ALIGNMENT PROCEDURES

Operating Conditions

Unless otherwise noted, the following conditions must be observed when aligning the CTC210 chassis:

Chassis must be operated from a 120VAC isolation transformer, with line voltage set to 120VAC (±2.0V).

Picture controls (black level, contrast, etc.) must be set to factory presets via the Picture Quality menu.

Procedures must be performed in the sequence given.

A 10X probe must be used for oscilloscope and frequency measurements.

The audio output leads must not be shorted together or to ground with the chassis on.

All video signals must have -40 IRE sync tips unless specified otherwise.

Chassis AC power must be removed for 10 seconds before disconnecting any cable.

A 3-minute warm-up is required for chassis or module related alignments. A 15-minute warm-up is required for Kine related alignments.

Required Test Equipment

- Dual-Trace Oscilloscope
- Digital Voltmeter
- Frequency Counter
- Audio Signal Generator
- NTSC Signal Generator (B&K 1249, or equivalent)
- MTS Signal Generator (B&K 2009, or equivalent)
- Sweep/Marker Generator (or Standard Signal Generator)
- TAG001 Service Generator (stock # 215568)
- YPrPb Signal Generator (DVD player w/YPrPb)
- DC Power Supply (5.0V/0.25A) for TAG001
- Chipper Check® software
- Chipper Check® interface box and computer
- Personal Computer (IBM Compatible w/ CD ROM and Sound Card)

All alignments should be done using Chipper Check® software and interface box.

X-Ray Shutdown Check

The following procedure should be performed prior to, and upon completion of service:

1. Set Black Level and Contrast to maximum.

Momentarily apply a short between the shutdown test point (JW14901- located at back edge of chassis) and ground. The instrument must shutdown immediately, then turn back on after ~ 2 seconds.

Apply and maintain a short between JW14901 and ground. The instrument must shutdown immediately and remain shutdown (the instrument will attempt to restart three times, then remain off).

Remove the short from JW14901.

Enter the Service Mode and reset the error code parameter(s) to "0".

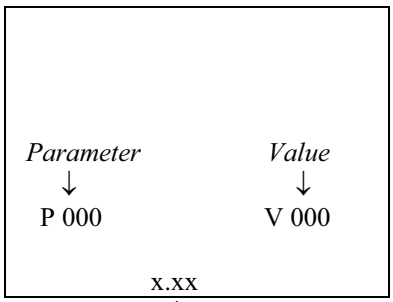
Service Mode

Most of the alignments for this chassis are software-driven. Some alignments can be accessed and modified through the front panel service mode. It is recommended that all adjustments should be made by modifying parameter values using Chipper Check. When parameter values are modified the corresponding registers and EEPROM locations are updated.

Entering the TV Service Mode Using the Front Panel Controls

1. Press and release the **POWER** button to turn the instrument on.
2. Press and hold the **MENU** button.
3. Press and release the **POWER** button.
4. Press and release the **VOLUME+** button.
5. Release the **MENU** button

The instrument should display the following one line menu:



Micro Software Revision

- The **VOL +** and **VOL -** buttons on the FPA or remote control are used to change the value (**V**).
- The **CH /** and **CH \/** buttons on the front panel or the remote control are used to change the parameter (**P**) number.

NOTE: Attempting to change the parameter number (using **CH ∧** or **CH ∨**) before the security code is entered will cause the instrument to exit the service mode (**see note above*). A valid security code must be entered (using **VOL +** or **VOL -**) before selecting an alignment parameter.

Security Codes

When the service mode is first turned on, the parameter will be "0", which does not correspond to an alignment. This is the security code parameter, the purpose of which is to prevent accidental entry into the parameter groups. The value (V) must be set to 76 for Front Panel access to chassis alignments, (V) set to 90 for Warranty Clock information and a value (V) of 200 for Chipper Check®. Once Chipper Check® mode (V=200) is selected, the Chipper Check® interface box will take control of the instrument and the front panel will become inoperative. Chipper Check has the ability to detect compatible chassis types when the instrument is directly connected to the service adapter. With Chipper Check connected and the instrument turned on and placed in the service mode, click the Detect Chassis button to enable the Chipper Check auto detection function.

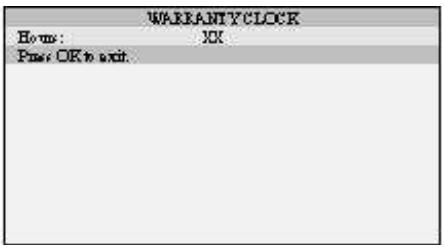
Value		***Parameter Group***
76		Instrument
90		Warranty Clock
200		Selects Service Computer Mode - must unplug TV to get out of the Service Computer Mode.

Security Codes

Warranty Clock

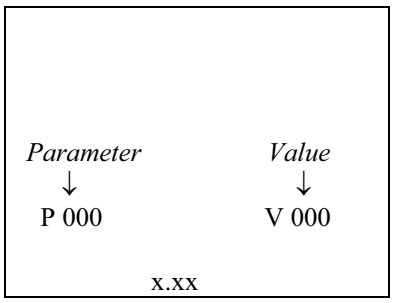
When the service mode is first turned on use **VOL +** to change the parameter number to 90, warranty clock security code. Press **CH ∧** one time to display the warranty clock display shown below.

Where: XX = hours since first turned on.



Instrument Alignment

When the service mode is first turned on use **VOL +** to change the parameter number to 76, alignment security code. Once a security code has been set, pressing **CH ∧** will result in the following display:



Where:

Version Number: xx.xx = Code Version
P: XX = Parameter Number
V: XX = Current Value

The **CH ∧** and **CH ∨** buttons can be used to change the parameter number and the **VOL +** and **VOL -** buttons can be used to change the value of the parameter selected.

Exiting The Service Mode

The service mode can be exited at any time by pressing the **MENU·OK** button on the FPA or **INFO** on the remote control (except when in ChipperCheck® mode). No additional steps are required to write new data into the EEPROM; new data is entered as parameter values are changed.

CHASSIS ALIGNMENT

The CTC210 chassis requires the use of ChipperCheck®, a TV/PC interface box, and a suitable computer for the majority of the alignments. Basic geometry and color temperature are the only alignments accessible through the front panel (see the following Parameter List). These adjustments have been included in this service manual as front panel procedures but it is not recommended that they be adjusted without using ChipperCheck®. ChipperCheck® software and the TV/PC interface box are available from:

TCE Publications
10003 Bunsen Way
Louisville, KY 40299
Tel. 502-491-8110

Instructions for the operation of ChipperCheck® software and connection of the TV/PC interface are included as context-sensitive help files in the ChipperCheck® software.

ALIGNMENT PROCEDURES

Geometry Alignment (Parameters 04 thru 17)

The Geometry alignments on this chassis are very critical and must be performed using ChipperCheck®. Even though some of the geometry alignments are available through the front panel service menu, adjustment is not recommended. Alignment in one mode will interact and affect the displays of the other modes.

High Voltage Adjustment

The high voltage in this instrument is very critical and requires special test equipment to measure and adjust. Field alignment is not recommended. If one of the following components is replaced the remainder of the components listed must be replaced at the same time. These components are packaged together in a kit (see parts list for stock number): R14767, R14778, R14780, R14776 and R14777. Adjustment of high voltage will not be necessary.

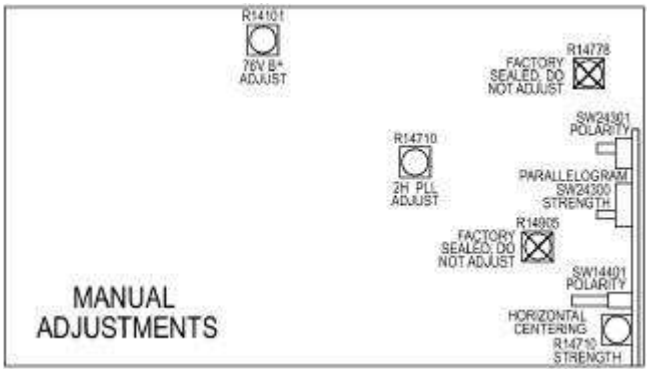
Note: To remove the high voltage leads from R14767, twist the lead (at least 360deg) while pulling up.

XRP Adjustment

The XRP circuit in this instrument requires special test equipment to measure and adjust. Field alignment is not recommended. If one of the following components is replaced the remainder of the components listed must be replaced at the same time. These components are packaged together in a kit (see parts list for stock number): CR14900, R14901, R14902, R14904 and Q14901. Adjustment of XRP will not be necessary.

Main B+ Alignment

1. Apply an NTSC (Mode 0) flat white field to AUX 1.
2. Connect a DVM to the +76VRUN power supply at TP14102.
3. Adjust R14101 (Run Adjust) for 76 ± 0.25VDC.

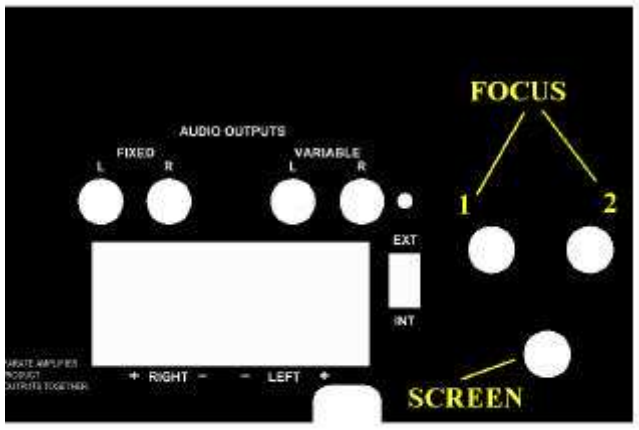


Focus Adjustment

Test Point:	Observe Display	
Adjust:	Focus Control(s)	Jack Panel

Note: Instrument must be warmed up at least 15 minutes prior to adjustment.

1. Tune the instrument to receive a crosshatch signal (HDTV Source).
2. Reset the Customer Controls.
3. Adjust Focus 1 for best focus of the vertical lines at the top left of the display.
4. Adjust Focus 2 for best focus of the horizontal lines at the center of the display.
5. Repeat steps 3 & 4 until the picture is well focused in all areas (This typically requires 3 alignment cycles).



Jack Panel (Right Side)

ALIGNMENT PROCEDURES

Error Code list for the CTC210

Error Code	Power Fatal	Error	Bus	Device	Condition
1	Yes	Initial Power Fail	--	+12V Run Dropout	Check +12V Run
3	Yes	+12V Run	--	+12V Run Monitor	Check +12V Run Regulation
6	Maybe	S-Video Switch	RUN 1	U16500	IC or Supply Failure
7	Yes	Scan Loss	--	Deflection	Loss of Scan
9	Yes	Video IC	RUN 1	U22300	IC or Supply Failure
10	Maybe	F2PIP POR	RUN 1	U18100	IC or Supply Failure
11	Maybe	Stereo Decoder	RUN 2	U31701	IC or Supply Failure
12	Maybe	AVR Latched	--		AVR Active
13	Yes	Fan Stopped	--	U13101	Fan or Fan Detect Circuit Failure
16	Yes	IIC Run1 or Run2 Bus Error	--	U13101	IIC clock or data failure
17	Never	USB Bus Latched	USB	U13201	IC or Supply Failure
18	Yes	IIC Standby Bus	--	U13101	IIC clock or data failure
20	Yes	Software Stack Overflow	--	U13101	Various Conditions. Reset system.
22	Never	4-Strikes -You're Out Occurred	--	U13101	Fault Detected by Micro
27	Yes	Scan Rate Converter KS	--	U32251	IC or clock and data failure
28	Yes	Scan Rate Converter GM	--	U32301	IC or clock and data failure
32	Maybe	SRC GMAFMC	USB	U32401	IC or clock and data failure
44/45	Maybe	F2PIP IC	RUN 1	U18100	IC or Supply Failure
64/65	Maybe	PIP IF DAC	RUN 2	U27902	IC or Supply Failure
66/67	Maybe	Main Tuner DAC	RUN 1	U32602	IC or Supply Failure
68	Maybe	Deflection DAC	RUN 2	U24800	IC or clock and data failure
72/73	Maybe	SYNC Proc	RUN 2	U38300	IC or Supply Failure
132/133	Maybe	Stereo Decoder	RUN 1	U31701	IC or Supply Error
134	Maybe	Composite AV Switch	RUN 1	U16501	IC or Supply Failure
136	Maybe	NTSC Decoder	RUN 1	U22300	IC or Supply Failure
136	Maybe	TVB	RUN 2	U11800	IC or Supply Failure
140	Maybe	Deflection Processor	RUN 2	U14350	IC or Supply Failure
184/185	Maybe	Frame Comb	RUN 1		IC or Supply Failure
186/187	Maybe	OSD IC	RUN 1	U13202	IC or Supply Failure
192	Maybe	PIP Tuner PLL	RUN 2	U17401	IC or Supply Failure
194	Maybe	PIP IF DAC	RUN 2	U27902	IC or Supply Failure
196	Maybe	Main Tuner PLL	RUN 1	U25501	IC or Supply Failure
198	Maybe	Main IF DAC	RUN 1	U32602	IC or Supply Failure
216	Maybe	SRC KS0127B	USB	U13101	Failure to Communicate with SRC Board

ALIGNMENT PROCEDURES

Front Panel Accessible Parameter List for CTC210

Parameter #	Parameter name	Value range	Notes and Comments
00	Security code for alignment parameters	Set to **76**	Must not advance to these parameters until value set
01	Error Detection (1st)		Value of first detected error
02	Error Detection (2nd)		Value of second detected error
03	Error Detection (last)		Value of last detected error
04	Horizontal Phase	00 .. 53	Write to HorizontalPhase TDA9151 reg. and EEPROM
05	Width Align	00 .. 63	Write to WidthAlign TDA8444 reg. and EEPROM
06	Width 9151 Ref	00 .. 63	Write to Width9151 TDA9151 reg. and EEPROM
07	E/W Parabola	00 .. 63	Write to E/WParabola TDA9151 reg. and EEPROM
08	E/W Trap	00 .. 07	Write to E/WTrap TDA9151 Reg. and EEPROM
09	E/W Corner	00 .. 63	Write to E/WCorner TDA9151 Reg. and EEPROM
10	Vertical Offset	00 .. 07	Write to VerticalCenter TDA9151 Reg. and EEPROM
11	Vertical Amp Aligned	00 .. 53	Write to VerticalAmp TDA9151 reg. and EEPROM
12	Vertical Amp Delta	00 .. 15	
13	Vertical Center	00 .. 63	Write to VerticalCenter TDA9151 reg. and EEPROM
14	Vertical Movie Mode	00 .. 02	0=Normal; 1=Movie1; 2=Movie2
15	Vertical Slope MSB	00 .. 255	Write to SlopeMSB TDA9151 reg. and EEPROM
16	Vertical Slope LSB	00 .. 255	Write to SlopeLSB TDA9151 reg. and EEPROM
17	Vertical Start Scan	00 .. 59	Write to STSC TDA9151 reg. and EEPROM
18	Red Cutoff	00 .. 255	Write to EEPROM Address depending on the source
19	Green Cutoff	00 .. 255	Write to EEPROM Address depending on the source selected.
20	Blue Cutoff	00 .. 255	Write to EEPROM Address depending on the source selected.
21	Video Mode Cutoff (Brightness Align)	00 .. 255	Write to EEPROM Address depending on the source selected.
22	Red Drive	00 .. 127	Write to EEPROM Address depending on the source selected.
23	Blue Drive	00 .. 127	Write to EEPROM Address depending on the source selected.
24	Video Mode Light Output	00 .. 117	Write to EEPROM Address depending on the source selected.
25	Text Mode Cutoff (Brightness Align)	00 .. 255	**DO NOT USE.**
26	Text Mode Light Output	00 .. 107	**DO NOT USE**
27	AKB Mode	00 .. 01	*00 = Off: 01 = On SET TO OFF*
28	Red Cutoff (override)	00 .. 255	Update TA1276 register and writes to EEPROM
29	Green Cutoff (override)	00 .. 255	Update TA1276 register and writes to EEPROM
30	Blue Cutoff (override)	00 .. 255	Update TA1276 register and writes to EEPROM
31	Cutoff (override)	00 .. 255	Update TA1276 register and writes to EEPROM
32	Comb D/A (Composite)	00 .. 127	
33	FPIP Contrast (Composite)	00 .. 127	
34	FPIP Fine Tint (Composite)	00 .. 255	
35	FPIP Saturation (Composite)	00 .. 127	
36	Comb D/A (SVideo)	00 .. 127	
37	FPIP Contrast (SVideo)	00 .. 127	
38	FPIP Fine Tint (SVideo)	00 .. 255	
39	FPIP Saturation (SVideo)	00 .. 127	
40	Digicon Bus Control	00 .. 01	*00 = Enables communication between the convergence micro & the digital convergence IC.* *01 = Disables communication between the convergence micro & the digital convergence IC.*
41	RGB Output Mode	00 .. 03	*0=Normal; 1=Red Only; 2=Green Only; 3=Blue Only*
42	Gemstar Horizontal OSD Position	00 .. 255	Write to EEPROM Address
43	Gemstar Vertical OSD Position	00 .. 255	Write to EEPROM Address
44	Gemstar Horizontal PIP Position	00 .. 255	Write to EEPROM Address
45	Gemstar Vertical PIP Position	00 .. 255	Write to EEPROM Address
46	Gemstar PIP Window Vertical Size	00 .. 13	Write to EEPROM Address
47	SCAP_SW Scan B+	00 .. 63	Update TDA8444 register and writes to EEPROM

Vertical Centering (Parameters 10, 11, 13)

Test Point:	Observe Display	
Adjust:	Vertical Offset (10)	Range 00-07
	Vertical Amp Aligned (11)	Range 00-53
	Vertical Center (13)	Range 00-63

1. Attach a YPrPb signal generator to the YPrPb input. Apply a crosshatch pattern (Mode 15 HDTV Source).
2. Note the value of the Width Alignment (parameter 05). Temporarily change the value of the Width Alignment to 63.
3. Preset the Vertical Center (parameter 13) to step 31.
4. Adjust the value of Vertical Offset (coarse adjustment parameter 10) to center the top and bottom lines of the crosshatch with the edge of the display.
5. Adjust the Vertical Center (fine adjustment parameter 13) to center the top and bottom lines with the edge of the display.
6. Adjust the Vertical Amp Aligned (parameter 11) so that approximately 3.75% of the crosshatch pattern is hidden at both the top and bottom of the display (7.5% over scan +/- 2.5%).

EXAMPLE: If the crosshatch display has 12 blocks vertically, adjust so that ~ 1/2 block is hidden at both the top and bottom of the display (0.5/12 = 4.1%).

7. Return the value of Width Alignment to the original value.

Vertical Movie Mode (Parameter 14)

1. Always set to "0".

Vertical Slope/Vertical Scan Start (Parameters 15, 16, 17)

These parameters are preset at the factory and should be not aligned

Width Align, Width 9151 Ref (U14350), Horizontal Phase (Parameters 04, 05, 06)

These alignments are preset at the factory and should not be adjusted. It may be necessary to adjust the Horizontal Phase (Parameter 04). If adjustment is needed, adjust for best overall display.

E/W Adjustments (Parameters 07, 08, 09)

1. Re-check Horizontal Phase (parameter 04) and adjust if necessary.
2. Re-check Vertical Amp Aligned (parameter 11) and adjust if necessary.
3. Adjust E/W Parabola (parameter 07) to obtain straight vertical lines on the left and right of the display.
4. Adjust the E/W Trap (parameter 08) for the same width at the top and bottom of the display.
5. Adjust the E/W Corner (parameter 09) for straight lines at the top and bottom of the vertical lines at the sides of the display.
6. Re-check E/W Parabola (parameter 07) and adjust if necessary

SCAP_SW Scan B+ (Parameter 47) ***(True Flat Only)***

1. Apply crosshatch pattern to the display.
2. Adjust so that the vertical lines at each side fall on the edge of the display.

VCO Alignment

1. Apply 5 volt positive going sync pulse at P14406 pin 10 and set for 31.4685 Khz.
2. Apply +12 volts DC to P14406 pin 16.
3. Monitor Phase Detector Output at TP14636.
4. Adjust L14550 for 1.26 volts +/- 0.1 volts

HVR Phase Lock Loop

1. Apply +15 volts DC to Cathode of CR14112
2. Monitor TP14707
3. Adjust R14710 for 31.468 Khz +/- 50Hz.

Video Deinterlacer Adjustments

Sync Amplitude Alignment

1. Turn set "ON" and allow to warm up for 1 minute before attempting adjustments
2. Set the Signal Generator to a monochrome test pattern.
3. Using an oscilloscope, measure the Sync pulse amplitude at the junction of C32226 and R32240
4. Adjust R32269 for a Sync pulse amplitude of 290mV measured from Sync tip to Back Porch.

Clamp Offset Adjustments

1. Set the Signal Generator to a monochrome test pattern.
2. Measure the signal at J32501 pin 10 and adjust R32259 for no pulse. Adjust for 0mV to +/-30mV with respect to the baseline signal
3. Measure the signal at J32501 pin 8 and adjust R32261 for no pulse. Adjust for 0mV to +/-30mV with respect to the baseline signal
4. Verify that the picture color temperature has minimal change as the color control is varied from minimum to maximum.

ALIGNMENT PROCEDURES

Color Temperature Alignment Patterns

Color temperature alignment for the CTC210 is similar to the MMC101 chassis. Some form of staircase pattern similar to Figures 1 below is required. Proper identification of the "0" (if available) and "7.5" or "setup" bars on screen and the waveform produced at the cathodes of the CRT will be needed. Consult the specification manual for the pattern generator used to confirm the location of these bars.

The oscilloscope waveform shows the relationship between the bars and the video signal at the cathodes of the CRT. This waveform is present on all three cathodes. With the oscilloscope adjusted to provide a full peak to peak readout of the waveform at the horizontal rate, the 7.5 IRE setup bar will be the critical area. Be certain this bar can be identified using the equipment available. If a 7.5 IRE bar is not available, 10 IRE may be used.

It should also be noted that bar patterns differ. Some vary from 10 to 100 IRE in various steps and in different directions, but most should have an identifiable 7.5 or 10 IRE bar.

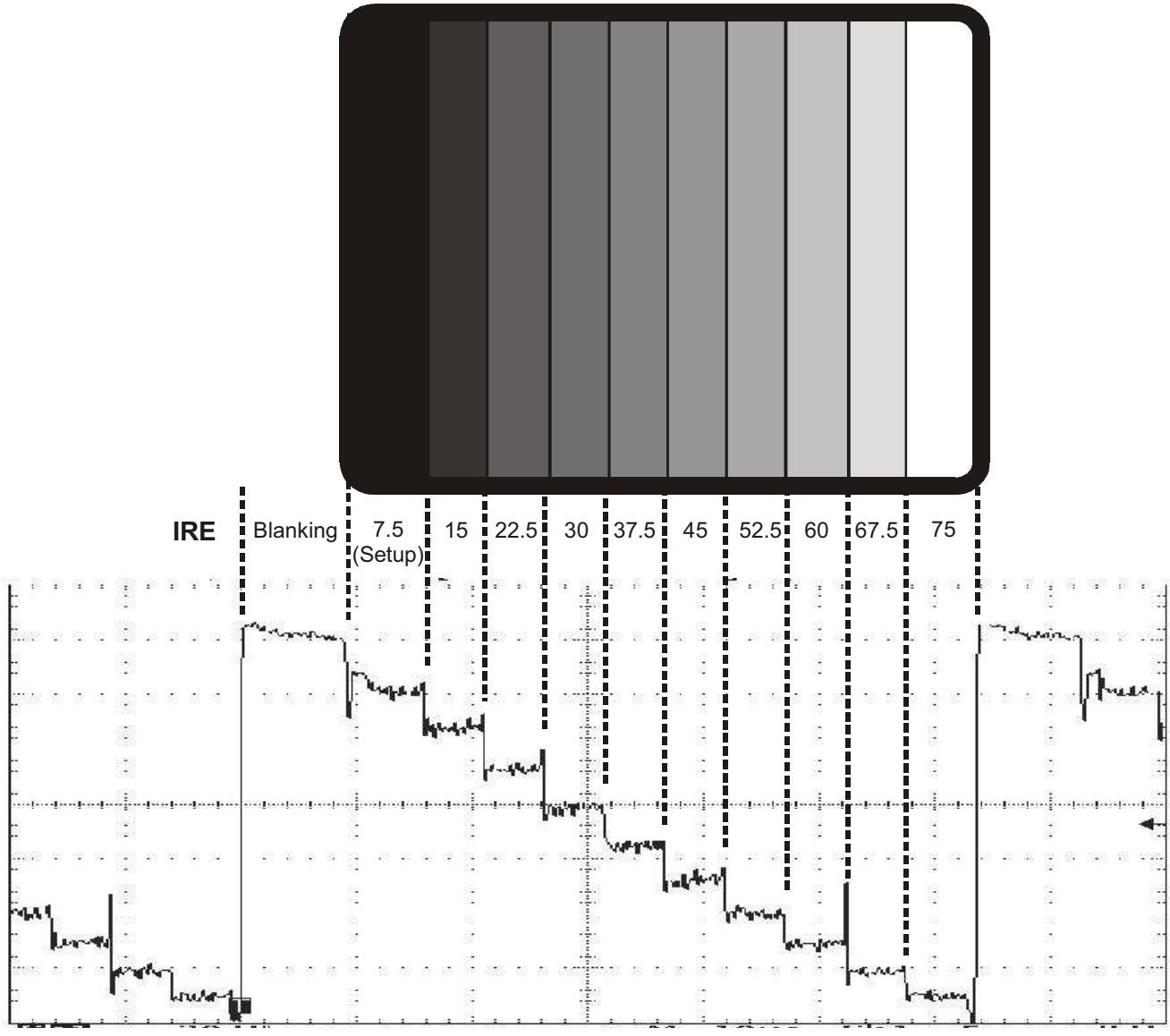


Figure 1

ALIGNMENT PROCEDURES

Screen and Color Temperature Setup

To Adjust the Screen Control:

NOTE: AKB will remain "OFF" for screen control adjustment. (Parameter = 27, Value =1)

1. Apply a vertical gray bar staircase pattern (at least 8 bars from "7.5" to "≥75" IRE similar to Figure 2 below) to the video input and adjust the set for operation from that input. Identify the "7.5" IRE bar location both on-screen and using an oscilloscope. The 7.5 IRE bar is "black" or "cutoff" and will be used for reference. On most patterns, the remainder of the bars will progressively become brighter.
2. Use the "Reset" function on the consumer picture quality controls to place black level, contrast, color, tint and sharpness to their nominal factory default settings. Use the "Picture Presets" to place the set in "Bright Lighting" mode.
3. Allow the instrument to warm up with the staircase pattern or active video on screen for at least 15 minutes. Make certain the staircase pattern is again on screen before proceeding.
4. Using an oscilloscope, monitor all three cathode voltages and identify the cathode whose “7.5” IRE pattern is the greatest.
5. Monitoring the cathode identified in step 4, slowly adjust the Screen Control until the 7.5 IRE bar is at 170V.
6. Do not change the Screen Control after this setup is complete. Any further adjustments will be done with the color temperature controls.

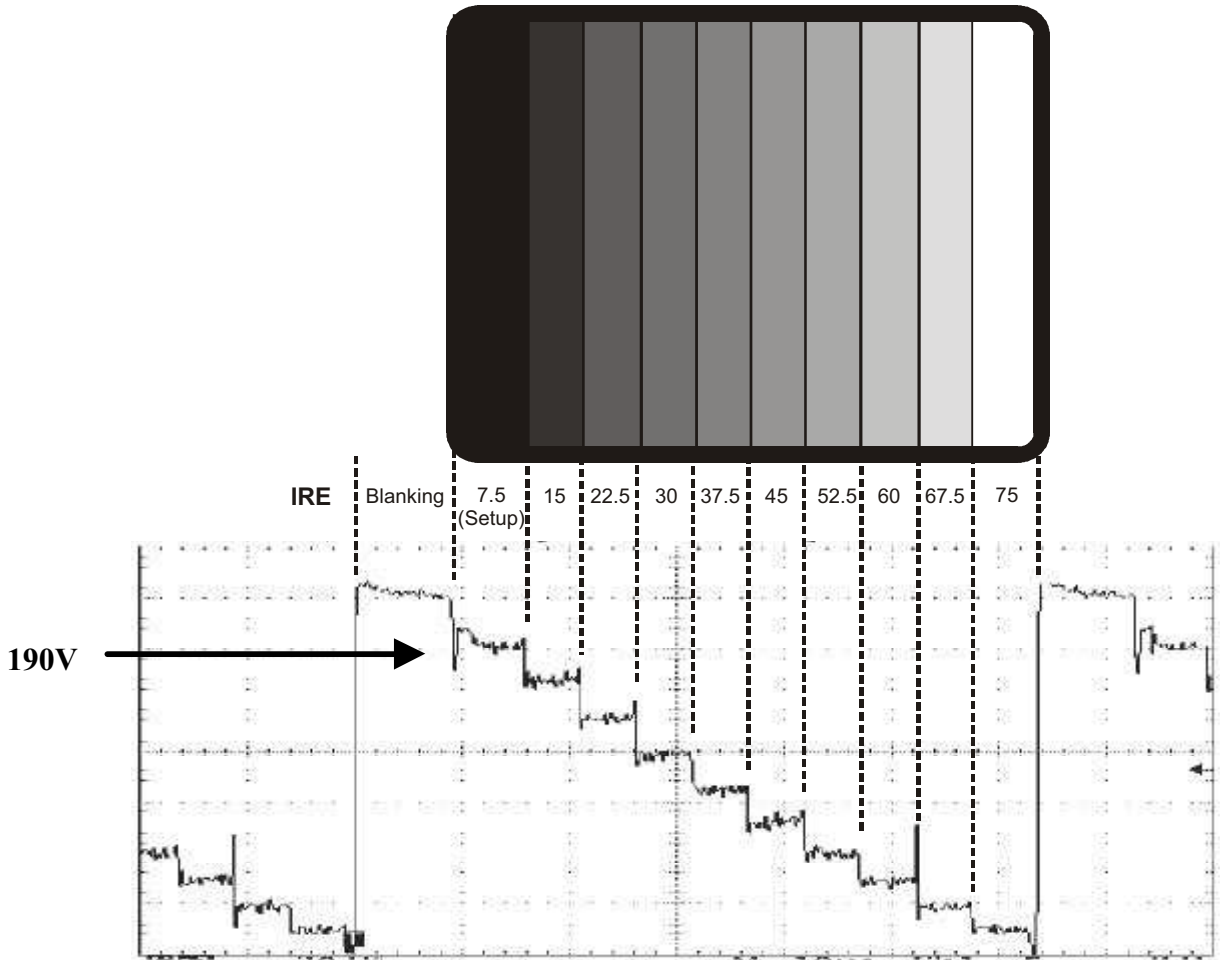


Figure 2

ALIGNMENT PROCEDURES

Color Temperature Background

The purpose of color temperature setup is to assure uniform gray level from black to the brightest scenes. If a uniform gray screen is displayed, no matter the brightness level, no tinting in either the red, green or blue direction should be apparent. This is known as "color tracking".

There are two user selectable color temperature settings, 6500K and 9300K. Each requires color temperature and light output alignment. The 6500K alignment should be performed first, followed by 9300K. YUV Cutoff or RGB Cutoff will be adjusted only during the 6500K setup. A single adjustment is good for both temperature settings.

If a CRT or video processor IC has been replaced, the technician should first perform screen control alignment. Then a critical evaluation of the color temperature setup of the CRT should be done. In most cases, *color temperature will be acceptable and not require alignment!*

Color Temperature Setup (YUV)

NOTE: Set Color temperature to "Warm**"**. You must use the "Y" input of the YPrPb (Component Video Input). Perform YUV Cutoff and 6500K setup first.

6500K setup

1. Apply a vertical gray bar staircase pattern (at least 8 bars from "7.5" to "≥75" IRE) to the Component Video Input (YPrPb) and adjust the set for operation from that input. Identify the 7.5 IRE bar location. It is the "black" or "cutoff" bar. For these adjustments, this bar and the next brighter bar will be used. On most patterns, the remainder of the bars will progressively become brighter. If a CRT or main EEPROM has been replaced, use Chipper Check or the front panel menu to set the Red, Green and Blue "Cutoff" values to midrange.
2. If all three colors (red, green and blue) appear too dim or too bright, adjust "R,G,B Cutoff" until any single color disappears from the black bar, but is still visible in the adjacent bar. Note that color.

   For instance, the black bar is plainly visible and close to gray. By decreasing the YUV Cutoff control all three colors will begin to dim. Blue may the first color to disappear from the black bar, leaving a red/green (yellow) tint to the black bar. YUV Cutoff adjustment should stop at this point.
3. Adjust the appropriate remaining red, green or blue "Cutoff (6500)" controls until any red, green or blue tint disappears from the black bar, *but is still visible in the adjacent bar*. When properly adjusted, the adjacent bar should be a very low level gray with no color tinting. Low level color temperature setup is now complete.
4. Now observe the brighter portions of the bars. Adjust the red or blue drive controls to remove any signs of red or blue tint in the higher brightness bars. Observe the bars for signs of CRT overdrive. Overall brightness may be adjusted using the "YUV Light Output-6500)" control. Some compromise may be required, but the higher IRE sections should be as free from color tinting as possible. Color temperature setup is now complete.

NOTE:

9300K Setup.

1. Apply a vertical gray bar staircase pattern (at least 8 bars from "7.5" to "≥75" IRE) to the video input and adjust the set for operation from that input. Identify the 7.5 IRE bar location. It is the "black" or "cutoff" bar. For these adjustments, this bar and the next brighter bar will be used. On most patterns, the remainder of the bars will progressively become brighter. If a CRT or main EEPROM has been replaced, use Chipper Check or the front panel menu to set the Red, Green and Blue "Cutoff" values to midrange.
2. Adjust the appropriate red, green or blue "Cutoff (9300)" controls until any red, green or blue tint disappears from the black bar, *but is still visible in the adjacent bar*. When properly adjusted, the adjacent bar should be a very low level gray with no color tinting. Low level color temperature setup is now complete.
3. Now observe the brighter portions of the bars. Adjust the red or blue drive controls to remove any signs of red or blue tint in the higher brightness bars. Observe the bars for signs of CRT overdrive. Overall brightness may be adjusted using the "YUV Light Output-9300" control. Some compromise may be required, but the higher IRE sections should be as free from color tinting as possible. Color temperature setup is now complete.

Overall Brightness Levels (Drive)

There is no control for the green drive (high brightness). Even though there is a front panel control to toggle the red drive to green, there is no EEPROM location to store the resulting adjustment. Any value for green would be stored to the red location.

If overall brightness is not adequate, increase it by using the YUV Light Output control. This control should not affect color temperature at this level, however large changes may disturb the low brightness level color temperature (cutoff). After high brightness alignment is complete always recheck low level brightness areas. If color temperature is not acceptable, begin color temperature alignment again. Generally, only small changes should be required at this time.

AKB Mode (Parameter 27)

A value of 00 turns AKB OFF. A Value of 01 turns AKB ON. This value should always be set to "00".

Comb D/A Level -Composite (Parameter 32)

1. Apply a 100 IRE (white) signal to the AUX 1 input.
2. Select AUX 1 for the main picture.
3. Connect a scope probe to the negative lead of C22323.
4. Adjust the Comb D/A value (Parameter 32) for 0.71 volts from black (blanking) to white.

Comb D/A Level –S Video (Parameter 36)

1. Apply a 100 IRE (white) signal to the AUX 1 input.
2. Select AUX 1 for the main picture.
3. Connect a scope probe to the negative lead of C22323.
4. Adjust the Comb D/A value (Parameter 36) for 0.71 volts from black (blanking) to white.

PIP Contrast -Composite (Parameter 33)

1. Apply a color bar signal to the AUX 1 input.
2. Select AUX 1 for the main picture.
3. Turn on PIP and select AUX 1 for the PIP picture.
4. Adjust PIP Contrast (Parameter 33) for equal contrast levels between the main picture and the PIP picture.

PIP Tint\Saturation -Composite (Parameters 34, 35)

1. Apply a color bar signal to the AUX 1 input.
2. Select AUX 1 for the main picture.
3. Turn on PIP and select AUX 1 for the PIP picture.
4. Set the PIP Saturation (Parameter 35) to midpoint, Value =63.
5. Adjust PIP Fine Tint (Parameter 34) for equal tint between the main picture and the PIP picture.
6. Adjust PIP Saturation (Parameter 35) for equal saturation between the main picture and the PIP picture (this may affect tint slightly).
6. Repeat steps 5 and 6 until both the tint and saturation level are the same for both pictures.

PIP Contrast – S Video (Parameter 37)

1. Apply a color bar signal to the AUX 1 input.
2. Select AUX 1 for the main picture.
3. Turn on PIP and select AUX 1 for the PIP picture.
4. Adjust PIP Contrast (Parameter 37) for equal contrast levels between the main picture and the PIP picture.

PIP Tint\Saturation - S Video (Parameters 38, 39)

1. Apply a color bar signal to the S Video input.
2. Select S Video for the main picture.
3. Turn on PIP and select S Video for the PIP picture.
4. Set the PIP Saturation (Parameter 39) to midpoint, Value =63.
5. Adjust PIP Fine Tint (Parameter 38)for equal tint between the main picture and the PIP picture.
6. Adjust PIP Saturation (Parameter 39) for equal saturation between the main picture and the PIP picture (this may affect tint slightly).
7. Repeat steps 5 and 6 until both the tint and saturation level are the same for both pictures.

Gemstar Adjustments (Parameters 42, 43, 44, 45, 46)

1. Adjust Gemstar Horizontal OSD Position (parameter 42) to center the Gemstar display horizontally on the screen.
2. Adjust Gemstar Vertical OSD Position (parameter 43) to center Gemstar display vertically on the screen.
3. Adjust Gemstar Horizontal PIP Position (parameter 44) to horizontally position the PIP picture in the Gemstar PIP window.
4. Adjust Gemstar Vertical PIP Position (parameter 45) to vertically position the PIP picture in the Gemstar PIP window.
5. Adjust Gemstar PIP Window Vertical Size (parameter 46) to change the size of the Gemstar PIP window.
6. Press Clear on the Remote to remove Gemstar window from the display.