

Alignments

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Note: The Service Default Alignment Mode (SDAM) is described in the "Service Modes, Error Codes and Fault Finding" section. SDAM menu navigation is performed by using the MENU UP, MENU DOWN, MENU LEFT, and MENU RIGHT keys of the remote control transmitter.

General Alignment Conditions

Perform all electrical adjustments under the following conditions:

AC voltage and frequency: 110 V ($\pm 10\%$), 60 Hz ($\pm 5\%$).

Connect the television set to the AC power via an isolation transformer.

Allow the television set to warm up for approximately 20 minutes.

Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use heatsinks as ground.

Test probe: $R_i > 10\text{ MO}$; $C_i < 2.5\text{ pF}$.

Use an isolated trimmer/screwdriver to perform the alignments.

Hardware Alignments

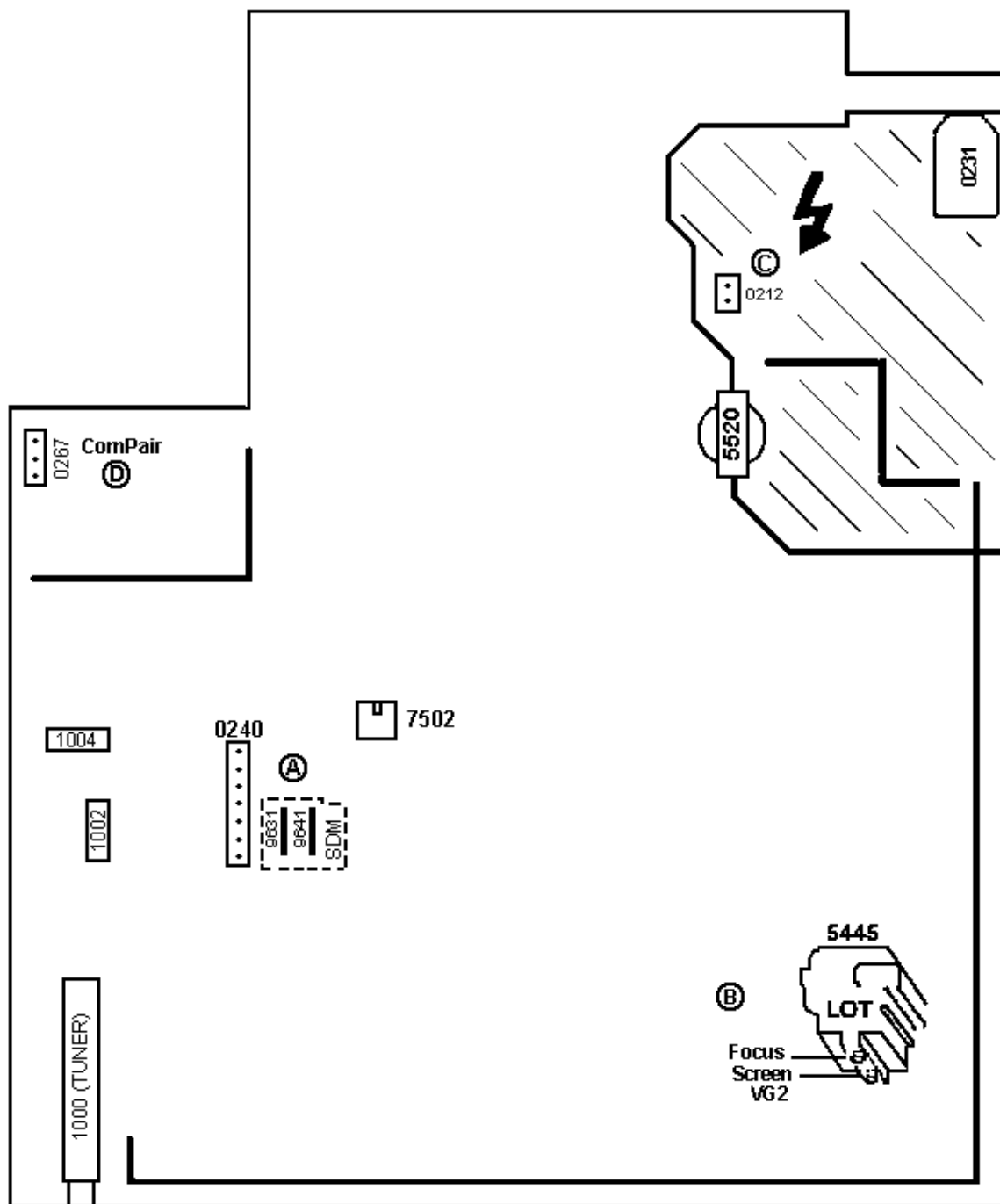


Figure: Mono Carrier (Top View) LS

4. Press the MENU LEFT or MENU RIGHT key to enter the WHITE TONE sub menu.
5. In the WHITE TONE sub menu, press the MENU UP/DOWN keys to select NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
6. Use the MENU LEFT/RIGHT keys to set the values of NORMAL RED, NORMAL GREEN and NORMAL BLUE to 40.
7. Press the MENU button twice to enter the normal user menu.
8. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
9. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
10. Use the MENU UP/DOWN keys to select PICTURE. Be sure to record the current value of PICTURE.
11. Use the MENU LEFT/RIGHT keys to set the value of PICTURE to zero.
12. Use the MENU UP/DOWN keys to select BRIGHTNESS. Be sure to record the current value of BRIGHTNESS.
13. Use the MENU LEFT/RIGHT keys to set the value of BRIGHTNESS to minimum (OSD just visible in a dark room).
14. Press the MENU button twice to return to the top level SDAM menu.
15. Press the STATUS/EXIT button to hide the SDAM onscreen display.
16. Connect the RF output of a video pattern generator to the antenna input.
17. Input a "black picture" test pattern to the television set.
18. Set the oscilloscope to 50 V/div and the time base to 0.2 milliseconds (external triggering on the vertical pulse).
19. Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket (see schematic diagram B).
20. Measure the cut off pulse during first full line after the frame blanking (see Fig. 8-2). You will see two pulses, one being the cut off pulse and the other being the white drive pulse. Choose the one with the lowest value; this is the cut off pulse.
21. Select the cathode with the highest VDC value for the alignment. Adjust the V Cut-Off of this gun with the SCREEN potentiometer (see Fig. 8-1) on the LOT to the correct value (see table below).
22. Press the STATUS/EXIT button to display the SDAM onscreen display.
23. Press the MENU button to enter the normal user menu.
24. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu (if necessary).
25. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
26. Use the MENU UP/DOWN keys to select PICTURE.
27. Use the MENU LEFT/RIGHT keys to reset the value of PICTURE to the original value.
28. Use the MENU UP/DOWN keys to select BRIGHTNESS.

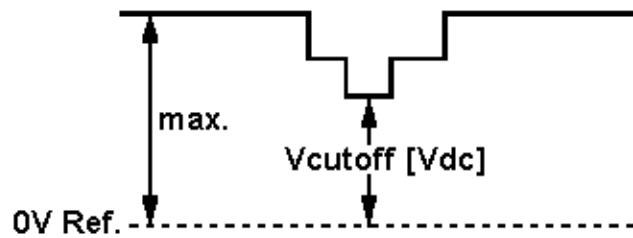


Figure: V Cut-Off

Table: Cut-off Voltage, Large Screen

Screen Size	Cut-off Voltage
25/28Tesla, 25/28BLD	+140V +/- 4V
20RF/21RF/25RF/29RF, 21RF Pin-Free, 25"HF LA, 25V/27V/32V/35V/25"/33"/28BLS, 29", 29SF EU,	+145V +/- 4V
21RF AP/CH, 25" AP/CH, 25RF/29RFAP/CH, 29SF AP	+155V +/- 4V
21RF Ph, 24/28/32WS BLD, 29RF (Eu), 28/32WSRF	+160V +/- 4V

Focusing

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a circle or crosshatch test pattern to the television set.
3. Press the AUTO PICTURE button on the remote control transmitter repeatedly to choose PERSONAL or MOVIES picture mode.
4. Adjust the FOCUS potentiometer (see Fig. 8-1) until the vertical lines near the left and right sides of the screen, and near the horizontal center of the screen, are at minimum width without visible haze.

Software Alignments and Settings

The following options are performed in the Service Default Alignment Mode (SDAM)

4. GEOMETRY
5. AUDIO

Options

OP1	XXX
OP2	XXX
OP3	XXX
OP4	XXX
OP5	XXX
OP6	XXX
OP7	XXX

Figure: Options Menu

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

How to change an Option Byte

An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very quickly. All options are controlled via seven option bytes.

To change Option Byte(s):

1. Enter SDAM:
Press the following key sequence on the remote control transmitter:
0-6-2-5-9-6-MENU
Do not allow the display to time out between entries while keying the sequence.
2. Use the MENU UP/DOWN keys to highlight the OPTIONS sub menu.
3. Press the MENU LEFT or MENU RIGHT key to enter the OPTIONS sub menu.
4. In the OPTIONS sub menu, press the MENU UP/DOWN keys to select OP 1 through OP 7.
5. Use the number keys on the remote control transmitter to enter a new value for the selected option byte. The value must be entered as a three-digit value (for example, "4" would be entered as "0-0-4").
6. The selected value must be between 0 and 255.
7. When all desired changes to the option bytes are made, press the MENU button to return to the top level SDAM menu. This will save changes to the option byte settings.

T8 Option Byte Codes

MODEL	OPTION BYTES						
	OP1	OP2	OP3	OP4	OP5	OP6	OP7
20RF40 S321	* NOT AVAILABLE						
20RF40 S325	* NOT AVAILABLE						
20RF50 S321	0	23	129	162	252	152	0
20RF50 S325	0	23	129	162	252	152	0
21PT63 9A85	* NOT AVAILABLE						
21PT83 9B85	* NOT AVAILABLE						
25PS40 S321	0	23	1	1	144	153	0
25PS40 S325	0	23	1	1	144	153	0
25PS50 S321	0	23	1	162	252	152	0
26LL50 0131	16	23	1	1	144	153	0
26LW50 2231	16	23	1	162	252	152	0
27PS50 B321	0	23	1	162	252	152	0
27PS55 S321	0	23	1	162	252	152	0
27PS60 S321	0	23	1	162	253	152	0
27RF50 S325	0	23	129	162	252	152	0
27RF72 S325	* NOT AVAILABLE						
29LL60 0131	16	23	1	162	252	152	0
29LW60 2231	16	23	1	162	252	152	0
29PV70 2235	16	23	129	162	252	152	0
32PS55 S321	0	23	129	162	252	152	0
32PS60 B321	0	23	129	162	253	152	0
32PS61 S321	0	23	129	162	253	152	0
33LL80 1131	0	23	129	162	253	152	0
MS2530 C321	0	5	0	10	192	9	0
MS2530 C325	0	5	0	10	192	9	0
MS2730 C321	0	5	0	1	192	9	0
MS3250 C321	0	215	129	162	164	88	0
MS3650 C329	0	215	129	162	164	88	0

* Option Byte Data for these models was not available at manual release.
Refer to future updates to this manual regarding these models.

Tuner

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

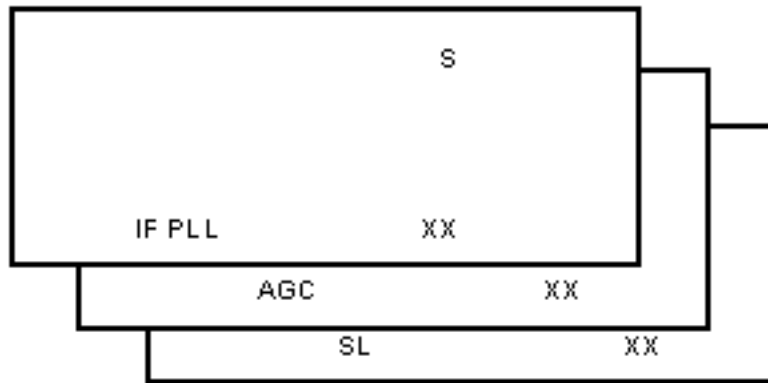


Figure: Tuner Menu

IF PLL

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

AGC (AGC take over point)

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a color bar test pattern to the television set.
3. Set the amplitude of the video pattern generator to 10 mV and set the frequency to 61.25 MHz (channel 3).
4. Connect a DC multimeter to pin 1 of the tuner(item 1000 on the main chassis).
5. Enter SDAM:
Press the following key sequence on the remote control transmitter:
0-6-2-5-9-6-MENU Do not allow the display to time out between entries while keying the sequence.
6. Use the MENU UP/DOWN keys to highlight the TUNER sub menu.
7. Press the MENU LEFT/RIGHT keys to enter the TUNER sub menu.
8. Use the MENU UP/DOWN keys to select AGC.
9. Use the MENU LEFT/RIGHT keys to adjust the AGC value (default value is 27) until the voltage at pin 1 of the tuner lies between 3.8V and 2.3V.
10. Press the MENU button to return to the top level SDAM menu.
11. To ensure the AGC change takes effect: Turn the television set OFF by using the POWER button on the remote control transmitter or the local keyboard. Disconnect the television set from AC power for at least ten seconds. Reconnect the television set to AC power. Turn the television set ON by using the POWER button on the remote control transmitter or the local keyboard.

OFF: slicing level dependent on noise detector

ON: fixed slicing level of 70%

To adjust SL:

1. Enter SDAM:

Press the following key sequence on the remote control transmitter:

0-6-2-5-9-6-MENU Do not allow the display to time out between entries while keying the sequence.

2. Use the MENU UP/DOWN keys to highlight the TUNER sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the TUNER sub menu.
4. Use the MENU UP/DOWN keys to select SL.
5. Use the MENU LEFT/RIGHT keys to toggle SL "Off" and "On"
6. Press the MENU button to return to the top level SDAM menu.
7. To ensure the SL setting is saved: Turn the television set OFF by using the POWER button on the remote control transmitter or the local keyboard. Disconnect the television set from AC power for at least ten seconds. Reconnect the television set to AC power. Turn the television set ON by using the POWER button on the remote control transmitter or the local keyboard.

White Tone

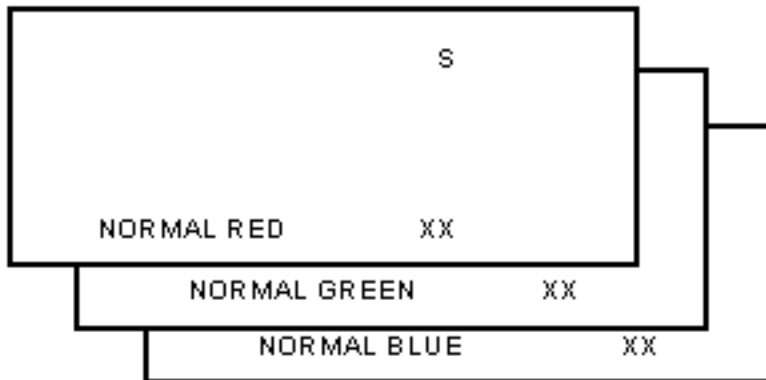


Figure: White Tone Menu

The values of the black cut off level can be adjusted in the WHITE TONE sub menu. Normally, no alignment is needed for WHITETONE, and the given default values are used.

To adjust NORMAL RED, NORMAL GREEN, and NORMAL BLUE:

1. Enter SDAM:
Press the following key sequence on the remote control transmitter:
0-6-2-5-9-6-MENU Do not allow the display to time out between entries while keying the sequence.
2. Use the MENU UP/DOWN keys to highlight the WHITE TONE sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the WHITE TONE sub menu.
4. Use the MENU UP/DOWN keys to select NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
5. Use the MENU LEFT/RIGHT keys to adjust the value of NORMAL RED, NORMAL GREEN, or NORMAL BLUE.
6. When all desired changes to the WHITE TONE submenu values are made, press the MENU button to return to the top level SDAM menu.
7. To ensure the WHITE TONE settings are saved: Turn the television set OFF by using the POWER button on the remote control transmitter or the local keyboard. Disconnect the television set from AC power for at least ten seconds. Reconnect the television set to AC power. Turn the television set ON by using the POWER button on the remote control transmitter or the local keyboard.

Geometry

The geometry alignments menu contains several items for correct picture geometry alignment.

1. Connect the RF output of a video pattern generator to the antenna input.
2. Input a crosshatch test pattern to the television set.
3. Set the amplitude of the video pattern generator to at least 1 mV and set the frequency to 61.25 MHz (channel 3).
4. Press the AUTO PICTURE button on the remote control transmitter repeatedly to choose PERSONAL or MOVIES picture mode.
5. Enter SDAM:
Press the following key sequence on the remote control transmitter:
0-6-2-5-9-6-MENU Do not allow the display to time out between entries while keying the sequence.
6. Use the MENU UP/DOWN keys to highlight the GEOMETRY sub menu.
7. Press the MENU LEFT/RIGHT keys to enter the GEOMETRY sub menu.
8. Use the MENU UP/DOWN keys to highlight either the HORIZONTAL sub menu or the VERTICAL sub menu.

12. When all desired changes to the HORIZONTAL and VERTICAL sub menu values are made, press the MENU button twice to return to the top level SDAM menu.
13. To ensure the GEOMETRY settings are saved: Turn the television set OFF by using the POWER button on the remote control transmitter or the local keyboard. Disconnect the television set from AC power for at least ten seconds. Reconnect the television set to AC power. Turn the television set ON by using the POWER button on the remote control transmitter or the local keyboard.

The following alignments can be performed in the GEOMETRY submenu:

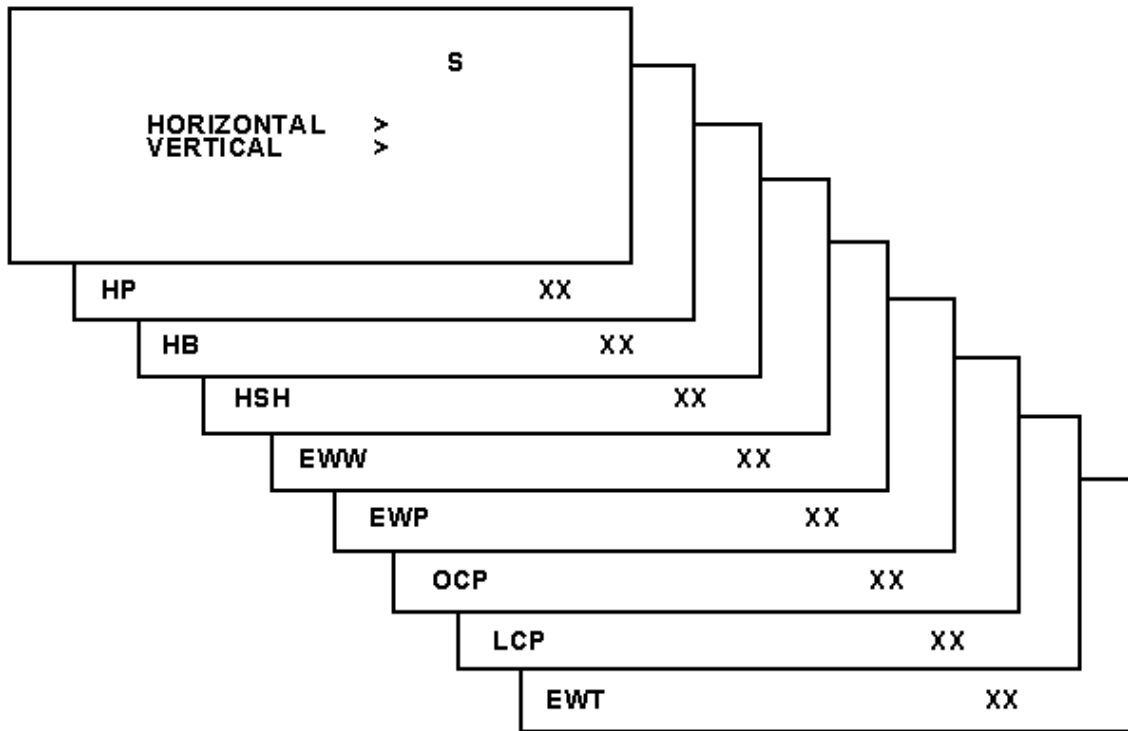


Figure: Horizontal Menu

Horizontal:

Horizontal Parallelogram (HP) Aligns straight vertical lines at the top and the bottom of the screen; vertical rotation round the center.

Horizontal Bow(HB) Aligns straight horizontal lines at the top and the bottom of the screen; horizontal rotation around the center.

Horizontal Shift(HSH) Aligns the horizontal center of the picture to the horizontal

Lower Corner Parabola (LCP) Aligns straight vertical lines in the lower corners of the screen.

East West Trapezium(EWT) Align straight vertical lines at the middle of the screen.

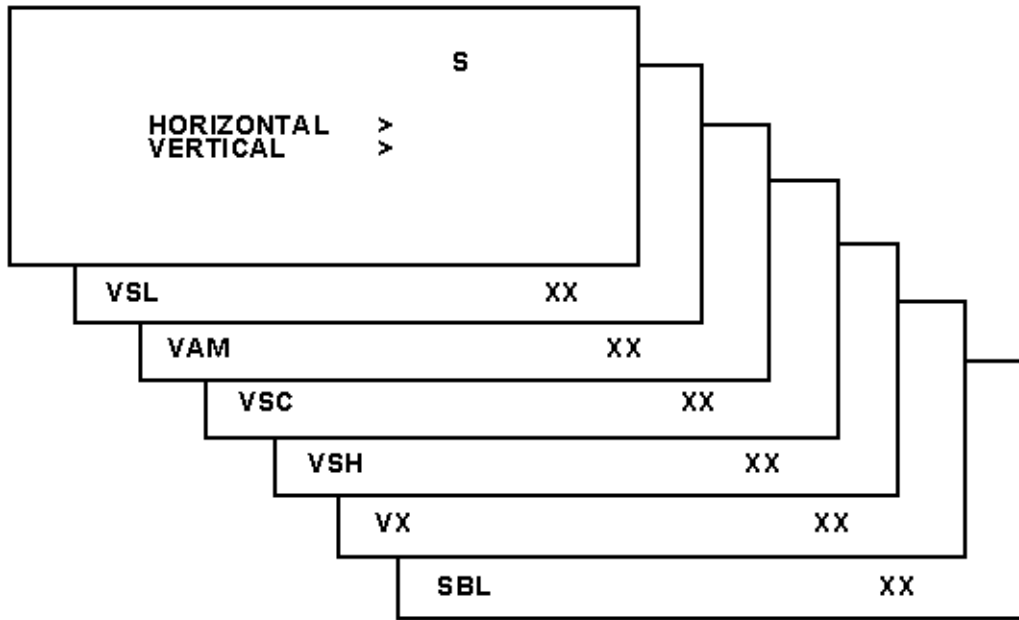


Figure: Vertical Menu

Vertical:

Vertical slope (VSL) Aligns the picture so the proportions are the same at the top and bottom of the screen. This alignment must be performed first, before all other vertical alignments. Turning SBL ON will assist in performing this alignment.

Vertical Amplitude(VAM) Aligns the height of the picture (other vertical alignments are NOT compensated).

Vertical S-Correction (VSC) Aligns the vertical linearity, so that the vertical intervals of the grid-patterns are the same over the entire height of the screen.

Vertical Shift(VSH) Aligns the vertical center of the picture to the vertical center of the CRT. After performing this alignment, it may be necessary to perform the VAM alignment again.

Vertical Zoom(VX) Adjusts picture height.

Service blanking(SBL) Turns the blanking of the lower half of the screen ON or OFF (to be used in combination with the vertical slope alignment).

HP	Hor. Parallelogram	31	33	33	31	33
HB	Hor. Bow	30	30	30	30	30
HSH	Hor. S hift	35	39	39	35	39
EWV	East West Width	34	35	35	34	35
EWP	East West Parabola	33	22	22	33	22
UCP	Upper Corner Parabola	35	41	41	35	41
LCP	Lower Corner Parabola	35	41	41	35	41
EWT	East West Trapezium	43	31	31	43	31
VSL	Vert. Slope	33	31	31	33	31
VAM	Vert. Amplitude	33	25	25	33	25
VSC	Vert. S -correction	32	35	35	32	35
VSH	Vert. S hift	35	21	21	35	21
VX	Vert. Zoom	33	25	25	33	25

Audio

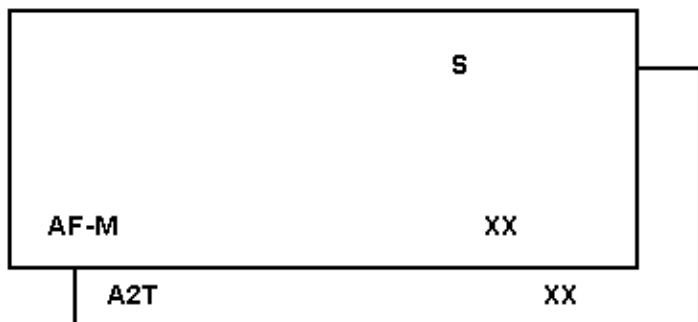


Figure: Audio Menu

No alignments are necessary for the AUDIO sub menu. Use the default values.

TV A2 Threshold
Default value is 250.

To adjust AF-M:

1. Enter SDAM:
Press the following key sequence on the remote control transmitter:
0-6-2-5-9-6-MENU Do not allow the display to time out between entries while keying the sequence.
2. Use the MENU UP/DOWN keys to highlight the AUDIO sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the AUDIO sub menu.
4. Use the MENU UP/DOWN keys to select AF-M.
5. Use the MENU LEFT/RIGHT keys to adjust the value of AF-M to 300.
6. Press the MENU button to return to the top level SDAM menu.
7. To ensure the AF-M setting is saved: Turn the television set OFF by using the POWER button on the remote control transmitter or the local keyboard. Disconnect the television set from AC power for at least ten seconds. Reconnect the television set to AC power. Turn the television set ON by using the POWER button on the remote control transmitter or the local keyboard.

To adjust A2T:

1. Enter SDAM:
Press the following key sequence on the remote control transmitter:
0-6-2-5-9-6-MENU Do not allow the display to time out between entries while keying the sequence.
2. Use the MENU UP/DOWN keys to highlight the AUDIO sub menu.
3. Press the MENU LEFT/RIGHT keys to enter the AUDIO sub menu.
4. Use the MENU UP/DOWN keys to select A2T.
5. Use the MENU LEFT/RIGHT keys to adjust the value of A2T to 250.
6. Press the MENU button to return to the top level SDAM menu.
7. To ensure the A2T setting is saved: Turn the television set OFF by using the POWER button on the remote control transmitter or the local keyboard. Disconnect the television set from AC power for at least ten seconds. Reconnect the television set to AC power. Turn the television set ON by using the POWER button on the remote control transmitter or the local keyboard.