

Note: The following Alignment Procedure was taken from Section 2.5 of the report.

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure

In the following procedure, the complete transmitter is adjusted for optimum performance, beginning with the modulator, starting at the baseband input and adjusting each circuit for its specified performance while observing the appropriate output parameters of the board or subassembly being adjusted.

Because of the broadband nature of most of the amplifier stages, this is a straightforward procedure, easily accomplished if baseband, IF, and RF test equipment is available. In this procedure, the input signals are first connected and each circuit is adjusted in sequence by connecting the test equipment to the specified point.

Equipment Needed

Backplane Test Fixture	Tektronix VM700
Spectrum Analyzer	10 MHz Reference Generator
Oscilloscope	Video Signal Generator
RF Power Meter	Voltmeter
30 dB Directional Coupler	50 Ω Load
10 dB Directional Coupler	

Modulator Assembly

Follow the steps below to align the Analog Modulator Module.

1. Connect test jumpers from Visual IF O/P to Visual IF I/P, and from Aural IF I/P to Aural IF O/P on the Backplane Test Fixture.
2. Preset the following jumpers on the modulator board:

J4 pins 2 and 3	J2 to In
J6 pins 2 and 3	J5 pins 1 and 2
J9 pins 2 and 3	J11 pins 1 and 2
3. Connect external 10MHz source to the 10MHz I/P of the Backplane Test Fixture.
4. Connect the +12V source to the power supply harness on the Backplane Test Fixture.
5. Measure voltage at test point 1 (TP1). Verify that voltage is between 3 and 6 volts.
6. Adjust L1 for 4 volts at TP1.

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure - continued

7. Record voltage level at TP2.
8. Connect the video source to the Video I/P on the Backplane Test Fixture.
9. Connect the VM700 to the Visual O/P of the Backplane Test Fixture.
10. Set the video generator for a 5 step NTSC video signal.
11. Set the front panel Clamp switch to “on”, and set the proper depth of modulation using R61..
12. Set the front panel Clamp switch to “off”, and adjust Manual Bias potentiometer R83 for proper depth of modulation.
13. With a spectrum analyzer connected to the Visual O/P of the Backplane Test Fixture, adjust front panel Visual Level potentiometer (R14) for an output of –8 dBm.
14. Adjust L17, L18 and L19 for maximum aural peak.
15. Adjust R167 to verify that a 15Db A/V ratio can be obtained.
16. Connect the VM700 to the Combined O/P of the Backplane test Fixture.
17. Using C107 and R197 adjust for best ICPM. Verify ICPM is within specifications.
18. Readjust Video Gain for proper depth of modulation.
19. Set the video signal to Multiburst and verify that the Out of Band products are within specifications.
20. Reconnect the Combined O/P to the spectrum analyzer and set video signal to Cable Sweep.
21. If necessary, adjust R161, R162, C81, and C82 to meet frequency response specifications.
22. Reconnect the VM700 to the Combined O/P of the Backplane Test Fixture and set the video input signal to SinX/X.
23. Adjust R69, R80, R79, R74, L2, L5, L4 and L3 for optimum Group Delay response.
24. Set the video source to FCC Composite, and measure the Differential Gain and Differential Phase. Verify measurements are within specs.
25. Measure Video Signal to Noise Ratio and verify measurement is within specs.
26. Adjust R98 Visual Overmodulation potentiometer just until DS7 LED illuminates, and verify no change in response.
27. Turn Visual Overmodulation potentiometer CCW just until DS7 LED extinguishes.
28. Verify that the external 10MHz LED lights with external 10MHz source connected to the board.

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure - continued

29. Disconnect the external 10MHz source, and verify that the external 10MHz LED extinguishes.
30. Connect an IF CW source (0dBm) to the IF CW jack of the Basckplane Test Fixture and verify that the CW LED lights.
31. Disconnect the video source from the bacdkplane and verify that the Video Loss LED lights.
32. Connect an external 4.5 MHz source from a signal generator at –10 dBm to the Composite Audio I/P. Reconnect the spectrum analyzer to the Combined IF O/P.
33. Set J4, J5 and J6 jumpers to pins 2 and 3.
34. Verify that a 15 dB A/V ratio can be set.
35. Return the J4, J5 and J6 jumpers to pins 1 and 2.

Control Monitoring Module (A4) 1585-1129

Set front panel configuration DIP switches as follows:

SW1	Open (no external amplifier)	SW5	Open (not used)
SW1	Open (external ITS-5010 modulator)	SW6	Open (not used)
SW3	Open (not used)	SW7	Open (not used)
SW4	Open (not used)	SW8	Open (English language LCD)

IF Processing Module (A3) 1585-1207

1. Select 75 Ω input impeadance using jumpers J28 and J29.
2. Select Low Input Impeadance using jumpers J8, J9, J10 and J11.
3. Enable Peak Vs. Average detection by placing J30 into the In position.
4. Enable Frequency Response Correction by placing J2 and J3 into the In position.

2.0 TECHNICAL DESCRIPTION

2.4 Alignment Procedure - continued

5. Set Delay Equalizers and Attenuation Equalizers as follows:

Delay Equalizer1 (J35, J36)	Out
Attenuation Equalizer1 (J37, J38)	Out
Delay Equalizer2 (J43, J44)	Out
Delay Equalizer3 (J31, J32)	Out
Attenuation Equalizer3 (J33, J34)	Out

6. Set filter circuit to Band Pass Filter by placing jumpers J19, J20, J22 and J23 into the BPF position.
7. Select High Output Gain by placing jumpers J26 and J27 into the High position.
8. Remove linear equalization by placing front panel Linear Equalization toggle switch into the out position.
9. Select Manual Gain by placing Gain Selection toggle switch into the Manual position.

LO/Upconverter Module (A5) 1585-1143

1. Place Reference jumper J1 into the External position..

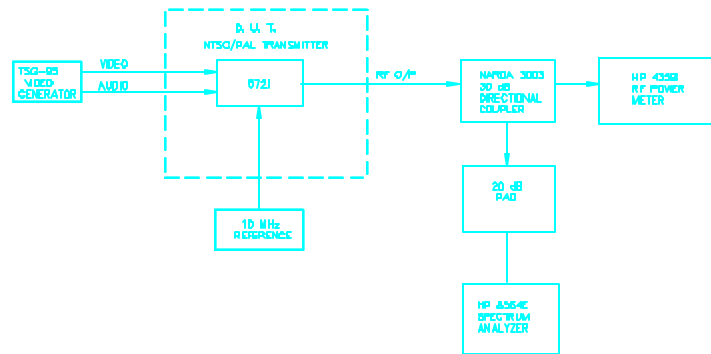
Power Amplifier Module (A6) 1585-1136

1. Select Peak Detection by placing J2 into the Peak position on the Dual Power Detector Module.

2.0 TECHNICAL DESCRIPTION

2.4 Alignment Procedure - continued

Connect the 5721 as shown below:



Power Setup/Meter Calibration

1. Apply power to the tray by placing the rear panel power switch (CB1) into the on position.
2. Measure voltage on Forward Detector Level test point on the Power Amplifier module front panel and adjust for 0 volts using the Forward Zero potentiometer.
3. Measure voltage on Reflective Detected Level test point on the Power Amplifier module front panel and adjust for 0 volts using the Reflected Zero potentiometer.
4. Verify that no faults are displayed on the LCD display on the front panel of the tray.
5. Place transmitter into operate by pressing the Operate button below the LCD display.
6. Set the video generator for a 0IRE no burst test signal and adjust Manual Gain potentiometer on front panel of IF Processing module for 50 watts peak-of-sync as observed on RF power meter.
7. Measure voltage on Forward Detected test point on front panel of Power Amplifier module and adjust for 1 volt using the Forward Level potentiometer.
8. Place transmitter into standby by pressing the Standby button below the front panel LCD display.
9. Remove cable connection from RF output jack (J8) of tray.
10. Place transmitter into operate mode by pressing the Operate button below the front panel LCD display.
11. Measure Reflective Detected Level test point and adjust for 1V using Reflected Level potentiometer.
12. Place transmitter into standby by pressing the Standby button below the front panel LCD display.

2.0 TECHNICAL DESCRIPTION

2.4 Alignment Procedure - continued

13. Reconnect cable to RF output jack (J8) of the tray.
14. Place transmitter into the operate mode by pressing the Operate button below the front panel LCD display.
15. Adjust ALC potentiometer on front panel of IF Processing module for 1 volt on the Forward Detected Level test point on power Amplifier Module.

RF Response

1. Adjust video generator for cable sweep input signal.
2. Adjust Spectrum Analyzer for the following settings:

Span	10MHz
Resolution BW	100KHz
Video BW	100 KHz
Center Frequency	Channel Frequency
3. Adjust the four Frequency Response potentiometers on the front panel of the IF Processing module for flat response on spectrum analyzer.