Operating Conditions

Unless otherwise noted, the following conditions must be observed when aligning the TV/VCR COMBO:

1. Chassis must be operated from a 110VAC isolation transformer, with line voltage set to 110VAC.
2. All voltages and waveforms referenced are with respect to Ground
3. Picture controls (brightness, contrast, etc.) must be set to factory presets via the "Reset" button on the remote transmitter. After pressing the Reset button the set will display "All picture controls have been reset to factory defaults".
4. Procedures must be performed in the sequence given.
5. A 10X probe must be used for oscilloscope and frequency measurements.
6. Minimum warm-up time is 10 minutes.

Required Test Equipment

Isolation Transformer:

Digital Voltmeter: Range .1V DC to 1000V DC, Accuracy: ± .5%/

DC Voltage Supply: Range: 0 to 50V, 2A---Well Filtered

Temperature Controlled Soldering Station: Grounded Tip Type—Tip Temperature 500F to 800F Adjustable

NTSC Video Signal Generator: Must provide 1V-P-P Negative Sync, Video into 75-OHM input. Produce, standard NTSC 75% Saturated Color Bars with 100% White Window. (B&K 1249, or equivalent)

RF Signal Generator: 100 kHz to 150 MHz .1V RMS, Int. Mod. 1KHz 30%

Cross Hatch Generator: Must have RF output.

Dual Trace, Delayed Sweep Oscilloscope: 25 MHz with Channel invert capability. Sensitivity' 5m/V/cm Maximum Sweep Rate: .1us/cm.

POWER SUPPLY ALIGNMENT

1. Insure that input voltage is at 110Vac, 60Hz.
2. Connect a voltmeter to supply "UB" (JP17) and turn on the set. "UB" should be less than 125V. If the voltage at "UB" exceeds 125V, turn off the set immediately and check components of the power supply circuit. Check that the values RP554, RP556, RP558 and RP559 in the feedback loop are the correct values. With "UB" less than 125V proceed to the next step.
3. Tune the set to a channel with a good picture.
4. Press "Menu" on the remote control and select→Screen→Picture Quality and set the brightness and contrast to nominal (half scale) and volume to minimum.
5. Using VG2 and Focus (LL05), adjust the controls for a normal picture.

6. Allow the set to warm up for at least 3 minutes.
7. Set brightness, contrast and volume to minimum.
8. Adjust PP01 so that the voltage at "UB" is equal to
   105.5Vdc +/- 0.5V for 13"
   115.5Vdc +/- 0.5V for 19"

TV SERVICE MODE

1. Turn on the combo and select the channel that will be used for the alignment procedure. *Note: The Service Mode will not come up if there is a tape cassette in the VCR carriage.*
2. Unplug the set from the isolation transformer.
3. Simultaneously **Press** and **Hold** the "Ch+" & "Ch-" buttons on the keyboard.
4. While still pressing the "Ch+" & "Ch-" buttons, plug the set into the isolation transformer and wait until the following screen is displayed then release the "Ch+" & "Ch-"buttons.
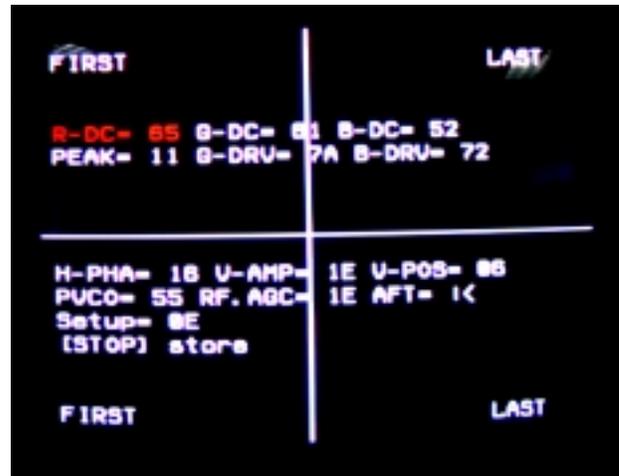
TV Service Mode Screen

5. The item that can be modified is highlighted in red. To select an item use the "Vol+" & "Vol-" keys on the keyboard or remote control. This causes the highlight to move from item to item. To adjust the value of the selected item use the "Ch+" & "Ch-" keys. **Note:** *Channel Change is possible using the number keys on the remote control. There is no channel number display on the screen when in the setup mode*.
6. To save the settings after completing the alignment procedures, press the "Stop" key on the keyboard or remote control. This stores the item values and turns the set off. ***To exit without saving the item values press the "OFF" or "POWER" key on the keyboard or remote control.***

7. The following table list the items that are adjustable from the setup screen and a functional description of the items.

LABEL	FUNCTION
R-DC	Relative DC adjust (red)
G-DC	Relative DC adjust (green)
B-DC	Relative DC adjust (blue)
PEAK	Peak White adjust (auto increase RGB gain together)
G-DRV	Green gain adjust
B-DRV	Blue gain adjust
PEAK	Peak White adjust (auto increase RGB gain together)
H-PHA	Horizontal phase adjust
V-AMP	Vertical amplitude adjustment
V-POS	Vertical position adjust
PVCO	PIF VCO
RF.AGC	RF Automatic Gain Control
Setup	Service Setup byte

8. The "Service Setup byte contains the encoded set configuration. (see following figure)

Setup Byte

7	6	5	4	3	2	1	0

1 = 4 Head

1 = FAV

1 = Commercial Scan

1 = AC/DC

1 = 2-tuner , 0 = 1 tuner

Not Used

Not Used

1 = Vertical Centering
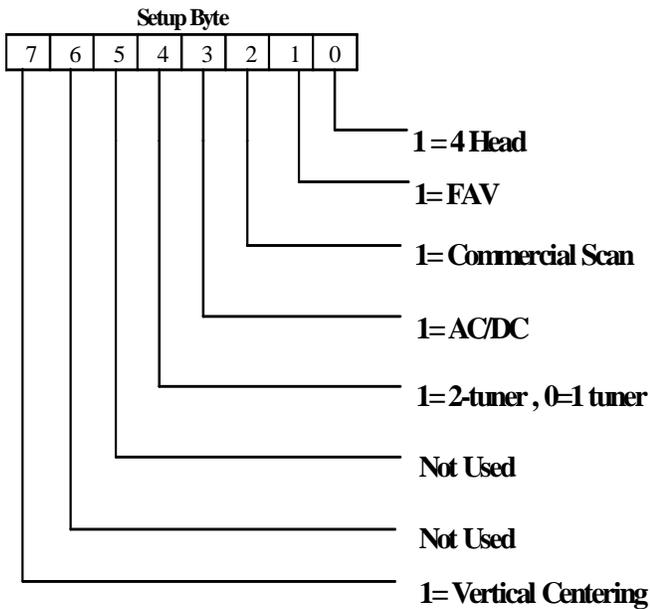
The following table shows the default values for the Service Setup Byte for the various models.

Model	SETUP
13TVR62	06
13TVR72	06
19TVR62	06
T13062	06
T13066	46
T13072	06
T13082	0E
T19064	07
T19065	46
T19066	17

Picture Quality Alignment

PEAK WHITE ADJUSTMENT

Test Point:	TU51, 61, 71 Collector	Kine CBA
Adjust:	Peak	Range: 00 - 34

1. Tune the instrument to receive a gray scale stairstep signal.
2. Press "Reset" on the remote control. This resets the customer controls.
3. Measure the collector voltage of TU51, 61, and 71. Use the collector of the transistor with the highest p-p voltage for this adjustment.

4. Place the instrument in the **TV SERVICE MODE.**
5. Select the "PEAK" adjustment and adjust the value to obtain 78V +/- 2V for a 13" instrument between the blanking and White level. (98V for19")

SCREEN ADJUSTMENT

Test Point:	Observe Display	
Adjust:	SCREEN (VG2)	IHVT

1. Tune the instrument to receive a gray scale stairstep signal. **Note:** Some generators produce gray scale stairsteps by using the color bars signal with the color burst turned off. This produces bars that step from Black (7.5IRE) to White (77IRE).

2. Set Picture Quality controls at nominal (Brightness Saturation at 50% and Contrast at 70%) by pressing "Reset" on the remote control.

3. Adjust the SCREEN (VG2) until the first gray scale bar (7.5 IRE) is just visible.

Color Temperature Adjustment

Test Point:	Observe Display	
Adjust:	R-DC (Red Bias)	Range: 00 - FF
	G-DC (Green Bias)	Range: 00 - FF
	B-DC (Blue Bias)	Range: 00 - FF
	G-DRV (Green Drive)	Range: 00 - FF
	B-DRV (Blue Drive)	Range: 00 - FF

NOTE: Allow the instrument to warm up for at least 15 minutes before doing the Color Temperature Adjustments. This compensates for color drift in the instrument as it warms to run temperature.

1. Tune the instrument to receive a gray scale stairstep signal.

2. Set Picture Quality controls at nominal (Brightness Saturation at 50% and Contrast at 70%) by pressing "Reset" on the remote control.

3. Put the instrument into **TV SERVICE MODE**.

4. Adjust R-DC, G-DC, and B-DC for gray tone on the first few steps of the gray scale.

5. Adjust the G-DRV and B-DRV for white level on the last steps of the gray scale.

Focus Adjustment

Test Point:	Observe Display	
Adjust:	Focus Control	IHVT

1. Tune the instrument to receive a crosshatch signal.

2. Press "Reset" on the remote control. This resets the customer controls.

3. Adjust the *Focus* control (LL05) for best overall focus.

PICTURE GEOMETRY ADJUSTMENT
Horizontal Phase Adjustment

Test Point:	Observe Display	
Adjust:	H-PHA	Range: 00 - 1F

1. Using a signal generator tune the instrument to receive a crosshatch or other pattern that can be easily centered horizontally.

2. Set the Picture Quality to 50% brightness, 70% contrast, 50% color saturation, 0% volume.

3. Put the set into the **TV SERVICE MODE** screen using the instructions in the section TV SERVICE MODE.

4. Using the Volume +/- on a remote control or keyboard highlight the "**H-PHA= XX**" adjustment. Adjust horizontal centering (H-PHA) for a centered picture.

Vertical Adjustments

Test Point:	Observe Display	
Adjust:	V-AMP	Range: 00 - 3F
	V-POS	Range: 00 - 0F

1. Tune the instrument to receive a crosshatch pattern.

2. Put the instrument into **TV SERVICE MODE**.

3. Adjust Vertical Size (V-AMP) so that both the top and bottom of the crosshatch pattern can be viewed.

4. Adjust Vertical Centering (V-POS) to center the display, using the top and bottom edges of the crosshatch as a reference.

5. Adjust Vertical Size (V-AMP) so that the top and bottom lines of the crosshatch pattern are an equal distance from the edge of the screen. Adjust 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%).

Warranty Clock

1. To display the warranty clock, press the **Keyboard** "Volume down" at the same time pressing "Volume up" on the **Remote Control**.

2. The warranty clock will display the number of hours the unit has been in operation and if available, the date the unit was first turned on (after factory reset). The warranty date will be detected via VBI transmission within the first 100 hours of power on operation.

3. The screen will time out after approximately 7 seconds or by pressing the menu button on the remote control.

GEMSTAR

OSD Alignment

Test Point:	Observe Display	
Adjust:	CH/\ Keyboard	Horizontal Position
	CH\/ Keyboard	Vertical Position

1. Tune to a RF channel that carries Gemstar Plus+ information in the Vertical Blanking Interval (VBI).

2. Press this following sequence of buttons on the remote control (MENU,6,1,GO BACK, INFO) to call up the GUIDE OSD Test Display shown below.

OSD Test Display

3. To adjust the OSD positioning press on the **front panel assembly keyboard**;

       CH∧ for Horizontal adjustment.

       CH∨ for Vertical adjustment.

4. Adjust the position of the GUIDE OSD so that it is centered on the screen.

OSD TEST DISPLAY

1. This diagnostic display performs 5 different tests on the Guide+ system. These five tests are **ROM**, **RAM**, **VBI**, **GLink** and **IR** tests. The ROM and RAM tests verify the proper operation of the memory IC's in the module. If one of these tests fail, the module will have to be repaired. During the VBI test, *the set must be tuned to a channel in the area that contains Guide+ dat**a**. If the set is not tuned to a channel that contains Guide+ data, the unit will always fail the **VBI Test**, however this does not mean that the module is defective. The Glink test is used to test the special retail demonstration fixture. It will also fail unless the 'Glink fixture' is connected (intended for use in retail store displays only). The IR test is for verifying the operation of the IR blaster. The IR Blaster is used for operation with cable boxes and VCR's. The IR Blaster test will always Fail.

2. Press "Clear" to exit test.
NOTE: The factory diagnostic test ***does not*** clear the channel map or program listings from the module.