ALIGNMENT PROCEDURES

Operating Conditions

Unless otherwise noted, the following conditions must be observed when aligning the ITC222 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 or Convergence 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)
- 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)

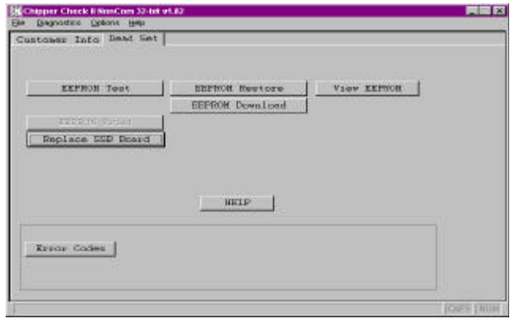
NOTE: For optimum performance it is critical that this instrument be properly aligned. For Auto Convergence to work correctly it is **HIGHLY RECOMMENDED** that the geometry alignments are first verified

Small Signal Board (SSB) Replacement

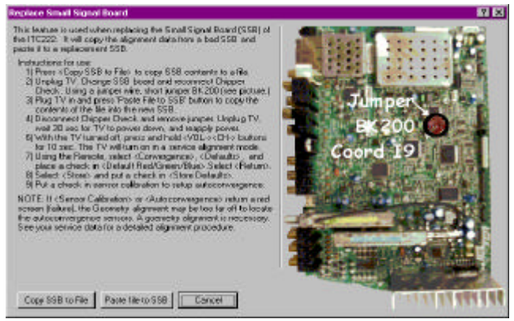
All alignment data is stored in EEPROMs located on the Small Signal Board (SSB). If the SSB needs to be replaced, it is **HIGHLY RECOMMENDED** the EEPROM data be downloaded by using Chipper Check. Once the SSB has been replaced, upload the alignment data back into the instrument. Then verify that the instrument is properly aligned.

1. Open Chipper Check. Select "**Dead Set" "ITC222"**. Follow the On Screen Instructions to establish a connection. Fill in the Customer Information on the **"Customer Info"** tab and change to the EEPROM tab.

   The following menu should appear.



2. Press the "Replace SSB Board" The following screen appears



3. Chose "Replace SSB Board Procedure". Follow the instructions on this screen to copy the alignment data from the defective SSB to the new SSB.

NOTE: It may be necessary to perform the geometry alignment to get the auto convergence to work correctly. Please refer to the section on Geometry Alignments

CRT Replacement (PTV Models)

If only 1 or 2 CRT's are replaced use a convergence pattern to align the new CRT. Align the new CRT to the pattern generated by the existing CRT by adjusting the Yoke and Centering Rings. Then run Auto Convergence. If all 3 CRT's are replaced, it will be necessary to first center the Green CRT using a pattern with a center dot. Then align Red and Blue following the Geometry Alignment procedures.

Service Mode

Most of the alignments for this chassis are software-driven. Those alignments must be accessed and modified through the front panel service mode.

ALIGNMENT PROCEDURES (Continued)

Entering the TV Service Mode Using the Front Panel Controls

1. **Press and release the POWER** button to turn the instrument off.
2. Wait 10 seconds before trying to enter the Field Service Mode.
3. Press and hold the **VOLUME DOWN** and **CHANNEL DOWN** buttons for at least 8 seconds.
4. The instrument will switch on and come up with the field service main menu on the screen. LED will illuminate before the picture comes up.

The instrument should display the following menu:

Main Menu

The **CH /** and **CH \/** buttons on the front panel are used to navigate up or down in the menu.

The **VOL +** and **VOL -** buttons on the FPA are used to select a menu item or decrease or increase a value in a selection list.

The remote control can also be used to navigate the field service mode.

NOTE: Before the Field Service Mode is exited, you must check **STORE** or all changes to alignments will be lost!

- **Clear button:** When this button is pressed the Field Service Mode disappears and the every-day TV functions are available.
- **Menu button:** To re-enter the Field Service Mode, make a **long press** on the Menu button. The service technician re-enters in the same menu point where he left the Field Service Mode.
- **Ù:** This button is used to navigate up in the menu.
- **Ú:** This button is used to navigate down in the menu.
- **<:** This button is used to select a menu item, to decrease a value or to select the previous value in a selection list.
- **>:** This button is used to select a menu item, to increase a value or to select the next value in a selection list.
- **OK:** This button is used to select or deselect a menu item.

Main Menu

Soft-Ver: Displays the current software version.

Runtime Counter: Displays the total runtime in hours and mintues.

DVD Soft-Ver: For DVD models only, displays the current software version.

Config: Displays the configuration code of the instrument. Each character represents a paraticular hardware feature or option.

Serial-No.: Displays the serial number of the instrument.

Common features found in the submenus

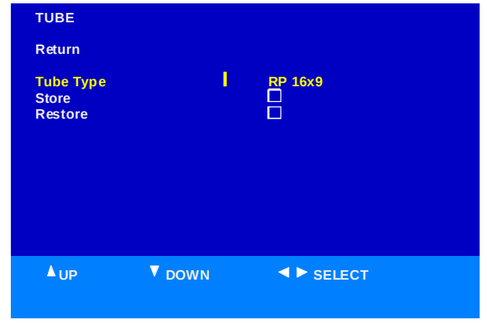
Return: The submenu is closed and the main Field Service Mode menu appears.
Defaults: The default values for the current menu are copied from ROM to RAM.

Note: If Default is checked a complete realignment of that particular menu is required.

Store: All current values from a menu group are stored into memory.
Restore: The last stored settings for the menu displayed are copied from NVM to RAM.

Tube Type Menu

1. Select the correct tube type from a pulled down list on the right hand side of the menu. (This will activate new tube type values along with default video and geometry parameters)
2. Check STORE to save new parameters in memory.



Tube Submenu

Chassis Setup

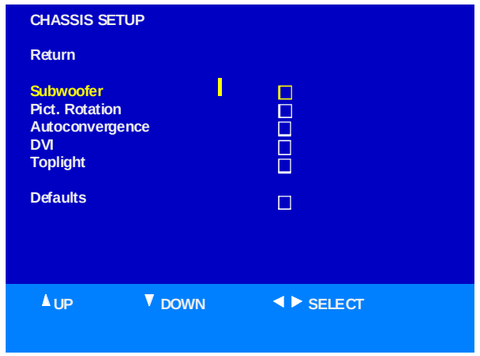
Subwoofer: Allows the instrument to be configured for a subwoofer

Pict. Rotation: Specifies whether the picture rotation option is available or not. (DV Models Only)

Autoconvergence: Specifies whether the autoconvergence option is available or not. (PTV Models Only)

DVI: Specifies whether the DVI option is available or not.

Toplight: Specifies whether the toplight option is available or not.



Chassis Setup Submenu

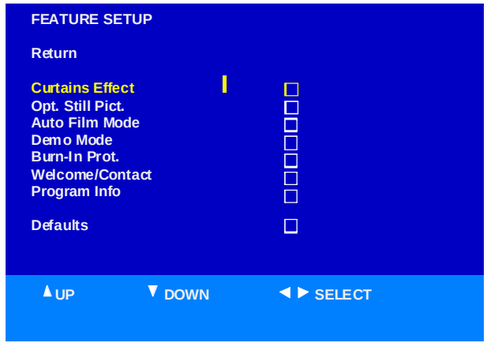
Feature Setup

Curtains Effect: Determines if the curtains feature is available to the user.

Opt. Still Pict. : Determines if the Optimised Still Picture feature is available to the user.

Auto Film Mode: Determines if the Automatic Film Mode Detection feature is available to the user.

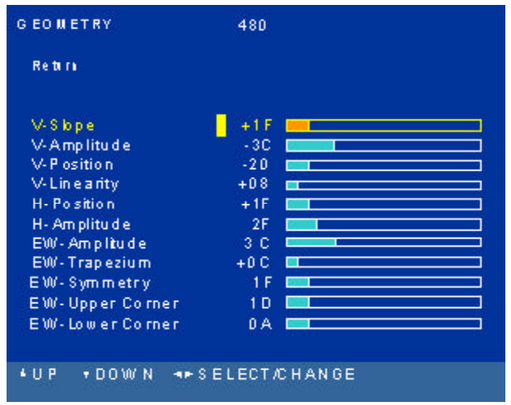
Burn-In Prot. : Determines if the Burn-In Protection feature is available to the user.



Feature Setup Submenu

Geometry Alignment

Entering the Geometry menu the display mode must be set to Standard Scanning Mode (480i/480p and 1080i). All 480i/480p alignments should be completed using the RF input. Use either component input or DVI-input for 1080i adjustments.



Geometry Submenu

Alignment Procedure (Direct View Models Only)

NOTE: Unless otherwise noted all Geometry adjustments must performed in both 480i/p and 1080i modes.

1. Place the instrument in the Field Service Mode.
2. Enter the Tube submenu. Verify the correct tube type is selected.
3. Enter the Geometry submenu.
4. Adjust H-Amplitude (Horizontal Amplitude) for slight underscan.
5. Enter the Video submenu. Selct the G2 alignment. Adjust the Screen control on the flyback until the just becomes visible.

Geometry Submenu

6. Adjust PL557 on the Dynamic Focus Board to center the raster between the tube border.
7. Realign G2 for 150V on the highest cathode.
8. Tune the instrument to receive a crosshatch pattern.
9. Return to the Geometry submenu.
10. Adjust V-Slope (Vertical Slope) until the middle line of the test pattern is just visible. (Not used in 1080i)
11. Using a Monoscope pattern, adjust V-Amplitude (Vertical Amplitude) until the first and last horizontal line of the test pattern is just hidden by the tube.

NOTE: Instruments with 16/9 CRT's must have this alignment performed with the format set to 16/9.

12. Adjust V-Position (Vertical Position) until the picture is centered vertically. It may be necessary to recheck the V-Amplitude (Step 11) adjustment.
13. Adjust V-Linearity (Vertical Linearity) for equal height of the squares in the crosshatch pattern.

NOTE: Instruments with 16/9 CRT's must have this alignment performed with the format set to 16/9.

14. Adjust H-Position (Horizontal Position) until the test pattern is horizontally centered.
15. Using a Monoscope pattern adjust H-Amplitude (Horizontal Amplitude) until the first and last horizontal line of the test pattern is just hidden by the tube. It may be necessary to recheck the H-Position (Step 14) adjustment.
16. Using a Crosshatch pattern adjust EW-Amplitude (East West Amplitude) until the vertical lines in the middle of the CRT are straight.
17. Adjust EW-Upper Corner (East West Corner) until the vertical lines are straight at the top of the screen.
18. Adjust EW-Lower Corner (East West Corner) until are straight at the bottom of the screen.
19. Adjust EW-Symmetry (East West Symmetry or H-Bow) until the left and right border of the screen are the same.

NOTE: It may be necessary to repeat Steps 14- 19 after this adjustment for optimum performance.

20. Adjust H-Parallel (Horizontal Parallelogram) the offset between the top and bottom of the picture.
21. Adjust EW-Trapezium (East West Trapezium) for best compromise between Left and right vertical lines.
22. Adjust Breathing (EHT Compensation) until horizontal amplitude will change with different beam current at the same ratio as vertical amplitude.
23. H-Max and H-M set the range limitations of the H-Amplitude adjustment. This adjustment should only be used in cases where CRT is replaced and it does not appear in the CRT list. To access this adjustment, the Development Support must be checked in the Miscellanous Setup menu.
24. To check the box to set the shutdown threshold for the XRP circuitry, hold down the "OK" button for approxomately 5 seconds. During this automatic process the screen will blank, then reappear once it is finished.
25. Before exiting the Geometry menu, check Store to save changes to memory.
26. After the Geometry Alignments, check the Earth-Field Compensation (EFC) adjustment (DV Models Only). Enter the Advanced Picture Setting Menu. Using a crosshatch pattern, adjust the EFC for minimum picture rotation at the top and bottom.

Alignment Procedure (Projection Models Only)

NOTE: Unless otherwise noted all Geometry adjustments must performed in both 480i/p and 1080i modes.

1. Place the instrument in the Field Service Mode.

NOTE: It is recommended the Geometry alignments be performed using the Green CRT only.

2. Enter the Tube submenu. Verify the correct tube type is selected.
3. Tune the instrument to receive a crosshatch pattern.
4. Return to the Geometry submenu.
5. Adjust V-Slope (Vertical Slope) until the middle line of the test pattern is just visible. (Not used in 1080i)
6. Exit the Geometry submenu and turn the instrument OFF. Disconnect the Convergence Yoke connectors BW001 and BW002 (Located in lower right corner of the Convergence Amplifier PCB). Turn the instrument ON and tune to receive a center line pattern. Adjust horizontal and vertical center lines according to the chart below with the static convergence magnets. When completed turn the instrument OFF and reconnect the convergence yoke connectors.

Screen Size	Red Center Line Set Left of Center	Blue Center Line Set Right of Center
40"	2.4 cm (0.94 in)	2.4 cm (0.94 in)
52"	3.1 cm (1.22 in)	3.1 cm (1.22 in)
56"	3.3 cm (1.29 in)	3.3 cm (1.29 in)
61"	3.5 cm (1.37 in)	3.5 cm (1.37 in)

7. Place in the Field Service Mode. Enter the Geometry submenu. Using a Monoscope pattern, adjust V-Amplitude (Vertical Amplitude) until the first and last horizontal line of the test pattern is just hidden by the tube.
8. Adjust V-Position (Vertical Position) until the picture is centered vertically.
9. Adjust V-Linearity (Vertical Linearity) for equal height of the squares in the crosshatch pattern.
10. Adjust H-Position (Horizontal Position) until the test pattern is horizontally centered.
11. Using a Monoscope pattern adjust H-Amplitude (Horizontal Amplitude) until the first and last horizontal line of the test pattern is just hidden by the tube.
12. Using a Crosshatch pattern adjust EW-Amplitude (East West Amplitude) until the vertical lines in the middle of the CRT are straight.
13. Adjust EW-Trapezium (East West Trapezium) for best compromise between Left and right vertical lines.
14. Adjust EW-Symmetry (East West Symmetry or H-Bow) until the left and right border of the screen are the same.

NOTE: It may be necessary to repeat Steps 10- 14 after this adjustment for optimum performance.

15. Adjust Breathing (EHT Compensation) until horizontal amplitude will change with different beam current at the same ratio as vertical amplitude.
16. H-Max and H-M set the range limitations of the H-Amplitude adjustment. This adjustment should only be used in cases where CRT is replaced and it does not appear in the CRT list. To access this adjustment, the Development Support must be checked in the Miscellanous Setup menu.
17. Check the box to set the shutdown threshold for the XRP circuitry by holding down the “OK” button for 5 sec. During this automatic process the screen will blank, then reappear once it is finished.
18. Before exiting the Geometry menu, check Store to save changes to memory.

Yoke Centering Ring Adjustment

If Chipper Check is not available it is possible to replace a single CRT and realign geometry by using the centering rings on the CRT.

Using the convergence pattern available when in service menu the pattern from the replacement CRT may be adjusted to align with either of the two remaining CRT's using the centering rings shown in Figure 1.

First make certain the replacement CRT and yoke are assembled and placed back in the mounting as close as possible to the original CRT and yoke. At this point having the convergence pattern on screen will assist in the mechanical mounting.

Using the centering rings and observing the convergence pattern, rotate and move the pattern until the replacement color overlays as close as possible to the two colors not replaced. Moving the ring tabs together around the neck of the CRT draws the raster in small circles. Spreading the tabs apart moves the raster in more linear angles. The closer the tabs are together, the less affect on the CRT beam they have.

When the raster is as close as possible fix the magnets with paint or nail polish to prevent further movement.

After fixing the magnets, if gross geometry errors are apparent, geometry alignment is indicated. If the raster is close, use the "Auto-convergence" feature provided in the consumer menu to re-align convergence. This should correct most minor geometry problems. Follow auto-convergence with the consumer red and blue centering adjustments, then evaluate the raster again.

In most cases convergence will now be acceptable. If only slight convergence errors are noted the technician should enter the manual digital convergence menu and begin "touch-up" of the screen.

If gross geometry errors are still apparent re-evaluate whether the errors are noticable on the replacement CRT or whether they are global, affecting all three CRT's. If the errors affect all three CRT's a full geometry alignment is indicated. If the errors only affect one CRT, particulary the replacement, return to the mechanical placement and centering ring adjustments and begin those procedures again.

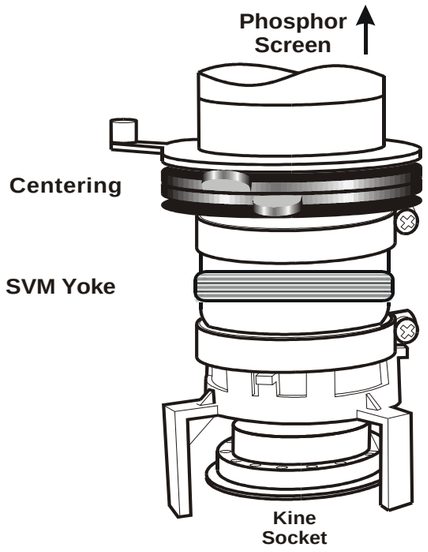


Figure 1 - Centering Rings

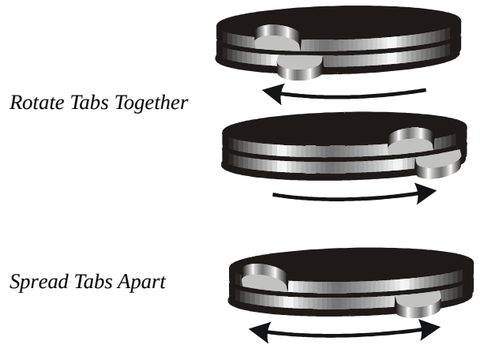


Figure 2 - Centering Ring Tab Movement

Focus Adjustments

Before attempting the Focus Adjustments, allow the instrument to warm up for a minimum of 15 minutes.

Dynamic Focus CRT (DV Models Only)

1. Tune the instrument to receive a crosshatch pattern.
2. Turn the F1 (Static) control on the focus block fully clockwise
3. Adjust the F1 control while observing the vertical lines along the left side of the screen for best possible focus.
4. Turn the F2 (Dynamic) control on the focus block fully clockwise.
5. Adjust the F2 control while observing the horzontal lines. Adjust for best possible focus.
6. Repeat step 3 and 5 for best possible overall focus.

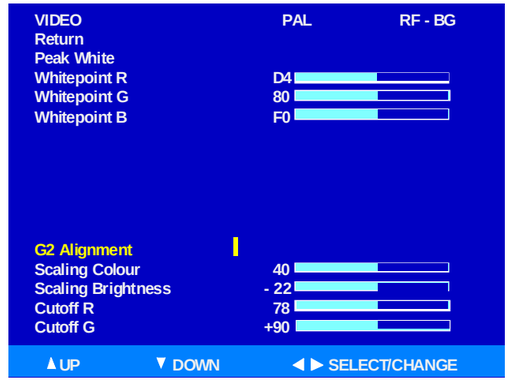
Single Focus CRT (DV Models Only)

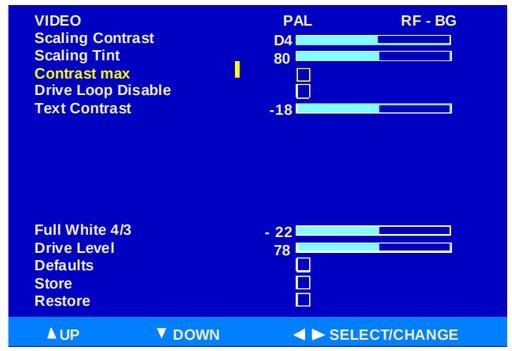
1. Tune the instrument to receive a crosshatch pattern.
2. Turn PL501 (Located on the Dynamic Focus PCB) to the full counter clockwise position.
3. Adjust F2 on the focus block for best possible focus of the horizontal lines.
4. Adjust PL501 for best possible focus of the vertical lines.
5. Repeat steps 3 and 4 for best possible overall focus.

Focus Adjustment (PTV Models)

1. Tune instrument to receive a crosshatch pattern.
2. Preset Contrast to maximun.
3. Adjust each CRT separately. Cover the two CRT’s not being adjusted and adjust for best overall focus.
5. Adjust the Green Electrical Focus control, located behind the speaker grill for best overall focus.
6. Repeat procedure for the Red and Blue CRT’s.

Video Alignments



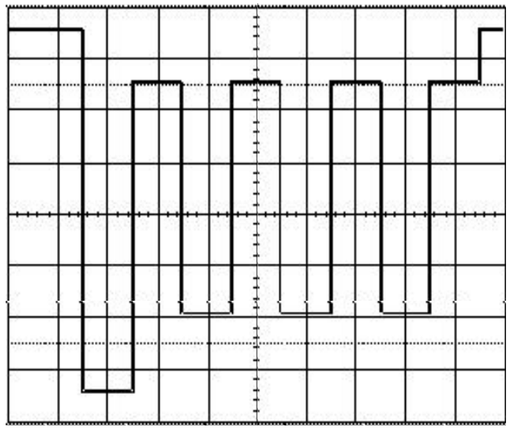


Video Alignment Submenu

Before attempting the Video Alignments, allow the instrument to warm up for a minimum of 15 minutes.

1. Tune the instrument to receive a crosshatch pattern.
5. Place the instrument in the Field Service Mode.
6. Enter the Video submenu.
7. Select G2 adjustment.
8. Adjust Screen control until retrace lines become visible, then adjust to make retrace lines invisible.
9. Press any key to exit the G2 alignment mode.
10. Select a pluge test pattern. Pattern should have a 0% background with a -2% and +2% bar.
11. Adjust Scaling Black Level to make the -2% bar invisible, keeping the +2% bar visible.

12. Select a 75% color bar test pattern.
13. Connect a scope to the Blue Cathode of the CRT board.
14. Adjust the Scaling Color to the levels shown



Note: This alignment must be performed in each of the following modes, Tuner, Comp 1H, Comp 2H, DVI and AUX_RGB (if DVD option is installed).

16. The Drive Level Alignment is preset according to the CRT type selected and does not need to be adjusted.
17. Before exiting the Video Alignment Submenu, check Store to save all alignments.

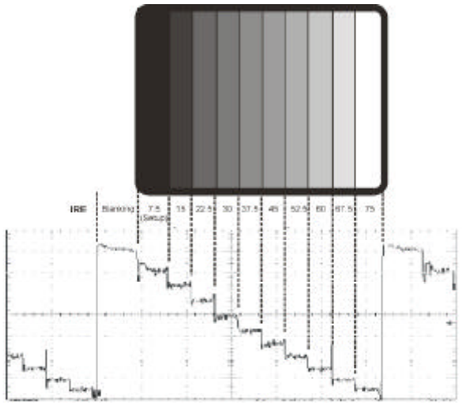
Color Temperature (Overview)

Color Temperature for the ITC222 is similar to past chassis. Some form of staircase pattern similar to the figure below is required. Proper identification of the "0" (if available) and "7.5" or "setup" bars on screen and the waveform produced on the cathodes of the CRT will be needed. Consult the specifications 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 the critical area. Be certain this bar can be identi fied using the equipment available. If a 7.5 IRE bar is not available, 10 IRE may be used.

It should 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 to 10 IRE bar.



The purpose of the 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 red, green or blue direction should be apparent. This is known as "color tracking". Once the proper color temperature is set, AKB will maintain the cutoff of the CRT to assure proper low light performance.

Black Cutoff R/G, Whitepoint R/G/B Setup (Recommended Method)

1. Apply a gray test pattern giving a 12 IRE flat window. Connect Colorimeter near the center of the screen.
2. Adjust Black Offset R and Black Offset G to obtain the following color coordinates.

	Direct View	Projection TV
X	0.282	0.283
Y	0.298	0.296

3. Apply a gray test pattern giving a 50 IRE flat window.
4. Adjust Whitepoint R, G, and B for the following color coordinates.

	Direct View	Projection TV
X	0.282	0.278
Y	0.298	0.291

Note: This alignment must be done in the following modes, RF (NTSC), Comp 1H, Comp 2H, DVI and AUX_RGB (If unit has DVD option installed).

Black Cutoff R/G, Whitepoint R/G/B Setup (Alternative Method)

1. Apply a vertical gray bar staircase pattern (at least 8 bars from "7.5" to "≥75" IRE). Identify the 7.5 IRE bar location. It is the "black" or "cutoff" bar.

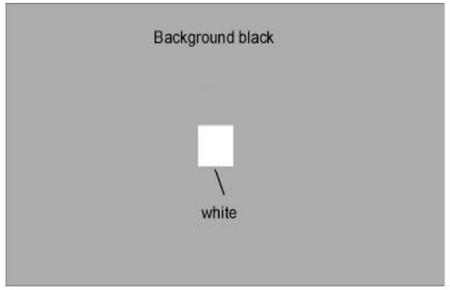
For these adjustments this bar and the next brighter bar will be used. On most patterns the remainder of the bars will progressively become brighter.

2. Adjust Black Cutoff R or Black Cutoff G until any tinting disappears from the black bar. When properly adjusted the adjacent bar should be a very low level gray with no color tinting.
3. Now observe the brighter portions of the bars. Adjust Whitpoint R, G, or B to remove any signs of tint in the higher brightness bars. Observe the bars for signs of CRT overdrive. Some compromise may be required, but the higher IRE bars should be as free from color tinting as possible.

Note: There are separate color temperature alignments for RF (NTSC), Comp 1H, Comp 2H, DVI and AUX_RGB (If unit has DVD option installed).

Peak White Alignment

1. Apply a white centered pattern of 100 IRE 2% of the picture surface on a dark background.
2. Adjust for peak white at center of the screen.
3. Check Scaling Black Level, Whitepoint, Black Offset and Peak White adjustments. It may be necessary to adjust these alignments several times for optimum performance.



Note: This alignment must be done in the following modes, RF (NTSC), Comp 1H, Comp 2H, DVI and AUX_RGB (If unit has DVD option installed).

Full White 3/4 Alignment

1. Insert a full white pattern of 100 IRE through RF. (Instrument will automatically set to ¾ mode).
2. Adjust for full white across the screen.

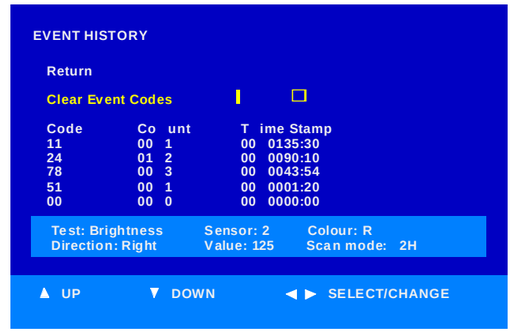
Text Contrast, Contrast Max, Scaling Contrast Alignments

1. Insert a white centered pattern of 100 IRE, 2% of the picture surface with a black background.
2. Adjust for peak white.
3. Contrast Max and Scaling Contrast are preset according to the CRT type selected and do not need to be adjusted.

Event

If a run-time event occurs, its error code will be stored in the NVM. The stored event codes can be read in one of two methods. The first is with the event menu. The last five event codes will be displayed, along with a time stamp from the run time counter. The time stamp will display the last occurrence of a particular event. The time stamp is displayed as "Run Hours". An event counter counts how many times that event has occurred. The counter will not count beyond 255. The most recent event code is displayed on top. To clear the event codes from memory, select the Clear Event Codes box. A long press will clear all stored codes.

Only the last error code stored in the NVM can be read with this method. The LED will blink two separate digits. Example, if the error code of 23 is the last error code stored



Event Submenu

in the NVM, the LED will have 2 short flashes, followed by a short pause. Then will flash 3 times, followed by a long pause. This will be repeated 4 times.

First allow the instrument to sit unplugged for 60 seconds. At plug in the LED will first blink twice to indicate microprocessor has reset. When an attempt is made to power up, the instrument will attempt 3 times to start. The LED will display a series of flashes followed by the error codes. The LED will flash the error code 4 times.

Sound Setup

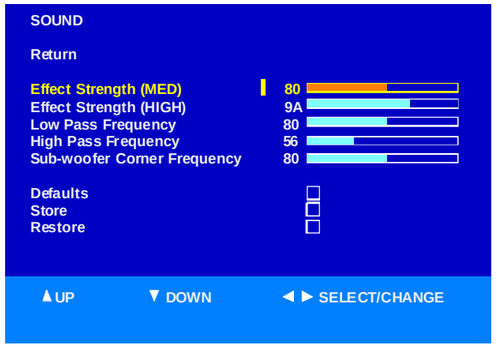
Effect Strength (MED): Modifies the bass effect strength for the user setting MEDIUM.

Effect Stength (HIGH) : Modifies the bass effect strength for the user setting HIGH.

Low Pass Frequency: Modifies the low pass cut-off frequency.

High Pass Frequency : Modifies the high pass cut-off frequency.

Sub-woofer Corner Frequency : Modifies the sub-woofer corner cut-off frequency.



Sound Setup Submenu

Miscellaneous

Clear Programs: Select with a 2 second press to clear all programs stored in memory and set Picture Preference, User Picture and Audio settings to factory values. Returns the instrument to "Out of Factory Mode".

Default Presets : Sets the default value for all factory sound and picture presets.

Bus Quiet: In this mode the NVM can be read, modified or reprogrammed. Enter this function with with a 2 second press. This mode is cancelled with a press of Clear, Left, Right, Up, Down or On-Off keys.

Development Support : Enables or Disables access to development support functions in the field service menus.

Restore Factory Settings : Restores the correct "Out of Box" condition.

Switch 2nd Tuner to Main : Causes the current signal on the 2nd tuenr to be switched to the main screen and the monitor output jacks. Any channel change will override this feature and return tuning to normal.

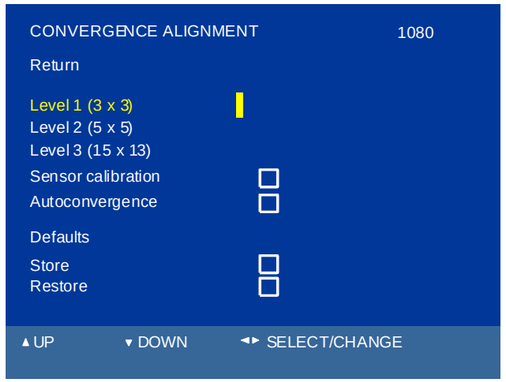
Miscellaneous Setup Menu

Convergence (PTV Models Only)

Overview

The ITC222 employs a ditigal convergence circuit that makes it possible to electronically align up to 208 separate points on the screen. 3 levels of convergence adjustment is provided.

Level 1: Provides 9 adjustment points
Level 2: Provides 25 adjustment points
Level 3: Provides 195 adjustment points



Convergence Submenu

It is recommended to adjust Levels 1 and 2 only if repairs have been made to the Convergence Signal circuitry or after CRT replacement. Before performing the Convergence Alignment procedure it is **HIGHLY RECOMMENDED** the Geometry Alignment of the instrument is checked.

Note: Alignments must be performed in order. If Level 3 is adjusted, prior to Levels 1 or 2, all Level 3 alignments will be lost.

In Level 1 and 2, Press OK to select the color to be aligned. The position of the adjustment point can adjusted using the navigation keys (up, down, left and right) on the remote. Press the 2 key of the remote to move to the next adjustment point. Press the EXIT/CLEAR key to exit when completed.

Level 3 alignment works simular to Levels 1 and 2. The only difference, to move to the next adjustment point press 2 (up), 8 (down), 6 (right) and 4 (left) on the remote unit. when completed with convergence, press STORE to save all changes.

Sensor Calibration is used to calculate a reference border for the autoconvergence photo sensors. Check the box to begin the process. Autoconvergence starts the autoconvergence process.

Defaults enters a default submenu. Checking the box loads a set of default values from the convergence backup NVM to the Convergence IC RAM. The box will remain checked until the value is changed or store or restore is pressed in the convergence submenu.

Note: Before the Convergence Alignement menu is exited, you must check Store or all settings will be lost.

Manual Convergence Procedure

1. Turn instrument **"On".** Allow to warm up for 20 munitues. Turn instrument **"Off".** Enter the Service Menu holding the **"Channel Down"** and **"Volume Down"** on the FPA for 8 seconds. Enter the **"Convergence Menu".**
2. Perform **"Level 3"** (and/or Level 1, Level 2) manual convergence as describe above. When completed, press **"Clear"**, then select **"Return"** to go back to the main Convergence Alignment Menu.
3. Check **"Store"** in the main Convergence Menu. A check mark will appear in the box.
4. Select **"Defaults"** to enter the Default Menu.
5. Select **"Store Defaults".** Press and hold **OK** on the Remote for 2.5 seconds. Then select **"Return"** to go back to the main Convergence Alignment Menu.
6. Perform **"Sensor Calibration".** Select it and press **"OK".**

Note: If the **Sensor Calibration** is successful, the software will answer by flashing a **GREEN SCREEN**. If the **GREEN SCREEN** does not appear, turn the instrument off and begain the convergence procedure again.

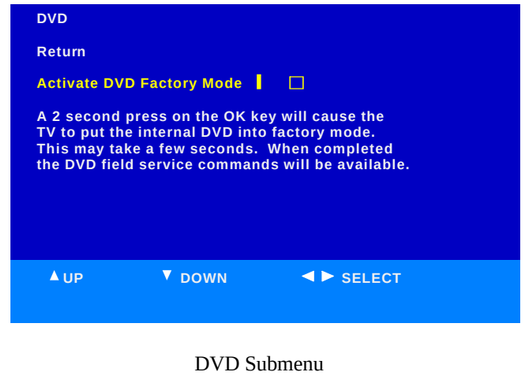
7. Select **"Return"** to exit the Convergence Alignment Menu.

Note: This procedure must be performed in both the 480P and 540P (1080I) modes. The initial service menu screen will indicate which mode the instrument is in.

DVD (DVD Models Only)

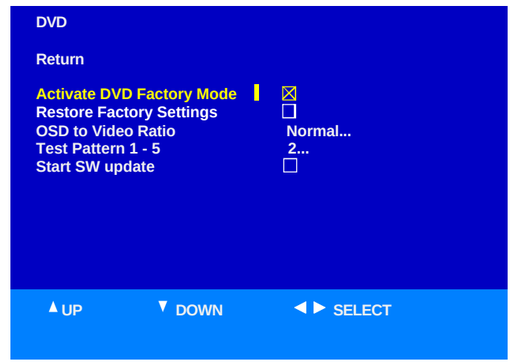
1. Place the instrument in the Field Service Mode.
2. Enter the DVD submenu.
3. Activate DVD Factory Mode by selecting the box. Press and hold the OK button for at least 2 seconds. The screen will then show the menu shown below. This process may take several seconds.

1. Place the instrument in the Field Service Mode.
2. Enter the DVD submenu.



DVD Submenu

3. Activate DVD Factory Mode by selecting the box. Press and hold the OK button on the remote for at least 2 seconds. The menu will then change to the menu shown below. This process may take several seconds.



DVD Submenu (with Factory Mode Activated)

Restore Factory Settings: This will re-initialise the DVD's NVM content using the system NVM.

OSD to Video Ratio: Aligns the ratio between the

DVD Video Signal and the DVD OSD Video Signal. This is internally adjusted by the DVD and cannot be modified.

Test Pattern 1 - 5: Provides 5 test patterns for alignment.

1. Scaling Color 75/White, 75% Color Bars
2. Cutoff Alignment, 140mVp/p
3. Drive Alignment, 455mVp/p
4. Peak White Alignment, 700mVp/p
5. Color Temperature and Peak White

   140/170/700/359/455mVp/p

Start Software Update: Allows the DVD software to be update. The update is sent as a CDROM

1. Selecting this function will automantically open the DVD and switch the instrument to the DVD mode.
2. Place the CDROM in the instrument. Follow the instructions provided on the screen. Durning the update process the display will read **"Updating DVD Soft ware".**
3. After the software update is complete, the DVD player will reboot. This may take several seconds to complete. Once it is complete, the instrument will exit the DVD Factory Mode. The display will return to the DVD submenu.

Event Code	Event	Circuit	Condition
11	I2C_1 Low SDA Line		Data Line of I2C Bus_1 Held Low
12	I2C_1 Low SCL Line		Clock Line of I2C Bus_1 Held Low
13/95	I2C_2 Low SDA Line		Data Line of I2C Bus_2 Held Low
14/95	I2C_2 Low SCL Line		Clock Line of I2C Bus_2 Held Low
15	I2C_3 Low SDA Line		Data Line of I2C Bus_3 Held Low
16	I2C_3 Low SCL Line		Clock Line of I2C Bus_4 Held Low
17	I2C_4 Low SDA Line		Data Line of I2C Bus_4 Held Low
18	I2C_4 Low SCL Line		Clock Line of I2C Bus_4 Held Low
19	Chassis Detection	HW	No Valid Chassis Detected
21/22/23/24			Free Event Code
25	No ACKN Main Tuner	Tuner	Main Tuner Does Not Answer
26	No ACKN PIP Tuner	Tuner	PIP Tuner Does Not Answer
27	No ACKN IX300	Video	Video Switch Does Not Answer
28	No ACKN IV300	PSI	PSI IC Does Not Answer
29	PDD Bit Is Set	PSI	IV300 Power Down Detection
31	No ACKN IV400	Deflection	IC Does Not Answer
32	POR Bit Is Set	Deflection	IV400 Power Down Detection
33	Safety_INT Is Active	Deflection	Safety Circuit Is Active
34	NHF Bit Is Set	Deflection	Horizontal Flyback Problem
35	NRF Bit Is Set	Deflection	Oscillator Is Not Locked
36	BCF Bit Is Set	Deflection	Tube Is Still Not Warm After Warmup Time
37	NDF Bit Is Set	Deflection	Vertical Problem
38	XRP Bit Is Set Durning Normal Operation	Deflection	X-Ray Protection
39	SL Bit Is Set	Deflection	Phase 1 Not Locked
41	No ACKN IA001	Audio	IA001 Does Not Answer
42	RESET Bit is Set	Audio	The RESET Bit of IA001 Is Active
43			Not Used
44	No ACKN IA900	Audio	IC Does Not Answer
45	Wrong MSP	Audio	Wrong MSP Is Fitted
46/47			Reserved/Not Used
48	No ACKN Main IF	IF	IF IC (Main Tuner) Does Not Answer
49	No ACKN PIP IF	IF	IF IC (PIP Tuner) Does Not Answer

Event Code	Event	Circuit	Condition
51	No ACKN IV100	Upconverter	IC Does Not Answer
52	POR Bit Is Set	Upconverter	Power Down Detection (IV100)
53			Not Used
54	No ACKN IR005		NVM IC Does Not Answer
55	No ACKN IR006		Port Expander IC Does Not Answer
56	FLS Bit Is Set		Flash Info Of The HOP Occurred
57	TECI Message Failed		Software Can Not Perform A System Command
58	Event Code Validation		Code Validation Failed
59	Wrong GenCAM Version Used		GenCAM cut 2.1 Must Be Used
61	5V Good	HW	Switched 5V Not Available
62	5V and 8V Good	HW	Switched 5V & 8V Not Available
63	Power_Fail	HW	Unexpected Level On Power_Fail Line Found (Mains To Low)
64	XRP Alignment	HW	XRP Adjustment Detected Overvoltage
65	XRP NVM Verify	HW	Write To XRP NVM Area Failed
66	XRP NVM Not Recoverable	HW	XRP NVM Contents Are Corrutped And Can Not Be Recovered
67			Reserved
68	5V Failed During Operation	HW	Switched 5V Not Available During Operation
69	H & V Sync Not Valid	HW	H & V Sync (For OSD) Not Present
71	No ACKN IC040	Video	Frame Comb Filter IC Does Not acknowledge
72	No ACKN IX400	Video	2H Video Switch Does Not Acknowledge
73/74/75/76/77			Reserved
78	No ACKN DVD Unit	DVD	DVD Does Not Answer
79	DVD Ready Bit	DVD	DVD Ready Bit Is Set
81	No ACKN Convergence IC IK201	PTV Models	Convergence IC Does Not Answer
82	No ACKN M24C32 (RP-NVM)	PTV Models	NVM IC Does Not Answer
83	Wrong Convergence Test Pattern	PTV Models	Convergence Test Pattern Is Wrong
84	Before Is Was An RP	PTV Models	Tube Type Is RP, But Convergence Was Not Detected
85	Convergence NVM 1 Problem	PTV Models	Convergence 1 NVM Data Is Wrong
86	Convergence NVM 2 Problem	PTV Models	Convergence 2 NVM Data Is Wrong
87	IK201 Loop Blocked	PTV Models	IK201 Electrical Loop Blocked
88	POR Bit Is Set	PTV Models	The POR Set Of IK201 Is Set
89	Convergence Power Supply Off	PTV Models	Convergence Power Suopply Is Not Valid
91	Watchdog Disabled	SW	Watchdog Function Is Disabled

Event Code	Event	Circuit	Condition
92	General I2C Problem	SW	General Problem Of One Of The I2C Cells
93	Install Problem Of I2C Bus 1 & 2	SW	Problem To Install I2C Bus Driver
94	Install Problem Of I2C Bus 3 & 4	SW	Problem To Install I2C Bus Driver
95	Install Problem Of Port Driver Or Bus Driver	SW	Problem To Install The Port Driver Or I2C Bus Driver
96	Install Problem Of ADC Driver	SW	Problem To Install ADC Driver
97	Install Problem Of AV-Link Driver	SW	Problem To Install AV-Link Driver
98	Install Problem Of SDRAM Timing	SW	Problem To Install The SDRAM Timing
99	Watchdog	SW	Watchdog Was Active