	1	1	1	1	1	1	1	1	1	1
6	Optimized-start										
5	Ultra Bass	1	1	1	1	1	1	1	1	1	1
4	Delta Volume	0	0	0	0	0	0	0	0	0	0
3											
2	Volume Limiter	1	1	1	1	1	1	1	1	1	1
1											
0	Stereo_Nicam_2CS	0	0	0	0	0	0	0	0	0	0
	OP4 value (decimal)	164	164	164	164	164	164	164	164	164	164
	OP4 value (hexadecimal)	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OP5											
7	AV1	1	1	1	1	1	1	1	1	1	1
6	AV2	1	1	1	1	1	1	1	1	1	1
5	AV3	1	1	1	1	1	1	1	1	1	1
4	CVI	1	1	1	1	1	1	1	1	1	1
3	SVHS2	1	1	1	1	1	1	1	1	1	1
2	SVHS3	0	0	0	0	0	0	0	0	0	0
1	Hotel Mode	0	0	0	0	0	0	0	0	0	0
0											
	OP5 value (decimal)	248	248	248	248	248	248	248	248	248	248
	OP5 value (hexadecimal)	F8	F8	F8	F8	F8	F8	F8	F8	F8	F8
OP6											
7	Personal Zapping	1	1	1	1	1	1	1	1	1	1
6	Smart surf	0	0	0	0	0	0	0	0	0	0
5	FM Trap	1	1	1	1	1	1	1	1	1	1
4	Combfilter	0	0	0	0	0	0	0	0	0	0
3	Active Control	1	1	1	1	1	1	1	1	1	1
2	Video Text	0	0	0	0	0	0	0	0	0	0
1	Light Sensor	1	1	1	1	1	1	1	1	1	1
0	Dual Text	0	0	0	0	0	0	0	0	0	0
	OP6 value (decimal)	170	170	170	170	170	170	170	170	170	170
	OP6 value (hexadecimal)	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
OP7											
7	Time Win1	0	0	0	0	0	0	0	0	0	0
6	Malay	0	0	0	0	0	0	0	0	0	0
5	Thai	0	0	0	0	0	0	0	0	0	0
4	Signal-strength	0	0	0	0	0	0	0	0	0	0
3		0	0	0	0	0	0	0	0	0	0
2		0	0	0	0	0	0	0	0	0	0
1		0	0	0	0	0	0	0	0	0	0
0		0	0	0	0	0	0	0	0	0	0
	OP7 value (decimal)	0	0	0	0	0	0	0	0	0	0
	OP7 value (hexadecimal)	00	00	00	00	00	00	00	00	00	00

Option bit Definition

Option Byte 1 (OP1)

- **OB17**: PHILIPS TUNER
  - 0 : ALPS / MASCO compatible tuner is in use.
  - 1 : Philips compatible tuner is in use.
- **OB16**: FM RADIO
  - 0 : FM radio feature is disabled or not applicable.
  - 1 : FM radio feature is enabled.
- **OB15**: LNA
  - 0 : Auto Picture Booster is not available or not applicable.
  - 1 : Auto Picture Booster is available.
- **OB14**: HDMI
  - 0 : High Definition Multimedia Interface (HDMI) feature is disabled or not applicable.
  - 1 : HDMI feature is enabled.
- **OB13**: YPbPr
  - 0 : Composite video (YPbPr) feature is disabled or not applicable.
  - 1 : YPbPr feature is enabled.
- **OB12**: UK PNP
  - 0 : UK's default Plug and Play setting is not available or not applicable.
  - 1 : UK's default Plug and Play setting is available.

  - When UK PNP and VIRGIN MODE are set to “1” at the initial setup and after exiting from menu, VIRGIN MODE will be set automatically to “0” while UK PNP remains “1”.
- **OB11**: VIRGIN MODE
  - 0 : Virgin mode is disabled or not applicable.
  - 1 : Virgin mode is enabled. Plug and Play menu item will be displayed to perform installation at the initial startup of the TV when VIRGIN MODE is set to “1”. After installation is finished, this option bit will be automatically set to “0”.
- **OB10**: CHINA
  - 0 : Tuning is not for China set, or this option bit is not applicable.
  - 1 : Tuning is for China set.

Option Byte 2 (OP2)
- **OB27**: Soft Clipping.
  - Not applicable. Default setting is “0”.
- **OB26**: GREEN UI
  - 0 : Green UI is disabled (for Philips brand).
  - 1 : Green UI is enabled (for Magnavox brand).
  - **Note:** only for NAFTA region.
- **OB25**: CHANNEL NAMING
  - 0 : Name FM Channel is disabled or not applicable.
  - 1 : Name FM Channel is enabled.
  - Note : Name FM channel can be enabled only when FM RADIO= “1”.
- **OB24**: LTI
  - 0 : Luminance Transient Improvement (LTI) is disabled or not applicable.
  - 1 : LTI is enabled.
- **OB23**: TILT
  - 0 : Rotate Picture is disabled or not applicable.
  - 1 : Rotate Picture is enabled.
- **OB22**: FINE TUNING
  - 0 : Fine Tuning for Channel Offset is disabled or not applicable.
  - 1 : Fine Tuning for Channel Offset is enabled.
- **OB21**: PIP PHILIPS TUNER
  - 0 : ALPS / MASCO compatible tuner is in use for PIP module.
  - 1 : Philips compatible tuner is in use for PIP module.
- **OB20**: HUE
  - 0 : Hue/Tint Level is disabled or not applicable.
  - 1 : Hue/Tint Level is enabled.

Option Byte 3 (OP3)
- **OB37**: EW FUNCTION
  - 0 : EW function is disabled. In this case, only Expand 4:3 is allowed, Compress 16:9 is not applicable.
  - 1 : EW function is enabled. In this case, both Expand 4:3 and Compress 16:9 are applicable.
- **OB36**: 2 TUNER PIP
  - 0 : Software selection no PIP
  - 1 : Software selection with PIP
  - **Note:** Only for EU/AP region for sets with PIP.
- **OB35**: PIP SPLITTER
  - 0 : Normal Tuner in PIP
  - 1 : Splitter in PIP
  - **Note:** Only for EU/AP region. For PIP sets and build in with Splitter in PIP tuner.
- **OB34**: SPLITTER
  - 0 : Normal Tuner for main chassis
  - 1 : Splitter Tuner for main chassis
  - **Note:** Only for EU/AP region.
- **OB33**: VIRTUAL DOLBY
  - 0 : Virtual Dolby is not applicable.
  - 1 : Virtual Dolby is applicable.
- **OB32**: WIDE SCREEN
  - 0 : Software is used for 4:3 sets or not applicable.
  - 1 : Software is used for 16:9 sets.
- **OB31**: WSSB (EU)
  - 0 : WSSB is disabled or not applicable.
  - 1 : WSSB is enabled.
  - Note : This option bit can be set to “1” only when WIDE SCREEN= “1”.
- **OB30**: ECO SUBWOOFER
  - 0 : Feature is disabled or not applicable.
  - 1 : Feature is enabled.

Option Byte 4 (OP4)
- **OB47**: OP_COMPRESS_16_10
  - 0 : Compress mode is not used.
  - 1 : Compress mode is used.
- **OB46**: OP_OPTIMISED_START
  - Not applicable. Default setting is “0”.
- **OB45**: ULTRA BASS
  - 0 : Ultra Bass is disabled or not applicable.
  - 1 : Ultra Bass is enabled.
  - Default setting is “0”.
- **OB44**: DELTA VOLUME
  - 0 : Delta Volume Level is disabled or not applicable.
  - 1 : Delta Volume Level is enabled.
- **OB43**: Reserved
  - Default setting is “0”.
- **OB42**: VOLUME LIMITER
  - 0 : Volume Limiter Level is disabled or not applicable.
  - 1 : Toggle Volume Limiter Level is enabled.
- **OB41**: Reserved
  - Default setting is “0”.
- **OB40**: STEREO NICAM 2CS
  - 0 : For AV Stereo.
  - 1 : For NICAM Stereo 2CS.

Option Byte 5 (OP5)
- **OB57**: AV1
  - 0 : AV1 source is not present.
  - 1 : AV1 source is present.
- **OB56**: AV2
  - 0 : AV2 source is not present.
  - 1 : AV2 source is present.
  - Note : For EU, when AV2=“1”, both EXT2 and SVHS2 should be included in the OSD loop.
- **OB55**: AV3
  - 0 : Side/Front AV3 source is not present.
  - 1 : Side/Front AV3 source is present.
- **OB54**: CVI
  - 0 : CVI source is not available.
  - 1 : CVI source is available.
- **OB53**: SVHS2
  - 0 : SVHS2 source is not available.
  - 1 : SVHS2 source is available.
  - Note : This option bit is not applicable for EU.
- **OB52**: SVHS3
  - 0 : SVHS3 source is not available.
  - 1 : SVHS3 source is available.
  - Note : This option bit is not applicable for EU.
- **OB51**: HOTEL MODE
  - 0 : Hotel mode is disabled or not applicable.
  - 1 : Hotel mode is enabled.
- **OB50**: Reserved
  - Default setting is “0”.

Option Byte 6 (OP6)
- **OB67**: PERSONAL ZAPPING
  - 0 : Personal Zapping feature is disabled or not applicable.
  - 1 : Personal Zapping feature is enabled.
- **OB66**: SMART_SURF
  - 0 : Smart Surf key is not used on remote control.
  - 1 : Smart Surf key is used on remote control.
- **OB65**: FM TRAP
  - 0 : FM Trap is not present.
  - 1 : FM Trap is present.
  - **Note:** Only for LATAM region.
- **OB64**: COMBFILTER
  - 0 : 3D-combfilter is not present.

  - 1 : 3D-combfilter is present.
- **OB63**: ACTIVE CONTROL
  - 0 : Active Control feature is disabled or not applicable.
  - 1 : Active Control feature is enabled.
- **OB62**: VIDEO TEXT
  - 0 : Video Text (DW with TXT) is disabled or not applicable.
  - 1 : Video Text (DW with TXT) is enabled.
  - **Note:** For EU only.
- **OB61**: LIGHT SENSOR
  - 0 : Light sensor feature is disabled or not applicable.
  - 1 : Light sensor feature is enabled.
- **OB60**: DUAL TEXT
  - 0 : Dual Text and Text Dual Screen are disabled or not applicable.
  - 1: Dual Text and Text Dual Screen are enabled.

Option Byte 7 (OP7)
- **OB77**: TIME WIN1
  - 00 : The time window is set to 1.2 s.
  - 01 : The time window is set to 2 s.
  - Note :The time-out for all digit entries depends on this setting.
- **OB76**: MALAY
  - For AP only. Default setting is “0”.
- **OB75**: THAI
  - For AP only. Default setting is “0”.
- **OB74**: SIGNAL_STRENGTH
  - For AP only. Default setting is “0”.
- **OB73**: Reserved
  - Default setting is “0”.
- **OB72**: Reserved
  - Default setting is “0”.
- **OB71**: Reserved
  - Default setting is “0”.
- **OB70**: Reserved
  - Default setting is “0”.

8.3.2 Tuner

Note: Described alignments are only necessary when the NVM (item 7601) is replaced.

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

AGC (AGC take over point)
1. Set the external pattern generator to a color bar video signal and connect the RF output to aerial input. Set amplitude to 10 mV and set frequency to 61.25 MHz (channel 3).
2. Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main panel).
3. Activate the SAM.
4. Go to the TUNER sub menu.
5. Select AGC with the UP/DOWN cursor keys.
6. Adjust the AGC-value with the LEFT/ RIGHT cursor keys until the voltage at pin 1 of the tuner lies between 3.8 and 2.3 V (default value is “20”).
7. Switch the set to STANDBY, in order to store the alignments.

CL (Cathode drive level)
Always set to “5”.

8.3.3 White Tone

In the WHITE TONE sub menu, the values of the black cut off level can be adjusted. Normally, no alignment is needed, and you can use the given default values.
The color temperature mode (NORMAL, COOL and WARM) and the color (R, G, and B) can be selected with the UP/DOWN RIGHT/LEFT cursor keys. The value can be changed with the LEFT/RIGHT cursor keys. First, select the values for the NORMAL color temperature. Then select the values for the COOL and WARM mode. After alignment, switch the set to STANDBY, in order to store the alignments.

Default settings:
- NORMAL:
  - NORMAL R= “26”
  - NORMAL G= “32”
  - NORMAL B= “27”
- COOL:
  - DELTA COOL R= “-3”
  - DELTA COOL G= “0”
  - DELTA COOL B= “5”
- WARM:
  - DELTA WARM R= “2”
  - DELTA WARM G= “0”
  - DELTA WARM B= “-6”

8.3.4 Geometry

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

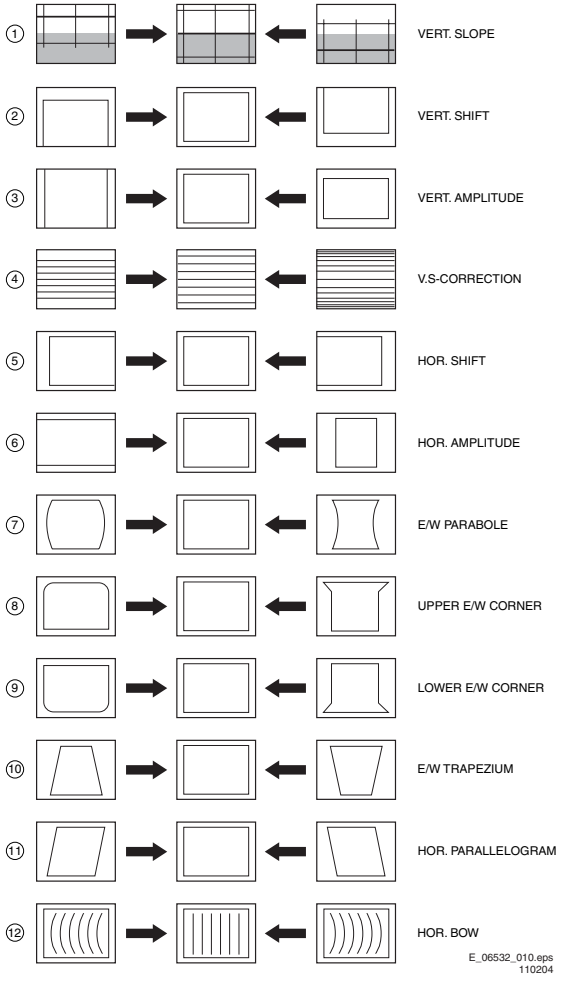


Figure 8-4 Geometry alignments

1. Connect an **external** video pattern generator to the aerial input of the TV-set and input a crosshatch test pattern. Set the generator amplitude to at least 1 mV and set frequency to 61.25 MHz (channel 3).
2. Set 'Smart Picture' to NATURAL (or MOVIES).
3. Activate the SAM menu (see chapter 5 “Service Modes, ...”).
4. Go to the GEOMETRY sub menu.
5. Choose HORIZONTAL or VERTICAL alignment.

Now the following alignments can be performed:

Horizontal

- **Horizontal Parallelogram (HP).** Align straight vertical lines in the top and the bottom; vertical rotation around the center.
- **Horizontal Bow (HB).** Align straight horizontal lines in the top and the bottom; horizontal rotation around the center.
- **Horizontal Shift (HSH).** Align the horizontal center of the picture to the horizontal center of the CRT.
- **East West Width (EWW).** Align the picture width until the complete test pattern is visible.
- **East West Parabola (EWP).** Align straight vertical lines at the sides of the screen.
- **Upper Corner Parabola (UCP).** Align straight vertical lines in the upper corners of the screen.
- **Lower Corner Parabola (LCP).** Align straight vertical lines in the lower corners of the screen.
- **East West Trapezium (EWT).** Align straight vertical lines in the middle of the screen.
- **H60 (Delta HSH for 60Hz, if present).** Align straight horizontal lines if NTSC system is used (60 Hz) i.s.o. PAL (50 Hz). Default value is “9”.

Vertical

- **Service blanking (SBL).** Switch the blanking of the lower half of the screen “on” or “off” (to be used in combination with the vertical slope alignment).
- **Vertical Shift (VSH).** Align the vertical centering so that the test pattern is located vertically in the middle. Repeat the 'vertical amplitude' alignment if necessary.
- **Vertical slope (VS).** Align the vertical center of the picture to the vertical center of the CRT. This is the first of the vertical alignments to perform. For an easy alignment, set SBL to “on”.
- **Vertical Amplitude (VAM).** Align the vertical amplitude so that the complete test pattern is visible.
- **Vertical S-Correction (VSC).** Align the vertical linearity, meaning that vertical intervals of a grid pattern must be equal over the entire screen height.
- **Vertical Zoom (VX, if present).** The vertical zoom is added in for the purpose of development. It helps the designer to set proper values for the movie expand or movie(16x9) compress. Default value is “25”.
- **V60 (Delta VAM for 60Hz, if present).** Align straight vertical lines if NTSC system (60 Hz) is used i.s.o. PAL (50 Hz). Default value is “-2”.

8.3.5 Audio

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

QSS (Quasi Split Sound)

- For NICAM/2CS sound system (EU/AP, except for AP-NTSC): set to “On”.
- For AV-Stereo sound system (sets without NICAM): set to “On”.
- For all other sets (NAFTA/LATAM/AP-NTSC): set to “Off”.

FMI (Frequency Modulation Intercarrier)

- For NICAM/2CS sound system (EU/AP, except for APNTSC): set to “On”.
- For AV-Stereo sound system (sets without NICAM): set to “Off”.
- For dBx/non-dBx sound systems: set to “On”.

NICAM Alignment

- For sets with NICAM/2CS (EU/AP, except for AP-NTSC) sound system: set to “79”.
- For all other sets (NAFTA/LATAM/AP-NTSC): set to “63”.

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

Index of this chapter:

Notes:

- Only **new** circuits compared to the L04U chassis are described in this chapter. For the other circuit descriptions, see the manual of the L04U chassis.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in sections “Block Diagrams, ...”, and/or “Electrical Diagrams”. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The "L05" chassis is designed for the model year 2005 and is used for TV sets with large screen sizes (from 29 to 34 inch), in Super Flat and Real Flat executions (both in 4:3 and 16:9 variants). This chassis is High Definition ready with a NTSC/PAL tuning system.
There are three types of CRT, namely one with 100 degrees deflection angle, one with 110 degrees and a Wide Screen CRT.

In comparison to its predecessor (the L04), this chassis has the following (new) features:

- **High Definition (HD) signal processing:** The chassis has a special HD processing board.
- **HDMI input:** The chassis has a High-Definition Multimedia Interface (HDMI) input.

The standard architecture consists of a Main panel (called "family board"), a Picture Tube panel, a Side I/O panel, a HDMI panel, a HD panel and a Top Control panel. The Main panel consists primarily of conventional components with some surface mounted devices in the audio and video processing part.
The functions for the basic video and audio processing are performed by one IC (TDA1200x, item 7200), the so-called third generation Ultimate One Chip (UOC-III) (a.k.a. ‘Hercules’). This chip is mounted on the “solder” side of the main panel, and has the following tasks:

- Mono/stereo, audio switching and part of the video switching.
- FM sound demodulation.

The CVBS-signal produced by the UOCIII is supplied to the HD panel. This panel converts the standard framerate (1fH) CVBS-signal coming from the tuner and from the AV1 and AV2 inputs into a HD-signal with double framerate (2fH). The HD panel also handles video signals from the HDMI and the CVI input (I/O panel).
All signals entering the TV set, be it NTSC/PAL signals from the tuner or signals already in HD format from the HDMI I/O panel, are displayed on the CRT in 1080i format. The HD panel performs the following functions:

- Video processing (mainly by the Trident chip, IC7201).
- OSD processing.
- Closed caption / text processing
- A/D conversion (of analog signals coming directly from the HDMI I/O panel).

The tuning system features 181 channels with on-screen display. The main tuning system uses a tuner, a microcomputer, and a memory IC mounted on the main panel. The microcomputer communicates via the I^2C bus with the memory IC, the customer keyboard, the remote receiver, the tuner, the signal processor IC, the HD processing section, and the audio output IC. The memory IC retains the settings for favorite stations, customer-preferred settings, and service / factory data.
The on-screen graphics and closed caption decoding are done within IC 7206 located on the HD panel. They are added to the main signal in the display processor, IC 7221, also located on the HD panel.

The chassis uses a Switching Mode Power Supply (SMPS) for the main voltage source. The chassis has a 'hot' ground reference on the primary side and a cold ground reference on the secondary side of the power supply and the rest of the chassis. For more information on the power supply, see the L04 manual.

9.2 2fH Synchronization

The 2fH sync generation is done by the DPTV SVP (IC7201). This IC converts the H and V sync signals (Hs and Vs) coming from the UOC into 2fH sync signals (HSYNC and VSYNC) which are outputted to the TDA9332 (HOP).
The HOP again generates the necessary deflection signals like VD+ and VD- for the Frame deflection; HD for line deflection; EW_DRIVE.

9.3 Source Select

This chassis has the following inputs in addition to the tuner RF input:

- **AV1:** This is a composite video input.
- **CVI:** This is a Component Video Input, it can accept 480i, 480p, 720p or 1080i.
- **AV2:** This input can accept CVBS or S-Video.
- **Side:** This input can accept CVBS or S-Video.
- **HDMI:** This is a High-Definition Multimedia Interface, it can accept 480p, 720p or 1080i video and audio in a digital TMDS (Transition Minimized Differential Signal) format.

The audio/video source selection between the tuner, AV1, AV2 and Side is controlled via the UOCIII. The selected signal is fed to the HD panel which selects between the output of the UOCIII, CVI, and the HDMI input.
The Audio/Video Source Select is one of the more complex functions due to its diversity and complex switching. The Audio/Video Source Select comprises the following components:

- The UOCIII for Mono Audio and Video Source Selection.
- The HEF switch for Stereo Audio as well as Video Selection.

9.3.1 Options

The option settings for the Source Selection can be found in Option settings of the SAM mode. The Option settings for Option 5 are as follows:

- Option Byte 5
  - Bit 7: AV1
  - Bit 6: AV2
  - Bit 5: AV3
  - Bit 4: CVI
  - Bit 3: SVHS2
  - Bit 2: SVHS3
  - Bit 1: Hotel mode
  - Bit 0:

For more details on the option settings, please refer to chapter 8 “Alignments”.

9.3.2 Audio Source Selection

The signals coming out of the DEMDEC (internal demodulator/ decoder block of the UOCIII) are selectable and consist of the following (depending on the transmission):

- DEC L/R (Can be NICAM, FM 2CS, or BTSC Stereo).
- Mono (Refers to fallback/forced Mono in Stereo Transmission).
- SAP.

For L05, the assigned I/O with respect to the UOCIII is as follows:

- AV1 Input assigned to **Audio In 5**.
- AV2 Input assigned to **Audio In 3**.
- Side AV Input assigned to **Audio In 4**.
- External Interface Input assigned **to Audio In 2**.
- Constant Level Output assigned to **Loudspeaker Output**.

9.3.3 Video Source Selection

Video source selection is done inside the UOCIII. Therefore it provides a video switch with 3 external CVBS inputs and a CVBS output. All CVBS inputs can be used as Y-input for Y/C signals. However, only 2 Y/C sources can be selected because the circuit has 2 chroma inputs.
The selected input signal is fed to the HD panel for further processing.

9.4 Video Processing

The Video Processing is divided into two sections, one for the processing of 1fH signals (by the UOCIII), and a second for the processing of 2fH signals (on the HD panel, by the Trident chip).

The tuner is only one of the sources of video signal for the UOCIII. The tuner is controlled by the UOCIII. The UOCIII also receives video signals from AV2 and the Side I/O panel.
If a video signal is selected by the user, the selected CVBS signal is output to two different lines. One CVBS line goes to the Trident chip, IC 7201, on the HD panel. CVBS_TXT signals are fed to IC 7206 on the HD panel, which is able to process Closed Caption text or Teletext. This IC also generates the OSD texts.

If the TV set receives a 2fH signal (via one of its HDMI panel inputs, i.e. the CVI/YPbPr or the HDMI input), the signal is fed to a selector switch on the HD panel, IC 7205. The selected signal (component video or RGB) is fed to an AD converter, IC 7210. The digital signal coming from the AD converter is fed to the Trident chip, IC 7201. This IC enhances the video quality of the picture and scales the picture to the 1080i format. The analog RGB signal coming from the Trident chip is fed to the display processor, IC 7221. Here, the picture control functions are performed, as well as the insertion of OSD. Then, the processed video signal is fed to the CRT panel.

Some features:

- Full YUV-loop interface (alternative functions: DVD, RGB or Y/C).
- Internal OSD insertion (not Saturation or Contrast controlled).
- Double window implementation.
- Linear / non linear scaling for 16:9 sets.
- Tint (hue) on UV signals (including DVD).
- Peaking, Coring, Black \ Blue \ White-stretch.
- Transfer-Ratio and Scavem (also on TXT).

9.4.1 Block Diagram

Following diagram is the block diagram of the video processing part:

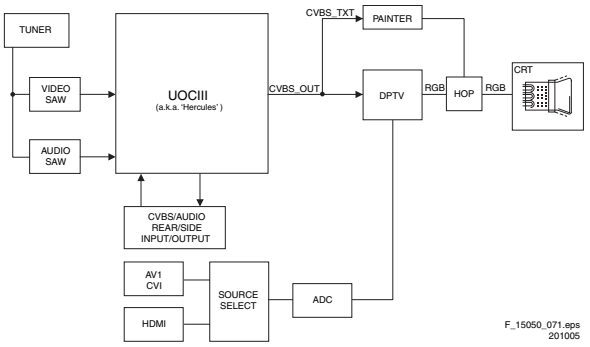


Figure 9-1 Video processing block diagram

9.5 Audio Processing

The audio decoding is done entirely via the UOCIII, IC 7200. The IF output from the Tuner is fed directly to either the Video-IF or the Sound-IF input depending on the type of concept chosen. There are mainly two types of decoder in the UOCIII, an analog decoder that decodes only Mono, regardless of any standards, and a digital decoder (or DEMDEC) that can decode both Mono as well as Stereo, again regardless of any standards.

Audio is included in the HDMI bit stream. Digital audio from IC7002 is fed to an audio DAC, IC 7011. The audio signal from the DAC is fed to IC 7050, a switch, of which only one input is used. The output of the switch is fed to the UOCIII chip, IC 7200.
Audio for the CVI input should be inserted into AV1. Pins 68 and 69 of the UOCIII provide the audio signal for the two-channel 20 W Audio Amplifier, IC 7990.

9.6 Abbreviation List

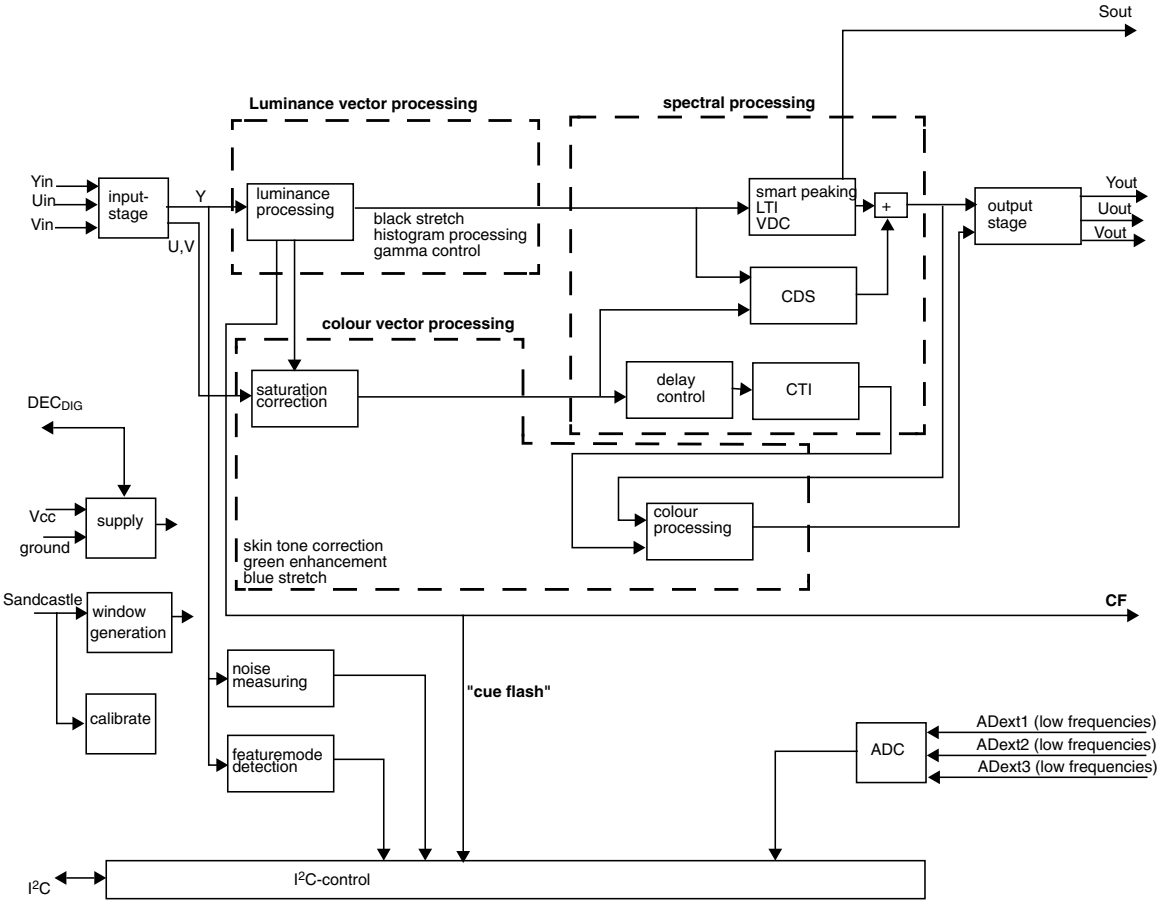
2CS	2 Carrier (or Channel) Stereo
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific region
AR	Aspect Ratio: 4 by 3 or 16 by 9
ATS	Automatic Tuning System
AV	External Audio Video
AVL	Automatic Volume Leveler
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
CC	Closed Caption
CCC	Continuous Cathode Calibration
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
CVI	Component Video Input
DAC	Digital to Analogue Converter
DBX	Dynamic Bass Expander or noise reduction system in BTSC
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFO	Extra High Tension information
EPG	Electronic Programming Guide
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FM	Field Memory or Frequency Modulation
H	Horizontal sync signal
HP	Headphone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C or IIC	Integrated IC bus
IF	Intermediate Frequency
ITV	Institutional TV
LATAM	Latin American countries like Brazil, Argentina, etc.
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	Large Screen or Loudspeaker
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OB	Option Bit
OC	Open Circuit
OP	Option Byte
OSD	On Screen Display
PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power-On Reset
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RGB	Red, Green, and Blue video signals
ROM	Read Only Memory
SDAM	Service Default / Alignment Mode
SAP	Second Audio Program
SC	Sandcastle: pulse derived from sync signals
S/C	Short Circuit
SCL	Serial Clock
SDA	Serial Data
SECAM	Sequence Couleur Avec Memoire. Color system mainly used in France and East Europe. Color carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
uP	Microprocessor
UOCIII	3rd generation Ultimate One Chip (a.k.a. 'Hercules')
UVSH	UHF, VHF, S-, and Hyper- band
V	Vertical sync signal
V_BAT	Main supply voltage for the deflection stage (mostly 141 V)
V-chip	Violence Chip
VCR	Video Cassette Recorder
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

9.7 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.7.1 Diagram H, TDA9178 (IC7610)

BLOCK DIAGRAM



PIN CONFIGURATION

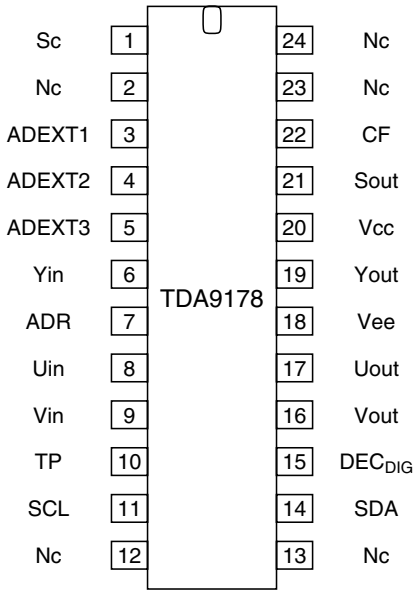


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Figure 9-2 Internal Block Diagram and Pin Configuration

10. Spare Parts List

Not applicable

11. Revision List

Manual xxxx xxx xxxx.0

- First release.