

## 2.0 TECHNICAL DESCRIPTION

### 2.5 Alignment Procedure

In the following procedure, the complete transmitter is adjusted for optimum performance, beginning with the start up procedure of the CM720M modulator, followed by the upconverter/amplifier, 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

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

Adjust the spectrum analyzer for the following settings:

1. Resolution BW = 30 KHz
2. Video Averaging (ON) = 10
3. Span = 20 MHz
4. Video Bandwidth = 30 KHz
5. Center Frequency = 44 MHz

The average power of a modulated QAM digital signal, with the specified analyzer settings, is +23dB higher than the displayed signal. The measurements in this alignment procedure will be given in average levels.

Example: Analyzer reading of -30 dBm  
Average power = -30 dBm + 23 dBm = - 7 dBm.

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## 2.5 Alignment Procedure - continued

### MODULATOR TRAY

Follow the step listed below to bring the CM720M modulator online.

1. Turn on the tray by connecting the AC power cable the unit and observing the front panel LEDs. The front panel lights flash through a consistent sequence when the unit is first powered on. when power-up is complete, the four seven-segment LEDs will illuminate, and the Fault LEDs will not illuminate.
2. Verify that the power-up message is displayed on the front panel LCD. If necessary, adjust the LCD contrast by pressing the increase/decrease buttons on the front panel.
3. Set the time/date.
4. Set the transmit power to -40 dBm to -50 dBm.
5. Confirm that transmit power is enabled.
6. Use the front panel to verify that the AQM mode is at the desired setting.
7. Use the front panel to verify that the scrambler, Reed-Solomon encoder, interleaver, and differential encoder are all enabled.

At this point the CM720M modulator has been powered up and the output spectrum may be observed.

Using a spectrum analyzer verify the proper shape and center frequency (44 MHz) of the spectrum at the IF output port (J5). Verify that the power level corresponds to that set in step 4 above.

The modulator circuitry requires no user adjustments.

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#### UPCONVERTER/AMPLIFIER TRAY

##### 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 $\Omega$  input impedance using jumpers J28 and J29.
2. Select Low Input Impedance 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.
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..

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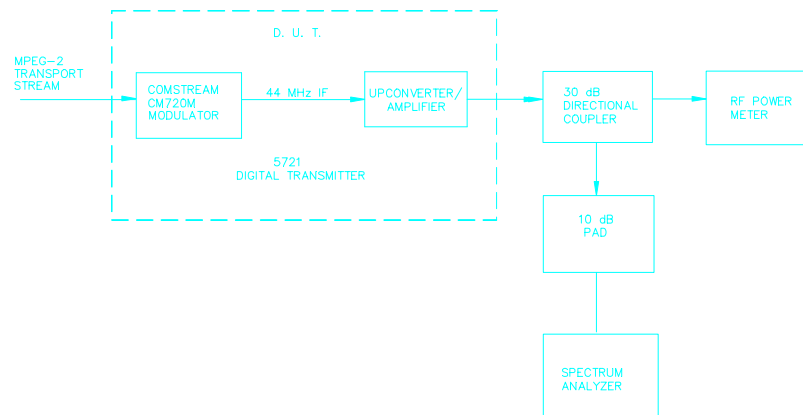
#### **Power Amplifier Module (A6) 1585-1136**

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

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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. Adjust Manual Gain potentiometer on front panel of IF Processing module for 2.5 watts (average) 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.

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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.

