zenith

SERVICE MANUAL

Product Type:	Flat Screen Digital TV
Chassis:	HD-S
Manual Series:	CM154
Manual Part #:	923-03496
Model Line:	E
Product Year:	2002

Model Series:

C27V22
C32V22
C36V22

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PRODUCT SAFETY SERVICING GUIDELINES FOR AUDIO-VIDEO PRODUCTS

IMPORTANT SAFETY NOTICE

This Manual was prepare for use only by properly trained audio-visual service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from Zenith Electronics Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard. These components are indicated by the letter "x" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by Zenith Electronics Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

Caution: Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

GRAPHIC SYMBOLS



The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of non-insulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.



The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

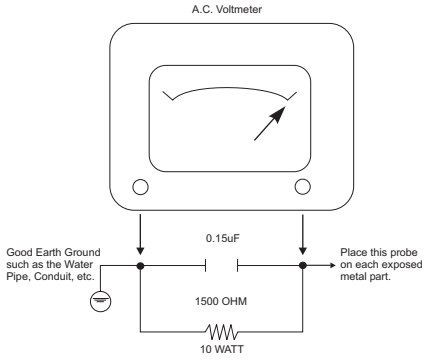
SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock.

After the original service problem has been corrected, make a check of the following:

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is specially important on items transported to and from the repair shop.
2. Verify that all protective devices as such as insulators, barriers, covers, shields, strain relief's, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After re-assembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST. Use an AC voltmeter having 5000 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measures for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



X-RADIATION

1. Be sure procedures and instructions to all service personnel cover the subject of x-radiation. The only potential source of x-rays in current TV receivers is the picture tube. However, this tube does not emit x-rays when the HV is at the factory-specified level. The proper value is given on the applicable schematic. Operation at higher voltages may cause a failure of the picture tube or high-voltage supply and, under certain circumstances, may produce radiation in excess of desirable levels.
2. Only factory-specified CRT anode connectors must be used.
3. It is essential that the service personnel have available an accurate and reliable high-voltage meter
4. When the high-voltage circuitry is operating properly, there is no possibility of an x-radiation problem. Every time a color chassis is serviced, the brightness should be run up and down while monitoring the high voltage with a meter, to be certain that the high voltage does not exceed the specified value and that it is regulating correctly.
5. When troubleshooting and making test measurements in a product with a problem of excessively high voltage, avoid being unnecessarily close the picture tube and the high voltage power supply. Do not operate the product longer than necessary to locate the cause of excessive voltage.
6. Refer to HV, B+, and shutdown adjustment procedures described in the appropriate schematics and diagrams (where used).

IMPLOSION

1. All direct view picture tubes are equipped with an integral implosion protection system; take care to avoid damage during installation.
2. Use only the recommended factory replacement tubes.

TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a titled position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using a cart or stand that has not been listed by Under writers Laboratories, Inc. for use with its specific model of television receiver or generically approved for use with TVs of the same or larger screen size
8. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

X-RADIATION

To prevent possible exposure to radiation caused by excessive CRT Anode voltage, the HD-S Chassis incorporates a "High Voltage Shutdown" circuit. This circuit senses the level of flyback pulse from the "Flyback Transformer" representative of the actual high voltage on the CRT anode. When this level exceeds a predetermined voltage, the circuit shuts down the horizontal drive, preventing further generation of anode voltage. In this condition, the horizontal drive is "latched" off for about 5 seconds, after which, restart is attempted.

SHUTDOWN CIRCUIT OPERATION

The flyback pulse voltage from Pin 6 of TX3201 (Flyback Transformer) is peak detected (rectified) by the action of diode D3000 and capacitor C3001. This forms a DC voltage appearing on C3001 representative of the CRT anode voltage (HV) produced by T3201. This voltage is divided down by precision resistors RX3001, RX3002, & RX3003. This lower voltage, appear on the positive input of IC3101.

If the CRT anode voltage becomes excessive, pin 5 of IC3101 will be higher than the negative input of pin 6. This will cause the output of pin 7 to rise to approximately 15 volts. This signal (SD_DRV) is sent to the base of **Q3401** causing the Horizontal Drive to be disabled and latched, which causes the HV to shutdown. In about 5 seconds, the shutdown circuit resets (Pins 8, 9 & 14 of IC2900), the Horizontal Drive and HV will be reestablished. The circuit formed by Q3104, C3108, C3113, D3107, R3134, R3132, R3131, and R3133 disables the HV compensation output (Q3102-B signal) during turn on and shutdown conditions (transients).

CRT ANODE HIGH VOLTAGE MEASUREMENT PROCEDURE

Each CRT screen has its own safe operating Anode Voltage and shutdown voltage. Critical Safety components (designed with an 'X' in the component designator) are designed to operate the CRT at a safe operating Anode voltage and provide proper shutdown thresholds. If replacement of any of these components are deemed necessary, it is important to use original type Zenith replacement components.

After a replacement is made, confirm proper Anode voltage using the following procedure.

Measurement of the CRT Anode voltage must be performed with no visible raster on the screen and operating at nominal horizontal sacnning frequency 37.9 khz (TV or SVGA signal).

After discharging the CRT, connect a high impedance high voltage meter to the CRT anode. Turn the television 'On' and confirm good signal is being displayed. Reduce Brightness and Contrast settings until the picture is well extinguished. Observe the Anode voltage meter reading and compare with the table below for the proper CRT screen size. If the voltage reading is higher than the maximum, verify circuit component values and proper operation.

HV SHUTDOWN MEASUREMENT PROCEDURE

1. Adjust the beam current to 0mA in NTSC mode.

2. Apply a variable DC voltage to pin 10 of the PDT1 connector, from 20 to 0 VDC, starting at 20 VDC.

3. Slowly decrease supply towards zero.

4. Remove DC voltage from pin 10 of PTD1.

5. After approximately 5 seconds, verify that the HV must be reestablished (High Voltage Reset).

SHUTDOWN SAFETY CIRCUIT

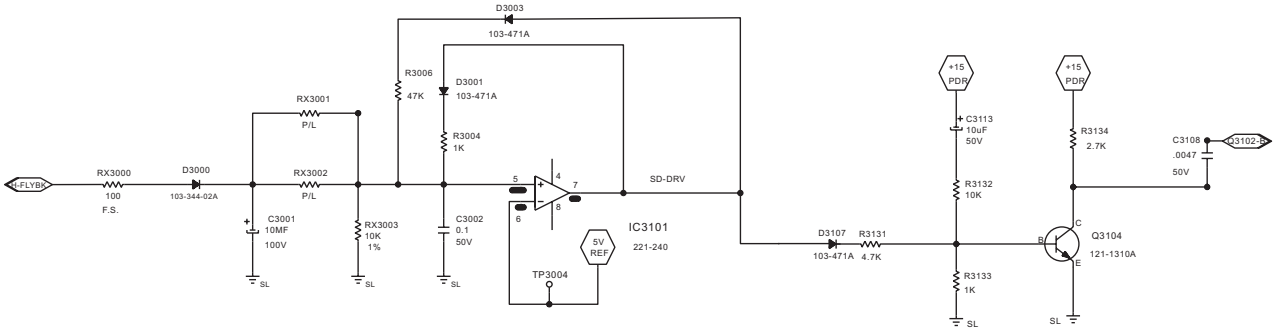


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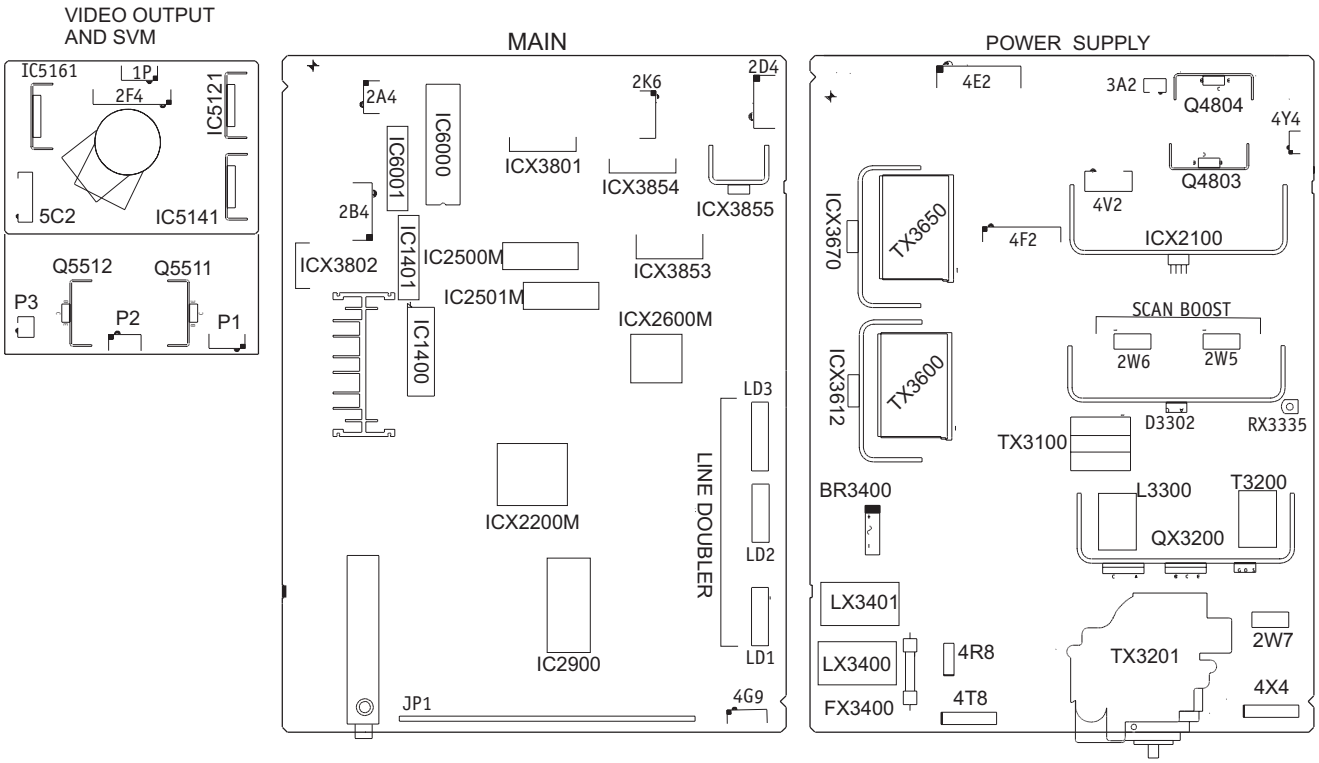
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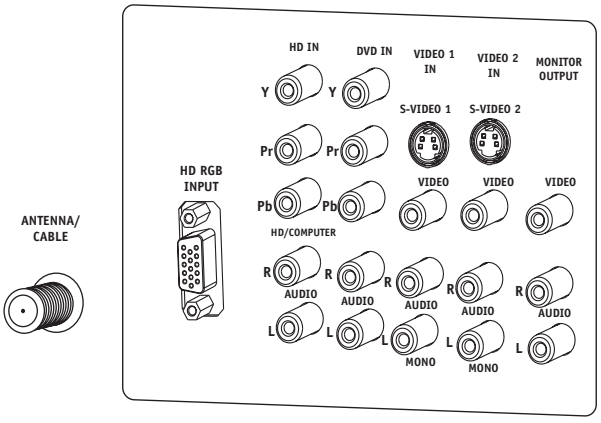
OVERVIEW

The HD-S chassis will be used on the E-Line Consumer Products. This chassis was developed for the entertainment or consumer market. This manual covers 27", 32", and 36" screen sizes. A main & power supply boards are used for all models in a particular screen size. Additional plug in boards with jack packs were added to the chassis to accommodate the different features. The main board employs one additional plug in module, the line doubler, and the power supply require two additional modules for the deflection section, Dynamic S-Correction and Scan Boost & Shut Down circuits.

The HD-S series chassis features 10 IC's for small signal, sync and sweep processing. The ICX2200M, video driver, handles the base band signal processing, the RGB processing, and video switching (HV sync signal processing included). The NTSC signal is processed through the line doubler module located at LD1, LD2 & LD3, which integrates the luminance signal processing, chrominace signal processing, and the sync signal. ICX2600M is used to drive the deflection section on the power supply board, it supports different scan modes, enabvling several video formats. IC1400 includes functions such as stereo modulation, SAP (Second Audio Program), dBx noise reduction, and sound processing. In addition to this, IC1401 was added to improve lower and higher audio frequencies, an added feature called EZ bass. IC2900 is an A/V switch that determines which auxiliary video and audio signals will be processed by the video driver ICX2200M, also it can switch the IF video signal from main. IC2500M is used bring an RGB Picture-In-Picture on the screen and employs IC2501M for getting the Vertical sync. IC6000 is the main microprocessor and IC6001 is the main EAROM memory, IC6010 is also used to get the Horizontal Sync from the Horizontal Flyback or Sweep transformer.

CONNECTIONS

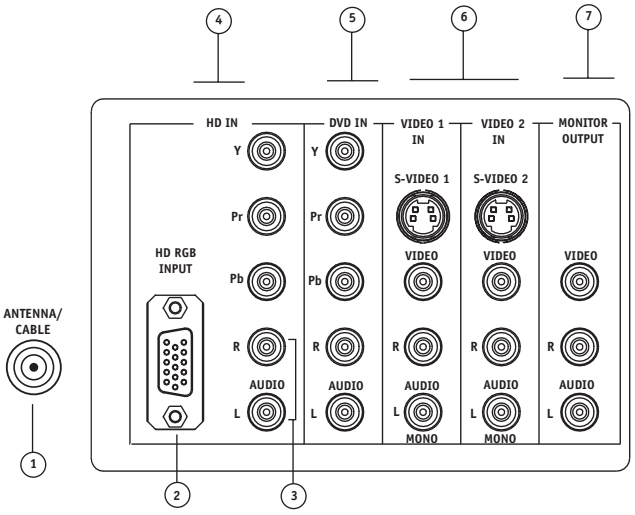
The connection center on the rear of the TV allows for connection of the viewing source. The diagrams on the next page list the use of each jack on the connection center.



REAR JACKS

1. ANTENNA/CABLE JACK

This jack is used for 75-ohm antenna-type signal connections to the TV. Attach antenna, cable TV line, or other video equipment jack. The input cable may come from an outdoor or master antenna, cable TV line, cable decoder box, or the RF output from a VCR.



2. RGB INPUT

Standard DB15 receptable for 480p or HD 1080i input video signal from setup box.

3. HD-RGB

These jacks provide left and right audio to the HD input, but also can be paired with the HD-RGB input.

4. HD IN

Connect High Definition equipment to these jacks.

5. DVD IN

Connect DVD player to these jacks. That includes, component video inputs (Y, Pc & Pb) and audio inputs (R,L).

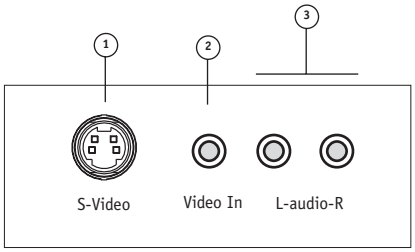
6. VIDEO 1 & VIDEO 2 INPUTS

Use the Video and R-L Audio In jacks for baseband video and audio input signals from a VCR or other signal source. To view the signal input to these jacks, select the SOURCE on the remote control. Use S-VIDEO for SUPER-VHS, DVD or Digital camera and Video equipment.

7. MONITOR OUTPUT

Use R-L output jacks for the stereo or home theater audio inputs. The composite video can be used for a video monitor or VCR monitor.

FRONT JACKS



1. S-VIDEO

Use this jack to connect a VCR, or DVD with S-Video output.

2. VIDEO IN

3. AUDIO IN

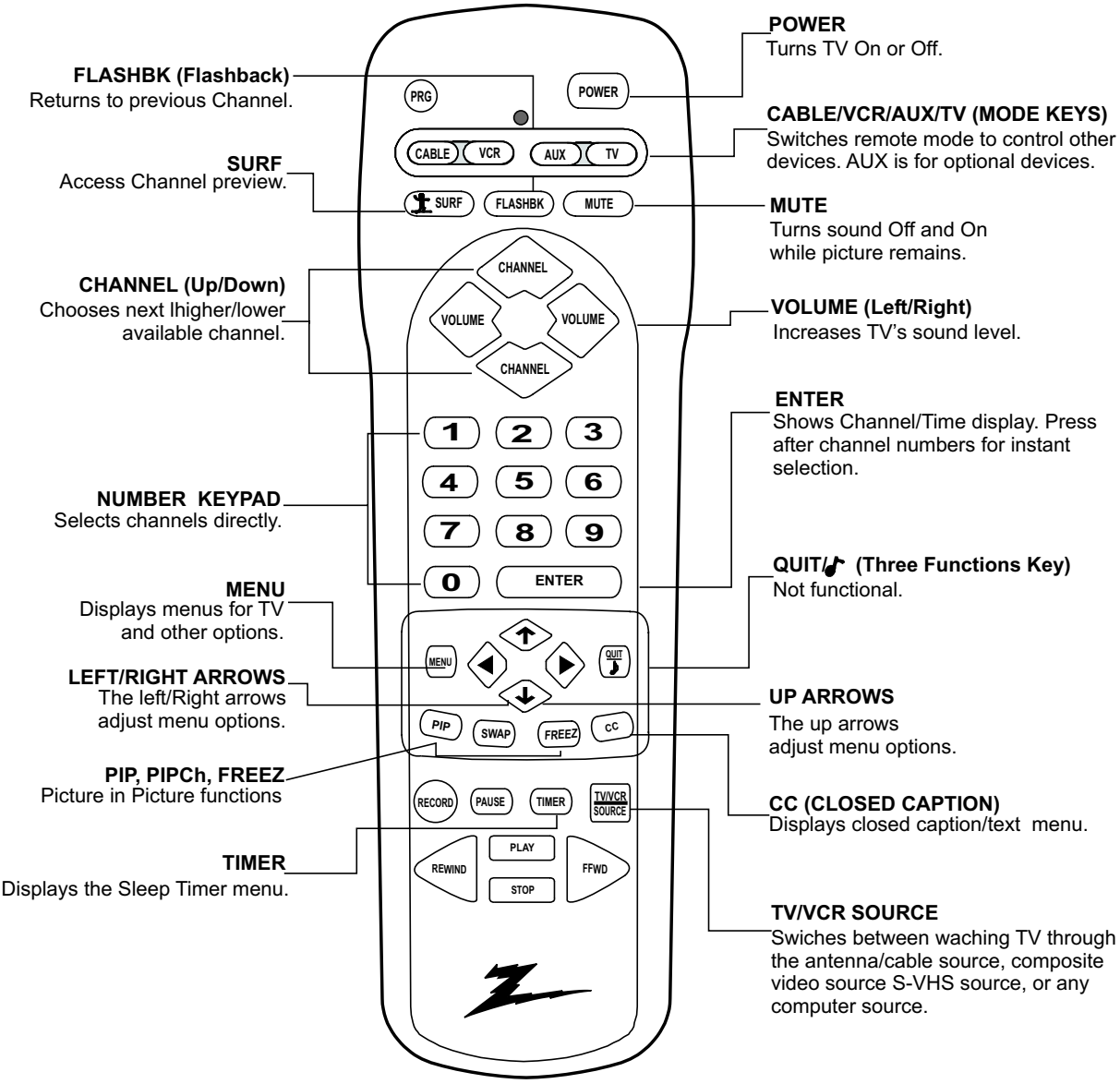
Provide left and right channels audio.

Compatible Video Formats		
Source	Video Format	Connector
Antenna/Cable	NTSC	RF
Video 1	NTSC	Video or S- Video
Video 2	NTSC	Video or S- Video
F- Video	NTSC	Video or S- Video
DVD In	480i	Y, Pb, Pr
HD Input	480p HD 1080i	Y, Pb, Pr
HD RGB	480p (RGB) HD 1080i (RGB)	DB15 RGB

VIDEO DISTRIBUTION AMPLIFIER

If your receiver/monitor will be part of a closed circuit network using a cable that is longer than 25 feet, or if several sets will be used together using the loop out jack, a video distribution amplifier will probably be necessary to ensure adequate signal strength. These amplifiers can be purchased separately in many consumer audio/video stores.

REMOTE CONTROL



MBR3457CT-A
124-00233-P05A

PROGRAMMING THE REMOTE

If you're using Zenith products, the remote is already programmed for most common codes: TV = 101, VCR = 201, CABLE = 353, DVD = 960, and HD/STB = 800. For other brand, or if your remote fails to control your Zenith products, you'll have to program the remote.

After installing the batteries, follow these steps for each product:

1. Press the device button to be programmed (CATV, VCR, DVD, TV, or HD/STB).
2. Press and hold MUTE & FLSHBK. Release MUTE & FLSHBK after the indicator light turns on.
3. Enter the 3-digit product code from chart on next page.
4. Press ENTER to save the code.
5. Point the remote at product and press POWER to test the product's operation. If it does not turn on, reprogram remote using a different code.
6. Write the codes on the label inside the battery compartment for future reference.

PROGRAMMING CODES

TV's	
Daewoo	149
Zenith	101,121,149 152

TV/VCR	
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Daewoo TV/VCR	148
Funai TV/VCR	154
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Symphonic TV/VCR	154
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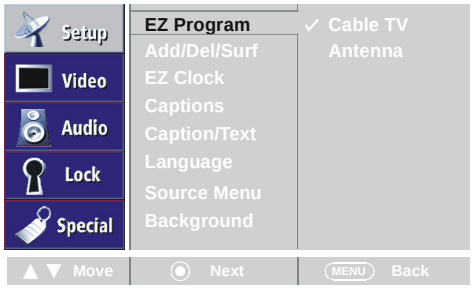
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SETUP MENU

The Setup Menu and all of the options for the Multimedia Chassis are described below.



EZ PROGRAM

The EZ Program feature automatically searches for all available channels and marks them as 'added' so that they may be accessed via the channel Up/Down key.

In the EZ Program screen:

- Using the Up/Down keys select Cable TV/Antenna, then press ENTER, EZ Program starts channel searching.

Notes:

- *EZ Program clears all Surfing channels, which were added.*
- *While searching for channels, all keys except for the Power key are disabled. This prevents an incomplete EZ Program procedure.*
- *Running the EZ Program will clear the factory mode, if it was active. This happens at the end of the EZ Program.*
- *If the EZ Program line in the Setup Menu is 'red', this indicates that the module did not pass one of the test equipment's tests.*

If no channels are found then the following message will appear: "Make sure that the cable/ant is connected and try again."

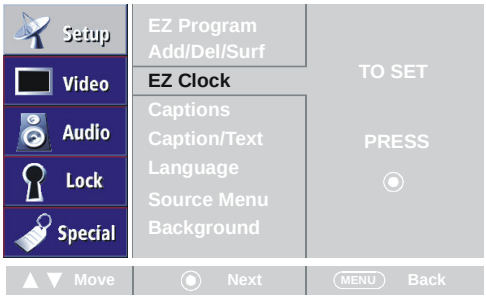
CHANNEL ADD/DEL/SURF

After running the EZ Program, all channels found by the EZ Program feature will be marked as 'Added'. However, some of these channels may be scrambled, or undesired by the customer. The Channel Add/Del/Surf feature allows the customer to selectively mark any channel as 'Deleted' or 'Added'. To change the status of a channel, press the Up/Down Arrow key.

To change the channel while adding or deleting channels, use the Channel Up/Down keys, or press the desired channel digits followed by 'Enter'. If Channel Up/Down is pressed the next or previous channel, which was marked 'Added', will appear. If only one channel is present, to change the channel the customer must use the digit keypad to select a channel.

EZ CLOCK

This Setup Menu Line allows the customer to set the clock time and date. When no time is set, the display shows: - -: - -.



The EZ Clock feature has two Clock modes: Manual and Automatic mode.

In the Manual mode there are two ways to set the time.

1. Direct Entry is preferred. Use the digit keys, followed by 'Enter' or Select Up/Down.
2. Left/Right Arrow keys. When the first digit is introduced, the display shows:

0:0d AM
When the time is set, the display shows:

hh:mm AM
where d = digit, mm = minutes, and hh = hours.

To select either AM or PM, the Timer key must be used. Pressing the FLASHBK key, toggles AM and PM to allow the customer to select AM or PM.

In the Automatic mode the user can select the 'Time Zone' and the 'Day Saving' options.

Time Zone has five options: 1.Auto, 2.Eastern, 3. Central 4.Mountain, 5. Pacific.

Day Saving has three options: 1.Auto, 2.Off, 3.On.

Notes:

- *Entering an invalid time ("0" for example) will result in the clearing of the current time - - : - -.*
- *When only one digit is pressed and no other is pressed in an interval of seven seconds, the current time will be cleared.*

CAPTIONS

This function allows the user to show in the screen the configuration menu to captions. The user can select any of the On or Off EZ Captions option.

CAPTION/TEXT

This function allows the user to activate or deactivate Captions or Text. Pressing the Up/Down Arrow keys sequentially through each of the following Caption/Text options.

Caption 1 Caption 2 Caption 3 Caption 4

Text 1 Text 2 Text 3 Text 4

Note:

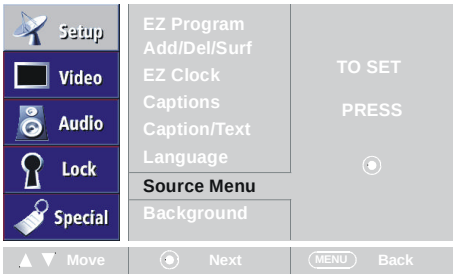
- *When captions are being displayed, if one of the Volume Up/Down keys is pressed, the volume bar will not appear.*

LANGUAGE

This feature allows the customer to change the menu language from English, Spanish, or French by pressing the Up/Down Arrow keys.

SOURCE MENU

This option allows the user to select the source desired, which determines the signal that feeds the video processor, the options are: ANTENNA/CABLE, VIDEO 1, VIDEO 2, FRONT VIDEO, DVD, HD, HD-RGB.



Note:

If any one of the HD sources is selected and no HD is connected to the source, the following screen will appear:

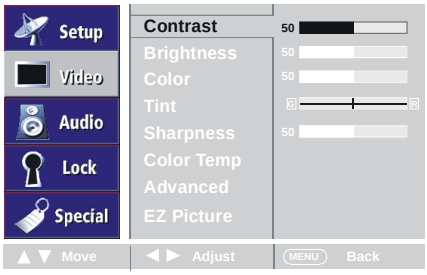


BACKGROUND MENU

This function allows the user set the Background On and add a blue background to increase the readability of the menus.

VIDEO MENU

Only Contrast, Brightness, Color, Tint and Sharpness menu items are adjusted with the Left/Right Arrow keys. Each option of the Video Menu is shown below:



CONTRAST

Contrast adjustment has 101 steps (0 to 100).

BRIGHTNESS

Adjusts the brightness of the picture. 101 steps (0 to 100).

COLOR

Color adjustment also has 101 steps (0 to 100).

TINT

Tint Adjustment has 101 steps (0 to 100).

SHARPNESS

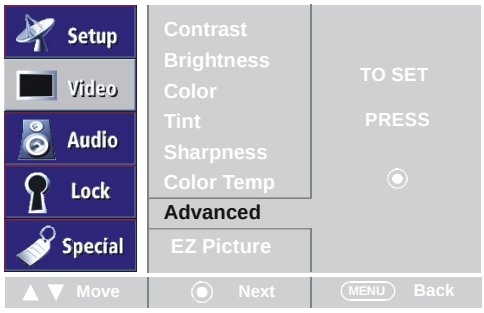
Sharpness adjustment has 101 steps (0 to 100). The sharpness value is sent to the video processor as Custom Sharpness.

COLOR TEMP

Adjust levels of all colors in the TV picture; cool or warm.

ADVANCED

This function allows the user to customize the picture appearence. Each option of the video advance function sub-menu is explained below:



Z-VIEW

On= Customer accurate picture.

Off= Brighter picture for the show room floor.

3D FILTER

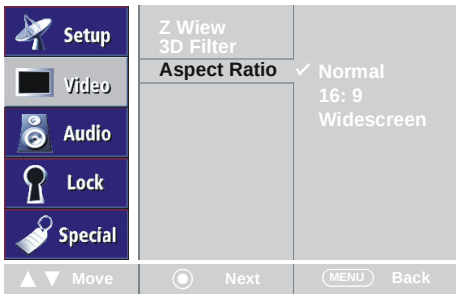
Adjusts the level of difference between white and black in the TV picture.

Note 1: Only available in Cable TV/Antenna, Video 1, Video 2 and Front Video.

Note 2: 3D Filter it is not available for C27V22 model.

ASPECT RATIO

Selects the proper picture proportion to match the source's image: Normal, 16:9, Widescreen.

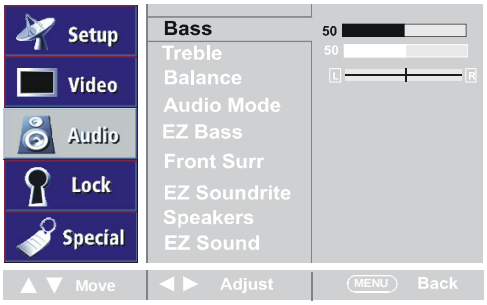


EZ PICTURE

The EZ Picture allows the customer to adjust all the items of the Video Menu or to select Preset values. Choose between: Custom, Normal, Movie, Digital, Video Game, Night Time, Sports and Weak Signal. Use the Up/Down Arrow keys to select one of the options.

AUDIO MENU

Only Bass, Treble and Balance menu items are adjusted with the Left/Right Arrow keys. Each option of the Audio Menu is shown below:options in the Audio Menu are selected with the Up/Down Arrow key. Once the option is selected, use the Left/Right Arrow keys to adjust to option to the desired setting.



BASS

Bass adjustment has 23 steps (0 to 100 in 5 value resolution).

TREBLE

Treble adjustment has 23 steps (0 to 100 in 5 value resolution).

BALANCE

Balance adjustment has 101 steps (from +50 left to 50 right). A center mark indicates equal balance sound in right and left speakers.

AUDIO MODE

There are three audio modes available: Mono, Stereo, 2 nd Audio/SAP. If 2 nd Audio/SAP is selected, but the current channel does not support SAP, then either Stereo or Mono will be heard.

EZ BASS

Turns the bass booster function On or Off.

FRONT SURROUND

Front Surround sound can be set to 'ON' or 'OFF', regardless of the current Audio Mode setting. However, the surrond effect can only be heard when the Audio Mode has been set to 'Stereo' and a Stereo signal is present. When this condition exists, there will be a short mute (200ms) while toggling the Surround 'On' to 'Off', to embellish front surround activation.

EZ SOUNDRITE

The SoundRite feature is used to obtain a uniform volume level, particularly while changing channels. The SoundRite feature can be best demonstrated on a channel with no signal (snow).

SPEAKERS

The Speaker feature is used to turn the internal speakers On or Off.

EZ SOUND

This feature allows the customer to maintain five separate audio settings by selecting Normal, Stadium, News, Music, Theater, or "Custom" settings. The audio settings are selected using the Up/Down Arrow keys.

LOCK MENU

The Lock Menu items are selected with the Up/Down Arrow keys. Once the option is selected, use the Up/Down Arrows keys to set each of the option.

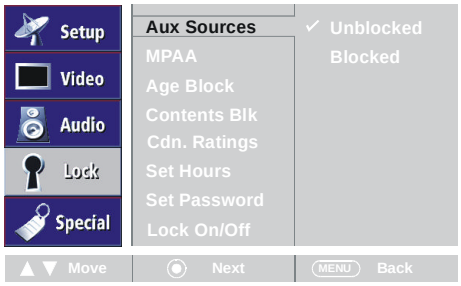
AUXILIARY SOURCES

To Block or Unblock the sources, press the Up/Down Arrow key.

Note: The SOURCE key may be used to view the video source.

MPAA RATING

The MPAA selector allows the customer to select either to have the channel Unblocked, G , PG, PG-13, R , NC 17, or X.



AGE BLOCK MENU

Use the Up/down Arrow keys to select the Age Block Menu.

GENERAL BLOCK

Once entering into the Age Block Menu, the customer has the option to block channels for general age or to block channels for children. To block channels for a general age, the customer may either select: UNBLOCKED, TV-G , TV-PG, TV-14 or TV-MA.

CHILDREN BLOCK
To block channels for children, select either: Unblocked, TV-Y or TV-Y7.

CONTENT BLOCK
Use the Up/Down Arrow keys to select the Content Block Menu.

DIALOG BLOCK
To block the dialog, use the Up/Down Arrow keys to select either: Unblocked, TV-PG or TV-14.

LANGUAGE BLOCK
To block the dialog, use the Up/Down Arrow keys to select either: Unblocked, TV-PG, TV-14, or TV-MA.

SEX SCENES BLOCK
To block the Sex Scenes, use the Up/Down Arrow keys to select either: Unblocked, TV-PG, TV-14, or TV-MA.

VIOLENCE BLOCK
To block the Violence, use the Up/Down Arrow keys to select either: Unblocked, TV-PG, TV-14, or TV-MA.

F VIOLENCE BLOCK
To block the FViolence, use the Up/Down Arrow keys to select either: Unblocked, TV-Y7.

NO RATING
To block No Rating, use the Up/Down Arrow keys to select either: Unblocked and Blocked.

SET HOURS
Use the Left/Right Arrow keys to adjust the number of hours the Lock menu feature will be active.

SET PASSWORD
Press the Up/Down Arrow key to allow setting a Password.

TO ENTER PASSWORD
The software accepts four-digit codes only. The customer must enter a password.

REPEAT PASSWORD
After a four-digit code has been entered, the software requires the customer to re-enter the same four-digit code.

PASSWORD NOT ACCEPTED
If an invalid code is entered, or the two codes entered do not match, an error message ("Not Accepted!") will appear blinking.

Note:
This error message also appears when no code is entered for the password or if only one digit is entered and no other digit has been entered.

LOCK ON/OFF
This item enables/disables the TV blocking.The Adv. TV Ctrl. feature can only be turned On if the hours >0, and a password has been set. Otherwise the Lock On/Off line will display either of the following error messages: "Must Set Hours" or "Must Set Password.".

RE-ENTERING LOCK MENU
If the LOCK feature has been activated, the software will only allow the customer to enter the password. If an incorrect password is entered, an error message ("Not Accepted!") appears, and will not disappear until 5 seconds has elapsed. This extended time provision increases the amount of time necessary for a child to "crack" the password.

Notes:
- *After correctly entering the password, all other functions will be enabled.*
- *Entry into and exit from the Installer's Menu, will automatically unblock all lock (See page 2-1).*
- *The Lock menu will remain up for 15 seconds after the last key press.*
- *The QUIT key may be pressed to remove the Lock menu.*
- *The Lock Hours and Password will be cleared upon exit of the Adv. TV Ctrl menu (unless the Adv. TV Ctrl feature has been turned on.)*

DISPLAY WHEN LOCK IS ACTIVE
When the Lock is active and the channel is blocked, the display on the screen shows two lines. The first line displays a message saying that the "LOCKOUT IS ACTIVE." The second line displays the amount of time (in hours) left in the lockout.

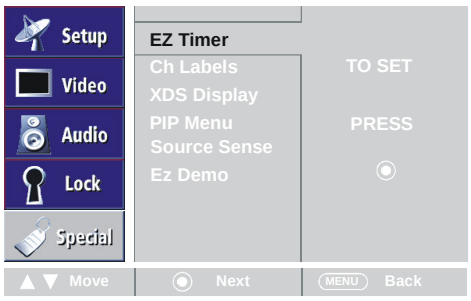
SOFT MUTE
The first time that mute key is pressed, enable Softmute. Soft decreases volume (not complete mute).

MUTE
When the Mute key is pressed for second time or if volume level is low, the speakers will be turned off.

SPECIAL

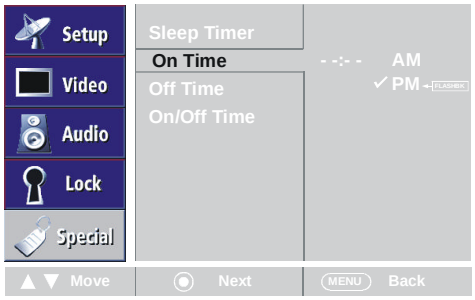
EZ TIMER
The EZ Timer Menu contains the Sleep Timer and the On/Off Timer features.

SLEEP TIMER
The Up/Down Arrows can be used to adjust the current sleep timer setting:Off, 0:10, 0:20, 0:30, 1:00, 1:30, 2:00, 3:00 or 4:00.



ON/OFF TIMER

This feature consists of four menu lines: “Sleep Timer”, "On Time", "Off Time", and "On/Off Timer". This feature allows the set to turn On and Off at the times specified in "On Time" and "Off Time". The "On Time" and "Off Time" are set identical to the Clock Set feature in the Setup Menu.



An Off Time must be specified, before turning On the "EZ Timer"- otherwise an error message ("Must Set On/ Off") will be displayed on the On/Off Timer line. The On/ Off Timer option turns the Timer On or Off. If there is no Off Time set, then the On/Off Timer displays the above message saying: "Set Off Timer." Once the Off timer has been set, the customer can then set the option to either On or Off.

CH LABELS

This feature allows the customer to select a channel label for the current station. This channel label is displayed in the Channel/Time display. To change the current channel label, press the Up/Down Arrow key. To change the channel while adjusting channel labels, use the Channel Up/Down keys, or press the desired channel digits, followed by 'Enter'. (If Channel Up/Down is pressed, the next or previous channel which was marked 'Added' will appear.)

Notes:

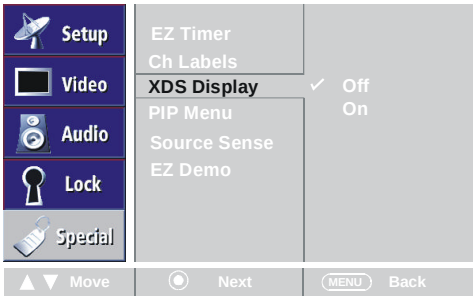
- *If the label selected is different of “----”, None, ABC, next, the Auto channel label is disactivated.*

Channel Labels						
A&E	CMTV	ESPN	HSE	NOS	TBN	VC
ABC	CNBC	ESP2	HSN	PBS	TELE	VCR
ACTS	CNN	ET	IC	PLAY	TLC	VH-1
ADC	COM	EWTN	INSP	PTL	TMC	VISN
AMC	CSPN	FAM	JCN	QVC	TNN	VJN
BCC	CSP2	FNN	LIFE	RDS	TNT	WB
BET	CTN	FOX	MAX	REQ	TRAV	WGN
BRAV	CTV	F&V	ME/U	SC	TSN	WTBS
CA	DIS	FX	MMT	SCFI	TVA	WWOR
CBC	DISC	GALA	MTV	SHOW	TWC	YTV
CBN	E!	HBO	NBC	SIN	UPN	- - - -
CBS	ENC	HN	NICK	TBS	USA	None

NOTE:
Selecting the "- - - -" label option means that auto label is selected. Selecting the "None" option means the channel will not have a label.

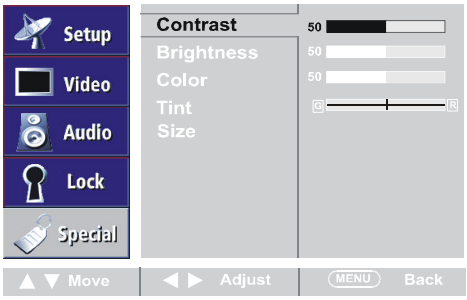
XDS DISPLAY

Extended Data Service. Pressing the Up/Down Arrow Keys allows the customer to select the XDS Display either On or Off.



PIP MENU

Allows the user to set the PIP inset picture appearance options to your personal viewing preferences.



CONTRAST

Contrast adjustment has 101 steps (0 to 100). This item allows the contrast adjustment of the PIP window.

BRIGHTNESS

This item allows adjust the PIP brightness. Brightness Adjustment has 101 steps (0 to 100).

COLOR

Adjust levels of all colors in the PIP picture. Adjustment has 101 steps (0 to 100).

TINT

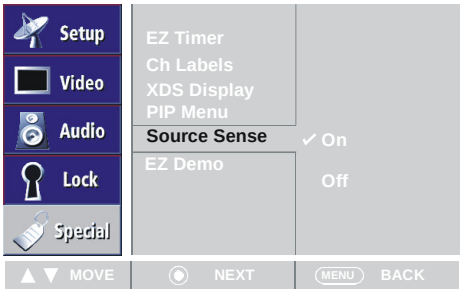
This item allows adjust the PIP tint. Tint Adjustment has 101 steps (50 Green to 50 Red).

SIZE

This option is used to select size of the PIP window. The customer may select the PIP window size either small or large.

SOURCE SENSE

ON-TV shows sources with and without equipment connected. OFF-TV shows all source menu options.



EZ DEMO MENU

The EZ Demo is designed to show-off the icon menus and other icon displays on the sales floor. The EZ Demo feature can be turned On/Off with the Up/Down Arrow keys. Initially, when the feature is activated, as soon as the OSD times out, the EZ Demo will start.

The only way to turn EZ Demo off is to select Off, in the SPECIAL menu.

VIDEO SOURCE INPUT

(Video 1, Video 2, Front Video and DVD)

CUSTOM FEATURES

(For Video Source Input)
Same as Setup Menu, except EZ Program and Add/Del/Surf.

AUDIO MENU

(For Video Source Input)
Same as Audio Menu for Antenna/Cable input.

VIDEO MENU

(For Video Source Input)
All menu items are adjusted with the Left/Right Arrow keys.

This feature allows the customer to maintain eight separate Contrast, Brightness, Color, Tint, and Sharpness settings "EZ Picture". The factory sets the following EZ Pictures: Normal, Movie, Digital, Video Game, Sport, Night Time and Weak Signal, and the customer sets Custom. The EZ Pictures and Custom settings are selected using the Up/Down Arrow keys.

ADVANCED

Z-VIEW
On= Customer accurate picture.

Off= Brighter picture for the show room floor.

3D FILTER
Adjusts the level of difference between white and black in the TV picture.

ASPECT RATIO
Selects the proper picture proportion to match the source's image: Normal, 16:9, Widescreen.

Note: Only available in Cable TV/Antenna, Video 1, Video 2 and Front Video.

HD SOURCE INPUT

The TV can display two HD Video formats: 480p and HD 1080i.

SETUP MENU

(For HD Source Input)
Same as Setup Menu for Antenna/Cable, except EZ Program and Add/Del/Surf.

AUDIO MENU

(For HD Source Input)
Same as Audio Menu for Antenna/Cable inputs.

VIDEO MENU

(For HD Source Input)
All menu items are adjusted with the Left/Right Arrow keys.

This feature allows the customer to maintain separate Contrast, Brightness, Color, Tint, and Sharpness settings "EZ Picture". The factory sets the EZ Picture (see the EZ Picture section). The EZ Pictures and Custom settings are selected using the Up/Down Arrow keys.

EZ PICTURE

For 480p and HD1080i have seven options: Custom, Normal, Movie, Digital, Video Game, Sports, Night Time, Weak Signal.

Z-VIEW
On= Customer accurate picture.

Off= Brighter picture for the show room floor.

ASPECT RATIO

Selects the proper picture proportion to match the source's image: Normal, 16:9, Widescreen.

SERVICE MENU

IDENTIFIER	DESCRIPTION
16x9OffSet	Offset for HSize when aspect Ratio is 16x9.
3D CombEnable	Enable/Disable 3D ComFilter.
6 KEY SYS	Enable Keyboard type
9400NaLip	Not active line input defines the nymber of lines from the V-Sync to the first active line of the field.
9400Opdel	Delay (in number of lines) of the internal V-Sync (delayed VIN to the outgoing V-Sync (VOUT).
A ATT	Audio attenuator
A ATT2	Audio attenuator 2
A FILTER	Audio processor filter
A SPECTRAL	Audio processor spectral
AblMode	Switching of ABL of ABL mode
AblTh	Adjustment of threshold voltage for ABL-IN input.
Abrspd	Automatic Brightness Reduction Speed, '000': 2 fields..'111': 16 fields.
Abrthd	Automatic Brightness Reduction Threshold. Lumi-nance value is reduced, if the integral value of luminance exceeds the selected thresh-old '0000': ABR off, '0001': ABR at luminance value of 240..'1111': ABR at luminance value of 180.
AC ON	AC Power Only Off/On
AccSatBit0-07	bit[0-7] Saturation control
AccSatBit8-11	bit[8-11] Saturation control. 0... 4095 (2070 corresponds to 100% saturation)
Adopmode	Dynamic Operation Modes.
AfcMode	AFC loop gain control. Initial value: 1FH.
AfcRange	AFC pull-in range setting (100%: Free-running frequency): 0= ±3% Narrow range mode 1= ±5% Wide range mode
AfcRangeHD	AFC pull-in range setting (100%: Free-running frequency): 0= ±3% Narrow range mode 1= ±5% Wide range mode. (For HD YUV)
Agcval	Automatic Gain Control Value AGC value for fixed mode (AGCMD='11'), '0': input voltage 0.5 Vpp, '15': input voltage 1.5 Vpp.
AkbT	Selection of timing pulse, which generates ref-erence pulse. 0=NOR-MAL mode (reference pulse generated by SCP input only), 1=V compres-sion mode (reference pulse generated from VTIM-IN, HP-IN).
Ampu	Amplification of (B-Y) signal path
Ampv	Amplification of (R-Y) signal path
Ampy	Amplification of luminance signal path
APCom	Used to store customer menu adjustment
AVCO	Audio processor VCO value
Avoin	Positive/negative polarity for AVO signal.
Avopre	0-AVO and active Y/C data at same time, 1-AVO precedes Y/C data one clock cycle, 10-AVO precedes Y/C data two clock cycles, 11-AVO precedes Y/C data three clock cycles

IDENTIFIER	DESCRIPTION
B1 AfcRange	AFC Range for 480p Video Format.
B7 Air AFT	Set to 1 to enable AFT.
Bacgr	Activation of background insertion
BAND/AFC	Broadcast band adjustment
Bckpos	Background insertion, positioning of inserted area.
Bckwid	Background insertion, horizontal width of in-serted area.
BcofAUX	Luminance peaking, gain of band pass filter.
BcofRF	Luminance peaking, gain of band pass filter.
BcofYUV	Luminance peaking, gain of band pass filter.
BCutOff	B channel cutoff
Bdrive	B channel drive gain control.
Black	Coding of inserted black level (Y-channel), com-putation.
BlkBottom	RGB-OUT bottom limiter level control
Blklb	Blanking level blue.
Blklg	Blanking level green.
Blklr	Blanking level red.
BlkSw	Selection of H, V blanking system for RGB-OUT (Set to 0 at power on). 0=Normal blanking mode (blanking up to VCE (sat) level, 1=Blank-ing at value set by
BR	Luma brightness –128..127.
BrtAdj	Brightness Adjustment. Adjusts the brightness of the picture in 15 steps '0000': nominal brightness..'1111': +20% brightness.
Cb OffSet1	For canceling the offset between CrCb of IN1 and SELIN systems.
CDLAUX	Fine adjustment of C signal output delay (for auxiliary sources).
CDLRF	Fine adjustment of C signal output delay (for antenna).
CipBr	Brightness of the RGB/YUV component input
CipCt	Contrast of the RGB/YUV Component input.
CipTnt	Tint control of the RGB/YUV componet input, tint
Ckill	Color Killer Threshold. Color will be switched off, if the chroma damping is higher than: '0': -12 dB, '1': -18 dB, '2': -24 dB, '3': color al-ways off.
Clmpid	Clamping duration. Adjusts duration of clamp-ing pulse for ADC.
Clp	Clamp pulse phase setting.
Clpsw	Switch for selecting replacement pulse for color dif-ference input pin offset control. 0=Pulse generated inside IC, 1= Clamping pulse which has been separated from SCP.
Comex	Compander working condition.
Comp	Compander Activation
Concdj	Contrast Adjustment adjusts the contrast of the picture '0000': nominal contrast..'1111': +30% contrast in-crease.

IDENTIFIER	DESCRIPTION
Cor	Luminance peaking, coring for high- and band-pass filter.
Cr OffSet1	For canceling the offset between CrCb of IN1 and SELIN systems.
CT	Lume Contrast.
CtiLevel	Color difference signal edge enhancement setting
Cvbsel	CVBS Select Selection of CVBS input source, '0': CVBS1, '1': CVBS2, '2': Y/C (Y@CVBS2 / C@CVBS3), '3': CVBS3
DbLnk	Disable hor. & vert. Blanking of invalid data in 656 mode.
DCTranZOff	Y System DC transmission ratio setting. (Z view OFF)
DCTranZOn	Y System DC transmission ratio setting. (Z view OFF)
DDR	Diagonal dot reduction.
D-Pic	Dynamic picture (black expansion) control 0=Off, 1=Low inflection point 30 IRE, 2=Medium inflection point 35 IRE, 3=High inflection point 40 IRE.
DVDSubHue	Tint center control
Factory Mode	Factory mode pref.
FEATURE LEVEL	Selects Zenith or private IR codes
Fieinv	Field polarity invertion
FixSync	Switch for setting sync identification circuit operation mode to auto or fixed
Freeze	Freeze Picture interrupts the inset picture writing and reads the stored field, 0: live picture, 1: still picture.
Frsel	Frame Select selects between the normal frame and the shaded frame, '0': normal frame, '1': shaded frame with 3D impression.
GammaZOff	Control of gamma correction amount. OH=OFF. FH=max (output increased by 15 IRE at input 40 IRE point).
GammaZOn	Control of gamma correction amount. OH=OFF. FH=max (output increased by 15 IRE at input 40 IRE point).
GCutOff	G channel cutoff
Gdrive	G channel drive gain control.
GYB	G-Y axis -(B-Y) component setting
GYR	G-Y axis -(R-Y) component setting
HblkSw	HBLK width control ON/OFF. Fixed Value: OH.
HcInv	Positive/negative polarity for HC signal.
HcofAUX	Luminance peaking, gain of high pass filter.
HcofRF	Luminance peaking, gain of high pass filter.
HcofYUV	Luminance peaking, gain of high pass filter.
HDG	Horizontal difference gain.
HdTc	Setting of H sync separation time constant for YG-IN (Pin 26) input: 0 =Time constant for input complying with HD-TV standard 1=Time constant for input complying with any other HD-TV standard.

IDENTIFIER	DESCRIPTION
Horpos	Horizontal position adjustment.
Horwidth	Setting of output pulse width to HS-OUT and clamping pulse generation block. When the pulse width of the input sync signal is wider than the pulse width in each data, the wider of the pulses is output.
Houtdel	Out Delay.
Houtfr	HOUT generator 1:Freerunning mode 0:locked mode
HpllAA B0-07	Internal AFC1 (Low).
HpllAA B8-15	Internal AFC1 (High).
HpllAB B0-07	Internal AFC2 (Low).
HpllAB B8-15	Internal AFC2 (High).
HpllMd	Hpll speed.
HPos	Moves captions and displays horizontally on the screen
Hposition	Horizontal position adjustment.
Hsdel	Start of black level insertion, delay to HS-signal
HsInv	Positive/negative polarity for HS signal.
Hsize	Horizontal amplitude adjustment
HsMask	Setting for wether H Sync is to be added in V Sync at HS-OUT (pin 29) and SELH-OUT (pin 79).
HsUp	Enable suppression of 656-headers during invalid video lines.
Hue	Hue phase of color subcarrier adjustment for NTSC (tint), '100000': -44.8°...'000000': 0°...'011111': 43.4°. Note:setting has no influence when in PAL or SECAM mode Hue control.
HWidth	Setting of output pulse width to HS-OUT and clamping pulse generation block
Hysw	Switch for switching signal output to YG-OUT pin. 0=For a Sync on Y, Sync on Green input, 1=For a composite Sync input.
HZoom	Horizontal Zoom selects the parent clock frequency '0': 27.34 MHz, '1': 20.25 MHz, '2': 35.27 MHz, '3': 25.43 MHz, '4': 26.67 MHz, '5': 20.63 MHz, '6': 34.17MHz, '7': 28.04 MHz.
Ifcomp	IF-Compensation filter. Equalizes the IF-stage char-acteristic '00':no filtering, 1':simple bandpass active, '2':IF-compensation active (6dB/octave), '3': (reserved).
Infrm	Inner Frame activation actives inner frame for multi-PIP display, '0': inner frame off, '1': inner frame on.
Intmode10	Free Programmable INTERLACED signal for AC coupled deflections.
Intmode32	Free programmable INTERLACED signal for AC coupled deflections.
Kilhy	Amplitud killer hysteresis.
Kilvl	Amplitud killer level.
LcofAUX	Luminance peaking, gain of low pass filter.

IDENTIFIER	DESCRIPTION
LcofRF	Luminance peaking, gain of low pass filter.
LcofYUV	Luminance peaking, gain of low pass filter.
LDLY	Luma/Chroma delay adjust. The setting is updated when 'sdt' register is updated.
LeftBlk	HBLK width control for left side of picture when HBLK_SW=0.
LimitLevel	Limiter to cope with excessive high inputs
LinLenBit0-07	Line Length register in LLC mode, this register defines the cycle of the sync counter which generates the SYNC pulses. In LLC mode, the sync counter counts from) to LINE LENGTH, so this register has to be set to 1295 for correct adjustment of vertical signals. (Low)
LinLenBit8-10	Line Length register in LLC mode, this register defines the cycle of the sync counter which generates the SYNC pulses. In LLC mode, the sync counter counts from) to LINE LENGTH, so this register has to be set to 1295 for correct adjustment of vertical signals. (High)
LlcClkc	llc clock generator control word.
LlcClkH B0-07	20bit IIc clock center frequency (Low)
LlcClkH B8-15	20bit IIc clock center frequency (High)
LlcClkL B0-07	20bit IIc clock center frequency (High)
LlcClkL B0-07	20bit IIc clock center frequency (High)
LlcClkL B8-15	20bit IIc clock center frequency (High)
LlcDFLim B0-07	Pll frequency limiter. (Low)
LlcDFLim B8-15	Pll frequency limiter. (High)
LlcGaiBit0-07	Gain PLL (Low).
LlcGaiBit8-15	Gain PLL (High).
LlcStart B0-07	Vertical freeze start. (Low).
LlcStart B8-11	Vertical freeze start. (High).
LlcStop B0-07	Vertical freeze stop. (Low).
LlcStop B8-11	Vertical freeze stop. (High).
Lmofst	Luminance Offset. Modifies to blank level offset.
LoCpin	Horizontal pin distortion compensation.
LoPin	Horizontal pin distortion compensation.
LoVlin	Vertical linearity control.
LowP	Enable luma low pass filter.
LPF2	Horizontal lowpass filter for Y/C.
LRGB2Level	LRGB2 system picture level control
LtiLevel	Luminance signal edge enhancement setting
MatOut	Selection of type matrix conversion
MaxLine	Number of free-running lines setting.
MUTE TIME	Time during the TV stays in blank state
Nalip_NTSC2	Not active line input defines the nymber of lines from the V-Sync to the first active line of the field.
Nosel	Notch filter select.
Opdel_NTSC2	Delay (in number of lines) of the internal V-Sync (delayed VIN to the outgoing V-Sync (VOUT).
Ovfilt	Oversampling Control (OVSAMP=1). 0/1 Interpolation OFF/ON
Ovsamp	Oversampling control. 0/1 Doubling of sample frequency OFF/ON
PABLLevel	Setting of level detection DC at RGB-OUT of PEAK-ABL
PFS	Horizontal peaking filter.
Phacom	Filter coefficient for compensation of non-linear phases
PinPhase	Horizontal trapezoidal distortion compensation .
PK	Peaking gain.
PkCor	Peaking filter coring enable, 0/1 bypass/coring enabled.
Pklb	Peak level blue.
Pklg	Peak level green.
Pklr	Peak level red.
PllITC	Inset PLL Time Constant.
Posofh	Position Offset Horizontal.
Posofv	Position Offset vertical. Vertical position offset in steps of four lines.
PreOver	Preshoot to overshoot ratio setting.
RCutOff	R channel cutoff
Rdrive	R channel drive gain control.
Readd	Read Double Mode for compatibility with double read systems (e.g.100 Hz, progressive), 0: PIP display with single read frequency and 2x oversampling, 1: PIP display with double read frequency.
Rgbins	RGB Insertion enables the insertion of external RGB/YUV sources, '00': no external insertion possible, FSW input inactive, '01': (reserved), '10': external insertion with FSW possible (priority of FSW input), '11': external insertion with FSW possible (priority of PIP).
RightBlk	HBLK width control for right side of picture when HBLK_SW=0.
RYB	R-Y axis -(B-Y) component setting
RYR	R-Y axis +(R-Y) component setting
Satadj	Color Saturation Adjustment. Adjusts the color satu-ration '0000': no color, '1000': nominal saturation, '1111': nominal saturation multiplied by 1.875. Note:values greater than '1000' can drive signal into saturation.
SatCb	Saturation Cb.
SatCr	Saturation Cr.
Scadj	Color Subcarrier Adjustment. Color subcarrier fre-quency fine adjustment '00000': max. negative deviation (-150 ppm)...'00111': default (for nominal crystal frequency)...'11111': max. positive deviation (+310 ppm).

IDENTIFIER	DESCRIPTION
Seldel	Select Delay delay of the signal SEL at the output referred to the insertion, '1000':-8 clock cycles of display clock, '0000': 0 clock cycles of display clock, '0111': +7 clock cycles of display clock. Note:restricted range in OSD only mode.
ShpF0	Sharpness setting
Stopmode	Static Operation Modes.
SubBright	Sub-brightness
SubCol	Color gain control
SubCon	Sub contrast adjustment
SubCon16x9	Contrast gain control (Y system level adjustment). (16 x 9).
SubHue	Tint center control
SubShp	Sharpness center control
Svalfi	Sensitivity of field difference in the motion detection for scan rate conversion.
Svalfr	Sensitivity of frame difference in the motion detection for scan rate conversion.
System	Signal frequency band switching; select the band in accordance with the TV System.
Thrcle	Temporal noise reduction of chrominance
Thrcly	Temporal noise reduction of luminance.
Thresh	Sensitivity threshold.
TintBit0-07	NTSC tint angle, ±512 = ±p/4 (Byte Low)
TintBit8-15	NTSC tint angle, ±512 = ±p/4 (Byte High)
Trawid	Maximal length of an improved transition.
Twout	Chrominance output format
UpCpin	Horizontal pin distortion compensation.
UpPin	Horizontal pin distortion compensation.
UpVlin	Vertical linearity control.
Vangle	Vertical line slope compensation.
Vaspect	Aspect control ratio.
Vaspect 16:9	17 x 9 ratio.
Vaspect Wide	Wide ratio.
VBackBlk	VBLK width control.
VbackBlk16x9	VBLK width control.
VbackBlkWide	VBLK width control.
Vbow	Vertical line slope compensation
VDG	Vertical difference gain
Verint	Vertical Expansion Factor.
Vermode	Input filtering of the incoming field signal.
Vertpos	Vertical position adjustment
Vertwidth	Vertical width of inserted picture in input lines: Vertical width =(2 * VERWIDTH) [VERWIDTH=0].
VfrontBlk	VBLK width control.
VfrontBlk16x9	VBLK width control.
VfrontBlkWide	VBLK width control.
Vindel	VIN input delay: Delay (VIN)to internal V-sync)= (128*VINDEL +1)*Tclk1 [VINDEL=0].
Vlin	Vertical linearity adjustment.

IDENTIFIER	DESCRIPTION
VmDel	VM-OUT phase control; defined by difference in phase from R-OUT
VmLev	VM-OUT level control
Voutfr	Vout generator.
Vpan	Vertical adjustment of the output picture.
Vpara2Amp	General purpose V parabola 2 wave amplitude control.
Vpara2Dc	General purpose V parabola 2 DC bias control.
Vpara2Phase	General purpose V parabola 2 SAW component amplitude control.
VPK	Vertical peaking gain.
VPos	Moves captions and displays vertically on the screen
Vposition	Vertical positon adjustment .
VsCorCN	Vertical S correction.
Vscroll	Vertical picture scroll control.
VsInv	Positive/negative polarity for VS signal.
Vsize	Vertical amplitude adjustment .
VsMode	0 Use vertical window as VFLAG, 1 Use vsync as VFLAG.
Vspdel	Vertical sync pulse noise reduction.
Vspnsrg	Vertical Sync Pulse Noise Reduction noise reduc-tion of the VSP pulse, '0': Noise reduction on, '1': Noise re-duction off.
VTC	Setting for V sync separation time constant
Vtim	VTIM fall position control.
WIDE BAND	Audio processor wide band
WideOffSet	Offset for HSize when aspect Ratio is WideScreen.
X1Pos	Horizontal Picture Position (Upper Left position).
X2Pos	Horizontal Picture Position (Bottom right position).
Y1Pos	Vertical Picture Position (Upper Left position).
Y2Pos	Vertical Picture Position (Bottom right position).
Ycdel	Y/C delay. Adjust the delay between luminance and chrominance.
Ydel1	Delay adjustment of luminance signal.
YmVm	Mute function ON/OFF switch for VM-OUT (pin 59) in YM ON block setting takes effect for both YS/YM1 (pin 45) and YS/YM-2 (pin 49). 0= OFF:no muting, 1=ON:muting.
Ypeak	Y Peaking Adjustment. Adjusts luminance peaking '000': no peaking..'111': strongest peaking.
YPFG	Specifies a Y peaking filter gain.
YPFT	Specifies the Y peaking filter (BPF) center frequency.
Yuvsel	YUV Select, 0: CVBS or Y/C Source, 1: YUV Source.

27" Micro# 221-1526-00 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
00	Factory Mode	0-2	1	1	1	1
01	APCom	0-1	1	1	1	1
02	VPos	0-30	10	10	22	21
03	HPos	0-45	20	20	13	12
04	BAND/AFC	0-7	0	0	0	0
05	AC ON	0-1	0	0	0	0
06	FEATURE LEVEL	0-1	1	1	1	1
07	MUTE TIME	0-254	125	125	125	125
08	6 KEY SYS	0-1	1	1	1	1
09	A ATT	0-15	6	6	6	6
10	A ATT2	0-15	6	6	6	6
11	AVCO	0-63	38	38	38	38
12	A FILTER	0-63	28	28	28	28
13	A SPECTRAL	0-63	12	12	12	12
14	WIDE BAND	0-63	32	32	32	32
15	Avopre	0-3	0	0	0	0
16	SatCr	0-63	37	37	37	37
17	SatCb	0-63	38	38	38	38
18	CipTnt	0-63	10	10	10	10
19	CipCt	0-63	30	30	30	30
20	CipBr	0-254	65	65	65	65
21	LDLY	0-63	59	59	59	59
22	AccSatBit8-11	0-15	7	7	7	7
23	AccSatBit0-07	0-254	220	220	220	220
24	TintBit8-15	0-254	0	0	0	0
25	TintBit0-07	0-254	70	70	70	70
26	BR	0-254	16	16	16	16
27	PK	0-7	3	3	3	3
28	PFS	0-3	0	0	0	0
29	CT	0-63	46	46	46	46
30	LPF2	0-3	0	0	0	0
31	HpllMd	0-3	0	0	0	0
32	Nosel	0-3	3	3	3	3
33	DDR	0-3	2	2	2	2
34	HDG	0-3	2	2	2	2
35	VDG	0-3	2	2	2	2
36	VPK	0-15	0	0	0	0
37	LlcGaiBit8-15	0-254	0	0	0	0
38	LlcGaiBit0-07	0-254	8	8	8	8
39	LinLenBit8-10	0-7	3	3	3	3
40	LinLenBit0-07	0-254	88	88	88	88
41	LowP	0-1	0	0	0	0
42	HsInv	0-1	1	1	1	1
43	HcInv	0-1	0	0	0	0
44	Avoin	0-1	0	0	0	0
45	VsInv	0-1	0	0	0	0
46	DbLnk	0-1	0	0	0	0
47	VsMode	0-1	0	0	0	0
48	HsUp	0-1	0	0	0	0
49	PkCor	0-1	0	0	0	0
50	AblMode	0-3	0	0	0	0
51	AblTh	0-3	2	2	2	2
52	LRGB2Level	0-15	4	4	4	4
53	PABLLevel	0-15	15	15	15	15
54	VTC	0-3	3	3	3	3
55	SubCol	0-15	15	15	15	15
56	SubHue	0-15	7	7	7	7
57	DVDSubHue	0-15	7	7	7	7
58	CtiLevel	0-3	0	0	0	0
59	RYR	0-15	4	4	4	4
60	RYB	0-15	2	2	2	2

27" Micro# 221-1526-00 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	GYR	0-15	3	3	3	3
62	GYB	0-15	11	11	11	11
63	SubShp	0-3	3	3	3	3
64	LtiLevel	0-3	0	0	0	0
65	FixSync	0-3	1	1	1	1
66	SubCon	0-15	11	11	11	11
67	BlkBottom	0-15	15	15	15	15
68	HWidth	0-3	1	1	1	1
69	LimitLevel	0-3	1	1	1	1
70	GammaZOn	0-15	0	0	0	0
71	DCTranZOn	0-7	2	2	2	2
72	GammaZOff	0-15	10	10	10	10
73	DCTranZOff	0-7	2	2	2	2
74	AkbT	0-1	1	1	1	1
75	Blksw	0-1	1	1	1	1
76	HsMask	0-1	1	1	1	1
77	Hysw	0-1	0	0	0	0
78	YmVm	0-1	1	1	1	1
79	Clpsw	0-1	1	1	1	1
80	HdTc	0-1	0	0	0	0
81	AfcMode	0-3	0	0	0	0
82	HblkSw	0-1	0	0	0	0
83	BlkSw	0-2	1	1	1	1
84	AfcRange	0-1	1	1	1	1
85	AfcRangeHD	0-1	0	0	0	0
86	Trawid	0-15	15	15	15	15
87	Thresh	0-15	14	14	14	14
88	Ydel1	0-15	9	9	9	9
89	Hsdel	0-63	0	0	0	0
90	Bckpos	0-254	215	215	215	215
91	Bckwid	0-254	0	0	0	0
92	Black	0-127	69	69	69	69
93	Phacom	0-3	0	0	0	0
94	BcofYUV	0-15	5	5	5	5
95	LcofYUV	0-7	4	4	4	4
96	HcofYUV	0-15	0	0	0	0
97	BcofAUX	0-15	5	5	5	5
98	LcofAUX	0-7	4	4	4	4
99	HcofAUX	0-15	0	0	0	0
100	BcofRF	0-15	3	3	3	3
101	LcofRF	0-7	4	4	4	4
102	HcofRF	0-15	0	0	0	0
103	Cor	0-1	1	1	1	1
104	Comex	0-1	0	0	0	0
105	Comp	0-1	1	1	1	1
106	Ovsamp	0-1	1	1	1	1
107	Ovfilt	0-1	1	1	1	1
108	Bacgr	0-1	1	1	1	1
109	Ampv	0-1	0	0	0	0
110	Ampu	0-1	0	0	0	0
111	Ampy	0-1	0	0	0	0
112	Vindel	0-63	3	3	3	3
113	Vertwidth	0-254	64	64	64	64
114	Vertpos	0-254	32	32	32	32
115	Horwidth	0-63	18	18	18	18
116	Horpos	0-63	18	18	18	18
117	Houtdel	0-254	166	166	166	166
118	Stopmode	0-15	3	3	3	3
119	Adopmode	0-7	1	1	1	1
120	Intmode32	0-3	0	0	0	0

27" Micro# 221-1526-00 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
121	Verint	0-63	63	63	63	63
122	Intmode10	0-3	0	0	0	0
123	Vpan	0-254	0	0	0	0
124	Thrcly	0-15	12	12	12	12
125	Thrcle	0-15	7	7	7	7
126	Svalfi	0-15	2	2	2	2
127	Svalfr	0-15	0	0	0	0
128	Fieinv	0-1	0	0	0	0
129	Vermode	0-1	1	1	1	1
130	Voutfr	0-1	0	0	0	0
131	Houtfr	0-1	0	0	0	0
132	Twout	0-1	1	1	1	1
133	HZoom	0-7	2	2	2	2
134	Rgbins	0-3	0	0	0	0
135	Seldel	0-15	15	15	15	15
136	Agcval	0-15	8	8	8	8
137	Cvbsel	0-3	0	0	0	0
138	Ckill	0-3	0	0	0	0
139	Ifcomp	0-3	0	0	0	0
140	Hue	0-100	50	50	50	50
141	Scadj	0-31	7	7	7	7
142	Concdj	0-100	50	50	50	50
143	BrtAdj	0-100	50	50	50	50
144	Satadj	0-100	50	50	50	50
145	Ypeak	0-7	5	5	5	5
146	Abrthd	0-15	0	0	0	0
147	Abrspd	0-7	0	0	0	0
148	Readd	0-1	1	1	1	1
149	Freeze	0-1	0	0	0	0
150	Yuvsel	0-1	0	0	0	0
151	Vspnsrg	0-1	1	1	1	1
152	Frsel	0-1	1	1	1	1
153	Infrm	0-1	0	0	0	0
154	LlcDFLim B8-15	0-254	0	0	0	0
155	LlcDFLim B0-07	0-254	54	54	54	54
156	LlcStart B8-11	0-15	15	15	15	15
157	LlcStart B0-07	0-254	221	221	221	221
158	LlcStop B8-11	0-15	0	0	0	0
159	LlcStop B0-07	0-254	18	18	18	18
160	LlcClkH B8-15	0-254	0	0	0	0
161	LlcClkH B0-07	0-254	42	42	42	42
162	LlcClkL B8-15	0-254	10	10	10	10
163	LlcClkL B0-07	0-254	171	171	171	171
164	LlcClkC	0-63	5	5	5	5
165	HpllAA B8-15	0-254	1	1	1	1
166	HpllAA B0-07	0-254	186	186	186	186
167	HpllAB B8-15	0-254	0	0	0	0
168	HpllAB B0-07	0-254	58	58	58	58
169	SubCon16x9	0-15	2	2	2	2
170	9400NaLip	0-63	19	19	19	19
171	9400Opdel	0-254	14	14	14	14

27" Micro# 221-1526-00 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
01	Rdrive	0-63	31	31	31	31
02	Gdrive	0-63	31	31	31	31
03	Bdrive	0-63	31	31	31	31
04	RCutOff	0-63	0	0	0	0

27" Micro# 221-1526-00 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
05	GCutOff	0-63	0	0	0	0
06	BCutOff	0-63	0	0	0	0
07	SubBright	0-63	20	30	30	30
08	MatOut	0-3	0	0	0	2
09	ShpF0	0-3	3	1	1	1
10	System	0-3	1	1	1	3
11	PreOver	0-3	0	0	0	0
12	VmLev	0-3	1	3	1	3
13	VmDel	0-3	3	3	2	3
14	D-Pic	0-3	2	0	0	0
15	LeftBlk	0-63	28	28	34	20
16	RightBlk	0-63	34	34	34	33
17	Clp	0-15	9	9	6	0
18	Vangle	0-63	31	31	31	31
19	Vbow	0-63	31	31	31	31
20	Hsize	0-63	31	31	31	31
21	PinPhase	0-63	31	31	31	34
22	UpPin	0-63	31	31	31	31
23	LoPin	0-63	31	31	31	31
24	UpCpin	0-63	31	31	31	31
25	LoCpin	0-63	31	31	31	31
26	Vpara2Dc	0-63	0	0	0	0
27	Vpara2Phase	0-63	35	35	35	35
28	Vpara2Amp	0-63	6	6	6	6
29	Vsize	0-63	31	31	31	31
30	VsCorCN	0-15	7	7	10	7
31	Vlin	0-15	7	7	7	7
32	Vscroll	0-63	42	42	42	42
33	UpVlin	0-15	4	4	0	0
34	LoVlin	0-15	0	0	1	1
35	Vaspect	0-63	20	20	20	20
36	MaxLine	0-254	160	160	190	160
37	VfrontBlk	0-127	17	17	5	5
38	VBackBlk	0-127	36	36	25	36
39	VfrontBlk16x9	0-127	20	5	25	5
40	VbackBlk16x9	0-127	48	36	32	25
41	VfrontBlkWide	0-127	48	60	60	60
42	VbackBlkWide	0-127	77	77	80	80
43	Vtim	0-254	39	45	39	45
44	Hposition	0-63	32	32	34	30
45	Vposition	0-63	28	28	28	28
46	WideOffSet	0-15	3	3	3	3
47	16x9OffSet	0-15	6	6	6	6
48	X1Pos	0-226	34	34	24	26
49	Y1Pos	0-236	81	81	127	138
50	X2Pos	0-22	45	45	73	74
51	Y2Pos	0-236	50	50	60	66
52	Vspdel	0-31	29	29	29	29
53	Clmpid	0-3	3	3	3	3
54	Lmofst	0-3	1	1	1	1
55	Ycdel	0-15	0	0	0	0
56	Posofv	0-7	0	0	0	0
57	Posofh	0-31	0	0	0	0
58	PllITC	0-3	0	0	0	0
59	Blklr	0-15	5	5	5	5
60	Blklg	0-15	5	5	5	5
61	Blklb	0-15	5	5	5	5
62	Pklr	0-254	170	170	170	170
63	Pklg	0-254	170	170	170	170
64	Pklb	0-254	170	170	170	170

32" Micro# 221-1526-02 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
00	Factory Mode	0-2	1	1	1	1
01	APCom	0-1	1	1	1	1
02	VPos	0-30	10	10	22	21
03	HPos	0-45	20	20	13	12
04	BAND/AFC	0-7	0	0	0	0
05	AC ON	0-1	0	0	0	0
06	FEATURE LEVEL	0-1	1	1	1	1
07	MUTE TIME	0-254	125	125	125	125
08	6 KEY SYS	0-1	1	1	1	1
09	B7 Air AFT	0-1	0	0	0	0
10	A ATT	0-15	6	6	6	6
11	A ATT2	0-15	6	6	6	6
12	AVCO	0-63	38	38	38	38
13	A FILTER	0-63	28	28	28	28
14	A SPECTRAL	0-63	12	12	12	12
15	WIDE BAND	0-63	32	32	32	32
16	Avopre	0-3	0	0	0	0
17	SatCr	0-63	37	37	37	37
18	SatCb	0-63	38	38	38	38
19	CipTnt	0-63	10	10	10	10
20	CipCt	0-63	30	30	30	30
21	CipBr	0-254	65	65	65	65
22	LDLY	0-63	59	59	59	59
23	AccSatBit8-11	0-15	7	7	7	7
24	AccSatBit0-07	0-254	220	220	220	220
25	TintBit8-15	0-254	0	0	0	0
26	TintBit0-07	0-254	70	70	70	70
27	BR	0-254	16	16	16	16
28	PK	0-7	3	3	3	3
29	PFS	0-3	0	0	0	0
30	CT	0-63	46	46	46	46
31	LPF2	0-3	0	0	0	0
32	HpllMd	0-3	0	0	0	0
33	Nosel	0-3	3	3	3	3
34	DDR	0-3	2	2	2	2
35	HDG	0-3	2	2	2	2
36	VDG	0-3	2	2	2	2
37	VPK	0-15	0	0	0	0
38	LlcGaiBit8-15	0-254	0	0	0	0
39	LlcGaiBit0-07	0-254	8	8	8	8
40	LinLenBit8-10	0-7	3	3	3	3
41	LinLenBit0-07	0-254	88	88	88	88
42	LowP	0-1	0	0	0	0
43	HsInv	0-1	1	1	1	1
44	HcInv	0-1	0	0	0	0
45	Avoin	0-1	0	0	0	0
46	VsInv	0-1	0	0	0	0
47	DbLnk	0-1	0	0	0	0
48	VsMode	0-1	0	0	0	0
49	HsUp	0-1	0	0	0	0
50	PkCor	0-1	0	0	0	0
51	AblMode	0-3	0	0	0	0
52	AblTh	0-3	2	2	2	2
53	LRGB2Level	0-15	4	4	4	4
54	PABLLevel	0-15	15	15	15	15
55	VTC	0-3	3	3	3	3
56	SubCol	0-15	15	15	15	15
57	SubHue	0-15	7	7	7	7
58	DVDSubHue	0-15	7	7	7	7
59	CtiLevel	0-3	0	0	0	0
60	RYR	0-15	4	4	4	4

32" Micro# 221-1526-02 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	RYB	0-15	2	2	2	2
62	GYR	0-15	3	3	3	3
63	GYB	0-15	11	11	11	11
64	SubShp	0-3	3	3	3	3
65	LtiLevel	0-3	0	0	0	0
66	FixSync	0-3	1	1	1	1
67	SubCon	0-15	11	11	11	11
68	BlkBottom	0-15	15	15	15	15
69	HWidth	0-3	1	1	1	1
70	LimitLevel	0-3	1	1	1	1
71	GammaZOn	0-15	0	0	0	0
72	DCTranZOn	0-7	2	2	2	2
73	GammaZOff	0-15	10	10	10	10
74	DCTranZOff	0-7	2	2	2	2
75	AkbT	0-1	1	1	1	1
76	Blksw	0-1	1	1	1	1
77	HsMask	0-1	1	1	1	1
78	Hysw	0-1	0	0	0	0
79	YmVm	0-1	1	1	1	1
80	Clpsw	0-1	1	1	1	1
81	HdTc	0-1	0	0	0	0
82	AfcMode	0-3	0	0	0	0
83	HblkSw	0-1	0	0	0	0
84	BlkSw	0-2	1	1	1	1
85	AfcRange	0-1	1	1	1	1
86	AfcRangeHD	0-1	0	0	0	0
87	Trawid	0-15	15	15	15	15
88	Thresh	0-15	14	14	14	14
89	Ydel1	0-15	9	9	9	9
90	Hsdel	0-63	0	0	0	0
91	Bckpos	0-254	215	215	215	215
92	Bckwid	0-254	0	0	0	0
93	Black	0-127	69	69	69	69
94	Phacom	0-3	0	0	0	0
95	BcofYUV	0-15	5	5	5	5
96	LcofYUV	0-7	4	4	4	4
97	HcofYUV	0-15	0	0	0	0
98	BcofAUX	0-15	5	5	5	5
99	LcofAUX	0-7	4	4	4	4
100	HcofAUX	0-15	0	0	0	0
101	BcofRF	0-15	3	3	3	3
102	LcofRF	0-7	4	4	4	4
103	HcofRF	0-15	0	0	0	0
104	Cor	0-1	1	1	1	1
105	Comex	0-1	0	0	0	0
106	Comp	0-1	1	1	1	1
107	Ovsamp	0-1	1	1	1	1
108	Ovfilt	0-1	1	1	1	1
109	Bacgr	0-1	1	1	1	1
110	Ampv	0-1	0	0	0	0
111	Ampu	0-1	0	0	0	0
112	Ampy	0-1	0	0	0	0
113	Vindel	0-63	3	3	3	3
114	Vertwidth	0-254	64	64	64	64
115	Vertpos	0-254	32	32	32	32
116	Horwidth	0-63	18	18	18	18
117	Horpos	0-63	18	18	18	18
118	Houtdel	0-254	166	166	166	166
119	Stopmode	0-15	3	3	3	3
120	Adopmode	0-7	1	1	1	1

32" Micro# 221-1526-02 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
121	Intmode32	0-3	0	0	0	0
122	Verint	0-63	63	63	63	63
123	Intmode10	0-3	0	0	0	0
124	Vpan	0-254	0	0	0	0
125	Thrcly	0-15	12	12	12	12
126	Thrcle	0-15	7	7	7	7
127	Svalfi	0-15	2	2	2	2
128	Svalfr	0-15	0	0	0	0
129	Fieinv	0-1	0	0	0	0
130	Vermode	0-1	1	1	1	1
131	Voutfr	0-1	0	0	0	0
132	Houtfr	0-1	0	0	0	0
133	Twout	0-1	1	1	1	1
134	HZoom	0-7	2	2	2	2
135	Rgbins	0-3	0	0	0	0
136	Seldel	0-15	15	15	15	15
137	Agcval	0-15	8	8	8	8
138	Cvbsel	0-3	0	0	0	0
139	Ckill	0-3	0	0	0	0
140	Ifcomp	0-3	0	0	0	0
141	Hue	0-100	50	50	50	50
142	Scadj	0-31	7	7	7	7
143	Concdj	0-100	50	50	50	50
144	BrtAdj	0-100	50	50	50	50
145	Satadj	0-100	50	50	50	50
146	Ypeak	0-7	5	5	5	5
147	Abrthd	0-15	0	0	0	0
148	Abrspd	0-7	0	0	0	0
149	Readd	0-1	1	1	1	1
150	Freeze	0-1	0	0	0	0
151	Yuvsel	0-1	0	0	0	0
152	Vspnsrg	0-1	1	1	1	1
153	Frsel	0-1	1	1	1	1
154	Infrm	0-1	0	0	0	0
155	LlcStart B8-11	0-15	15	15	15	15
156	LlcStart B0-07	0-254	221	221	221	221
157	LlcStop B8-11	0-15	0	0	0	0
158	LlcStop B0-07	0-254	18	18	18	18
159	Kilvl	0-254	25	25	25	25
160	Kilhy	0-254	5	5	5	5
161	LlcClkL B8-15	0-254	10	10	10	10
162	LlcClkL B0-07	0-254	171	171	171	171
163	LlcClkc	0-63	5	5	5	5
164	HpllAA B8-15	0-254	1	1	1	1
165	HpllAA B0-07	0-254	186	186	186	186
166	HpllAB B8-15	0-254	0	0	0	0
167	HpllAB B0-07	0-254	58	58	58	58
168	SubCon16x9	0-15	2	2	2	2
169	Cr OffSet1	0-15	7	7	7	7
170	Cb OffSet1	0-15	7	7	7	7
171	B1 AfcRange	0-1	1	1	1	1
172	Nalip_NTSC2	0-63	19	19	19	19
173	Opdel_NTSC2	0-254	14	14	14	14
174	CDLRF	0-7	4	4	4	4
175	CDLAUX	0-7	4	4	4	4
176	YPFT	0-3	0	0	0	0
177	YPFG	0-15	4	4	4	4

32" Micro# 221-1526-02 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
01	Rdrive	0-63	31	31	31	31
02	Gdrive	0-63	31	31	31	31
03	Bdrive	0-63	31	31	31	31
04	RCutOff	0-63	0	0	0	0
05	GCutOff	0-63	0	0	0	0
06	BCutOff	0-63	0	0	0	0
07	SubBright	0-63	20	30	30	30
08	MatOut	0-3	0	0	0	2
09	ShpF0	0-3	3	1	1	1
10	System	0-3	1	1	1	3
11	PreOver	0-3	0	0	0	0
12	VmLev	0-3	1	3	1	3
13	VmDel	0-3	3	3	2	3
14	D-Pic	0-3	2	0	0	0
15	LeftBlk	0-63	28	28	34	20
16	RightBlk	0-63	34	34	34	33
17	Clp	0-15	9	9	6	0
18	Vangle	0-63	31	31	31	31
19	Vbow	0-63	31	31	31	31
20	Hsize	0-63	31	31	31	31
21	PinPhase	0-63	31	31	31	34
22	UpPin	0-63	31	31	31	31
23	LoPin	0-63	31	31	31	31
24	UpCpin	0-63	31	31	31	31
25	LoCpin	0-63	31	31	31	31
26	Vpara2Dc	0-63	0	0	0	0
27	Vpara2Phase	0-63	35	35	35	35
28	Vpara2Amp	0-63	6	6	6	6
29	Vsize	0-63	31	31	31	31
30	VsCorCN	0-15	7	7	10	7
31	Vlin	0-15	7	7	7	7
32	Vscroll	0-63	42	42	42	42
33	UpVlin	0-15	4	4	0	0
34	LoVlin	0-15	0	0	1	1
35	Vaspect	0-63	20	20	20	20
36	MaxLine	0-254	160	160	190	160
37	VfrontBlk	0-127	17	17	5	5
38	VBackBlk	0-127	36	36	25	36
39	VfrontBlk16x9	0-127	20	5	25	5
40	VbackBlk16x9	0-127	48	36	32	25
41	VfrontBlkWide	0-127	48	60	60	60
42	VbackBlkWide	0-127	77	77	80	80
43	Vtim	0-254	39	45	39	45
44	Hposition	0-63	32	32	34	30
45	Vposition	0-63	28	28	28	28
46	WideOffSet	0-15	3	3	3	3
47	16x9OffSet	0-15	6	6	6	6
48	X1Pos	0-226	34	34	24	26
49	Y1Pos	0-236	81	81	127	138
50	X2Pos	0-22	45	45	73	74
51	Y2Pos	0-236	50	50	60	66
52	Vspdel	0-31	29	29	29	29
53	Clmpid	0-3	3	3	3	3
54	Lmofst	0-3	1	1	1	1
55	Ycdel	0-15	0	0	0	0
56	Posofv	0-7	0	0	0	0
57	Posofh	0-31	0	0	0	0
58	PllITC	0-3	0	0	0	0
59	Blklr	0-15	5	5	5	5
60	Blklg	0-15	5	5	5	5

32" Micro# 221-1526-02 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	Blklb	0-15	5	5	5	5
62	Pklr	0-254	170	170	170	170
63	Pklg	0-254	170	170	170	170
64	Pklb	0-254	170	170	170	170

36" Micro# 221-1526-02 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
00	Factory Mode	0-2	1	1	1	1
01	APCom	0-1	1	1	1	1
02	VPos	0-30	10	10	22	21
03	HPos	0-45	20	20	13	12
04	BAND/AFC	0-7	0	0	0	0
05	AC ON	0-1	0	0	0	0
06	FEATURE LEVEL	0-1	1	1	1	1
07	MUTE TIME	0-254	125	125	125	125
08	6 KEY SYS	0-1	1	1	1	1
09	B7 Air AFT	0-1	0	0	0	0
10	A ATT	0-15	6	6	6	6
11	A ATT2	0-15	6	6	6	6
12	AVCO	0-63	38	38	38	38
13	A FILTER	0-63	28	28	28	28
14	A SPECTRAL	0-63	12	12	12	12
15	WIDE BAND	0-63	32	32	32	32
16	Avopre	0-3	0	0	0	0
17	SatCr	0-63	37	37	37	37
18	SatCb	0-63	38	38	38	38
19	CipTnt	0-63	10	10	10	10
20	CipCt	0-63	30	30	30	30
21	CipBr	0-254	65	65	65	65
22	LDLY	0-63	59	59	59	59
23	AccSatBit8-11	0-15	7	7	7	7
24	AccSatBit0-07	0-254	220	220	220	220
25	TintBit8-15	0-254	0	0	0	0
26	TintBit0-07	0-254	70	70	70	70
27	BR	0-254	16	16	16	16
28	PK	0-7	3	3	3	3
29	PFS	0-3	0	0	0	0
30	CT	0-63	46	46	46	46
31	LPF2	0-3	0	0	0	0
32	HpllMd	0-3	0	0	0	0
33	Nosel	0-3	3	3	3	3
34	DDR	0-3	2	2	2	2
35	HDG	0-3	2	2	2	2
36	VDG	0-3	2	2	2	2
37	VPK	0-15	0	0	0	0
38	LlcGaiBit8-15	0-254	0	0	0	0
39	LlcGaiBit0-07	0-254	8	8	8	8
40	LinLenBit8-10	0-7	3	3	3	3
41	LinLenBit0-07	0-254	88	88	88	88
42	LowP	0-1	0	0	0	0
43	HsInv	0-1	1	1	1	1
44	HcInv	0-1	0	0	0	0
45	Avoin	0-1	0	0	0	0
46	VsInv	0-1	0	0	0	0
47	DbLnk	0-1	0	0	0	0
48	VsMode	0-1	0	0	0	0
49	HsUp	0-1	0	0	0	0
50	PkCor	0-1	0	0	0	0
51	AblMode	0-3	0	0	0	0
52	AblTh	0-3	2	2	2	2
53	LRGB2Level	0-15	4	4	4	4
54	PABLLevel	0-15	15	15	15	15
55	VTC	0-3	3	3	3	3
56	SubCol	0-15	15	15	15	15
57	SubHue	0-15	7	7	7	7
58	DVDSubHue	0-15	7	7	7	7
59	CtiLevel	0-3	0	0	0	0
60	RYR	0-15	4	4	4	4

36" Micro# 221-1526-02 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	RYB	0-15	2	2	2	2
62	GYR	0-15	3	3	3	3
63	GYB	0-15	11	11	11	11
64	SubShp	0-3	3	3	3	3
65	LtiLevel	0-3	0	0	0	0
66	FixSync	0-3	1	1	1	1
67	SubCon	0-15	11	11	11	11
68	BlkBottom	0-15	15	15	15	15
69	HWidth	0-3	1	1	1	1
70	LimitLevel	0-3	1	1	1	1
71	GammaZOn	0-15	0	0	0	0
72	DCTranZOn	0-7	2	2	2	2
73	GammaZOff	0-15	10	10	10	10
74	DCTranZOff	0-7	2	2	2	2
75	AkbT	0-1	1	1	1	1
76	Blksw	0-1	1	1	1	1
77	HsMask	0-1	1	1	1	1
78	Hysw	0-1	0	0	0	0
79	YmVm	0-1	1	1	1	1
80	Clpsw	0-1	1	1	1	1
81	HdTc	0-1	0	0	0	0
82	AfcMode	0-3	0	0	0	0
83	HblkSw	0-1	0	0	0	0
84	BlkSw	0-2	1	1	1	1
85	AfcRange	0-1	1	1	1	1
86	AfcRangeHD	0-1	0	0	0	0
87	Trawid	0-15	15	15	15	15
88	Thresh	0-15	14	14	14	14
89	Ydel1	0-15	9	9	9	9
90	Hsdel	0-63	0	0	0	0
91	Bckpos	0-254	215	215	215	215
92	Bckwid	0-254	0	0	0	0
93	Black	0-127	69	69	69	69
94	Phacom	0-3	0	0	0	0
95	BcofYUV	0-15	5	5	5	5
96	LcofYUV	0-7	4	4	4	4
97	HcofYUV	0-15	0	0	0	0
98	BcofAUX	0-15	5	5	5	5
99	LcofAUX	0-7	4	4	4	4
100	HcofAUX	0-15	0	0	0	0
101	BcofRF	0-15	3	3	3	3
102	LcofRF	0-7	4	4	4	4
103	HcofRF	0-15	0	0	0	0
104	Cor	0-1	1	1	1	1
105	Comex	0-1	0	0	0	0
106	Comp	0-1	1	1	1	1
107	Ovsamp	0-1	1	1	1	1
108	Ovfilt	0-1	1	1	1	1
109	Bacgr	0-1	1	1	1	1
110	Ampv	0-1	0	0	0	0
111	Ampu	0-1	0	0	0	0
112	Ampy	0-1	0	0	0	0
113	Vindel	0-63	3	3	3	3
114	Vertwidth	0-254	64	64	64	64
115	Vertpos	0-254	32	32	32	32
116	Horwidth	0-63	18	18	18	18
117	Horpos	0-63	18	18	18	18
118	Houtdel	0-254	166	166	166	166
119	Stopmode	0-15	3	3	3	3
120	Adopmode	0-7	1	1	1	1

36" Micro# 221-1526-02 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
121	Intmode32	0-3	0	0	0	0
122	Verint	0-63	63	63	63	63
123	Intmode10	0-3	0	0	0	0
124	Vpan	0-254	0	0	0	0
125	Thrcly	0-15	12	12	12	12
126	Thrcle	0-15	7	7	7	7
127	Svalfi	0-15	2	2	2	2
128	Svalfr	0-15	0	0	0	0
129	Fieinv	0-1	0	0	0	0
130	Vermode	0-1	1	1	1	1
131	Voutfr	0-1	0	0	0	0
132	Houtfr	0-1	0	0	0	0
133	Twout	0-1	1	1	1	1
134	HZoom	0-7	2	2	2	2
135	Rgbins	0-3	0	0	0	0
136	Seldel	0-15	15	15	15	15
137	Agcval	0-15	8	8	8	8
138	Cvbsel	0-3	0	0	0	0
139	Ckill	0-3	0	0	0	0
140	Ifcomp	0-3	0	0	0	0
141	Hue	0-100	50	50	50	50
142	Scadj	0-31	7	7	7	7
143	Concdj	0-100	50	50	50	50
144	BrtAdj	0-100	50	50	50	50
145	Satadj	0-100	50	50	50	50
146	Ypeak	0-7	5	5	5	5
147	Abrthd	0-15	0	0	0	0
148	Abrspd	0-7	0	0	0	0
149	Readd	0-1	1	1	1	1
150	Freeze	0-1	0	0	0	0
151	Yuvsel	0-1	0	0	0	0
152	Vspnsrg	0-1	1	1	1	1
153	Frsel	0-1	1	1	1	1
154	Infrm	0-1	0	0	0	0
155	LlcStart B8-11	0-15	15	15	15	15
156	LlcStart B0-07	0-254	221	221	221	221
157	LlcStop B8-11	0-15	0	0	0	0
158	LlcStop B0-07	0-254	18	18	18	18
159	Kilvl	0-254	25	25	25	25
160	Kilhy	0-254	5	5	5	5
161	LlcClkL B8-15	0-254	10	10	10	10
162	LlcClkL B0-07	0-254	171	171	171	171
163	LlcClkc	0-63	5	5	5	5
164	HpllAA B8-15	0-254	1	1	1	1
165	HpllAA B0-07	0-254	186	186	186	186
166	HpllAB B8-15	0-254	0	0	0	0
167	HpllAB B0-07	0-254	58	58	58	58
168	SubCon16x9	0-15	2	2	2	2
169	Cr OffSet1	0-15	7	7	7	7
170	Cb OffSet1	0-15	7	7	7	7
171	B1 AfcRange	0-1	1	1	1	1
172	Nalip_NTSC2	0-63	19	19	19	19
173	Opdel_NTSC2	0-254	14	14	14	14
174	CDLRF	0-7	4	4	4	4
175	CDLAUX	0-7	4	4	4	4
176	YPFT	0-3	0	0	0	0
177	YPFG	0-15	4	4	4	4

36" Micro# 221-1526-02 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
01	Rdrive	0-63	31	31	31	31
02	Gdrive	0-63	31	31	31	31
03	Bdrive	0-63	31	31	31	31
04	RCutOff	0-63	0	0	0	0
05	GCutOff	0-63	0	0	0	0
06	BCutOff	0-63	0	0	0	0
07	SubBright	0-63	20	30	30	30
08	MatOut	0-3	0	0	0	2
09	ShpF0	0-3	3	0	1	1
10	System	0-3	1	1	3	3
11	PreOver	0-3	0	0	0	0
12	VmLev	0-3	1	1	2	1
13	VmDel	0-3	2	1	1	3
14	D-Pic	0-3	2	0	0	0
15	LeftBlk	0-63	28	28	20	20
16	RightBlk	0-63	34	34	34	33
17	Clp	0-15	9	9	6	0
18	Vangle	0-63	34	34	31	31
19	Vbow	0-63	29	29	31	31
20	Hsize	0-63	31	31	31	31
21	PinPhase	0-63	12	12	32	32
22	UpPin	0-63	21	21	15	15
23	LoPin	0-63	17	17	20	20
24	UpCpin	0-63	36	36	31	31
25	LoCpin	0-63	33	33	34	34
26	Vpara2Dc	0-63	0	0	0	0
27	Vpara2Phase	0-63	35	35	34	34
28	Vpara2Amp	0-63	6	6	18	18
29	Vsize	0-63	44	44	51	51
30	VsCorCN	0-15	10	10	10	10
31	Vlin	0-15	7	7	7	7
32	Vscroll	0-63	41	41	37	41
33	UpVlin	0-15	4	4	4	4
34	LoVlin	0-15	2	2	2	2
35	Vaspect	0-63	20	20	20	20
36	MaxLine	0-254	28	28	160	160
37	Vaspect 16:9	0-63	57	57	5	5
38	Vaspect Wide	0-63	160	160	32	36
39	VfrontBlk	0-127	17	17	25	5
40	VBackBlk	0-127	36	36	36	38
41	VfrontBlk16x9	0-127	25	25	60	60
42	VbackBlk16x9	0-127	58	58	89	89
43	VfrontBlkWide	0-127	48	48	45	45
44	VbackBlkWide	0-127	77	77	34	34
45	Vtim	0-254	45	45	31	31
46	Hposition	0-63	34	34	3	3
47	Vposition	0-63	31	31	6	6
48	WideOffSet	0-15	3	3	17	18
49	16x9OffSet	0-15	6	6	117	130
50	X1Pos	0-226	29	29	62	63
51	Y1Pos	0-236	83	77	67	74
52	X2Pos	0-22	37	37	29	29
53	Y2Pos	0-236	49	41	3	3
54	Vspdel	0-31	29	29	1	1
55	Clmpid	0-3	3	3	0	0
56	Lmofst	0-3	1	1	0	0
57	Ycdel	0-15	0	0	0	0
58	Posofv	0-7	0	0	0	0
59	Posofh	0-31	0	0	5	5
60	PllITC	0-3	0	0	5	5

36" Micro# 221-1526-02 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	Blklr	0-15	5	5	5	5
62	Blklg	0-15	5	5	170	170
63	Blklb	0-15	5	5	170	170
64	Pklr	0-254	170	170	170	170
65	Pklg	0-254	170	170	28	28
66	Pklb	0-254	170	170	57	57

32" Micro# 221-1526-03 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
00	Factory Mode	0-2	1	1	1	1
01	APCom	0-1	1	1	1	1
02	VPos	0-30	10	10	22	21
03	HPos	0-45	20	20	13	12
04	BAND/AFC	0-7	0	0	0	0
05	AC ON	0-1	0	0	0	0
06	FEATURE LEVEL	0-1	1	1	1	1
07	MUTE TIME	0-254	125	125	125	125
08	6 KEY SYS	0-1	1	1	1	1
09	B7 Air AFT	0-1	0	0	0	0
10	A ATT	0-15	6	6	6	6
11	A ATT2	0-15	6	6	6	6
12	AVCO	0-63	38	38	38	38
13	A FILTER	0-63	28	28	28	28
14	A SPECTRAL	0-63	12	12	12	12
15	WIDE BAND	0-63	32	32	32	32
16	Avopre	0-3	0	0	0	0
17	SatCr	0-63	37	37	37	37
18	SatCb	0-63	38	38	38	38
19	CipTnt	0-63	10	10	10	10
20	CipCt	0-63	30	30	30	30
21	CipBr	0-254	65	65	65	65
22	LDLY	0-63	59	59	59	59
23	AccSatBit8-11	0-15	7	7	7	7
24	AccSatBit0-07	0-254	220	220	220	220
25	TintBit8-15	0-254	0	0	0	0
26	TintBit0-07	0-254	70	70	70	70
27	BR	0-254	16	16	16	16
28	PK	0-7	3	3	3	3
29	PFS	0-3	0	0	0	0
30	CT	0-63	46	46	46	46
31	LPF2	0-3	0	0	0	0
32	HpllMd	0-3	0	0	0	0
33	Nosel	0-3	3	3	3	3
34	DDR	0-3	2	2	2	2
35	HDG	0-3	2	2	2	2
36	VDG	0-3	2	2	2	2
37	VPK	0-15	0	0	0	0
38	LlcGaiBit8-15	0-254	0	0	0	0
39	LlcGaiBit0-07	0-254	8	8	8	8
40	LinLenBit8-10	0-7	3	3	3	3
41	LinLenBit0-07	0-254	88	88	88	88
42	LowP	0-1	0	0	0	0
43	HsInv	0-1	1	1	1	1
44	HcInv	0-1	0	0	0	0
45	Avoin	0-1	0	0	0	0
46	VsInv	0-1	0	0	0	0
47	DbLnk	0-1	0	0	0	0
48	VsMode	0-1	0	0	0	0
49	HsUp	0-1	0	0	0	0
50	PkCor	0-1	0	0	0	0
51	AblMode	0-3	0	0	0	0
52	AblTh	0-3	2	2	2	2
53	LRGB2Level	0-15	4	4	4	4
54	PABLLevel	0-15	15	15	15	15
55	VTC	0-3	3	3	3	3
56	SubCol	0-15	15	15	15	15
57	SubHue	0-15	7	7	7	7
58	DVDSubHue	0-15	7	7	7	7
59	CtiLevel	0-3	0	0	0	0
60	RYR	0-15	4	4	4	4

32" Micro# 221-1526-03 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	RYB	0-15	2	2	2	2
62	GYR	0-15	3	3	3	3
63	GYB	0-15	11	11	11	11
64	SubShp	0-3	3	3	3	3
65	LtiLevel	0-3	0	0	0	0
66	FixSync	0-3	1	1	1	1
67	SubCon	0-15	11	11	11	11
68	BlkBottom	0-15	15	15	15	15
69	HWidth	0-3	1	1	1	1
70	LimitLevel	0-3	1	1	1	1
71	GammaZOn	0-15	0	0	0	0
72	DCTranZOn	0-7	2	2	2	2
73	GammaZOff	0-15	10	10	10	10
74	DCTranZOff	0-7	2	2	2	2
75	AkbT	0-1	1	1	1	1
76	Blksw	0-1	1	1	1	1
77	HsMask	0-1	1	1	1	1
78	Hysw	0-1	0	0	0	0
79	YmVm	0-1	1	1	1	1
80	Clpsw	0-1	1	1	1	1
81	HdTc	0-1	0	0	0	0
82	AfcMode	0-3	0	0	0	0
83	HblkSw	0-1	0	0	0	0
84	BlkSw	0-2	1	1	1	1
85	AfcRange	0-1	1	1	1	1
86	AfcRangeHD	0-1	0	0	0	0
87	Trawid	0-15	15	15	15	15
88	Thresh	0-15	14	14	14	14
89	Ydel1	0-15	9	9	9	9
90	Hsdel	0-63	0	0	0	0
91	Bckpos	0-254	215	215	215	215
92	Bckwid	0-254	0	0	0	0
93	Black	0-127	69	69	69	69
94	Phacom	0-3	0	0	0	0
95	BcofYUV	0-15	5	5	5	5
96	LcofYUV	0-7	4	4	4	4
97	HcofYUV	0-15	0	0	0	0
98	BcofAUX	0-15	5	5	5	5
99	LcofAUX	0-7	4	4	4	4
100	HcofAUX	0-15	0	0	0	0
101	BcofRF	0-15	3	3	3	3
102	LcofRF	0-7	4	4	4	4
103	HcofRF	0-15	0	0	0	0
104	Cor	0-1	1	1	1	1
105	Comex	0-1	0	0	0	0
106	Comp	0-1	1	1	1	1
107	Ovsamp	0-1	1	1	1	1
108	Ovfilt	0-1	1	1	1	1
109	Bacgr	0-1	1	1	1	1
110	Ampv	0-1	0	0	0	0
111	Ampu	0-1	0	0	0	0
112	Ampy	0-1	0	0	0	0
113	Vindel	0-63	3	3	3	3
114	Vertwidth	0-254	64	64	64	64
115	Vertpos	0-254	32	32	32	32
116	Horwidth	0-63	18	18	18	18
117	Horpos	0-63	18	18	18	18
118	Houtdel	0-254	166	166	166	166
119	Stopmode	0-15	3	3	3	3
120	Adopmode	0-7	1	1	1	1

32" Micro# 221-1526-03 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
121	Intmode32	0-3	0	0	0	0
122	Verint	0-63	63	63	63	63
123	Intmode10	0-3	0	0	0	0
124	Vpan	0-254	0	0	0	0
125	Thrcly	0-15	12	12	12	12
126	Thrcle	0-15	7	7	7	7
127	Svalfi	0-15	2	2	2	2
128	Svalfr	0-15	0	0	0	0
129	Fieinv	0-1	0	0	0	0
130	Vermode	0-1	1	1	1	1
131	Voutfr	0-1	0	0	0	0
132	Houtfr	0-1	0	0	0	0
133	Twout	0-1	1	1	1	1
134	HZoom	0-7	2	2	2	2
135	Rgbins	0-3	0	0	0	0
136	Seldel	0-15	15	15	15	15
137	Agcval	0-15	8	8	8	8
138	Cvbsel	0-3	0	0	0	0
139	Ckill	0-3	0	0	0	0
140	Ifcomp	0-3	0	0	0	0
141	Hue	0-100	50	50	50	50
142	Scadj	0-31	7	7	7	7
143	Concdj	0-100	50	50	50	50
144	BrtAdj	0-100	50	50	50	50
145	Satadj	0-100	50	50	50	50
146	Ypeak	0-7	5	5	5	5
147	Abrthd	0-15	0	0	0	0
148	Abrspd	0-7	0	0	0	0
149	Readd	0-1	1	1	1	1
150	Freeze	0-1	0	0	0	0
151	Yuvsel	0-1	0	0	0	0
152	Vspnsrg	0-1	1	1	1	1
153	Frsel	0-1	1	1	1	1
154	Infrm	0-1	0	0	0	0
155	LlcStart B8-11	0-15	15	15	15	15
156	LlcStart B0-07	0-254	221	221	221	221
157	LlcStop B8-11	0-15	0	0	0	0
158	LlcStop B0-07	0-254	18	18	18	18
159	Kilvl	0-254	25	25	25	25
160	Kilhy	0-254	5	5	5	5
161	LlcClkL B8-15	0-254	10	10	10	10
162	LlcClkL B0-07	0-254	171	171	171	171
163	LlcClkc	0-63	5	5	5	5
164	HpllAA B8-15	0-254	1	1	1	1
165	HpllAA B0-07	0-254	186	186	186	186
166	HpllAB B8-15	0-254	0	0	0	0
167	HpllAB B0-07	0-254	58	58	58	58
168	SubCon16x9	0-15	2	2	2	2
169	Cr OffSet1	0-15	7	7	7	7
170	Cb OffSet1	0-15	7	7	7	7
171	B1 AfcRange	0-1	1	1	1	1
172	Nalip_NTSC2	0-63	19	19	19	19
173	Opdel_NTSC2	0-254	14	14	14	14
174	3D ComEnablFact	0-1	1	1	1	1
175	CDLRF	0-7	4	4	4	4
176	CDLAUX	0-7	4	4	4	4
177	YPFT	0-3	0	0	0	0
178	YPFG	0-15	4	4	4	4

32" Micro# 221-1526-03 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
01	Rdrive	0-63	31	31	31	31
02	Gdrive	0-63	31	31	31	31
03	Bdrive	0-63	31	31	31	31
04	RCutOff	0-63	0	0	0	0
05	GCutOff	0-63	0	0	0	0
06	BCutOff	0-63	0	0	0	0
07	SubBright	0-63	20	30	30	30
08	MatOut	0-3	0	0	0	2
09	ShpF0	0-3	3	1	1	1
10	System	0-3	1	1	1	3
11	PreOver	0-3	0	0	0	0
12	VmLev	0-3	1	3	1	3
13	VmDel	0-3	3	3	2	3
14	D-Pic	0-3	2	0	0	0
15	LeftBlk	0-63	28	28	34	20
16	RightBlk	0-63	34	34	34	33
17	Clp	0-15	9	9	6	0
18	Vangle	0-63	31	31	31	31
19	Vbow	0-63	31	31	31	31
20	Hsize	0-63	31	31	31	31
21	PinPhase	0-63	31	31	31	34
22	UpPin	0-63	31	31	31	31
23	LoPin	0-63	31	31	31	31
24	UpCpin	0-63	31	31	31	31
25	LoCpin	0-63	31	31	31	31
26	Vpara2Dc	0-63	0	0	0	0
27	Vpara2Phase	0-63	35	35	35	35
28	Vpara2Amp	0-63	6	6	6	6
29	Vsize	0-63	31	31	31	31
30	VsCorCN	0-15	7	7	10	7
31	Vlin	0-15	7	7	7	7
32	Vscroll	0-63	42	42	42	42
33	UpVlin	0-15	4	4	0	0
34	LoVlin	0-15	0	0	1	1
35	Vaspect	0-63	20	20	20	20
36	MaxLine	0-254	160	160	190	160
37	Vaspect 16:9	0-63	32	32	32	32
38	Vaspect Wide	0-63	57	57	57	57
39	VfrontBlk	0-127	17	17	5	5
40	VBackBlk	0-127	36	36	25	36
41	VfrontBlk16x9	0-127	20	5	25	5
42	VbackBlk16x9	0-127	48	36	32	25
43	VfrontBlkWide	0-127	48	60	60	60
44	VbackBlkWide	0-127	77	77	80	80
45	Vtim	0-254	39	45	39	45
46	Hposition	0-63	32	32	34	30
47	Vposition	0-63	28	28	28	28
48	WideOffSet	0-15	3	3	3	3
49	16x9OffSet	0-15	6	6	6	6
50	X1Pos	0-226	34	34	24	26
51	Y1Pos	0-236	81	81	127	138
52	X2Pos	0-22	45	45	73	74
53	Y2Pos	0-236	50	50	60	66
54	Vspdel	0-31	29	29	29	29
55	Clmpid	0-3	3	3	3	3
56	Lmofst	0-3	1	1	1	1
57	Ycdel	0-15	0	0	0	0
58	Posofv	0-7	0	0	0	0
59	Posofh	0-31	0	0	0	0
60	PllITC	0-3	0	0	0	0

32" Micro# 221-1526-03 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	Blklr	0-15	5	5	5	5
62	Blklg	0-15	5	5	5	5
63	Blklb	0-15	5	5	5	5
64	Pklr	0-254	170	170	170	170
65	Pklg	0-254	170	170	170	170
66	Pklb	0-254	170	170	170	170

36" Micro# 221-1526-03 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
00	Factory Mode	0-2	1	1	1	1
01	APCom	0-1	1	1	1	1
02	VPos	0-30	10	10	22	21
03	HPos	0-45	20	20	13	12
04	BAND/AFC	0-7	0	0	0	0
05	AC ON	0-1	0	0	0	0
06	FEATURE LEVEL	0-1	1	1	1	1
07	MUTE TIME	0-254	125	125	125	125
08	6 KEY SYS	0-1	1	1	1	1
09	B7 Air AFT	0-1	0	0	0	0
10	A ATT	0-15	6	6	6	6
11	A ATT2	0-15	6	6	6	6
12	AVCO	0-63	38	38	38	38
13	A FILTER	0-63	28	28	28	28
14	A SPECTRAL	0-63	12	12	12	12
15	WIDE BAND	0-63	32	32	32	32
16	Avopre	0-3	0	0	0	0
17	SatCr	0-63	37	37	37	37
18	SatCb	0-63	38	38	38	38
19	CipTnt	0-63	10	10	10	10
20	CipCt	0-63	30	30	30	30
21	CipBr	0-254	65	65	65	65
22	LDLY	0-63	59	59	59	59
23	AccSatBit8-11	0-15	7	7	7	7
24	AccSatBit0-07	0-254	220	220	220	220
25	TintBit8-15	0-254	0	0	0	0
26	TintBit0-07	0-254	70	70	70	70
27	BR	0-254	16	16	16	16
28	PK	0-7	3	3	3	3
29	PFS	0-3	0	0	0	0
30	CT	0-63	46	46	46	46
31	LPF2	0-3	0	0	0	0
32	HpllMd	0-3	0	0	0	0
33	Nosel	0-3	3	3	3	3
34	DDR	0-3	2	2	2	2
35	HDG	0-3	2	2	2	2
36	VDG	0-3	2	2	2	2
37	VPK	0-15	0	0	0	0
38	LlcGaiBit8-15	0-254	0	0	0	0
39	LlcGaiBit0-07	0-254	8	8	8	8
40	LinLenBit8-10	0-7	3	3	3	3
41	LinLenBit0-07	0-254	88	88	88	88
42	LowP	0-1	0	0	0	0
43	HsInv	0-1	1	1	1	1
44	HcInv	0-1	0	0	0	0
45	Avoin	0-1	0	0	0	0
46	VsInv	0-1	0	0	0	0
47	DbLnk	0-1	0	0	0	0
48	VsMode	0-1	0	0	0	0
49	HsUp	0-1	0	0	0	0
50	PkCor	0-1	0	0	0	0
51	AblMode	0-3	0	0	0	0
52	AblTh	0-3	2	2	2	2
53	LRGB2Level	0-15	4	4	4	4
54	PABLLevel	0-15	15	15	15	15
55	VTC	0-3	3	3	3	3
56	SubCol	0-15	15	15	15	15
57	SubHue	0-15	7	7	7	7
58	DVDSubHue	0-15	7	7	7	7
59	CtiLevel	0-3	0	0	0	0
60	RYR	0-15	4	4	4	4

36" Micro# 221-1526-03 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	RYB	0-15	2	2	2	2
62	GYR	0-15	3	3	3	3
63	GYB	0-15	11	11	11	11
64	SubShp	0-3	3	3	3	3
65	LtiLevel	0-3	0	0	0	0
66	FixSync	0-3	1	1	1	1
67	SubCon	0-15	11	11	11	11
68	BlkBottom	0-15	15	15	15	15
69	HWidth	0-3	1	1	1	1
70	LimitLevel	0-3	1	1	1	1
71	GammaZOn	0-15	0	0	0	0
72	DCTranZOn	0-7	2	2	2	2
73	GammaZOff	0-15	10	10	10	10
74	DCTranZOff	0-7	2	2	2	2
75	AkbT	0-1	1	1	1	1
76	Blksw	0-1	1	1	1	1
77	HsMask	0-1	1	1	1	1
78	Hysw	0-1	0	0	0	0
79	YmVm	0-1	1	1	1	1
80	Clpsw	0-1	1	1	1	1
81	HdTc	0-1	0	0	0	0
82	AfcMode	0-3	0	0	0	0
83	HblkSw	0-1	0	0	0	0
84	BlkSw	0-2	1	1	1	1
85	AfcRange	0-1	1	1	1	1
86	AfcRangeHD	0-1	0	0	0	0
87	Trawid	0-15	15	15	15	15
88	Thresh	0-15	14	14	14	14
89	Ydel1	0-15	9	9	9	9
90	Hsdel	0-63	0	0	0	0
91	Bckpos	0-254	215	215	215	215
92	Bckwid	0-254	0	0	0	0
93	Black	0-127	69	69	69	69
94	Phacom	0-3	0	0	0	0
95	BcofYUV	0-15	5	5	5	5
96	LcofYUV	0-7	4	4	4	4
97	HcofYUV	0-15	0	0	0	0
98	BcofAUX	0-15	5	5	5	5
99	LcofAUX	0-7	4	4	4	4
100	HcofAUX	0-15	0	0	0	0
101	BcofRF	0-15	3	3	3	3
102	LcofRF	0-7	4	4	4	4
103	HcofRF	0-15	0	0	0	0
104	Cor	0-1	1	1	1	1
105	Comex	0-1	0	0	0	0
106	Comp	0-1	1	1	1	1
107	Ovsamp	0-1	1	1	1	1
108	Ovfilt	0-1	1	1	1	1
109	Bacgr	0-1	1	1	1	1
110	Ampv	0-1	0	0	0	0
111	Ampu	0-1	0	0	0	0
112	Ampy	0-1	0	0	0	0
113	Vindel	0-63	3	3	3	3
114	Vertwidth	0-254	64	64	64	64
115	Vertpos	0-254	32	32	32	32
116	Horwidth	0-63	18	18	18	18
117	Horpos	0-63	18	18	18	18
118	Houtdel	0-254	166	166	166	166
119	Stopmode	0-15	3	3	3	3
120	Adopmode	0-7	1	1	1	1

36" Micro# 221-1526-03 Factory Mode 1						
Address	Item	Range	NTSC2	480P	HD	HD RGB
121	Intmode32	0-3	0	0	0	0
122	Verint	0-63	63	63	63	63
123	Intmode10	0-3	0	0	0	0
124	Vpan	0-254	0	0	0	0
125	Thrcly	0-15	12	12	12	12
126	Thrcle	0-15	7	7	7	7
127	Svalfi	0-15	2	2	2	2
128	Svalfr	0-15	0	0	0	0
129	Fieinv	0-1	0	0	0	0
130	Vermode	0-1	1	1	1	1
131	Voutfr	0-1	0	0	0	0
132	Houtfr	0-1	0	0	0	0
133	Twout	0-1	1	1	1	1
134	HZoom	0-7	2	2	2	2
135	Rgbins	0-3	0	0	0	0
136	Seldel	0-15	15	15	15	15
137	Agcval	0-15	8	8	8	8
138	Cvbsel	0-3	0	0	0	0
139	Ckill	0-3	0	0	0	0
140	Ifcomp	0-3	0	0	0	0
141	Hue	0-100	50	50	50	50
142	Scadj	0-31	7	7	7	7
143	Concdj	0-100	50	50	50	50
144	BrtAdj	0-100	50	50	50	50
145	Satadj	0-100	50	50	50	50
146	Ypeak	0-7	5	5	5	5
147	Abrthd	0-15	0	0	0	0
148	Abrspd	0-7	0	0	0	0
149	Readd	0-1	1	1	1	1
150	Freeze	0-1	0	0	0	0
151	Yuvsel	0-1	0	0	0	0
152	Vspnsrg	0-1	1	1	1	1
153	Frsel	0-1	1	1	1	1
154	Infrm	0-1	0	0	0	0
155	LlcStart B8-11	0-15	15	15	15	15
156	LlcStart B0-07	0-254	221	221	221	221
157	LlcStop B8-11	0-15	0	0	0	0
158	LlcStop B0-07	0-254	18	18	18	18
159	Kilvl	0-254	25	25	25	25
160	Kilhy	0-254	5	5	5	5
161	LlcClkL B8-15	0-254	10	10	10	10
162	LlcClkL B0-07	0-254	171	171	171	171
163	LlcClkc	0-63	5	5	5	5
164	HpllAA B8-15	0-254	1	1	1	1
165	HpllAA B0-07	0-254	186	186	186	186
166	HpllAB B8-15	0-254	0	0	0	0
167	HpllAB B0-07	0-254	58	58	58	58
168	SubCon16x9	0-15	2	2	2	2
169	Cr OffSet1	0-15	7	7	7	7
170	Cb OffSet1	0-15	7	7	7	7
171	B1 AfcRange	0-1	1	1	1	1
172	Nalip_NTSC2	0-63	19	19	19	19
173	Opdel_NTSC2	0-254	14	14	14	14
174	3D ComEnablFact	0-1	1	1	1	1
175	CDLRF	0-7	4	4	4	4
176	CDLAUX	0-7	4	4	4	4
177	YPFT	0-3	0	0	0	0
178	YPFG	0-15	4	4	4	4

36" Micro# 221-1526-03 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
01	Rdrive	0-63	31	31	31	31
02	Gdrive	0-63	31	31	31	31
03	Bdrive	0-63	31	31	31	31
04	RCutOff	0-63	0	0	0	0
05	GCutOff	0-63	0	0	0	0
06	BCutOff	0-63	0	0	0	0
07	SubBright	0-63	20	30	30	30
08	MatOut	0-3	0	0	0	2
09	ShpF0	0-3	3	0	1	1
10	System	0-3	1	1	3	3
11	PreOver	0-3	0	0	0	0
12	VmLev	0-3	1	1	2	1
13	VmDel	0-3	2	1	1	3
14	D-Pic	0-3	2	0	0	0
15	LeftBlk	0-63	28	28	20	20
16	RightBlk	0-63	34	34	34	33
17	Clp	0-15	9	9	6	0
18	Vangle	0-63	34	34	31	31
19	Vbow	0-63	29	29	31	31
20	Hsize	0-63	31	31	31	31
21	PinPhase	0-63	12	12	32	32
22	UpPin	0-63	21	21	15	15
23	LoPin	0-63	17	17	20	20
24	UpCpin	0-63	36	36	31	31
25	LoCpin	0-63	33	33	34	34
26	Vpara2Dc	0-63	0	0	0	0
27	Vpara2Phase	0-63	35	35	34	34
28	Vpara2Amp	0-63	6	6	18	18
29	Vsize	0-63	44	44	51	51
30	VsCorCN	0-15	10	10	10	10
31	Vlin	0-15	7	7	7	7
32	Vscroll	0-63	41	41	37	41
33	UpVlin	0-15	4	4	4	4
34	LoVlin	0-15	2	2	2	2
35	Vaspect	0-63	20	20	20	20
36	MaxLine	0-254	28	28	160	160
37	Vaspect 16:9	0-63	57	57	5	5
38	Vaspect Wide	0-63	160	160	32	36
39	VfrontBlk	0-127	17	17	25	5
40	VBackBlk	0-127	36	36	36	38
41	VfrontBlk16x9	0-127	25	25	60	60
42	VbackBlk16x9	0-127	58	58	89	89
43	VfrontBlkWide	0-127	48	48	45	45
44	VbackBlkWide	0-127	77	77	34	34
45	Vtim	0-254	45	45	31	31
46	Hposition	0-63	34	34	3	3
47	Vposition	0-63	31	31	6	6
48	WideOffSet	0-15	3	3	17	18
49	16x9OffSet	0-15	6	6	117	130
50	X1Pos	0-226	29	29	62	63
51	Y1Pos	0-236	83	77	67	74
52	X2Pos	0-22	37	37	29	29
53	Y2Pos	0-236	49	41	3	3
54	Vspdel	0-31	29	29	1	1
55	Clmpid	0-3	3	3	0	0
56	Lmofst	0-3	1	1	0	0
57	Ycdel	0-15	0	0	0	0
58	Posofv	0-7	0	0	0	0
59	Posofh	0-31	0	0	5	5
60	PllITC	0-3	0	0	5	5

36" Micro# 221-1526-03 Factory Mode 2						
Address	Item	Range	NTSC2	480P	HD	HD RGB
61	Blklr	0-15	5	5	5	5
62	Blklg	0-15	5	5	170	170
63	Blklb	0-15	5	5	170	170
64	Pklr	0-254	170	170	170	170
65	Pklg	0-254	170	170	28	28
66	Pklb	0-254	170	170	57	57

LARGE SIGNAL MODULE

POWER SUPPLY DEFINITION

The HD-S Large signal module is a COLD chassis of a single sided circuit board, developed for covering 27V,32V & 36V screen sizes and consisting of two SMPS (One Stand-by called Master and other switched by the Microcontroller IC6000, called Slave), Horizontal & Vertical Deflection, two daughter boards and dynamic focus section.

The power supply section features seven IC's for voltage sources:

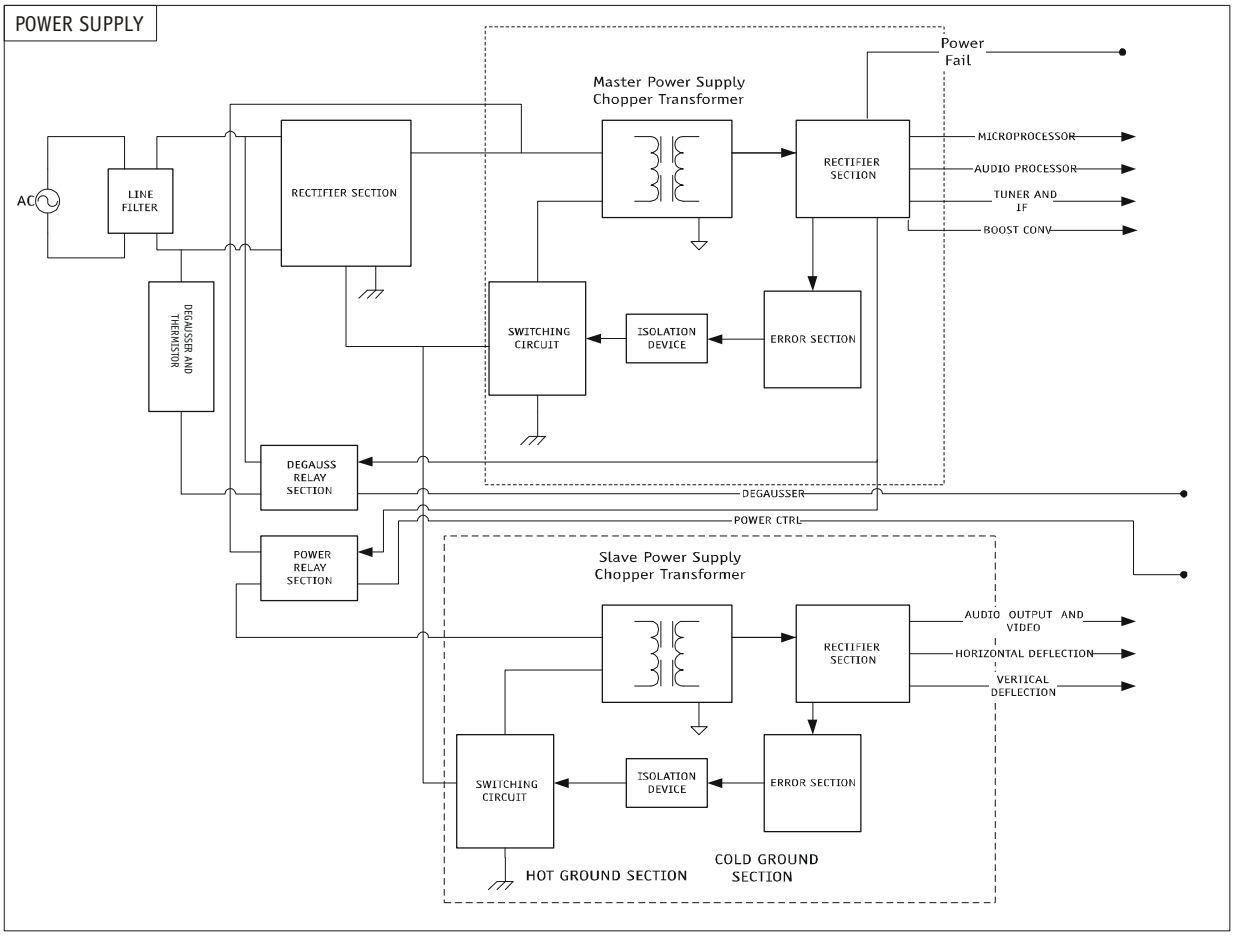
15Volts, 1Amp Linear Regulator for +15 volts switched source, 221-00213-05.

- 15Volts, 1Amp Linear Regulator pre-adjusted for +18 volts switched source, 221-00213-05 .
- 5Volts, 1A Linear Regulator pre-adjusted for 6.2 volts switched source, 221-00213.
- Two Switch Mode regulators, used on Master & Slave converters, 223-00060-03.
- Two Error amplifiers for both Master & Slave, 221-00265-03A.

POWER SUPPLIES

The HD-S Chassis uses two Switch Mode Power Supplies (SMPS) to supply the whole television. It uses two switching regulators, which develop up to 120 watts each, using quasi-resonant topology.

AC line voltage is supplied through a line filter consisting of LX3400, LX3401, CX3401, CX3402, and CX3405 to reduce AC line noise and vice versa (LCI); and bridge rectifier BR3400 (212-00168-04 with heat sink 126-03748-03) and CX3410 through fuse FX3400. The AC operating voltage is between 90Vrms and 135Vrms. The DC output (+VM) is supplied to the Master Regulator and should be between 127.3 VDC and 190.9 VDC.



MASTER POWER SUPPLY

The MASTER SMPS consists of ICX3612, ICX3701 (error amp), ICX3700 (feedback optocoupler}, and TX3600 (chopper transformer). It supplies:

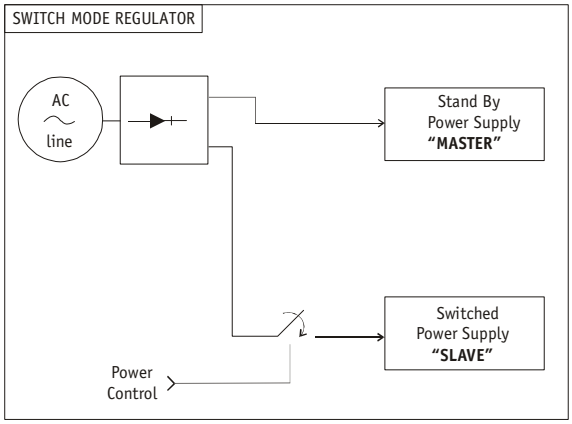
·12VSB (Voltage, Stand-by) to 5VDC linear regulator ICX3801 for the micro controller and the GEMSTAR module

·12VSB to 5VDC linear regulator ICX3802 for the combo tuners

·12VSB to 9VDC linear regulator ICX3803 for the MTS audio stereo decoder

·+80VDC for the Scan Boost converter, which generates a B++ output for the flyback converter in the horizontal deflection circuitry.

+PDD – a single diode rectified pulse signal for reset of the GEMSTAR module and the microcontroller after an AC power failure.



SLAVE POWER SUPPLY

The second SMPS is called SLAVE. It is switched on and off by relay KX3850, which receives a POWER-CTRL signal from the microcontroller, IC6000. SLAVE output (+VSLV) is a non-regulated voltage from the Bridge Rectifier, switched by KX3850. Output voltages are called Switched Voltages (VSW).

The SLAVE SMPS consists of ICX3670, ICX3751 (error amp), ICX3750 (feedback optocoupler), and TX3650 (chopper transformer). It supplies:

·12VSW to +5VSW linear regulator ICX3853 for the Line Doubler

·12VSW to 9VSW linear regulator ICX3854 for the A/V switch, chroma decoder, and PIP circuitry

·12VSW to 3.3VSW linear regulator ICX3855 for the Line Doubler circuit

·+12VDO for video output reference voltage and to ICX3852 for 6.2VFL CRT filament voltage

·+/-14AUD for the audio OP-AMP circuit (EZBASS)

·+/-15VDC for the vertical output amplifier, ICX2100

·+15DBA for the Daughter Board and the Scan Boost circuit

·+18HDR for the Horizontal Drive output

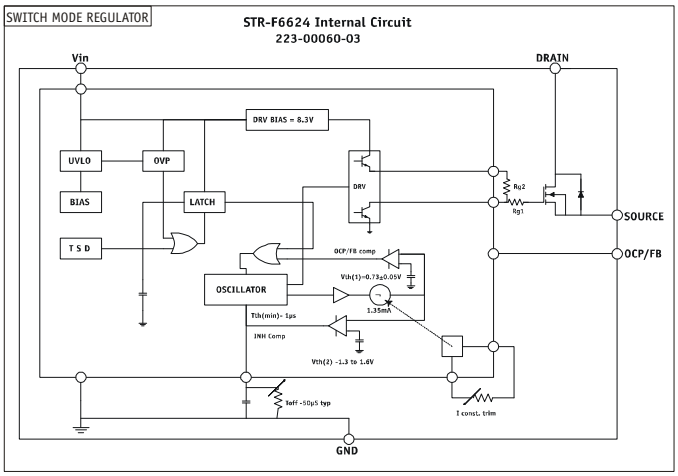
·+23VDC for the stereo audio amplifier

·+24SVM for small signal amplifiers in the scan velocity modulation circuit

·+100VDC for the scan velocity modulation output amps

+215VDO for the video output amplifiers.

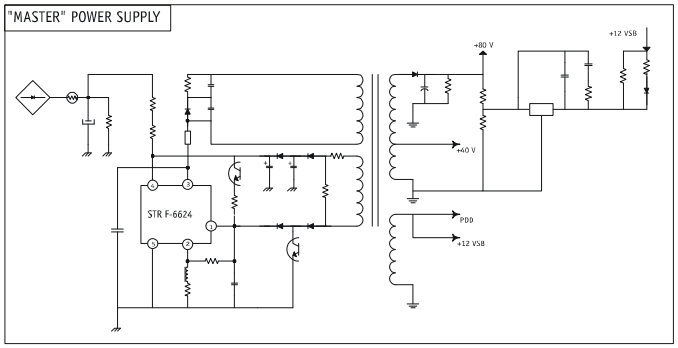
ICX3612 & ICX3670; 223 00060 03 SWITCH MODE REGULATOR



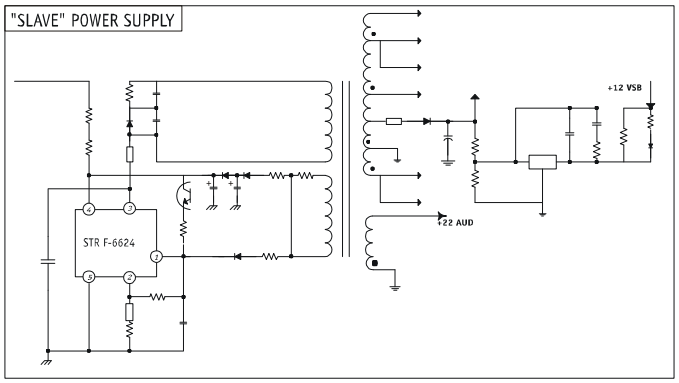
PIN DESCRIPTION

PIN #	Description	Function
1	OCP/FB	Constant off time, Quasi-Resonant & voltage regulation
2	SOURCE	MOSFET Source connection
3	DRAIN	To drive the chopper transformer
4	VIN	Controls Start-up and Shutdown of the IC
5	GROUND	Refers to hot ground

SMPS, BASIC CIRCUIT FOR MASTER SMPS



SMPS, BASIC CIRCUIT FOR SLAVE SMPS



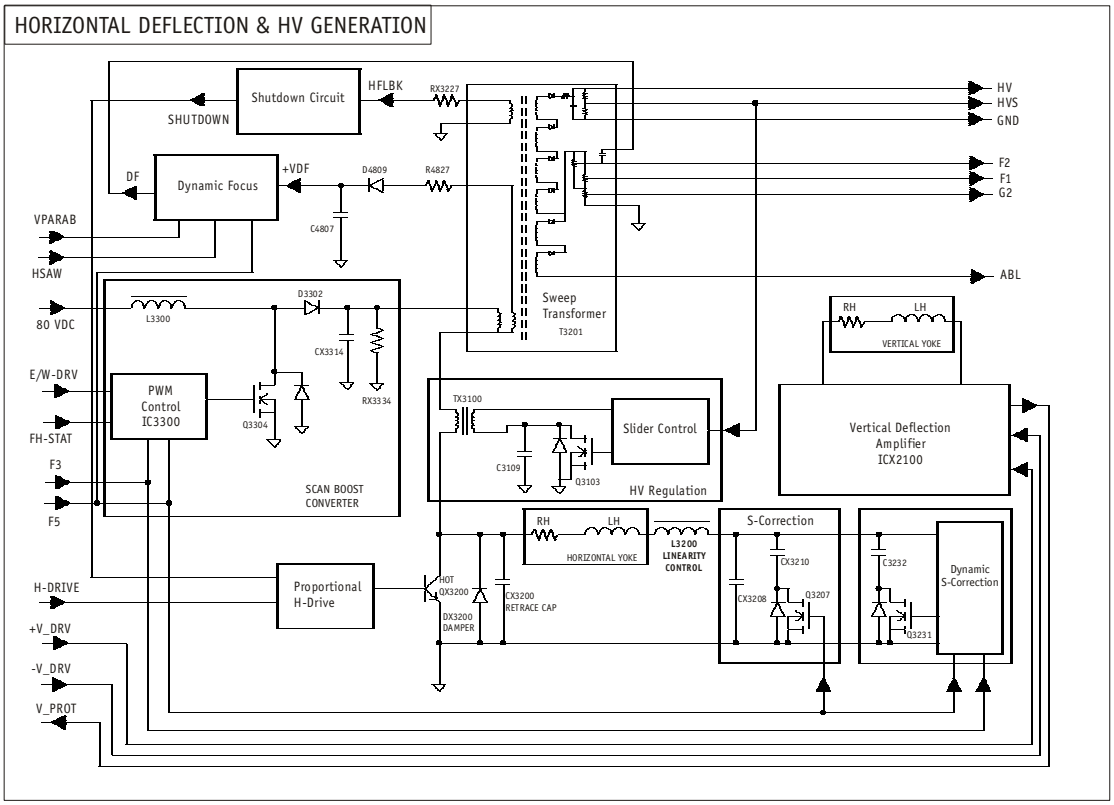
DEGAUSSING

IC6000 produces a high pulse of approx 4.8VDC for about 1 second, from pin 48. This pulse is routed through resistor R3900 to transistor Q3900, which activates the 12VDC relay, KX3900. When the relay is activated, AC line voltage is provided through connector 4T8 to the degaussing coil.

HORIZONTAL & VERTICAL DEFLECTION

This section was designed to support the following horizontal frequencies for DTV, 31.5, 33.75 and 37.9 Khz. The main function of this section is to supply horizontal and vertical currents to the deflection yoke coils, and the high voltage generation for the CRT. This section is dependent on other circuits in the main chassis to provide drive signal, DC control voltages and deflection corrections. This section can be divided into 9 functional blocks:

- Horizontal Deflection and HV Generation
- Scan Boost Converter
- Base Drive
- S-Capacitor Switching
- Dynamic S-Correction
- HV Compensation
- Shutdown Circuit
- Vertical Deflection
- Dynamic Focus



HORIZONTAL DEFLECTION AND HV GENERATION

The Horizontal Deflection circuitry is a common flyback topology used in many television and monitor applications. QX3200 is the Horizontal Output Transistor. When QX3200 is initially turned on, current is allowed to flow from the B++ supply, through TX3100, TX3201 and QX3200. This allows energy to be stored in TX3201. When QX3200 is turned off some of this energy is returned to charge the S-capacitor(s), CX3208,CX3210 and C3232. After several cycles (repeating at scanning frequency), sufficient voltage appears across the S-capacitors, providing an additional path producing current flow though the horizontal deflection yoke coil (connector 4X4). The negative current path is provided by Damper Diode, DX3200. The result is a positive and negative sawtooth current through the horizontal deflection coils (approximately 11 to 17 Amps. peak to peak). When QX3200 is turned off, about 1100 Volts peak of flyback voltage is produced, resulting from the stored energy in the horizontal deflection coils and TX3201. This voltage is induced to secondary windings of TX3201 to generate the high voltage, from 28 to 30 KV. The flyback (or retrace) period is about 5.0.

A sensing resistor, inside of TX3201, provide a DC voltage proportional to the CRT anode voltage and is used like a primary feedback for the HV compensation circuit. A secondary winding on TX3201 (pin 6) provides a low voltage flyback pulse (H-FLYBK) used for synchronization of the Scan Boost Converter and the HV Compensation circuit. A capacitive divider, CX3205 and CX3206, provides a low voltage flyback pulse (H-FBP) used for synchronization, phase comparison, etc. This pulse is sent to main chassis via pin 6 of connector 4G2.

Linearity Coil, L3200, is a saturating inductor skewed by a permanent magnet bonded to the coil. It produces a non-linear inductance curve vs current. This characteristic cancels non-linearity in the deflection current caused by horizontal deflection coil resistance.

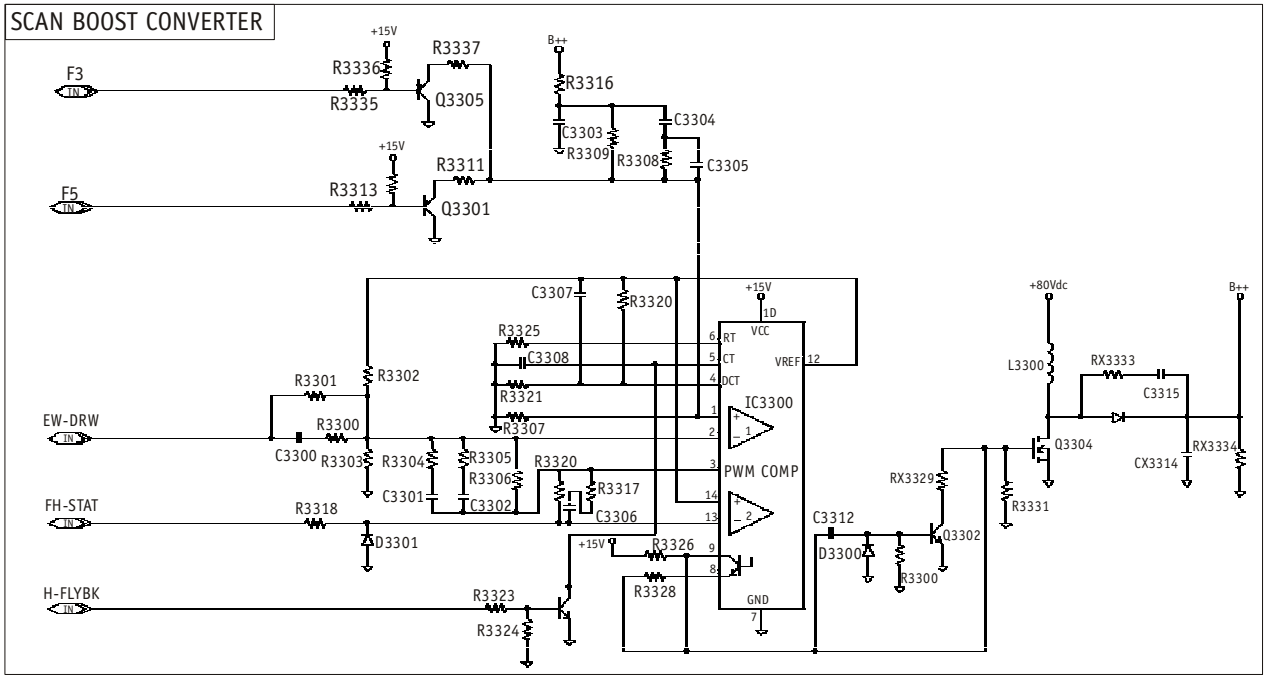
SCAN BOOST CONVERTER

(Refer to figure below)

Because the horizontal scan frequency is not constant, a variable voltage source is required to supply the main deflection circuit. This is accomplished by the Scan Boost Converter circuit. The +80 Vdc Power Supply (from the main switched mode power supply in the chassis) is boosted to the voltage required for a given operating frequency and becomes the B++ voltage to supply the main deflection circuit. The scan converter is a pseudo-synchronized, PWM, discontinuous, flyback type.

Pulse width modulation control is achieved by IC3300. Its function is to modulate the pulse width output at pin 8 based on the error voltage resulting from comparing the reference voltage at pin 2 with that at pin 1.

Scan converter free run operating frequency is controlled by R3325 and C3308. It is necessary to synchronize this frequency with the incoming Horizontal Scanning Frequency. Q3303 provides injection locking of the oscillator by discharging C3308 during the horizontal retrace interval, after which the oscillator is allowed to free run only during the remaining scanning period. The effect is a pseudo-sync-locked oscillator. This provides improved noise and response performance, while reliably operating in the discontinuous mode over the entire horizontal operating frequency range.



The output at pin 8, drives the gate of the switching transistor Q3304. The on interval determines the amount of stored energy in L3300. The longer Q3304 is on the more energy is stored, resulting in a higher rectified output voltage at B++ after Q3304 is turned off. Q3302 provides a fast turn off of Q3304.

One of the operational amplifiers of IC3300 (pins 1,2, & 3) provides the error voltage needed to regulate the B++ output voltage to a specified level. This voltage is dependent on the horizontal scanning frequency, and is determined by the Deflection Processor (ICX2600 in Main Chassis), a corresponding 0 or 9 Vdc level is sent to pins 4 and 7 of connector 4G2 (F3 and F5 signals), as shown in the next table. The F3 and F5 signals switch Q3301 and Q3305 to adjust the feedback path to have the B++ range showing in the table, and depending on the EW-DRV level from the same processor (Screen Size Control).

Signal From ICX2600	Operation Frequency	Operation Mode	B++ Voltage
F3 = 9Vdc and F5 = 9Vdc	31.5 KHz	NTSC2 (Line Doubler) or VGA Computer mode	110 - 120V
F3 = 0Vdc and F5 = 9Vdc	33.75 KHz	HD Ready	120 - 130V
F3 = 9Vdc and F5 = 0Vdc	37.9 KHz	SVGA Computer mode	130 - 140V

This circuit also receives a pincushion and size correction signal, EW-DRV from Deflection Processor (ICX2600), Pin 4 of connector 4V2, to modulate B++ to provide keystone and pincushion geometric correction. EW-DRV is a vertical deflection rate parabola.

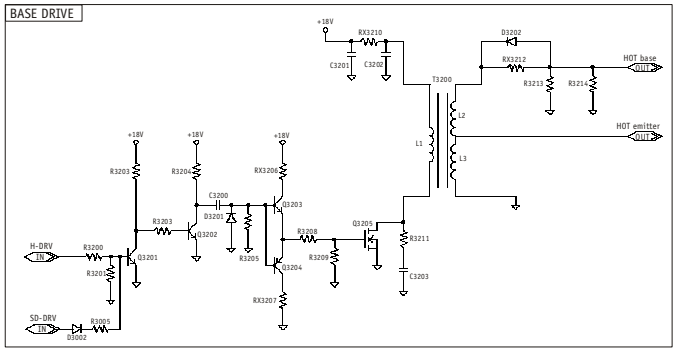
A Change Mode Protection is accomplished by the other operational amplifier in IC3300 (pins 13, 14, & 3). Comparing FH-STAT signal, from Deflection Processor (ICX2600) pin 8 of connector 4G2, with a 5 Vdc level provides this protection. When a change mode is performed FH-STAT signal goes to low level conducting the Scan Boost to work in a minimum mode (minimum B++) to minimize the change mode transients.

BASE DRIVE

(Refer to next figure)

The Base Drive (Proportional Drive) circuit provides high forward and reverse current to drive the base of the Horizontal Output Transistor QX3200, from a low level input (H-DRV from the Deflection Processor, ICX2600, in Main Chassis) at pin 1 of connector 4H2. This signal is approximately 9 Volts peak to peak at the operating frequency and has a duty cycle of about 40% high, 60% low.

Current from H-DRV is amplified by transistors Q3203 and Q3204, providing low impedance to rapidly drive the gate of the driver transistor, Q3205. This action results in an alternating current flow in the primary of driver transformer, T3200. During Q3205 on time, energy is stored in T3200 and rapid turn off of QX3200 is initiated. During Q3205 off time, the energy previously stored in T3200 is used to drive the base of QX3200. A winding in T3200 from the emitter of QX3200 to ground provides pulse shaping to optimize the base drive and improve efficiency.



S CAPACITOR SWITCHING

(Refer to Block Diagram on page 3 3)

The 'S' shaping capacitors, CX3208, and CX3210, provide the proper deflection current for optimum raster linearity with the three frequencies. As the horizontal scanning frequency increases, less capacity is needed. CX3208 is always connected in the circuit. CX3210 is switched by Q3207 via F5 signal (pin 7 of connector 4H2) from the Deflection Processor, ICX2600, in Main Chassis. This signal is buffered by Q3201. At NTSC, VGA, and HD modes all capacitors are switched in. At SVGA mode only CX3208 is switched in.

HV COMPENSATION

(Refer to next figure)

A Resistor inside of the sweep transformer senses the CRT anode voltage (Pin 14). The DC voltage appearing on this resistor is used in one of the operational amplifiers of IC3101 to provide the error voltage needed to regulate the HV to a specified level.

The error voltage is compared with a ramp signal, generated in one comparator of IC3100 and synchronized by the flyback pulse (H-FLYBK) at Horizontal Scanning Frequency, to modulate the pulse width in the output to drive the gate of the switching transistor Q3103. This ramp signal is present only during the flyback pulse.

Q3103 is on during the scan time and as long as the error voltage is higher than the ramp signal. This allows energy to be stored in TX3100. When Q3103 is turned off the resonant circuit formed by C3109 and the primary inductance of TX3100 produce a flyback voltage of about 400 volts peak resulting from the stored energy in TX3100. This voltage is induced to secondary windings of TX3100 to add to voltage generated in the Horizontal Deflection circuit. This induced voltage is used to compensate load variation (beam current variation) in HV Flyback Transformer TX3201.

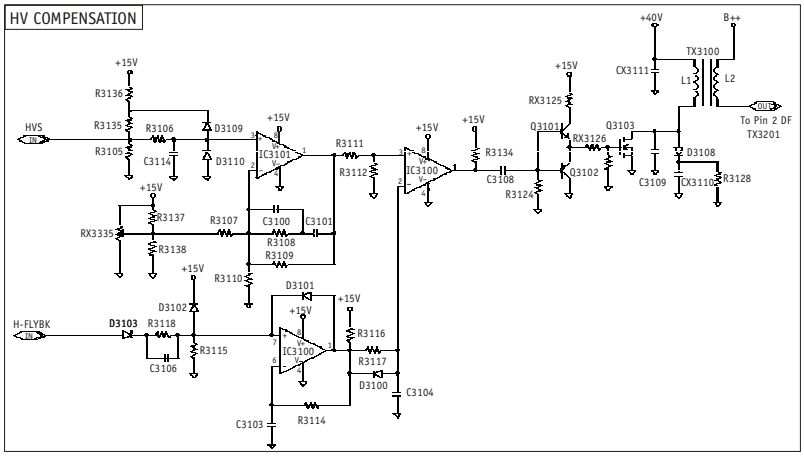
RX3335 (potentiometer) is used to adjust the high voltage to a specified level.

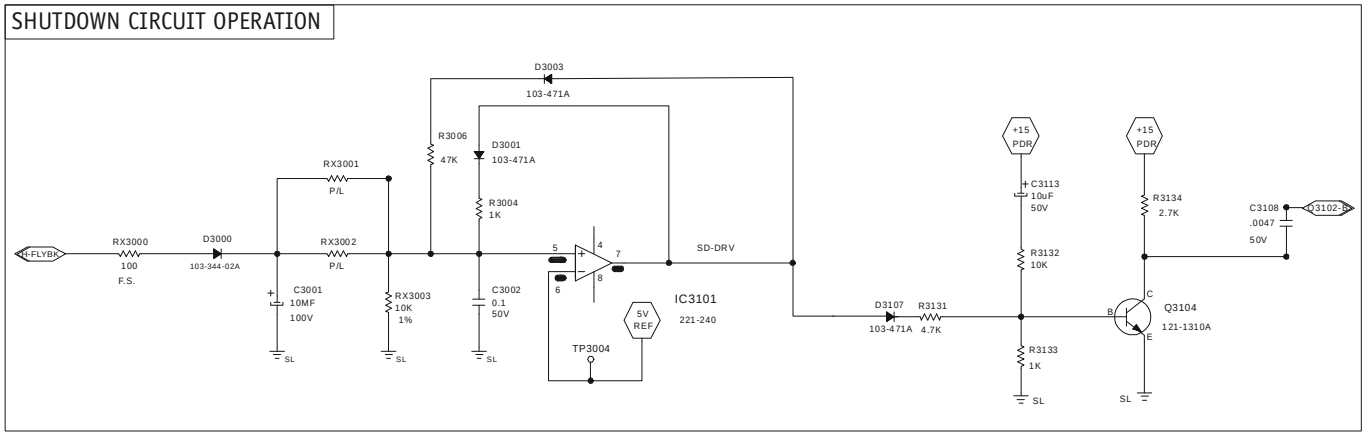
SHUTDOWN CIRCUIT OPERATION

(Refer to figure below)

The flyback pulse voltage from pin 6 of TX3201 (Flyback Transformer) is peak detected (rectified) by the action of diode D3000 and capacitor C3001. This forms a DC voltage appearing on C3001 representative of the CRT anode voltage (HV) produced by TX3201. This voltage is divided by precision resistors RX3001, RX3002, and RX3003. This lower voltage appears on the positive input (pin 5) of IC3101. In the event the CRT anode voltage become excessive, in IC3101 the positive input (pin 5) will be higher than negative input (pin 6) and therefore the output (pin 7) will go to high level, at approximately 15 volts. This signal (SD-DRV) is sent to Base of Q3201 causing Horizontal Drive to be disabled and latched causing HV to go down. In about 5 seconds, the shutdown reset circuit (Pins 8, 9 & 14 of IC3100) enable again the Horizontal Drive and HV must be reestablished. If the shutdown condition persist the circuit goes into hiccup mode.

The circuit formed by Q3104, C3113, C3108, D3107, R3131, R3132, R3133, and R3134, disables the HV compensation output (Q3102-B signal) during turn on and shutdown conditions (transients).





VERTICAL DEFLECTION

(Refer to figure below)

The Vertical Deflection circuit, ICX2100, is a linear amplifier that can directly drive the yoke current (including the required DC component). The sawtooh waveforms needed, as inputs, by ICX2100 are generated in the Deflection Processor, ICX2600, in the Main Chassis, V-DRV+ and V-DRV-, pin 1 and 2 of connector 4V2.

V-PROT, at pin 2 of connector 4G2, is an image of vertical deflection current and is used by the Deflection Processor to protect the CRT.

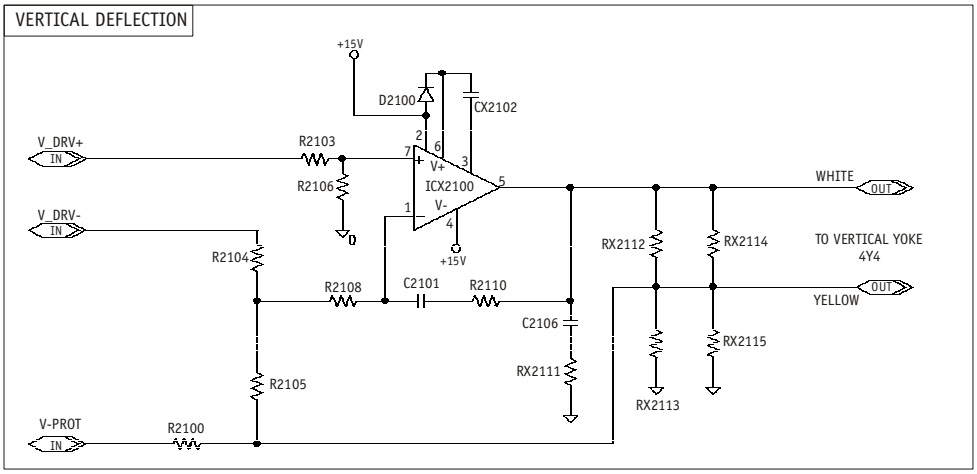
DYNAMIC S CORRECTION

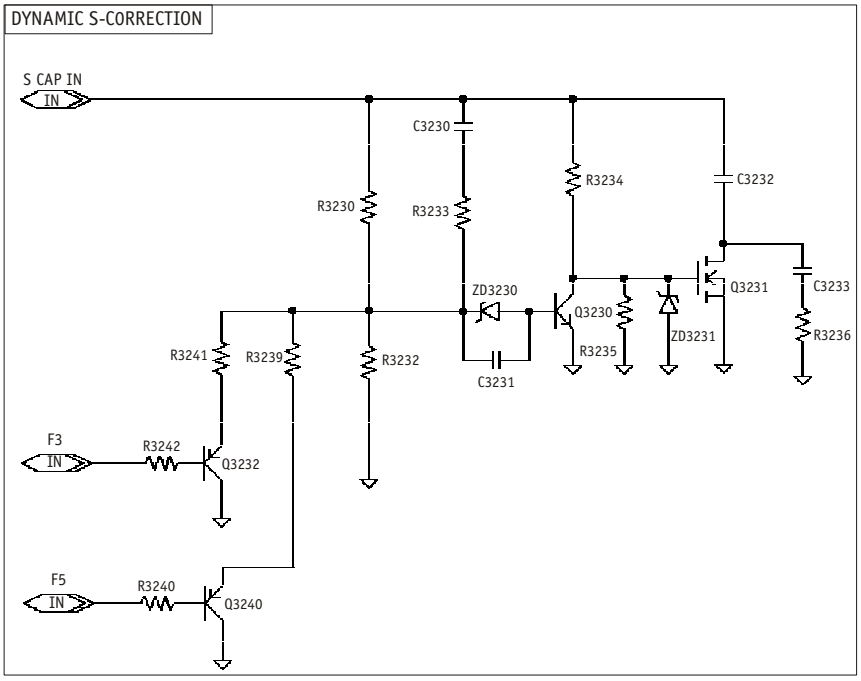
(Refer to figure below)

Flatter and shallower picture tubes show a strong increase of geometric errors like the moustache effect and inner pin. The moustache effect is a geometric error where the crosshatch width at the start and end of the picture are much smaller compared to the middle.

Compensating these increased higher order errors is difficult to realize with conventional circuits.

The moustache effect as well the inner pin distortion can be overcome by adapting the value of the S-capacitor during a certain interval of the scan time. In this way an improved S-shaped deflection current can be realized and is able to compensate the above mentioned higher order errors for any picture tube.



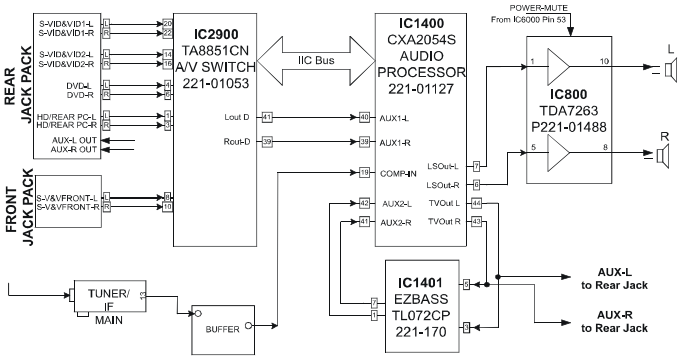


SMALL SIGNAL MODULE

Audio System description

The HD-S chassis offers up to eight Audio Input sources and an AUX output, Antenna/Cable signal is connected first to PIP Tuner and through the splitter to the Main Tuner. Both tuners deliver composite audio to a discrete audio swap switch. AUDIO-SWAP control line is used to switch between Main and PIP signals, then the Composite Audio signal passes through audio processor IC1400 in order to be demodulated and processed.

Block diagram of complete audio system for HD-S 9-2296 chassis.



FRONT JACKS sources available:

- S- Video/ Video Front

REAR JACKS sources available:

- Antenna/Cable (Main & PIP)
- S-Video/ Video 1
- S-Video/ Video 2
- DVD
- HD Setup BOX

In order to switch all the above signals, Audio processor IC1400 switches between the Composite Audio input (Comp-in) from Discrete Audio Swap switch section and AUX1 L/R channels from the A/V Switch ICX2900. On the other hand, the A/V Switch chooses among Six inputs from external audio sources (Rear and Front jack packs), both ICs are controlled by the I²C bus.

EZBASS circuit is for BASS and TREBLE enhancement. This circuit takes the signal from TVOut-L & TVOut-R pins 44, 43 of IC1400 and then returns the processed signal to AUX-2 input Pins of IC1400.

The power amplifier IC800 takes the Left and Right channels from the audio processor LSout L & LSout R outputs and is capable to deliver 5 watts per channel.

The audio auxiliary output is fixed and has no processing, it is taken from TVOut-L & TVOut-R pins 44, 43 of IC1400.

Audio processor CXA2054S (221 01127)

The CXA2054S is an IC designed as a decoder for the Zenith TV Multi-channel System. Functions include stereo demodulation, SAP (Separate Audio Program) demodulation, dbx noise reduction and sound processor. Various kinds of filters are built in while adjustment, mode control and sound processor control are all executed through I²C BUS.

The Audio processor block contains "VOLUME LIMITER", "PREVOL", "BASS/TREBLE" tone control functions, "SURROUND" (quasi-surround function) and "VOLUME". The figure below shows CXA2054S audio processor block diagram.

Operation theory

Audio source selection for the HD-S chassis is made throughout two internal switches, SW1, and SW2, inside Sony CXA2054S audio processor. These switches are controlled by EXT1 and EXT2 registers respectively to select among COMPIN Tuner /IF signal, AUX1 (Audio/Video switch) or AUX2 (EZBASS enhancement circuit). As TVOUT pin takes the signal from SW1, when SW2 is selected, the input signal will be the same selected by SW1, but processed by the EZBass enhancement circuit. When AUX 1 is selected, the A/V Switch chooses one of the Front or Rear Jack input sources.

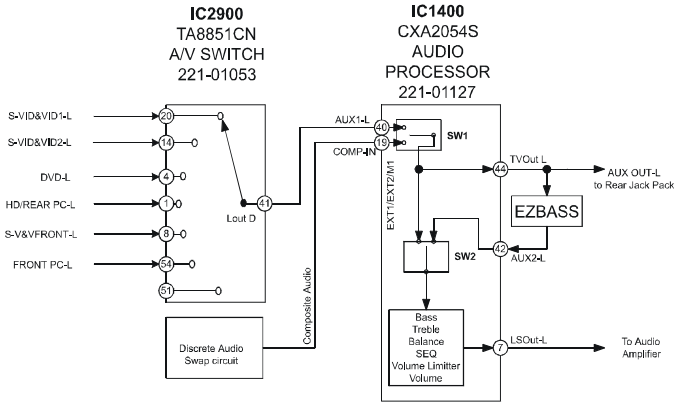
Toshiba AV switch TA8851CN (221-01053) has 7 audio inputs and 3 audio outputs.

D02 A/V switch register controls the sound selection from Main or Sub (PIP):

D02 = 0 Main sound (Default value)

D02 = 1 PIP sound

The switch the operation of the audio system for HD-S chassis is described according to the next block diagram:



Audio Amplifier

The Audio power Amplifier used is the P221-01488 (TDA7263), a stereo amplifier that drives an 8W, dome speakers per channel. The power supply for this IC has a nominal voltage of 24 V.

Its typical voltage gain is 30 dB. With this gain the input signal necessary to have maximum nominal power output (5 Watts per channel) is 200mVrms.

Because the output level (LSOUT-L/R) of the Audio processor CXA2054S is 490mVrms, it is necessary to use a divider net at the input of the amplifier in order to reduce the level signal.

The cut frequency was set at 15KHz by means of the capacitors C810M for the right channel and C820M for the left channel.

External muting is accomplished setting pin 3 at ground through Q800, which is driven by the PWR-MUTE line of the microprocessor. When the option Speakers on the audio menu is set to ON the line of the microprocessor is "low" and when the option Speakers on the audio menu is set to OFF the line is "high".

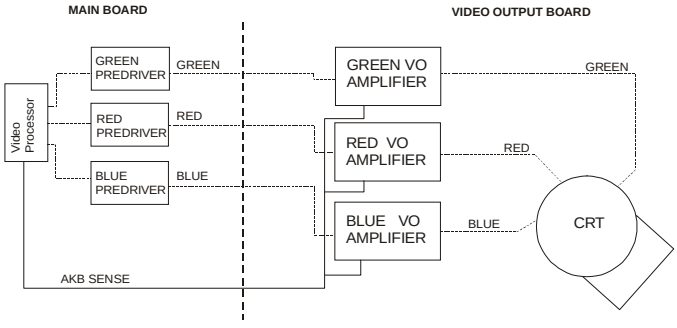
Audio AUX Output stage

The AUX audio output for the HD-S Chassis is fixed. As the signal is taken from TVOut pins of IC1400, it has no processing and output is constant. In this stage is only necessary to have extra protection in case of ESD provided for ZD1500, ZD1501, R1500 and R1501.

RGB VIDEO OUTPUT AMPLIFIER

The video output module drives the RGB cathodes with the video signal from the video drive ICX2200. This circuit includes the filament or heater G1 and G2 connections and grounds. Special circuitry senses the cathode current that controls the cut off gains.

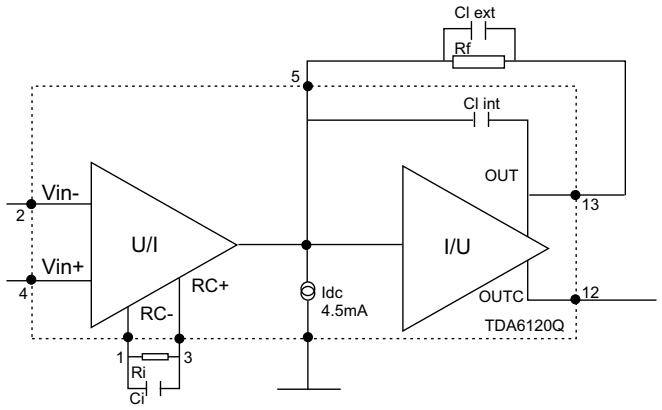
Below is a simplified block diagram of the HD-S chassis video output circuit. The signal is first uncoupled at the output of the video processor. The derived signals are then applied to the three transistors Q2205, Q2206, & Q2207 (one per color). The RGB signals are then sent to the video output board, where they are amplified to the levels required for an acceptable image on the screen. Each amplifier has a dedicated section for sensing the cathode current for the AKB system.



All components on the Video Output Board are numbered for easy identification. Locations designated x510x or x511x are support circuitry. Components designated x512x are in the Red circuit; x514x designates Green; and x516x designates Blue. Components in the color circuits that have the same last digit have the same function (e.g. R5128 in the Red circuit has the same function as R5148 in the Green and R5168 in the Blue). The three ICs (TDA6120Q from Philips), are operational amplifiers configured as inverting amplifiers. The inverting input is on pin 2 and the non-inverting input is on pin 4. The Feedback resistor is R5125. It has a gain peaking network between pin 1 and pin 3. This network is internally connected to the collectors of the differential input transistors.

The input signal is connected to the inverting input of the amplifier through resistor R5121 to avoid Hi frequency oscillations. The non-inverting input is connected to a voltage bias formed by resistors R5101 and R5102. C5122 is for AC decoupling and C5123 is for hi frequency filtering. The IC takes this voltage bias as a reference voltage for the input signal. The black level could be established by moving this reference voltage. The reference voltage is the same for all of the color amplifiers.

The cathode output is from pin 12 of the IC. This signal is passed through transistor Q5121, which samples the cathode current. Resistors R5127, R5128, and coil L5121 provide peaking improvement to the cathode output signal.



INTERNAL OPERATION DESCRIPTION

The TDA6120Q consists of one monolithic video output amplifier. The amplifier can be split-up in two amplifier stages in series. The first one is a voltage to current stage. The second one is a current to voltage stage, this gives rise to the term transadmittance-transimpedance amplifier.

At the second stage voltage to current feedback is applied by a resistor (R5125) connected from OUT (pin 13) to Iin (pin 5). The transadmittance of the first stage can be chosen by means of a resistor between pin 1 and pin 3, represented on this circuit by R5122.

The advantage of this amplifier configuration is that a higher bandwidth performance can be realized wit relation to the well know operational amplifier with voltage feedback. Furthermore,

the amplifier has a differential input, which makes the amplifier less sensitive for injection from noise sources and flexible regarding DC to Dc transfer. Also, this configuration has high input impedance, with the advantage of not loading the drive stage.

The signal input is through a differential pair of transistors. The signal is connected on pin 2, the inverting voltage input. The input configuration consists of a bipolar NPN transistor in a long tailed pair configuration. The input current amounts to 30uA type.

This IC is provided with a black current data pin. On this application, this pin 7 is not used. Instead of this pin, the current is sensed externally by means of transistor Q5121.

The frequency response is improved by means of a capacitor in series with a resistance, connected both between pins 1 and 3 of the IC. These are C5121 and R5123. The value of these elements is a compromise between bandwidth, overshoot and ringing.

AKB CIRCUIT

The auto cut off system is intended for stabilization of the black current, and to compensate CRT aging. The video processor adds 3 pulses on the last portion of the vertical blanking interval, one for each color. The currents on the cathode for each pulse are sensed and sent back to the video processor for correction purposes. Each pulse is actually a complete horizontal line, with a video level of approximately. 8 Ire's. These pulses could be seen slightly closing the vertical scan. They appear as a set of 3 lines on the top of the image.

The cathode current is sensed by means of a pnp transistor (Q5121). The 3 sensed currents are tied together and sent back to the video processor. On the main board, this current signal is converted to voltage and sent on to the video processor (pin 41 of ICX2200M).

The video drive internally senses the current level of each color, compares it to its internal reference and makes an adjustment.

The factory adjust of cut off is based on this system. The processor moves the reference pulse according with the level indicated on the cut off register. When the reference pulse is moved, the AKB system moves the black level of the signal, adjusting the white balance at low contrast.

G2 (SCREEN) SETUP

The purpose of this circuit is to adjust the optimal point of the G2 voltage on the CRT.

The idea of G2 setup is to force the DC voltage at the 3 cathodes to be equal to the nominal CRT cutoff voltage (180-215VDC with G1=0VDC). Under this condition the operator will adjust G2 until raster is almost cutoff (retrace lines just barely visible). When G2 setup mode is released the AKB circuit will automatically set the color with the highest CRT cutoff voltage to be very close to the G2 setup voltage (180-215VDC). The other two colors will be slightly below the G2 setup voltage depending upon how close the 3 electron guns in the CRT are matched in terms of their individual CRT cutoff voltages.

In normal operation, Q5102 is conducting and will pull pin 28 of ICX2900 to 0V. This pin is to be configured as an input that the micro can read the status of. If 0V is read then the microprocessor can read the status of. If 0V were read, then the micro, by means of software, would set the PICON register of the ICX2200M to activate the video.

If the SETUP connector is shorted, then Q5102 will not conduct and pin 28 of ICX2900 will go to +9V. The microprocessor would read this and set the PICON register to turn off the 3-video outputs. The RGB output of the ICX2200 will go to 0V. At the same time when the SETUP connector is shorted, Q5101 will turn off, providing a voltage divider to the video inputs of the CRT drivers: IC5121, IC5141 and IC5161. This DC voltage is formed from the resistance divider of R5111, R5112, the VO input resistor and the resistors of each output driver of the ICX2200. This voltage divider is adjusted to provide the necessary DC voltage level at the cathode to properly adjust the G2 level. Since the PICON register is set to turn off video, the RGB transistor buffer B-E junction will be a little reverse biased and will not affect the voltage divider.

SCAN VELOCITY MODULATOR

The Scan Velocity Modulator consists of a pair of coils installed under the purity magnets. These coils perform as a magnetic dipole delaying or accelerating the screen spot in the areas of brightness variation.

This module is another Printed Circuit Board added on the accessories panel board, along with the keyboard, front jack, line doubler, caller ID and RGB Video Output.

It is installed on the neck of the CRT, near of the Yoke assembly. This module has access to three signals: Video, Half Tone, and Fast Blanking. This PC Board has several sections to process the signals and to obtain a current signal, which will be applied over the coil.

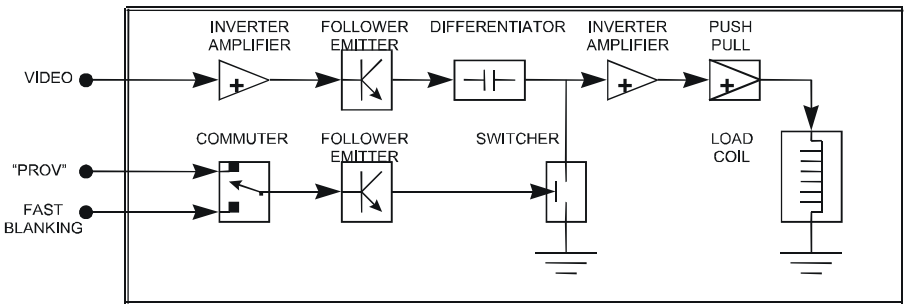
The PCB has two Inverter Amplifiers, two Push Pull Amplifiers, two Follower Emitter, one Differentiatior, one Switch and one Commuter; there is a Coil out of PCB which receives the Current to produce an Effect over the Picture.

The Video passes through an Inverter Amplifier to increase the level signal. Then it is coupled by a Follower Emitter to be differentiated; another Inverter Amplifier increases the signal generated by the differentiator, and then two steps of Push Pull Amplifiers drive the signal to feed the Coil.

The Half Tone signal is connected via the Commuter to be coupled by another Follower Emitter and the output signal controls the Switch.

All the time the Video is working, there is an SVM operation. This circuit also improves and enhances the picture in each color transition. The magnetic field produced by the loaded coil affects the electron beams to achieve a better definition between colors on the screen.

SCAN VELOCITY MODULATOR



MODEL PARTS

All HD-S models are module level repair only. Parts contact information is below.

Voice: 1-888-3-ZENITH
Fax: 1-888-6-ZENITH
Mail: ZENITH NATIONAL PARTS
P O Box 240007
Huntsville, AL 35824-6407

C27V22

020-04330-P62	Coil, Degausser
124-00233-P05A	Space Command, Transmitter, MBR3457CT-A
206-03808	Instr Book, Operating Guide
2426GF239AR	CPT Set, A68QCU259X 00Q7ND
6150Z-1343K	DY (Deflection Yoke)
854-006A	Wedge, Rubber
A-18682-P03	Power Cord Assy
A-18695-P25	Gnd Strap Assy, CRT
A-19197	Grounding Assy, Wire And Terminal, White DAG (NVGnd)
P009-02296	Module, Main
P009-02297	Module, Power Supply
P009-02298	Module, Video Output
P009-02299	Module, Line Doubler *
P014-12359-07	Cabinet Front
P014-12360	Cabinet Rear
P030-01538	Decorative Item
P050-02864	Connector & Cable Assembly, Speaker Interconnect
P138-01967-08	Cabinet Grille, Perforated Metal, Speaker
P149-00706	Magnet, Purity Correction, 'Chevron Magnet'
P192-00928	Lens, IR
PA-19393-07	Cover, Front Jack
PA-19426	Speaker Assy
PA-19471-01	Grounding Assy, Wire and Terminal, White DAG (Gnd Strap to spkr grille)
PA-19530	Magnet Assy and SVM Coil
PA-19597	Module, Scan Boost
PA-19598	Module, Dynamic 'S'
PF-54969	Keyboard Assy, 6 Buttons
PF-54972	Front Jacks Assy with Cables

C32V22

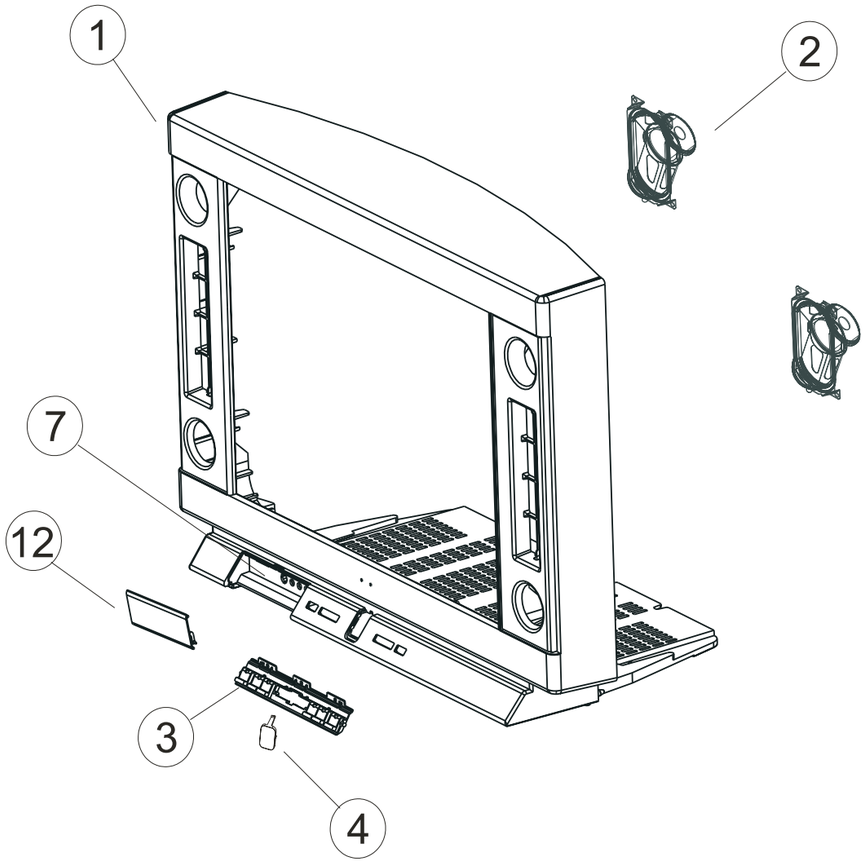
124-00233-P05A	Space Command, Transmitter, MBR3457CT-A
206-03808	Instr Book, Operating Guide
A-18682-P03	Power Cord Ass'y
A-18695-P26	Gnd Strap Ass'y, CRT
A-19197	Grounding Ass'y, Wire And Terminal, White DAG (NVGnd)
P009-02296-01	Module, Main
P009-02297-01	Module, Power Supply
P009-02298-01	Module, Video Output
P009-02299	Module, Line Doubler *
P014-12361-05	Front Cabinet
P014-12362-01	Cabinet Rear
P020-04330-48	Coil, Degausser
P024-03488-01	Cover, Blank, Tweeter Opening
P030-01538	Decorative Item
P050-02864	Connector & Cable Assembly, Speaker Interconnect
P138-01968-05	Cabinet Grille, Perforated Metal, Speaker
P149-00706	Magnet, Purity Correction, 'Chevron Magnet'
P192-00928	Lens, IR
PA-19393-07	Cover, Front Jack
PA-19410	Convergence Helper
PA-19426	Speaker Ass'y
PA-19471-01	Grounding Ass'y, Wire And Terminal, White DAG (Gnd Strap To Spkr Grille)
PA-19597-01	Module, Scan Boost
PA-19598-01	Module, Dynamic 'S'
PA-19603	CRT with Yoke (2H) Flat 32V Toshiba A80AJZ9
PF-54969	Keyboard Ass'y, 6 Buttons
PF-54972	Front Jacks Ass'y with Cables

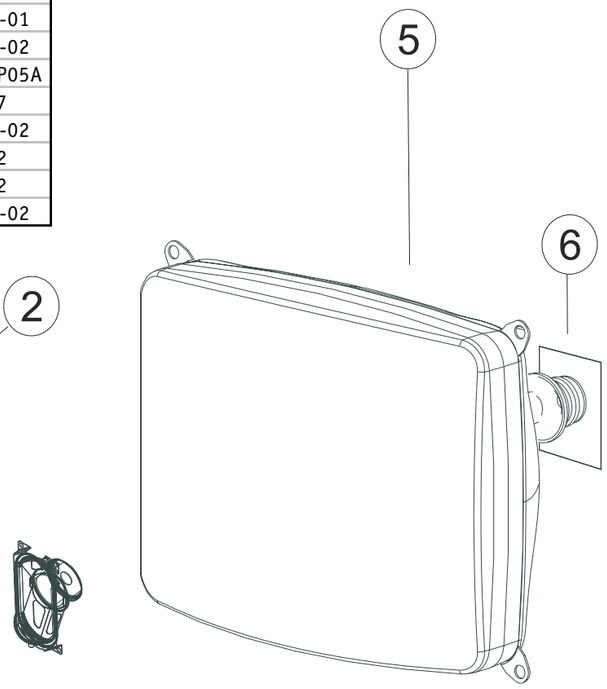
C36V22

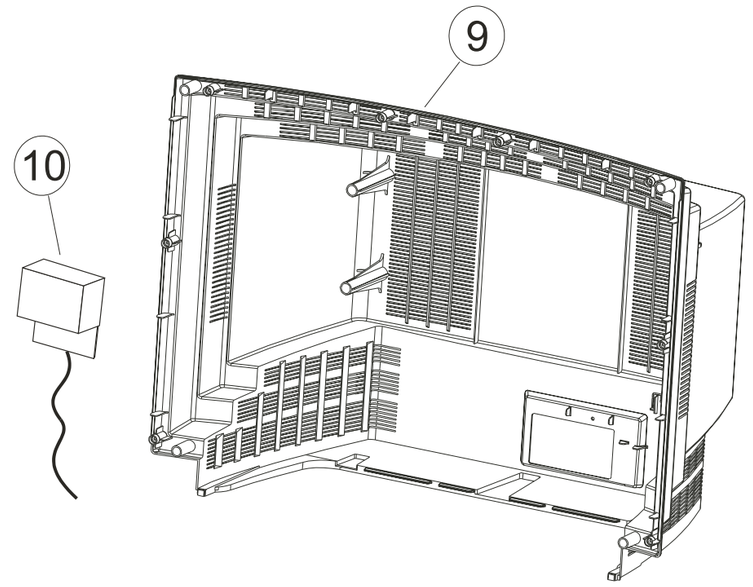
020-04330-P67	Coil, Degausser
124-00233-P05A	Space Command Transmitter, MBR3457Ct-A
206-03808	Instr Book, Operating Guide
A-18682-P03	Power Cord Ass'y
A-18695-P30	Gnd Strap Ass'y, CRT
A-19197	Grounding Ass'y, Wire and Terminal, White DAG (NVGnd)
P009-02296-02	Module, Main
P009-02297-02	Module, Power Supply
P009-02298-02	Module, Video Output
P009-02299	Module, Line Doubler *
P014-12363-05	Front Cabinet
P014-12364-01	Cabinet Rear
P024-03488-01	Cover, Blank, Tweeter Opening
P030-01538	Decorative Item
P050-02864-10	Connector & Cable Assembly, Speaker Interconnect
P138-01969-05	Cabinet Grille, Perforated Metal, Speaker
P149-00706	Magnet, Purity Correction, 'Chevron Magnet'
P192-00928	Lens, IR
PA-19393-07	Cover, Front Jack
PA-19410	Convergence Helper
PA-19426	Speaker Ass'y
PA-19471-01	Grounding Assy, Wire and Terminal, White DAG (Gnd Strap to spkr grille)
PA-19569	CRT with Yoke Ass'y, A90AJZ90X34
PA-19597-02	Module, Scan Boost
PA-19598-02	Module, Dynamic 'S'
PF-54969	Keyboard Ass'y
PF-54972	Front Jacks Ass'y

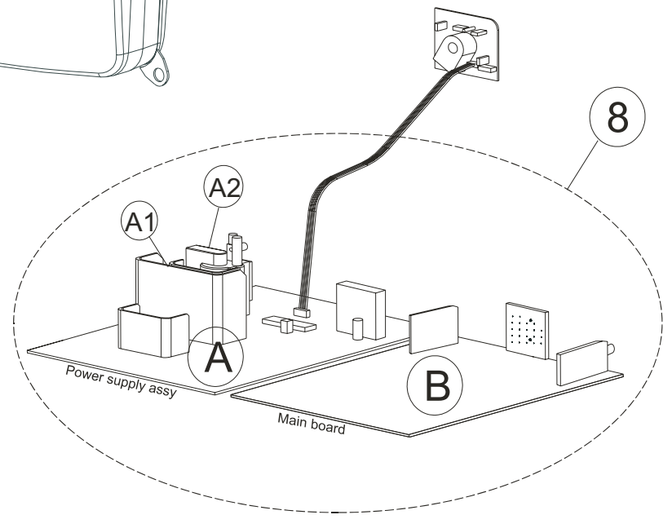
HD-S EXPLODED VIEW

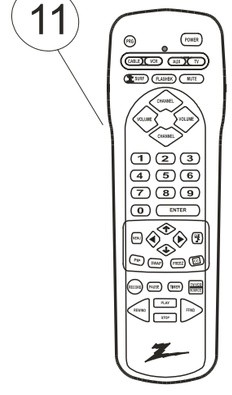
REF	DESCRIPTION	C27V22	C32V22	C36V22
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2	SPEAKER ASSY	PA-19426	PA-19426	PA-19426
3	KEYBOARD ASSY	PF-54969	PF-54969	PF-54969
4	IR LENS	P192-00928	P192-00928	P192-00928
5	CRT / CRT YOKE ASSEMBLY	2426GF239AR	PA-19603	PA-19569
6	DEFLECTION YOKE	6150Z-1343K	N/A	N/A
7	JACKPACK FRONT	PF-54972	PF-54972	PF-54972
8	MODULE & FRAME ASSY	PF-54956	PF-54956-01	PF-54956-02
9	REAR CABINET	P014-12360	P014-12362-01	P014-12364-01
10	VIDEO OUTPUT	P009-02298	P009-02298-01	P009-02298-02
11	REMOTE CONTROL	124-00233-P05A	124-00233-P05A	124-00233-P05A
12	FRONT DOOR	PA-19393-07	PA-19393-07	PA-19393-07
A	POWER SUPPLY ASSY	P009-02297	P009-02297-01	P009-02297-02
A1	DYNAMIC S CORRECTION	PA-19598	PA-19598-01	PA-19598-02
A2	HV COMP/SD DR BD	PA-19597	PA-19597-01	PA-19597-02
B	MODULE MAIN	P009-02296	P009-02296-01	P009-02296-02



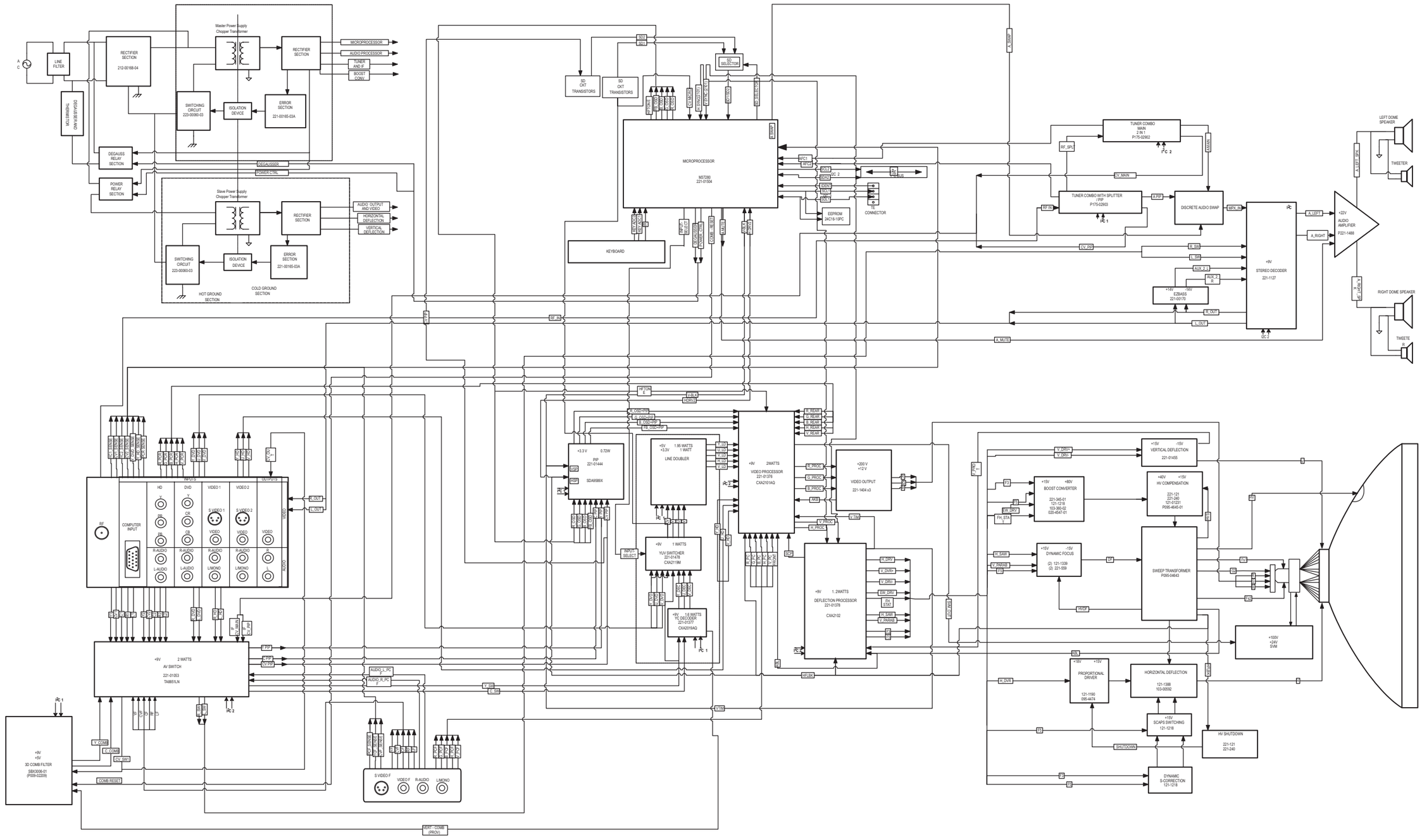




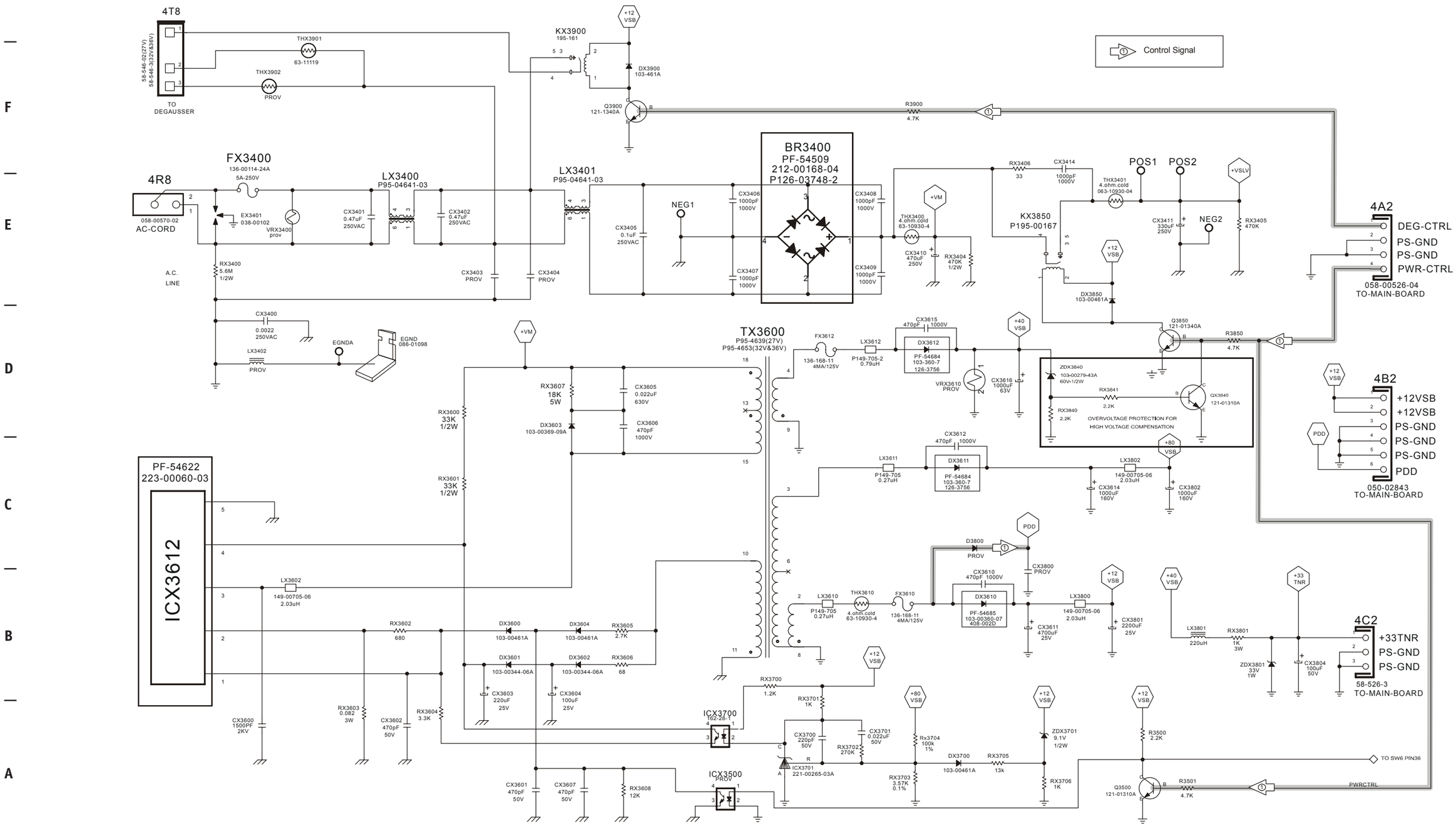




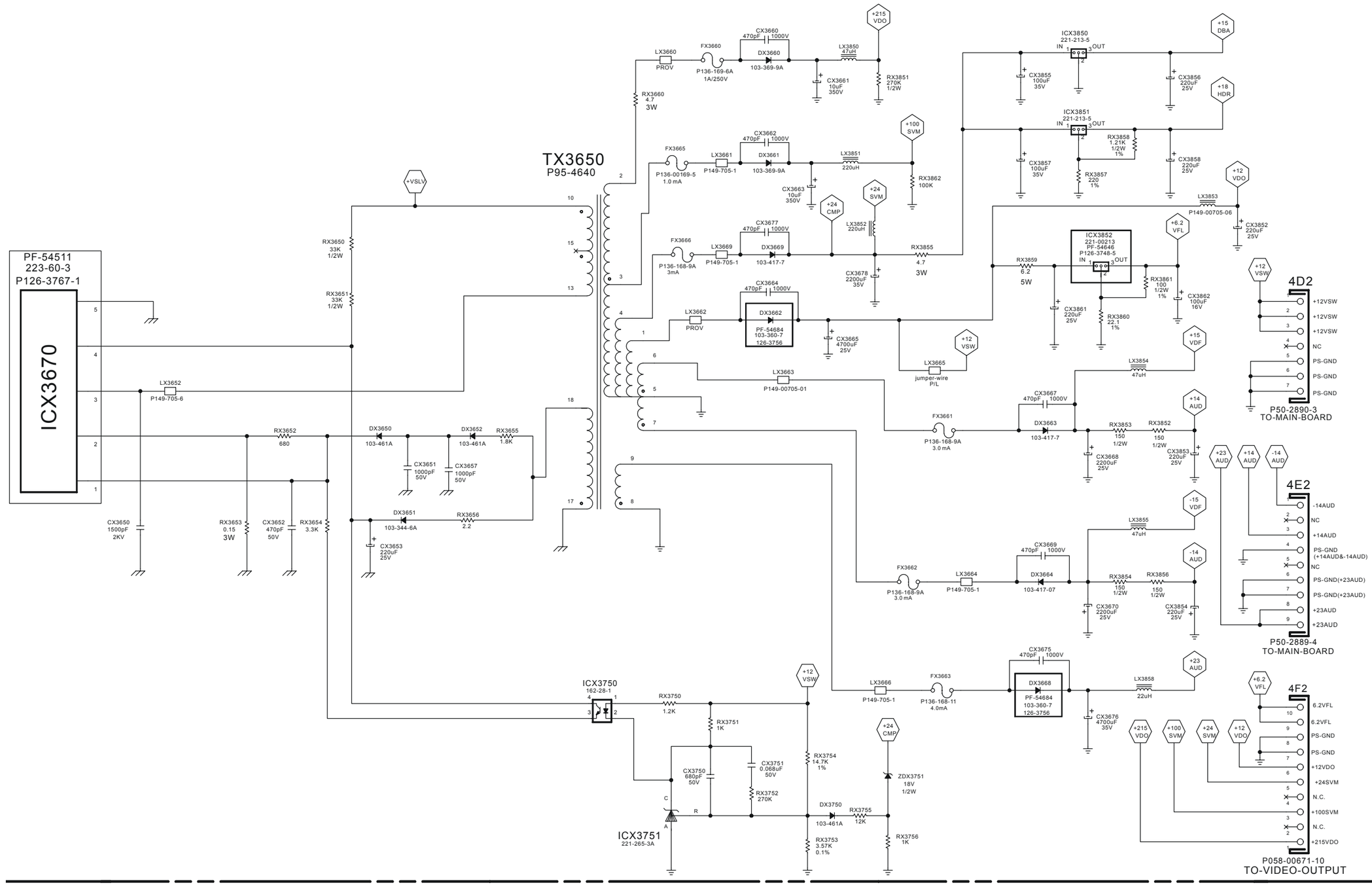
HD-S BLOCK DIAGRAM



HD-S Rectifier Circuit



HD-S Slave Power Supply Circuit

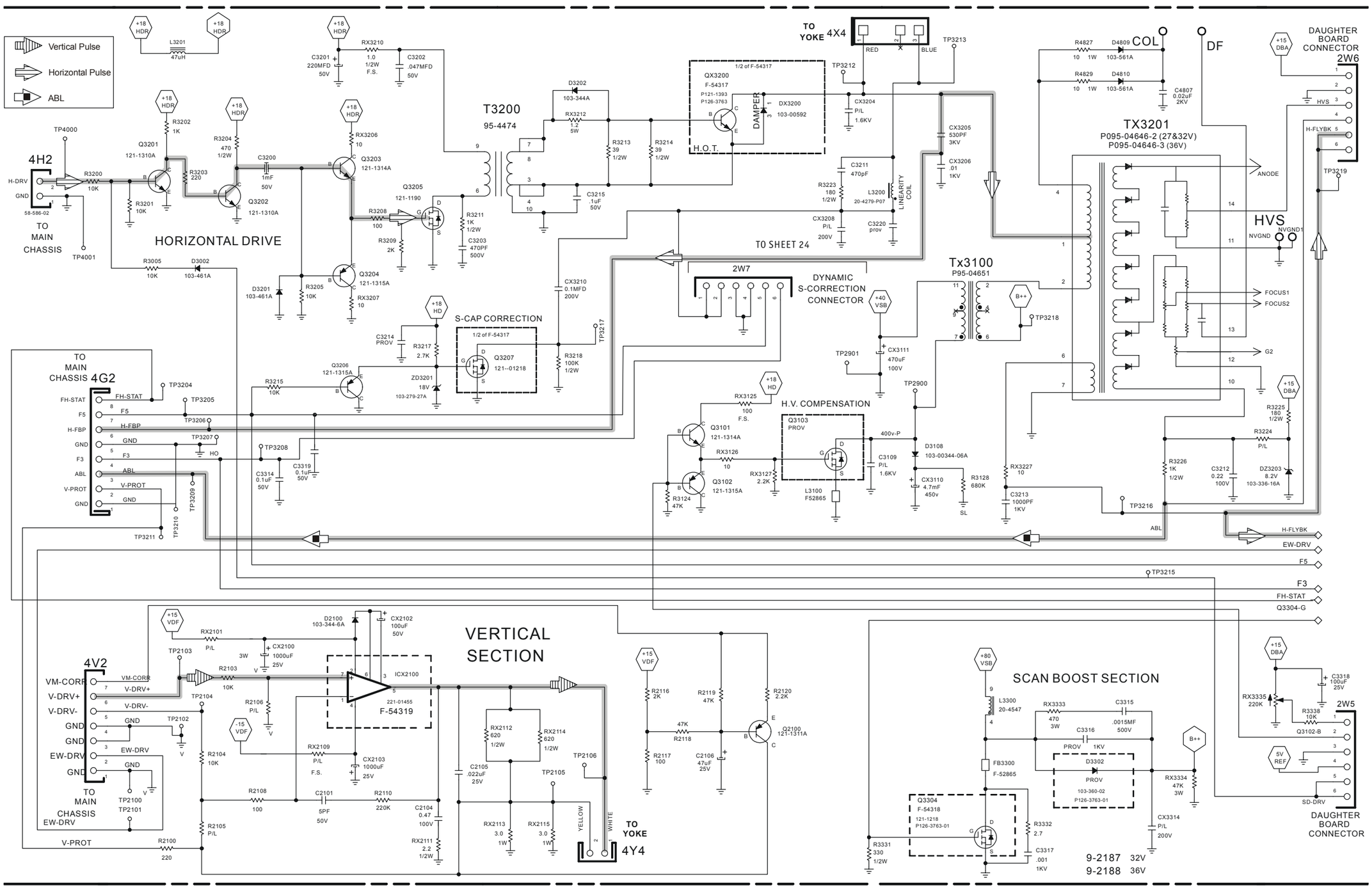


CM154 - 923-03496

CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE LETTER "X" IN THEIR COMPONENT DESIGNATORS. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

ALL SYMBOLS WITH "M" ON END OF DESIGNATOR INDICATE SURFACE MOUNTED COMPONENT

HD-S Deflection Circuit



HD-S Scanboost Controller Circuit

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

G

F

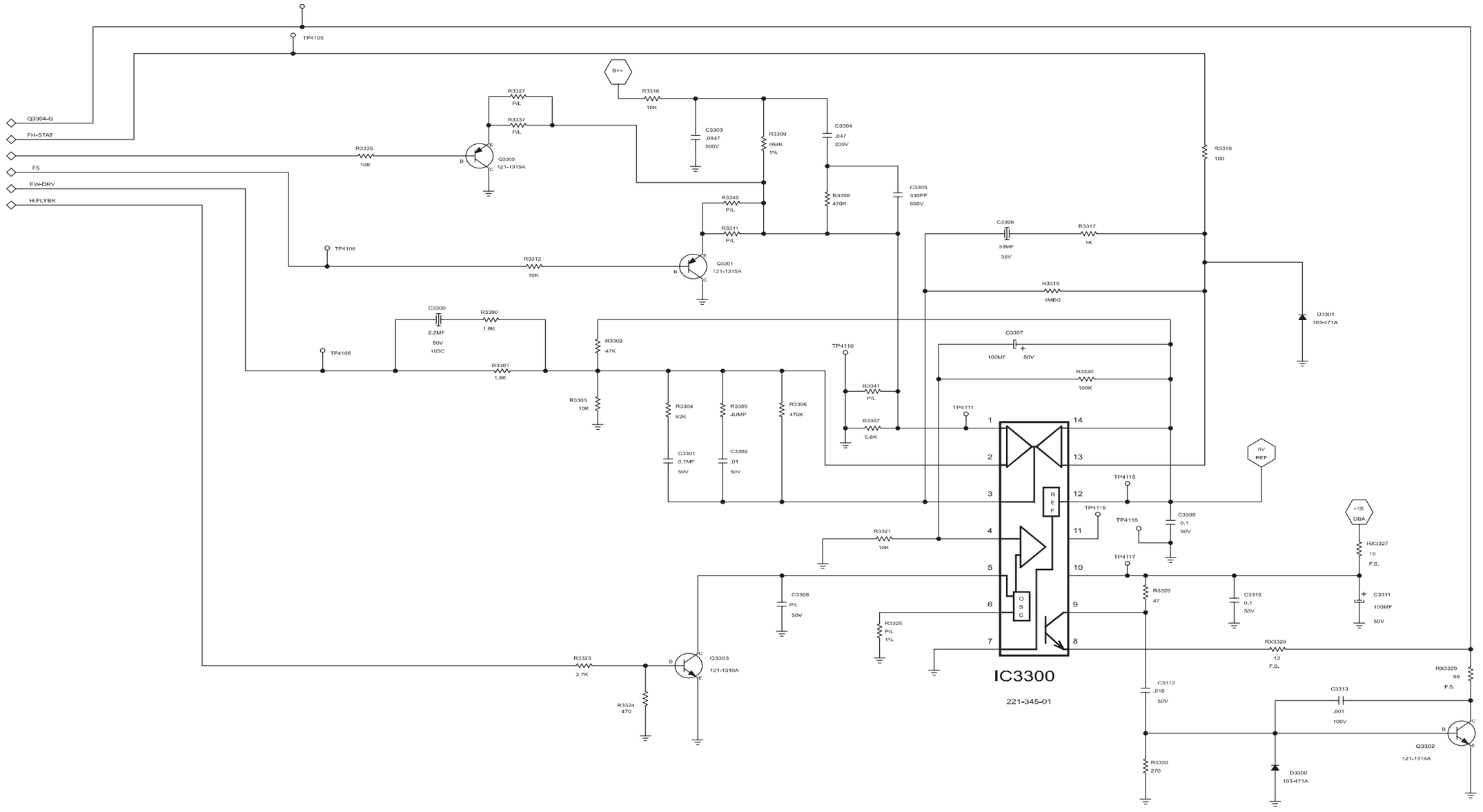
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D

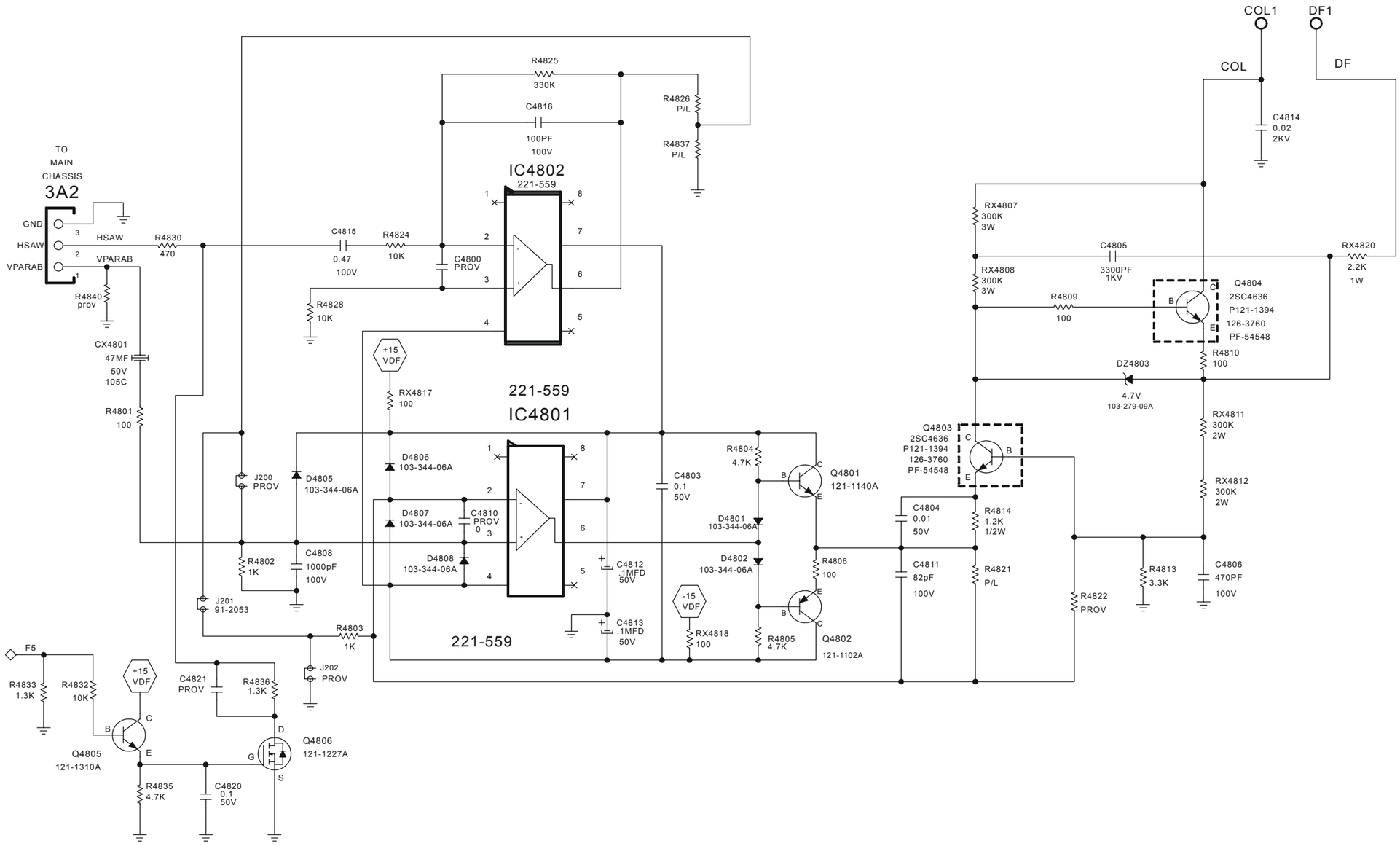
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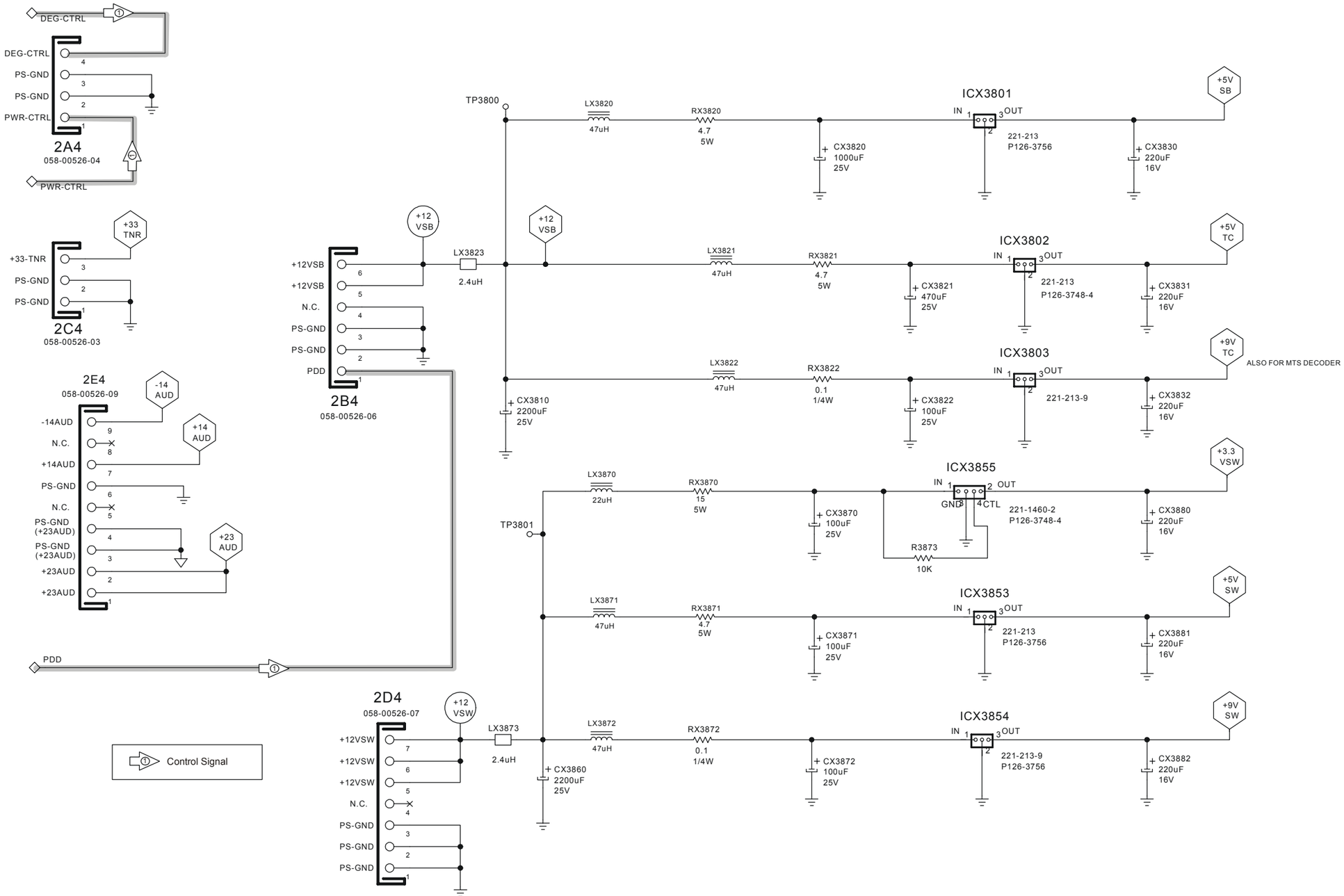
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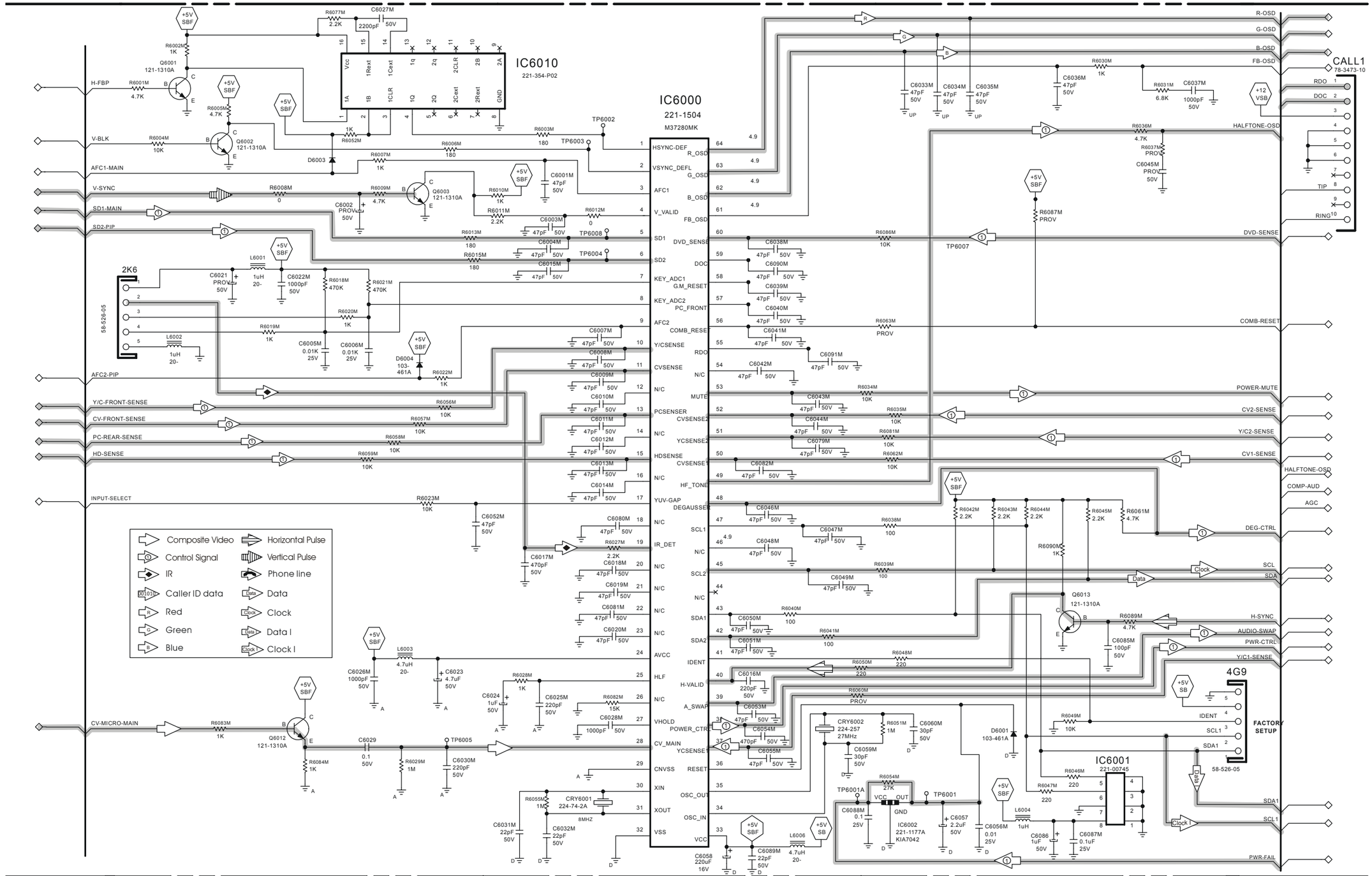
HD-S Dynamic Focus Circuit



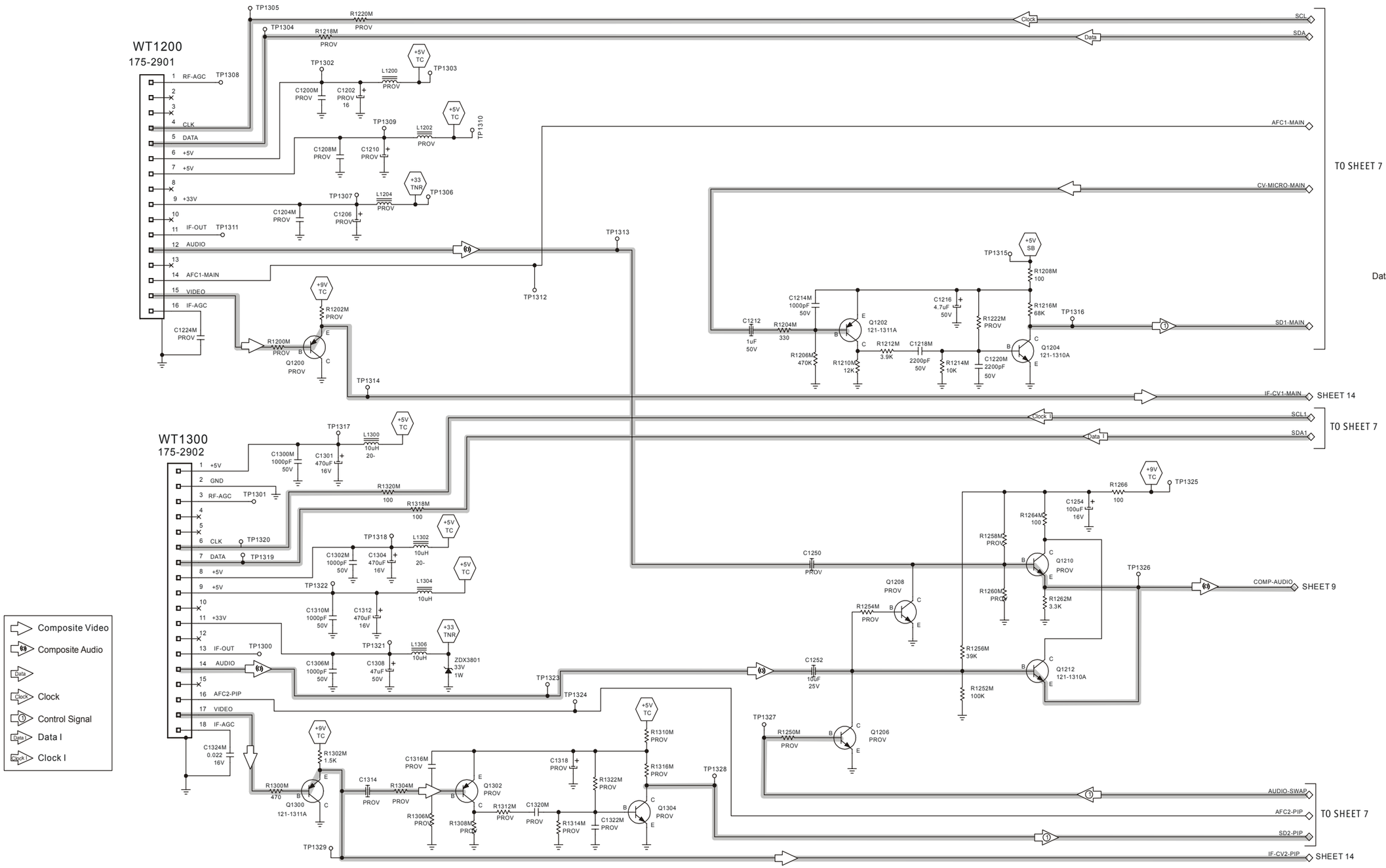
HD-S Linear Power Supply Circuit



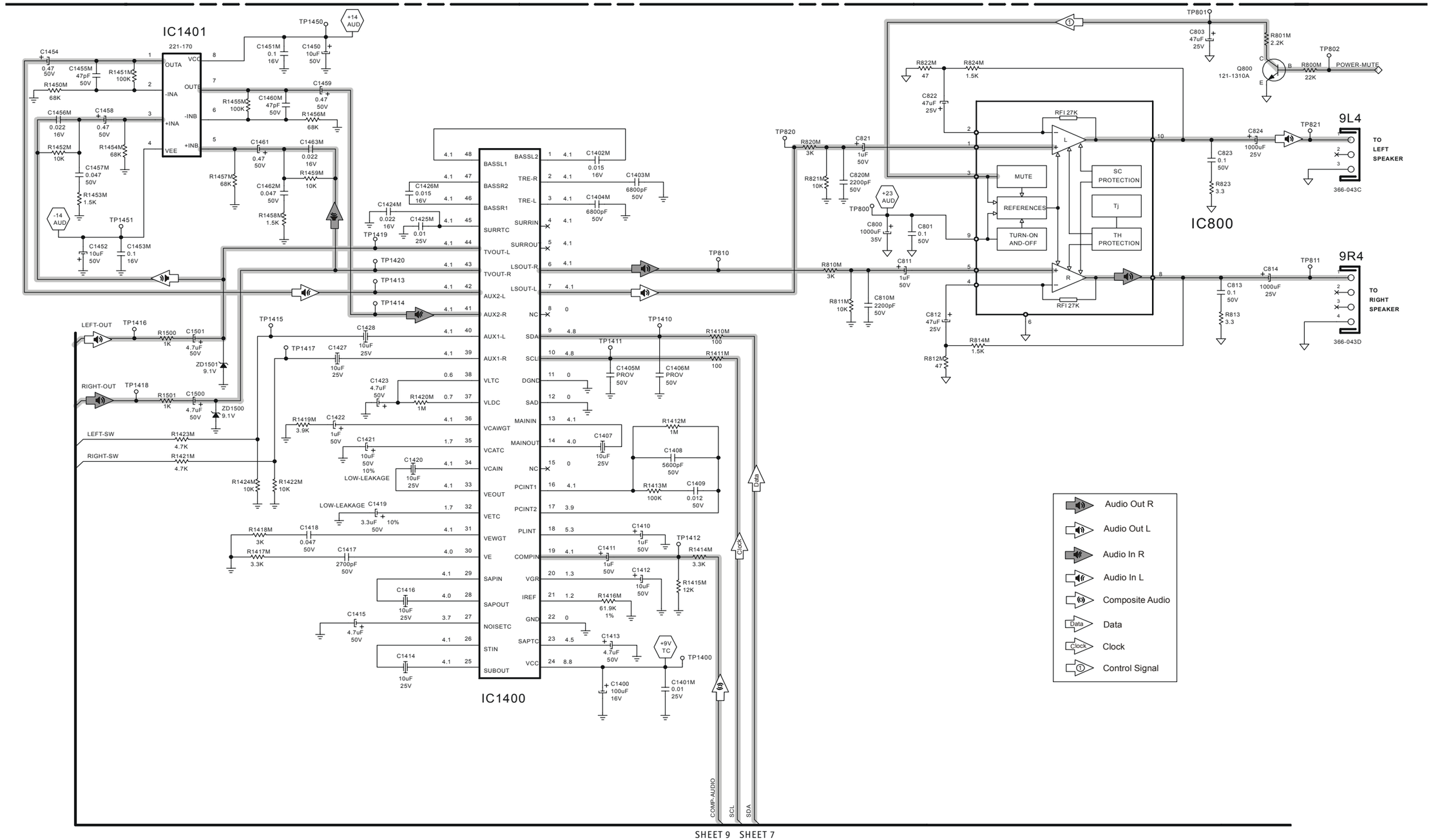
HD-S Main Microprocessor Circuit



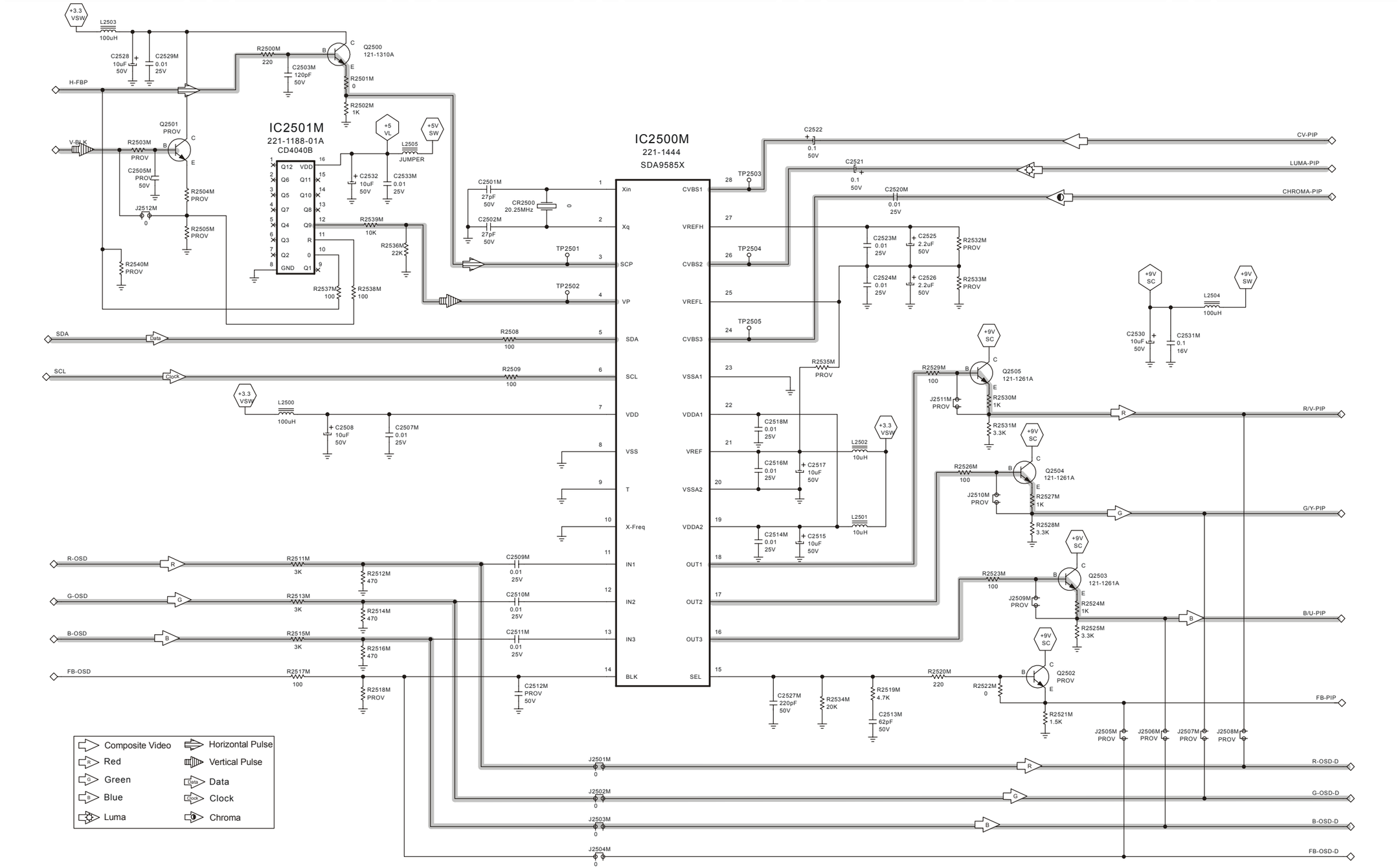
HD-S Tuner Circuit



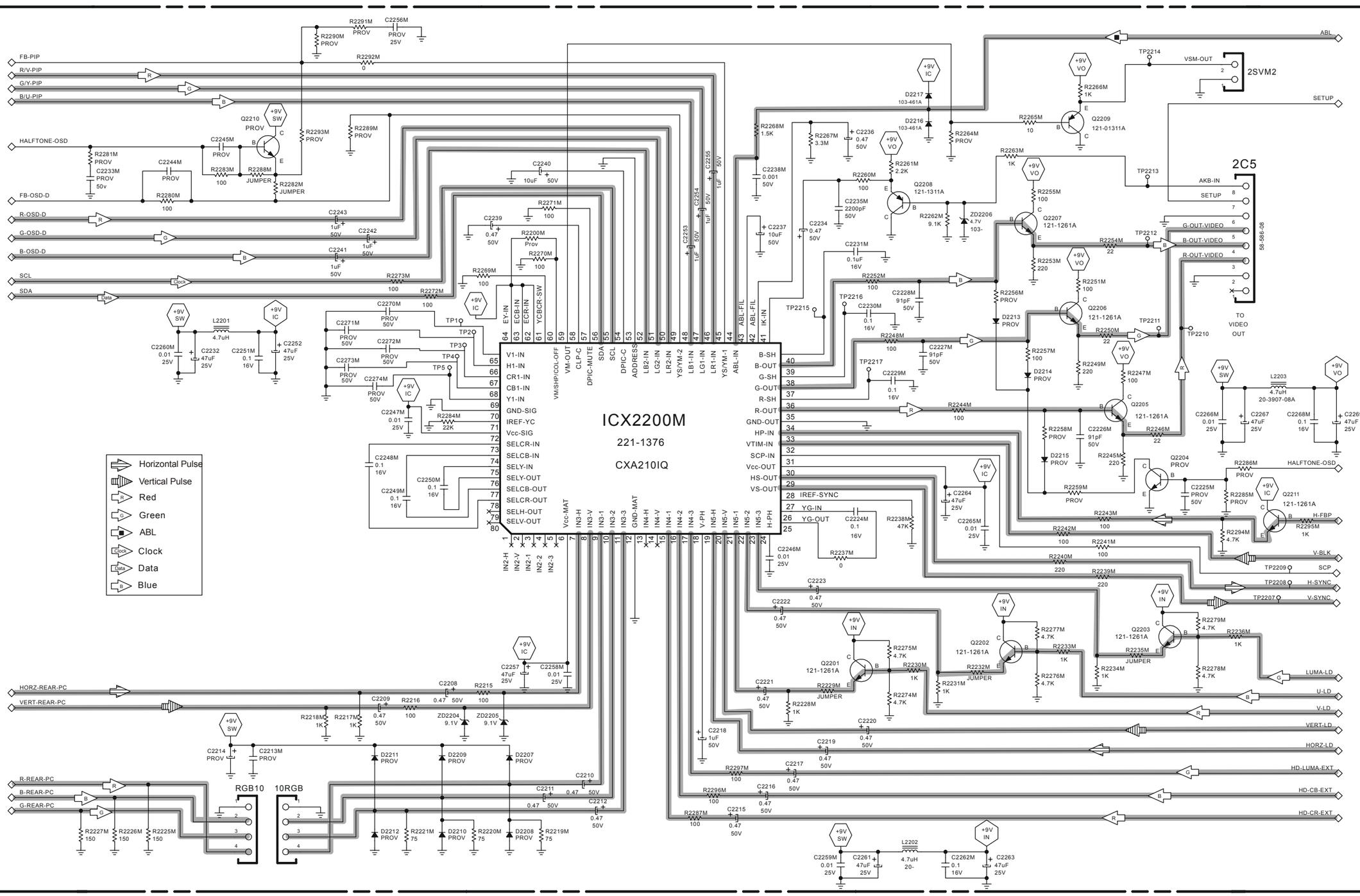
HD-S Audio Circuit



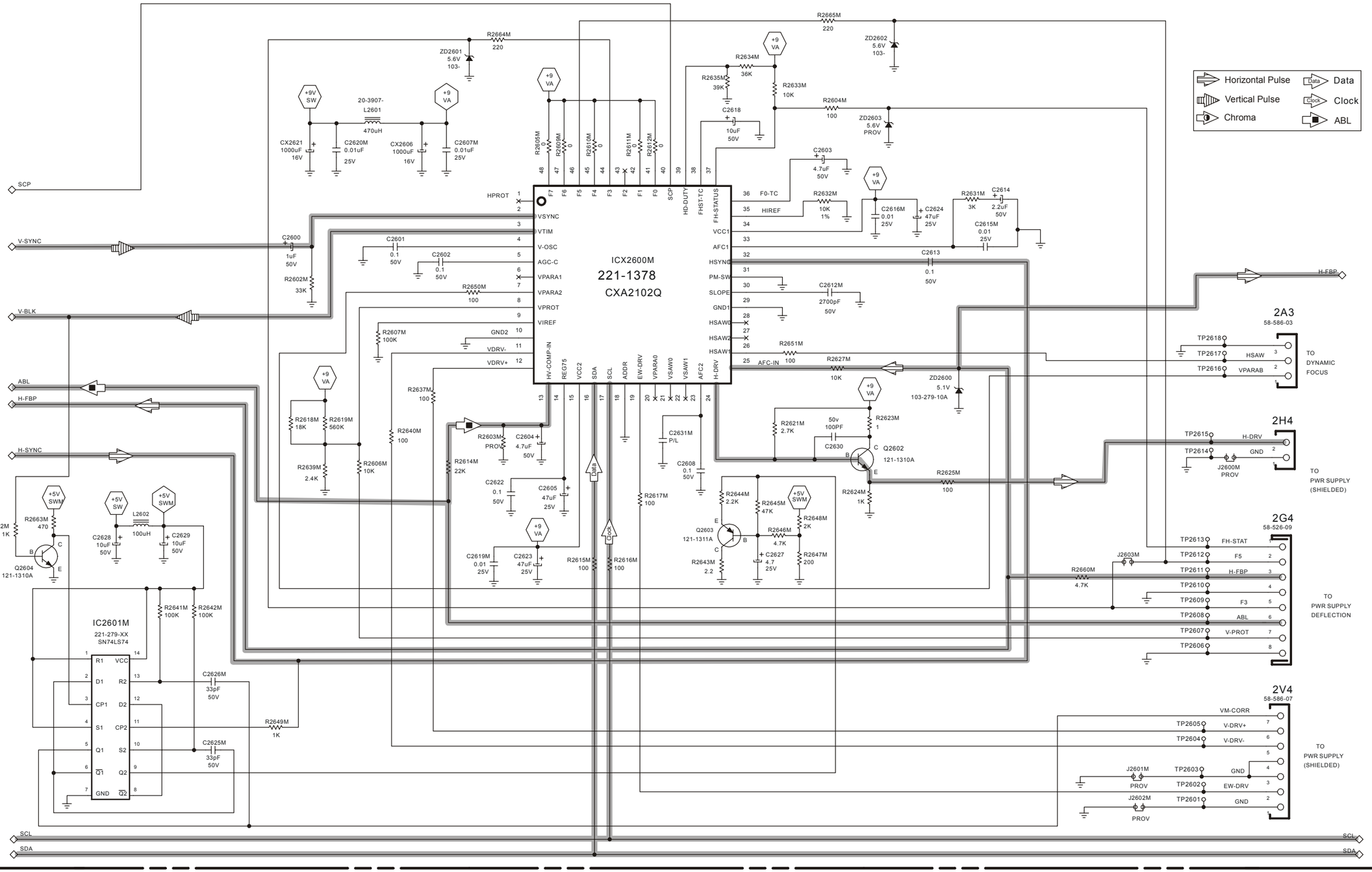
HD-S PIP Circuit



HD-S Multicomponent Processor Circuit

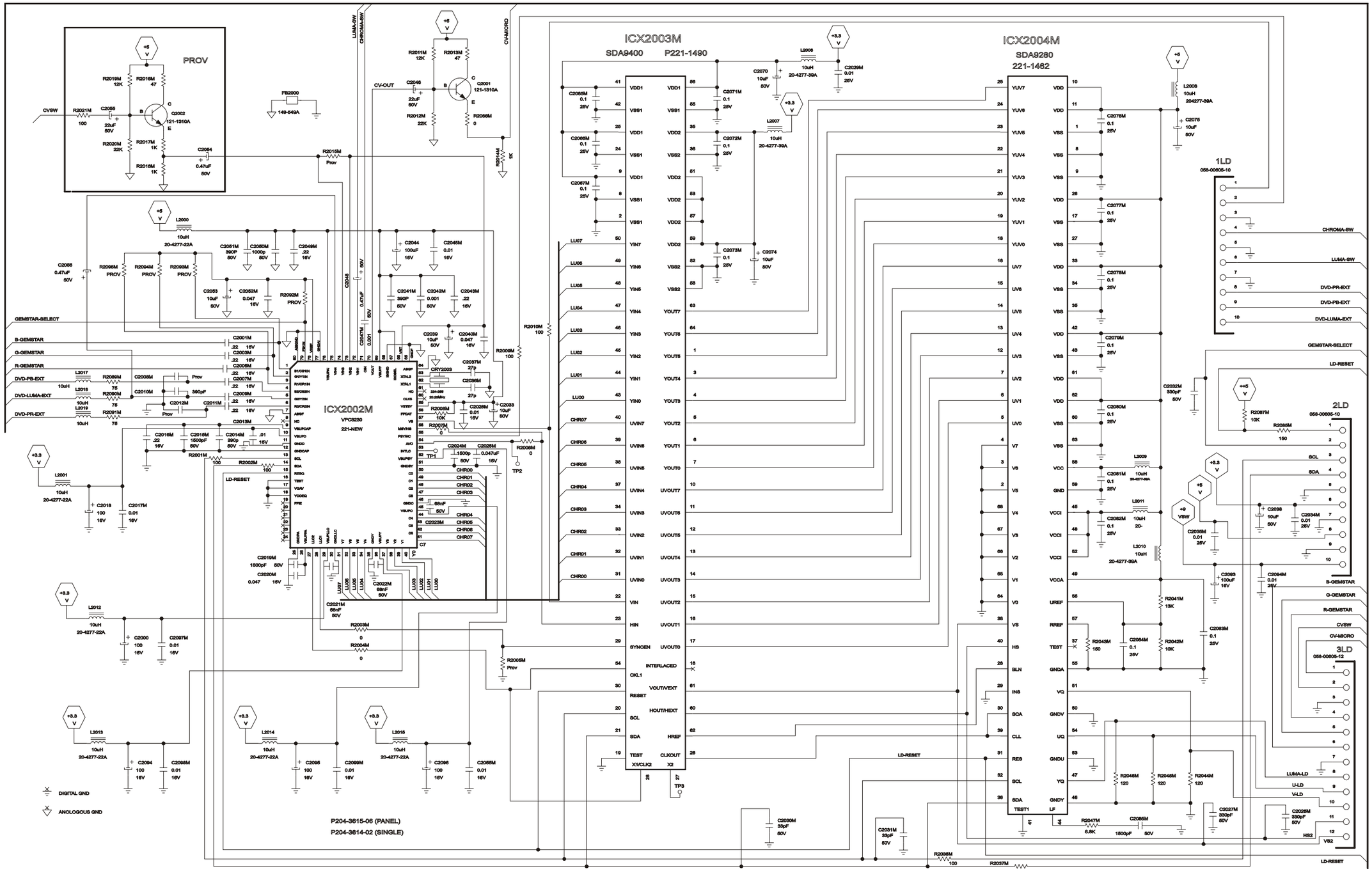


HD-S Synchrony Processor Circuit

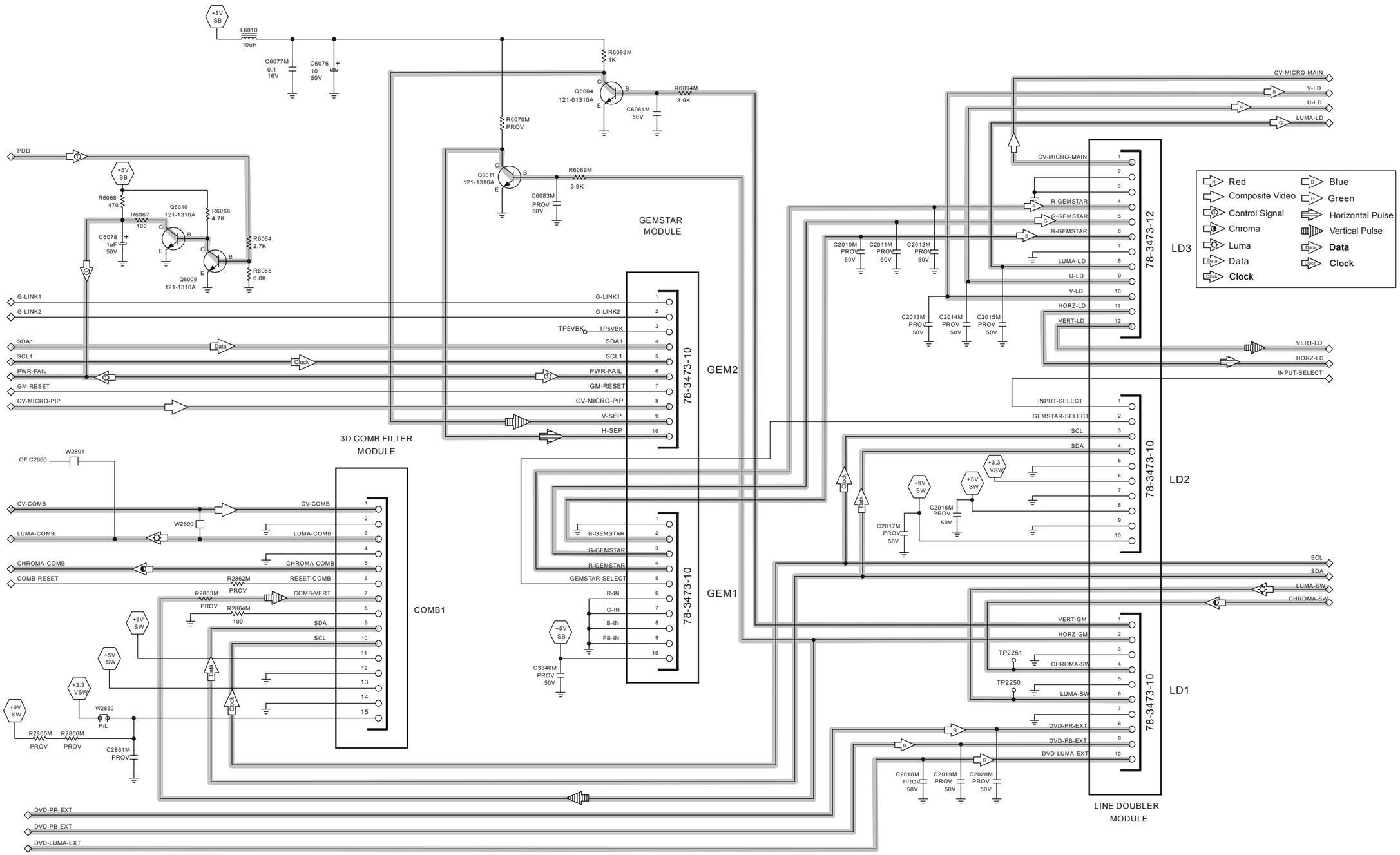


CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE LETTER "X" IN THEIR COMPONENT DESIGNATORS. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

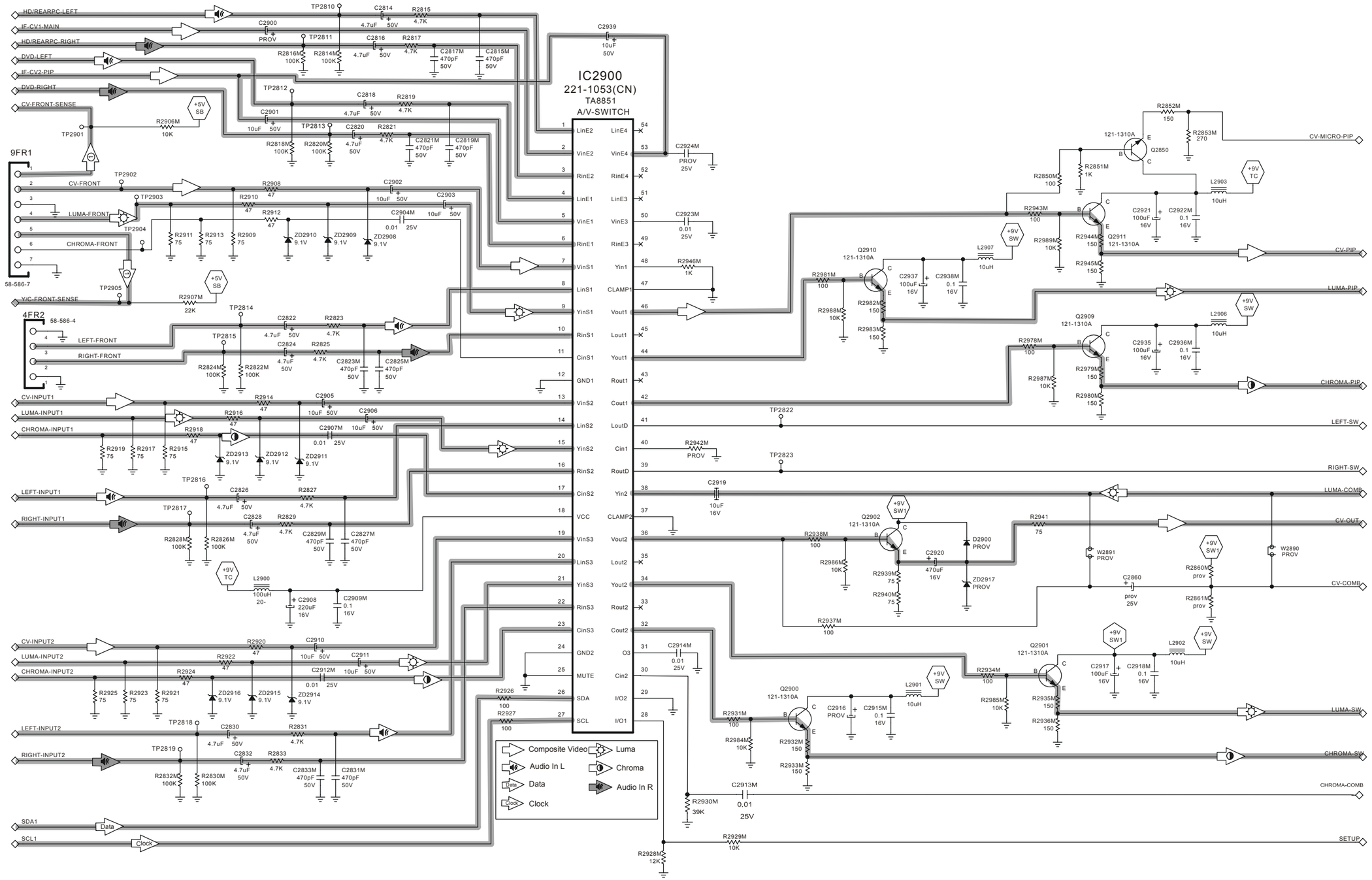
ALL SYMBOLS WITH "M" ON END OF DESIGNATOR INDICATE SURFACE MOUNTED COMPONENT


ICX2003M
SDA9400 P221-1490
ICX2004M
SDA9280
221-1462
ICX2002M
VPC3230
221-NEW
PROV
1LD
058-00605-10
2LD
058-00605-10
3LD
058-00605-12
CHROMA-SW
LUMA-SW
DVD-PR-EXT
DVD-PB-EXT
DVD-LUMA-EXT
GEMSTAR-SELECT
LD-RESET
B-GEMSTAR
G-GEMSTAR
R-GEMSTAR
CVSW
CV-MICRO
LUMA-LD
U-LD
V-LD
HS2
VS2
DIGITAL GND
ANOLOGOUS GND
P204-3615-06 (PANEL)
P204-3614-02 (SINGLE)

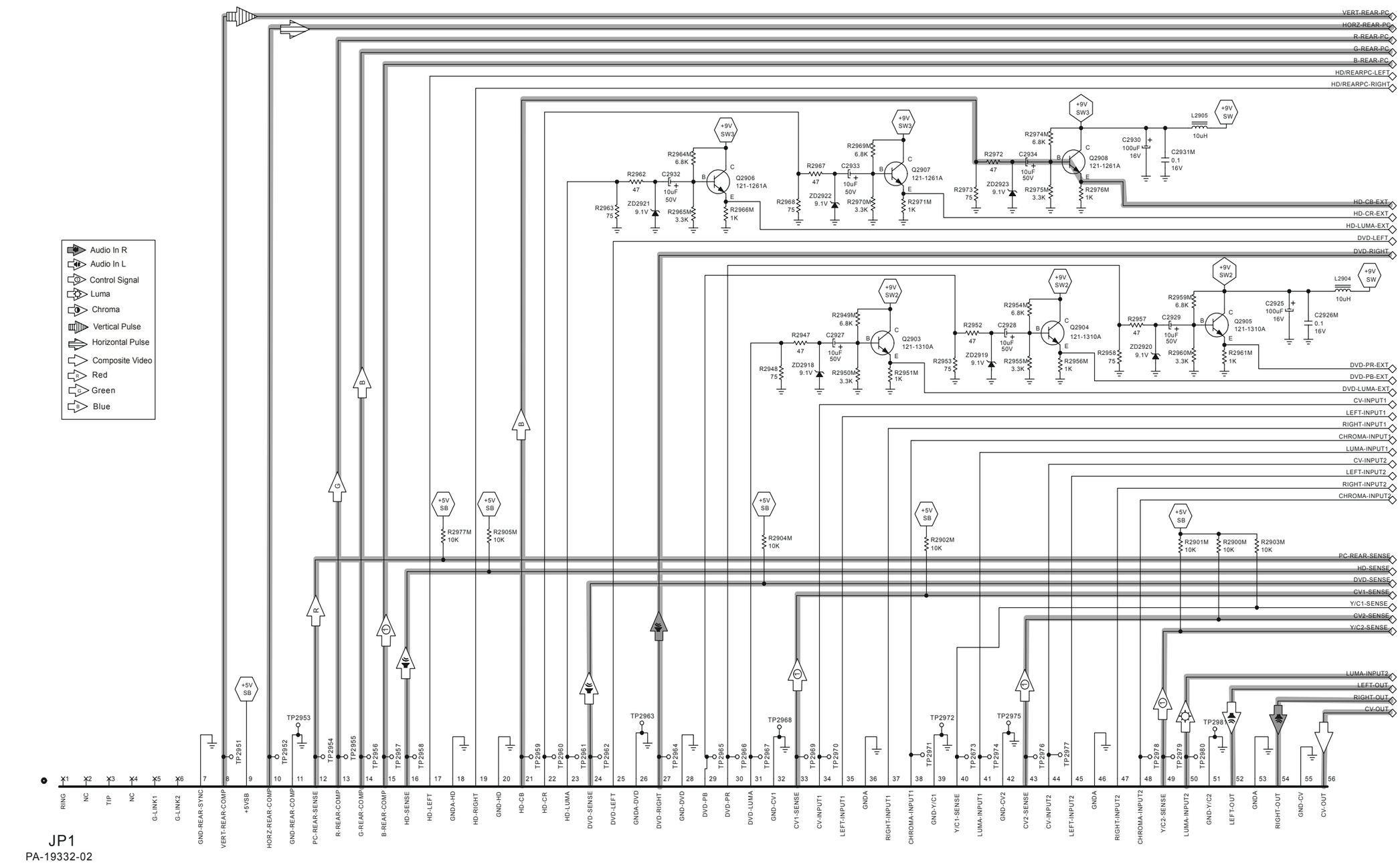
HD-S Line Doubler, 3D Comb, & Gemstar Circuit



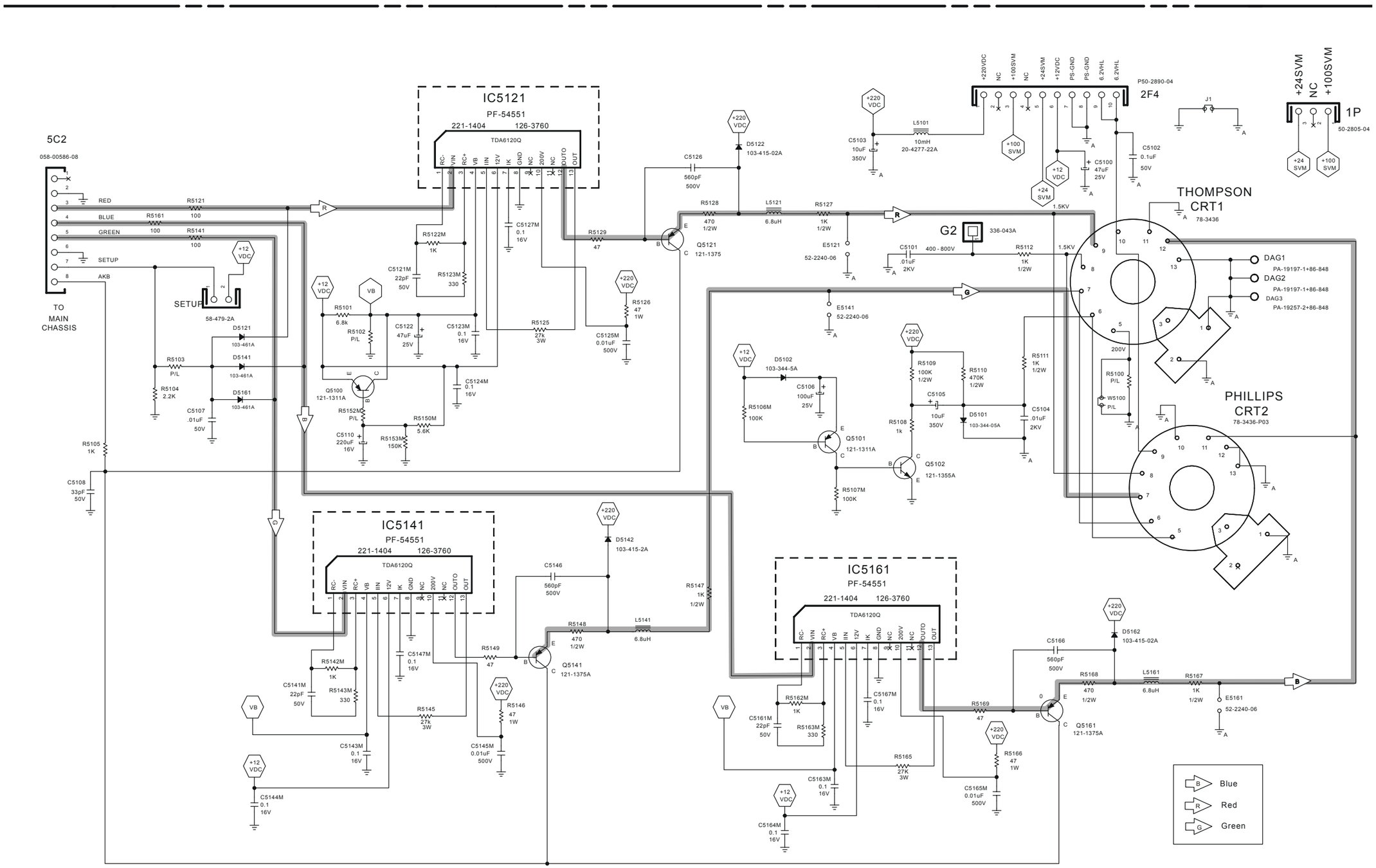
HD-S A/V Switch Circuit



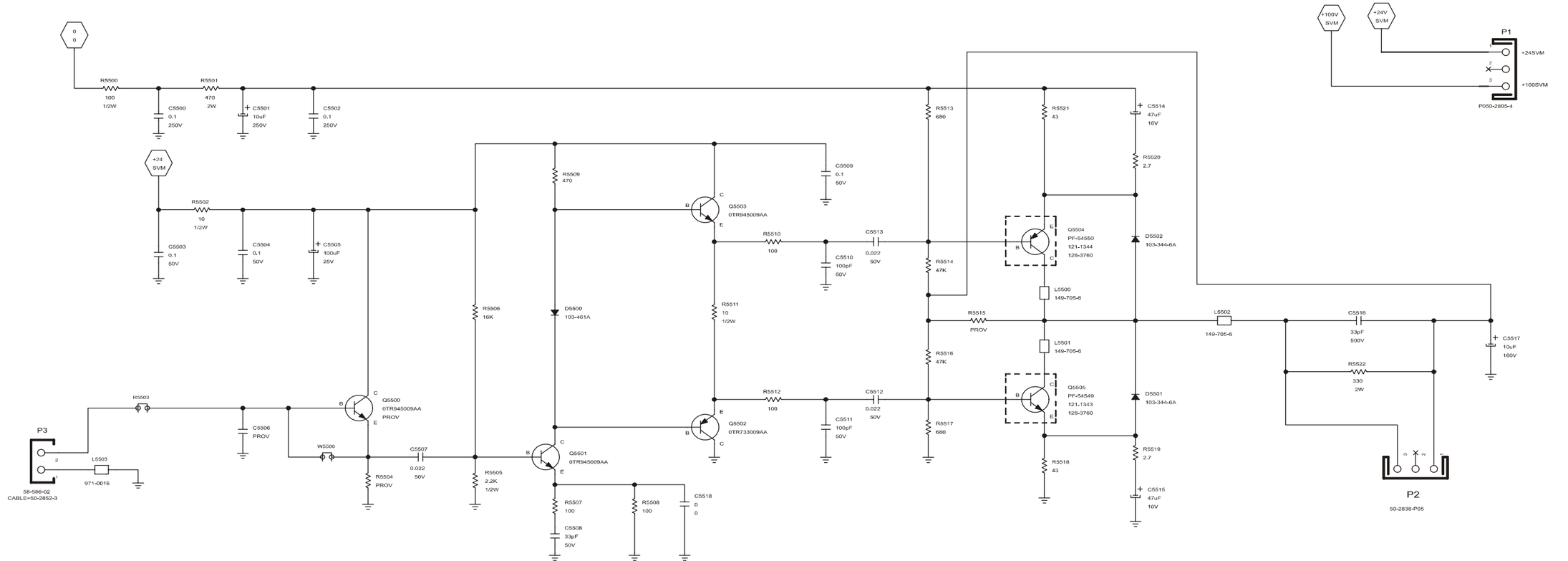
HD-S Jackpack Circuit



HD-S Video Output & Scan Velocity Modulator Circuit



HD-S Scan Velocity Modulator Circuit



HD-S Front Jackpack Circuit

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

G

F

E

D

C

B

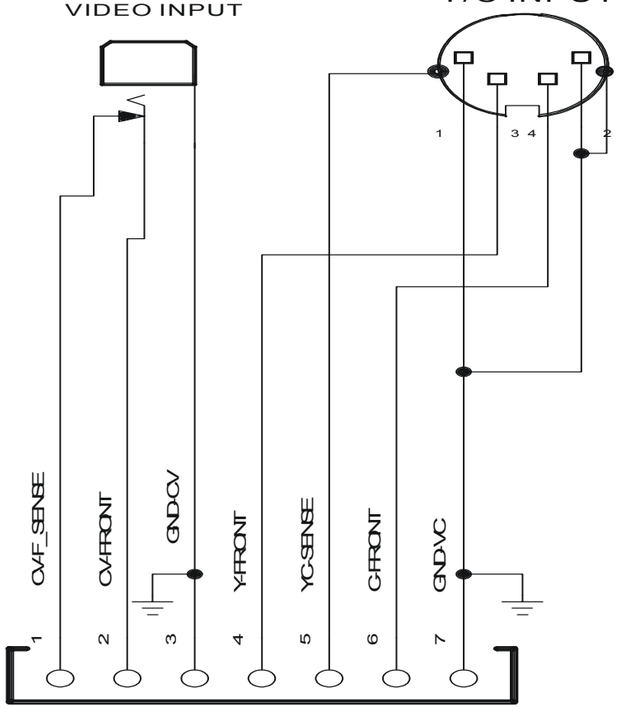
A

TO VIDEO OUT SHIELD

1A5
058-00542-02

J12
078-03403
VIDEO INPUT

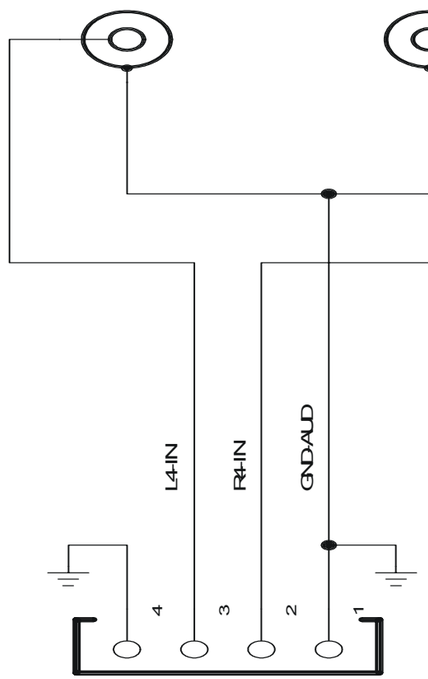
J11
078-03404-01
Y/C INPUT



1FR9
058-00586-07
To Sheet 14

J13
078-03402-01
LEFT IN

J14
078-03402
RIGHT IN



2FR4
058-00586-04
To Sheet 14

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ALL SYMBOLS WITH "M" ON END OF DESIGNATOR INDICATE SURFACE MOUNTED COMPONENT

HD-S Keyboard Circuit

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

G

F

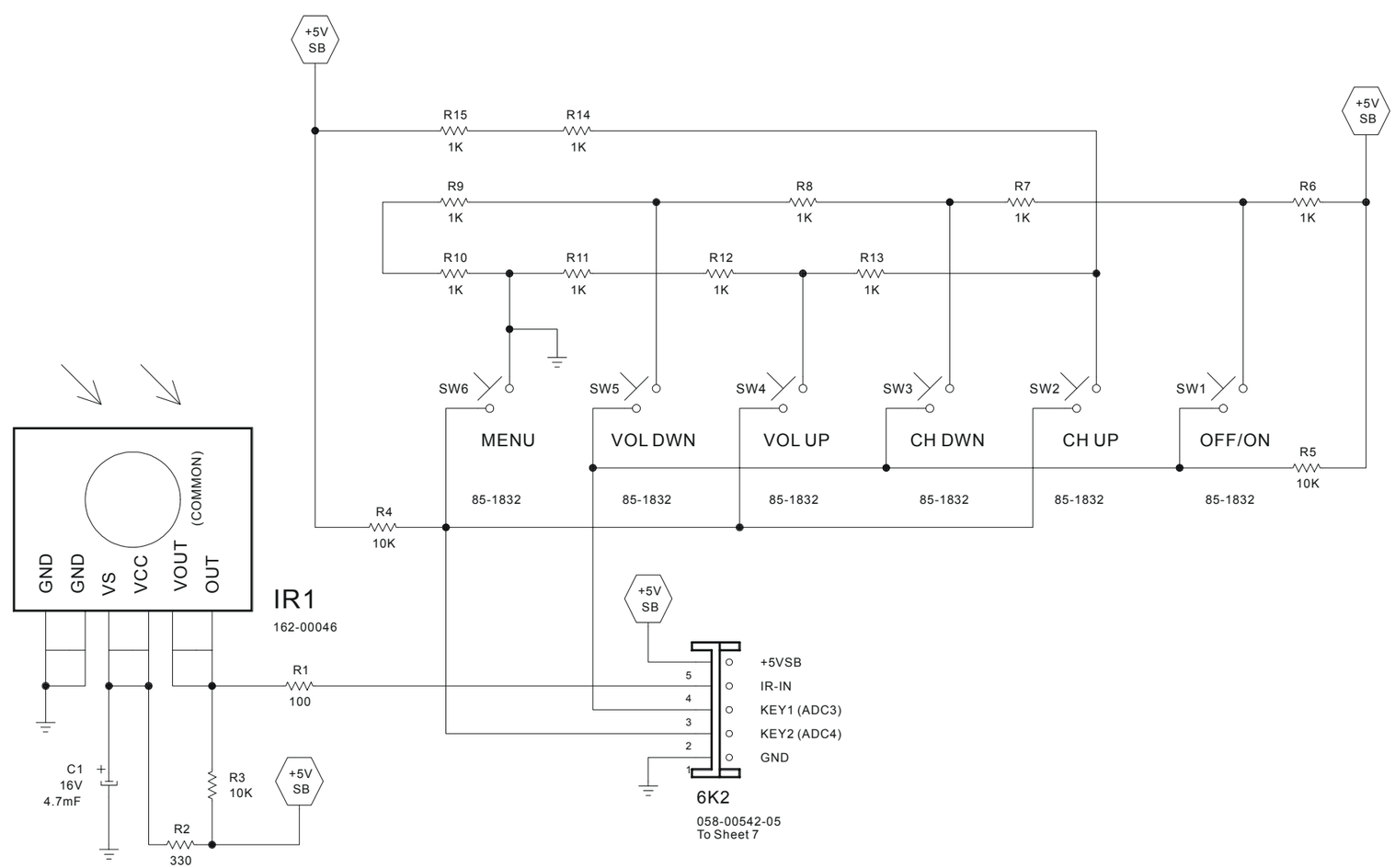
E

D

C

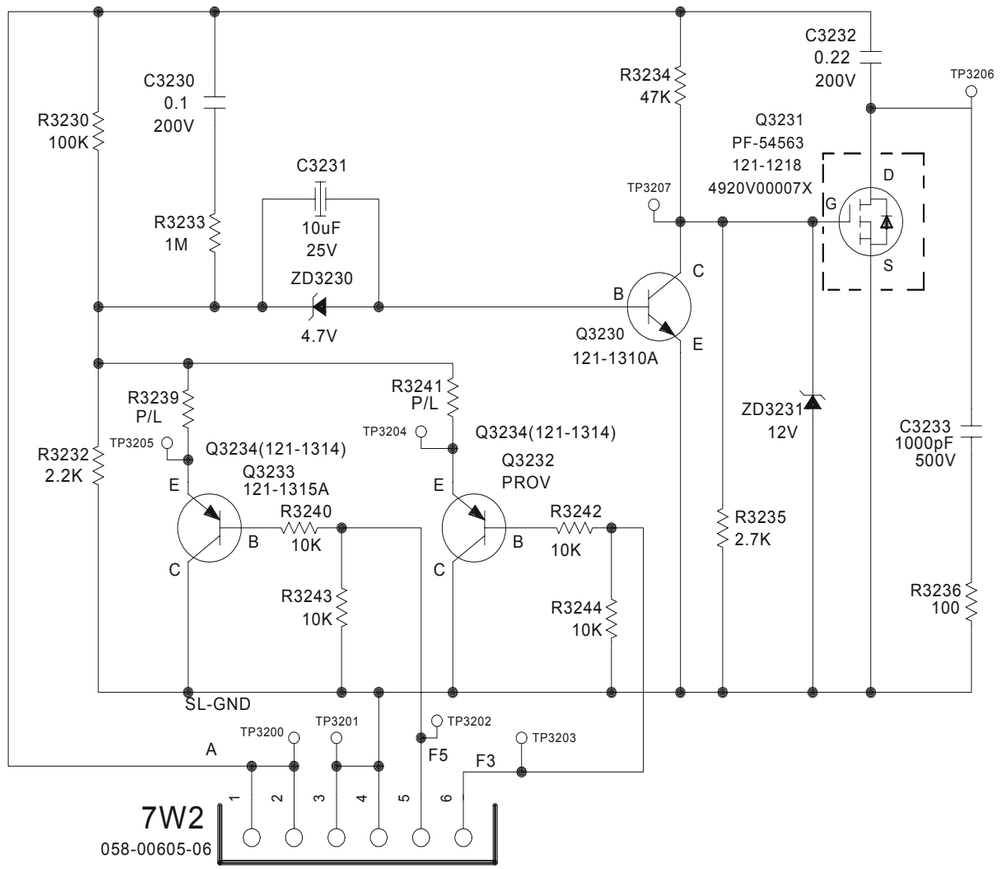
B

A

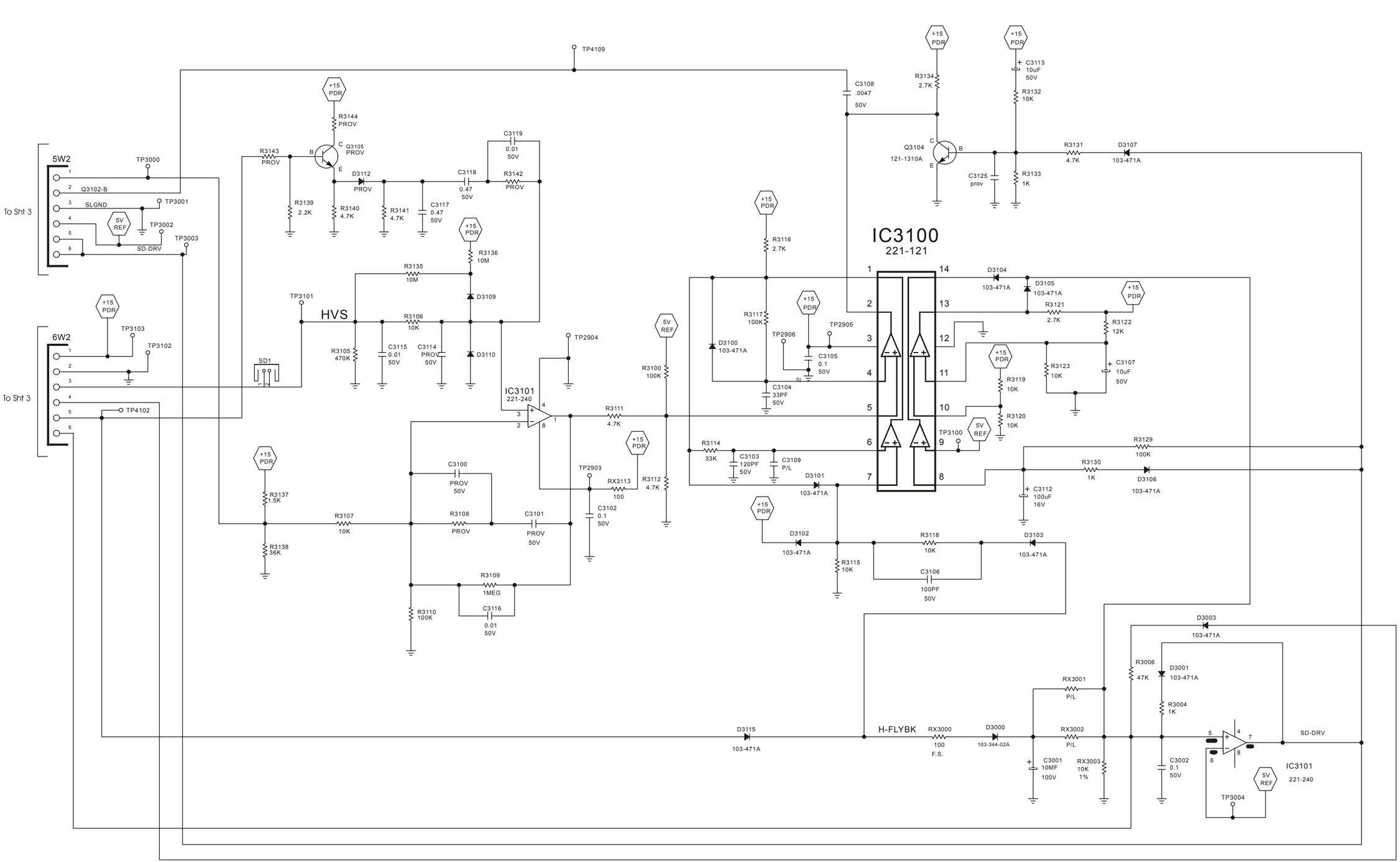


ALL SYMBOLS WITH M
ON END OF DESIGNATOR
INDICATE SURFACE
MOUNTED COMPONENT.

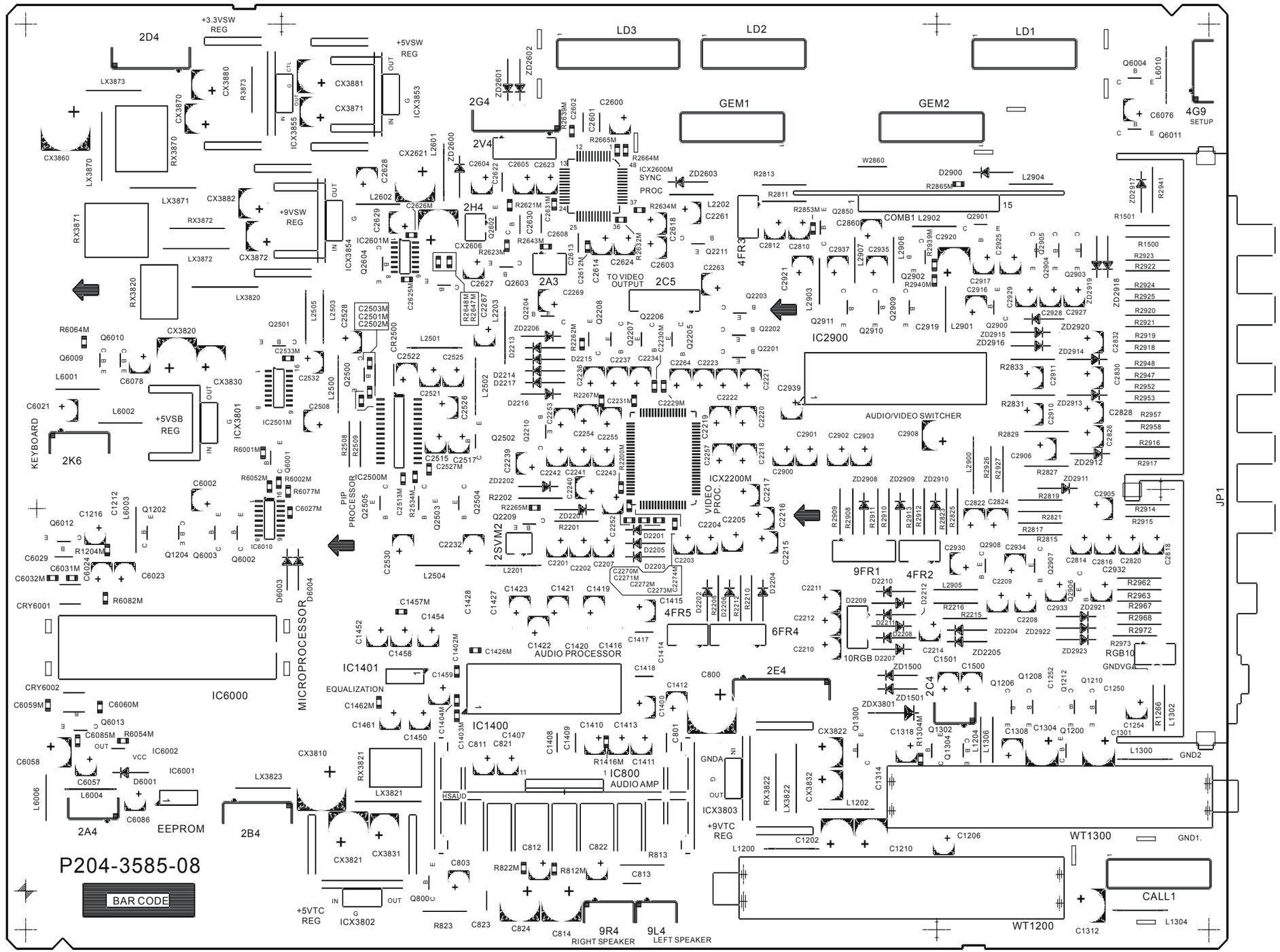
HD-S Dynamic Correction Circuit



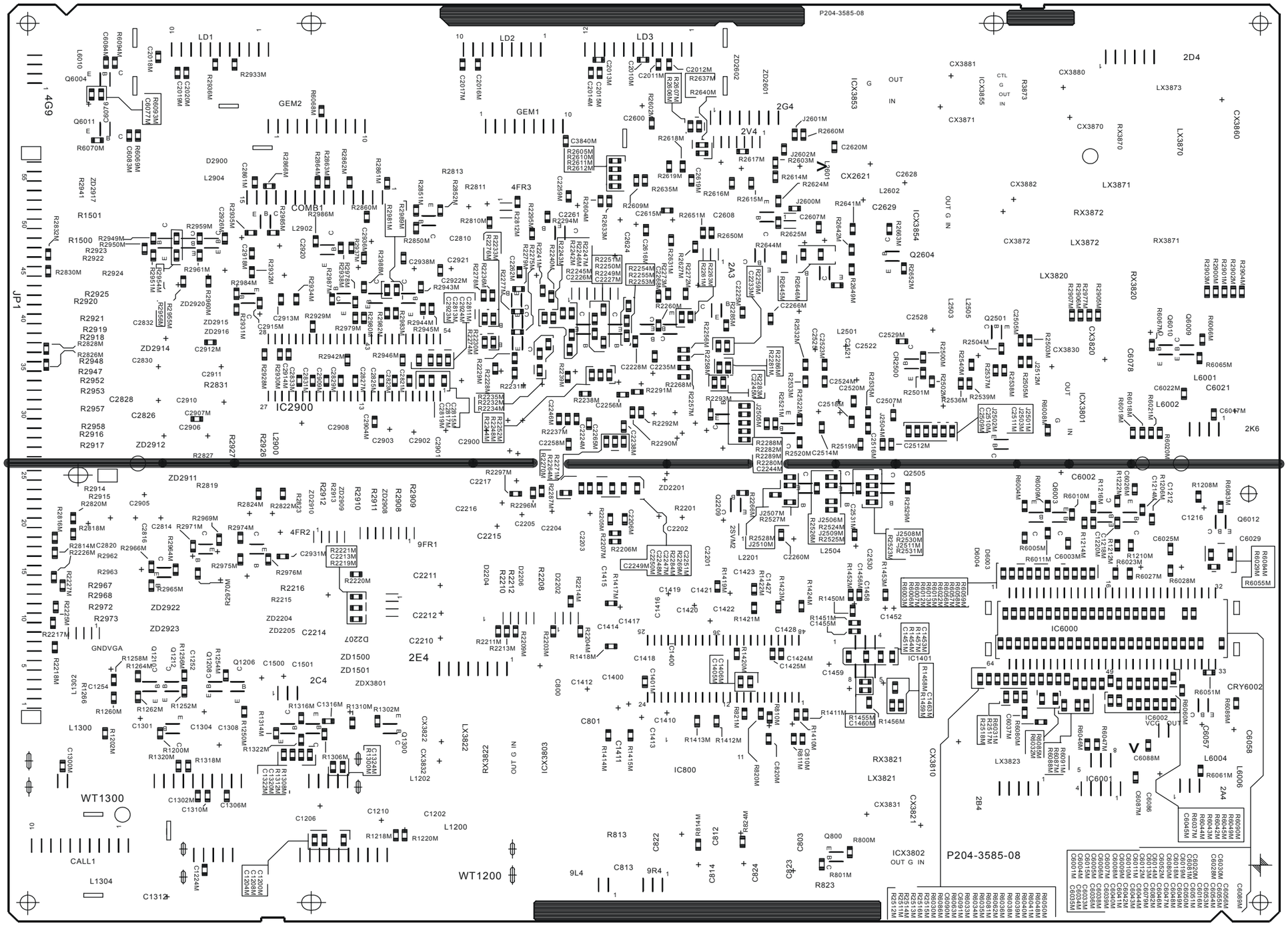
HD-S Scan Boost Circuit



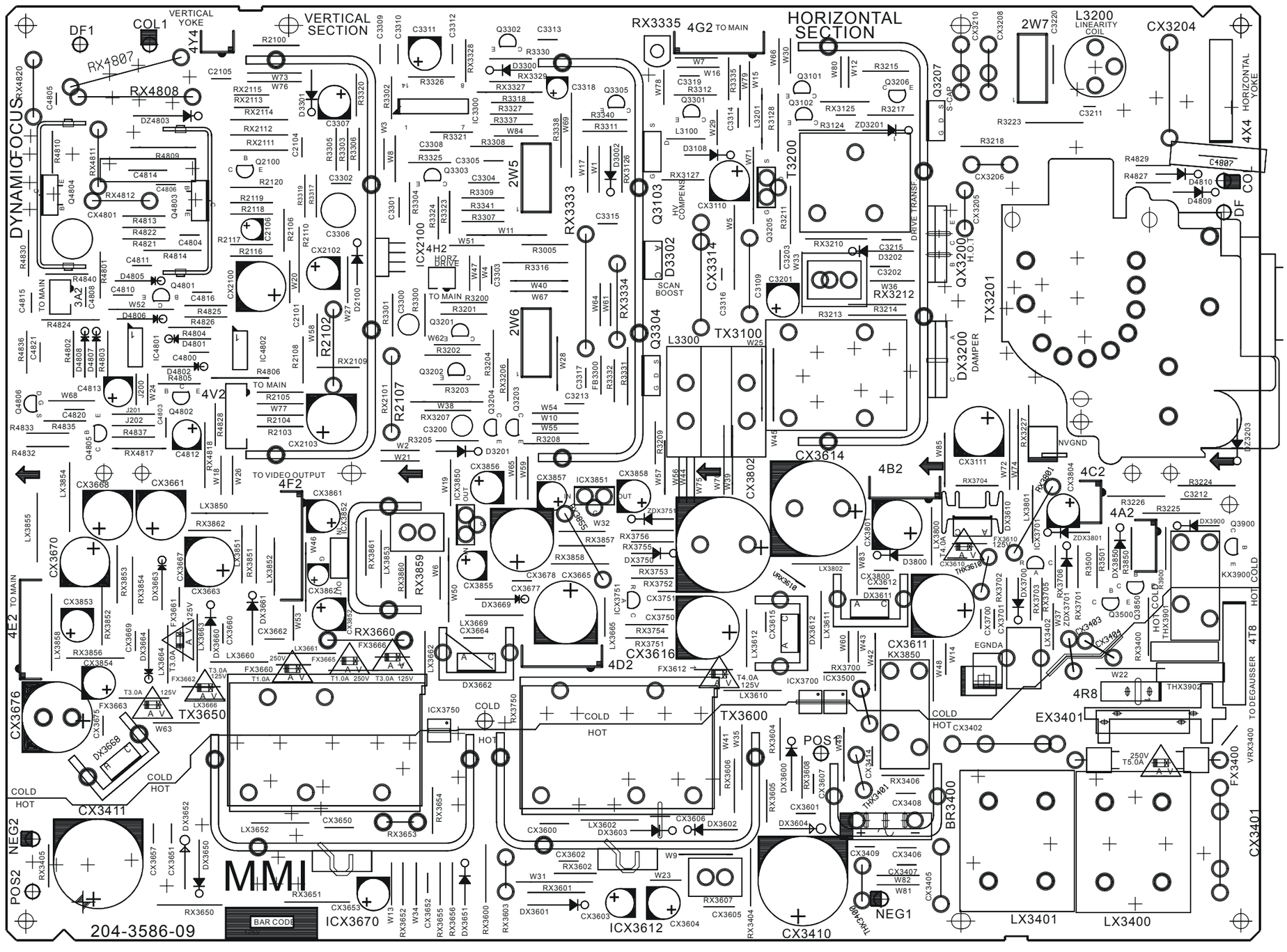
HD-S Main PCB Layout Bottom



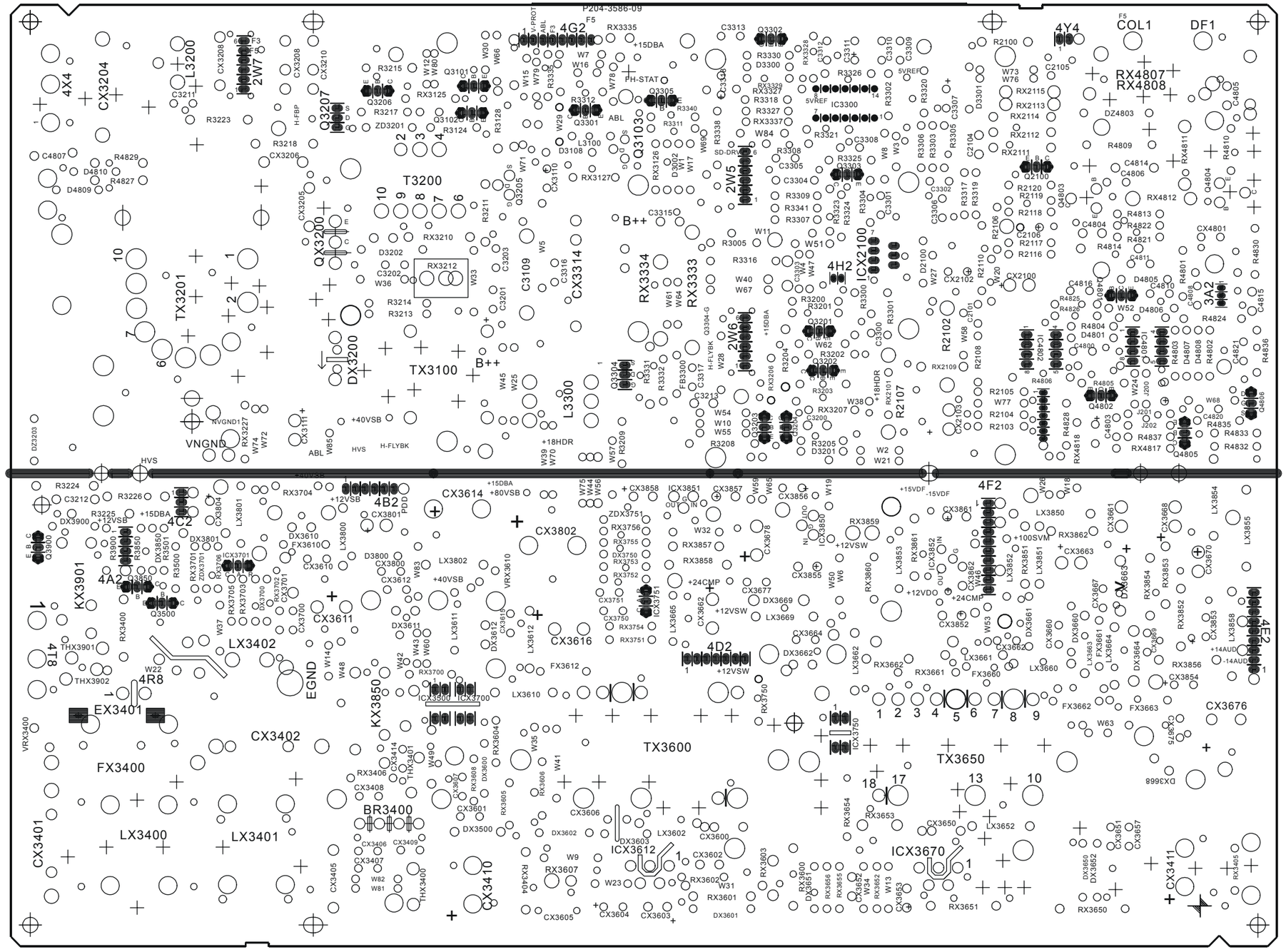
HD-S Main PCB Layout Top



HD-S SMPS PCB Layout Bottom



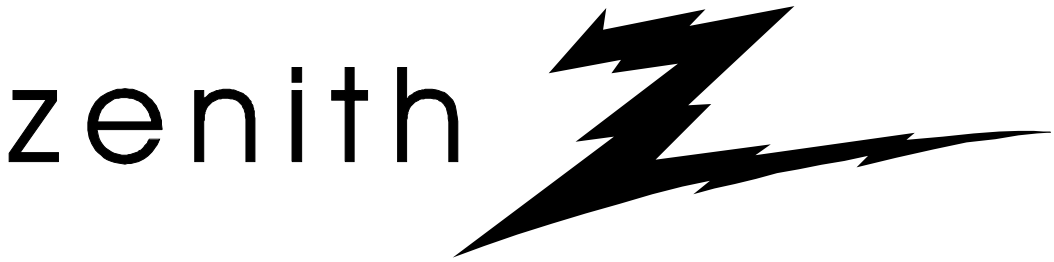
HD-S SMPS PCB Layout Top



CM154 - 923-03496

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ALL SYMBOLS WITH "M" ON END OF DESIGNATOR INDICATE SURFACE MOUNTED COMPONENT


zenith