

ALIGNMENTS

Operating Conditions

Unless otherwise noted, the following conditions must be observed when aligning this chassis:
Chassis must be operated from a 120VAC isolation transformer, with line voltage set to 120VAC (±2.0V).
Picture controls (color, brightness etc.) must be set to midrange.
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)
- DC Power Supply (5.0V/0.25A) for TAG001

Entering the Service mode

1. Enter the service mode (S-Mode) by pressing the VOLUME DOWN key on the instrument until the volume decreases to minimum.
2. Press the INFO key on the remote handset while holding the VOLUME DOWN key on the instrument.
3. Press the PROGRAM UP/DOWN buttons to select the different adjustments under the first menu and press the VOLUME UP/DOWN buttons to adjust the setting (value).
5. Press the OK button to toggle into the Main Menu selection mode and select the different Main menu sections using the PROGRAM UP/DOWN buttons. Press the OK button again to toggle back into the value adjustment mode.
6. Menus up to menu 19 can be selected directly using the remote control by pressing digital buttons 1~9, 0, notebook, CAP, Display, Sleep, Calendar, System/INS, Favourite, Return and Picture.
7. Press the Sound button to save the new settings and exit the service mode.

Note: Many factory alignments appear in the menus but only the ones listed here can be changed. The values can be accessed and the value (hex number) on the screen can be changed but the actual value the instrument is using cannot be changed except at the factory using special equipment.
The following is a list of all the menus and a description of the individual adjustments under each Main menu that can be changed. *Only the following menu items can actually be adjusted.*

Menu 1 (Remote key: 1)

Item	Remark
RC	R cut-off setting
GC	G cut-off setting
BC	B cut-off setting
GD	G drive setting
BD	B drive setting

Menu 2 (Remote key: 2)

Item	Remark
HIGH6	60Hz height
VP60	Vertical position
VLIN6	60Hz Vertical linearity
VSC6	Vertical S correction (60Hz)

Menu 3 (Remote key: 3)

Item	Remark
HPOS6	Horizontal position (60Hz)
PARA6	Parabola
TRAP6	Trapazoid
HSIZE	Horizontal size
CNRT6	Corners top
CNRB6	Corners bottom

Menu 4 (Remote key: 4)

No adjustments allowed

Menu 5(Remote key: 5)

No adjustments allowed

Menu 6(Remote key: 6)

No adjustments allowed

Menu 7(Remote key: 7)

No adjustments allowed

Menu 8 (Remote key: 8)

Item	Remark
RFAGC	RFAGC [12H, bit 5 ~ 0]

Menu 9 - 24

No adjustments allowed

ALIGNMENTS (Continued)

B+ Adjustment

1. Tune the instrument to receive a crosshatch signal.
2. Set the Preset Picture Mode to normal.
3. Adjust VR802 for 130Vdc +/- 0.5V at C422+ (B+).

RF AGC Adjustment

The RF AGC has been preset at the time of manufacture for optimum operation over a wide range of RF signal input conditions. Readjustment should not be required unless the tuner has been repaired or unusual signal conditions exist such as:

- a. Cable TV—adjacent channel interference.
- b. Picture bending and/or channel 6 color beats which are usually due to excessive RF signal input. This occurs when the receiver location is too close to the transmitting tower. It may also occur when the receiver is connected to an antenna distribution system where the RF signal has been amplified. The signal should be attenuated at the antenna input to a more satisfactory level.
- c. Picture Noise caused by “broadcast noise” or weak signal. If the broadcast is “clean” and the received signal is at least 1 mV, the picture will be noise free in any area.

NOTE: Adjustment of the RF AGC parameters may not have any visible effect except under unusual conditions. Adjusting the RF AGC to one extreme of it’s parameter limits will usually provide a relatively poor signal-to-noise ratio, while adjustment to the other extreme of it’s parameter limits will cause a degradation of overload conditions such as channel 6 color beats or Cable TV adjacent channel interference. Use the weakest local signal to adjust RF AGC parameter setting (Menu 8). If the RF AGC parameter setting is adjusted, check all local channels for proper operation.

Screen Adjustment

Test Point:	Observe Display	
Adjust:	Screen Control	Flyback

1. Tune the instrument to receive a crosshatch signal.
2. Set the Picture color temperature to Normal and set all of the picture controls (brightness, contrast etc.) to midrange.
3. Enter the Service mode and preset the Menu 1 values to RC/GC/BC to 80 AND GD/BD to 40.
4. While still in the service mode, press the Input button on the remote control. This will collapse the vertical.
5. Adjust the screen control to just produce a dim horizontal line on the CRT.

Focus Adjustment

Test Point:	Observe Display	
Adjust:	Focus Control	Flyback

1. Tune the instrument to receive a crosshatch signal.
2. Adjust the *Focus* control for best overall focus.

Color Temperature Adjustment

Test Point:	Observe Display	
Adjust:	Menu 1 RC	(Red Cutoff)
	Menu 1 GC	(Green Cutoff)
	Menu 1 BC	(Blue Cutoff)
	Menu 1 GD	(Green Drive)
	Menu 1 BD	(Blue Drive)

1. Perform the Screen adjustment.
2. Set the Picture color temperature to Normal and set all of the picture controls (brightness, contrast etc.) to midrange.
3. Tune the instrument to receive a grayscale staircase test pattern.
4. Enter the Service mode and adjust the values for the Cut-off and Drive controls to obtain proper color tracking (no tinting - only black, white and shades of gray). Correct color temperature is 9300 degrees - X=284 Y=299.
5. Check the low light to high light gray scale tracking (black and white picture). Should any color other than gray or white be dominant in low light to high light areas the color temperature settings have not been properly set. Repeat the procedure if necessary.

NOTE: Color Cutoff adjustments affect the low light (dark) areas while color drive adjustments affect the high light (white) areas.

ALIGNMENTS (Continued)

Sub-brightness Adjustment

Test Point:	Observe Display	
Adjust:	Menu 5 BRTC	Sub-brightness

1. Tune the instrument to receive a grayscale stairstep signal from the A/V inputs.
2. Set the Picture color temperature to Normal and set all of the picture controls (brightness, contrast etc.) to midrange.
3. Enter the Service mode and select Menu 5.
4. Adjust the value of BRTC (Sub-brightness) to just light the second dark bar making sure the first bar stays black.

Test Point:	Observe Display	
Adjust:	Menu 3 HPOS6	H Position
	Menu 3 PARA6	H Parabola
	Menu 3 TRAP6	H Trapazoid
	Menu 3 HSIZE6	H Size
	Menu 3 CNRT6	H Corner top
	Menu 3 CNRB6	H Corner bot
	Menu 2 HIGH6	Height
	Menu 2 VLIN6	Linearity
	Menu 2 VP60	Vertical Center
	Menu 2 VSC6	Vert S Correct

Note: Confirm correct convergence and purity before adjusting geometry.

1. Tune the instrument to receive a circular test pattern suitable for making visual geometry adjustments.
2. Enter the Service mode.
3. Adjust the Menu 2 and Menu 3 values listed for the least amount of geometric distortion and approximately 7% overscan.

X-Ray Protection Test

1. Tune the instrument to receive a crosshatch signal.
2. Apply an external power supply to C249 (observe polarity). Slowly increase the voltage from the supply.
3. The instrument must shut down and remain off when the voltage reaches 30 volts DC.

High Voltage Test

1. High voltage must not exceed 31.8 kV at any beam current.

CIRCUIT DESCRIPTION

Circuit Description

Tuner

The function of the tuner is to select the channel to be received and suppress the interference, amplify the high frequency signal, improve the receiving sensitivity and SNR, and to generate PIF signal through frequency conversion.

IF Channel

The IF Channel mainly ensures the sensitivity and selectivity of the complete instrument. The IF AMP integrated in TMPA8802 is made up of the third-stage dual-differential amplifier with gain value above 70db, SNR of 55dB and bandwidth of 6MHZ. The video demodulation circuit is made from the built-in PLL Sync Detector. The spectrum of the demodulation carrier is unitary and not affected by the content of the video signal. The PLL built-in the TMPA8802 generates 45.75MHz demodulation reference signal for sync detector to demodulate the video signal, which is called ‘PLL sync demodulation’.

Chroma Signal Decoding Circuit

The external BPF (band-pass filter) singles out the chroma signal and burst signal within the range of fsc+1.3MHZ from among the composite signals output from the video detector. After being amplified by ACC, the chroma signal is fed into the synchronous detector to be demodulated to obtain the color difference signal.

Luminance Channel and Matrix Circuit

The luminance channel of TMPA8802 has a black stretch circuit to make dark picture content darker thus improving the contrast and depth perception of the picture. It also has the delayed definition-enhanced circuit to enable the details of the picture seem more vivid. The luminance signal (Y) is sent into the matrix circuit after being delayed for 0.6 s and composes R/G/B signal combined with the three color-difference signals (B-Y, R-Y, G-Y).

Sync Separation and Deflection Processing Circuit

TMPA8802 has the 32fh PLL (fh = horizontal frequency). In reference to the frequency and phase information carried by the composite sync signal, the PLL generates a scan clock

signal with 32fh and a horizontal drive pulse that will be obtained through 32fh countdown. An integrating circuit is used to extract vertical sync from the composite sync pulse to control the counter for vertical countdown. The circuit countdowns the 32fh clock signal, thus vertical frequency sync pulses under various systems can be obtained.

TMPA8802 includes the vertical SW former (sawtooth wave former) and can control the gain and linearity of the SW (sawtooth wave).

Sound Channel

The second SIF goes via a filter of 4.5MHz, to MSP3425. The MSP3425 then decodes the SIF into MONO, STEREO or SAP. MONO, STEREO, SAP and sound effect processing modes are adjusted via the IIC bus.

Remote Control System

The MCU (TMPA8802) of an 8-bit CPU and the software constitute the control core of the remote control system, mainly accomplishing the following functions: decoding remote control commands; auto search memory; displaying characters and patterns; switching the signal source between AV and TV. The transmitter translates the commands from the buttons and separately demodulates the 37.9KHZ carrier and 940nm infrared ray to generate the infrared transmitting signal at the LED. The remote control system has three operating modes: user-controlled mode (U-mode), service mode (S-mode) and factory default mode (D-mode). U-mode includes the following functions: channel search and memory; channel selecting; volume control, brightness adjustment, contrast and color adjustment. S-mode and D-mode are mainly used in production, checking & repairing, including the following functions: horizontal & vertical centering control, vertical amplitude and linearity adjustment; setting the adjusting range for volume, contrast, brightness, tint and color; geometric adjustment and white balance adjustment.

CRT Drive Circuit

A cascode amplifier is used to amplify the voltage and current of the R/G/B signal so the CRT drive circuit can demodulate the cathode beam current of the CRT. The R/G/ B signal input into the cascode circuit is of negative polarity.