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 IF 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 base-band, 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.

Adjust the spectrum analyzer for the following settings:

1. Resolution Bandwidth = 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 +23 dB 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.

Modulator Tray

Follow the steps listed below to bring the PQM2100 modulator online (refer to Chapter 4: Operation of the PQM2100 Technical Manual included as Exhibit III of this report for a complete description of the Keypad /LCD user interface).

1. Turn on the tray by connecting the AC power cable the unit and placing the rocker switch on the back panel to the on position and observing the front panel LEDs. When power-up is complete, the LCD display will illuminate, the Fault LEDs will remain off, and the On LED will illuminate.

2. Press any key to enter the Password Entry screen.

3. If no password has been assigned, access the main menu by pressing Enter then enter the desired password using the Password Modification menu..

4. If Password exist, enter the current password and confirm by pressing Enter to bring up the Alarm Mode sub menu.

5. Press $\rightarrow$ to access the Alarm Mode selection screen.

2.5 Alignment Procedure - continued

6. Using the up and down arrows select the alarm mode (Normal: alarm relay contact opening in event of alarm, or Default alarm relay contact closure in event of alarm).

7. Press Enter to proceed to the Active Alarms Display menu

8. Using the up and down arrow keys, check that no alarms are present.

9. Return to the Alarm Mode menu by pressing the ← key and select the Parameters sub menu using the up and down arrow keys..

11. Press → to enter the Parameters submenu.

10. Press the → key to access the Bit Rate screen.

11. Using the arrow keys enter a Bit Rate of 3038297 kbit/s then press enter to save. After the Bit Rate has been entered, the modulation level (64 QAM) and Symbol Rate (5063 Kbaud) are automatically set.

At this point the PQM2100 modulator has been powered up and the output spectrum may be observed.

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure - continued

~~Upconverter/Amplifier Tray~~

Using a spectrum analyzer verify the proper level (-11 to -6 dBm average) and frequency of the spectrum at the IF output port of the Modulator.

Verify proper configuration of ITS-5722 modules as follows:

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 PQM2100 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 75Ω 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 SAW 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.

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure - continued

LO/Upconverter Module (A5) 1585-1143

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

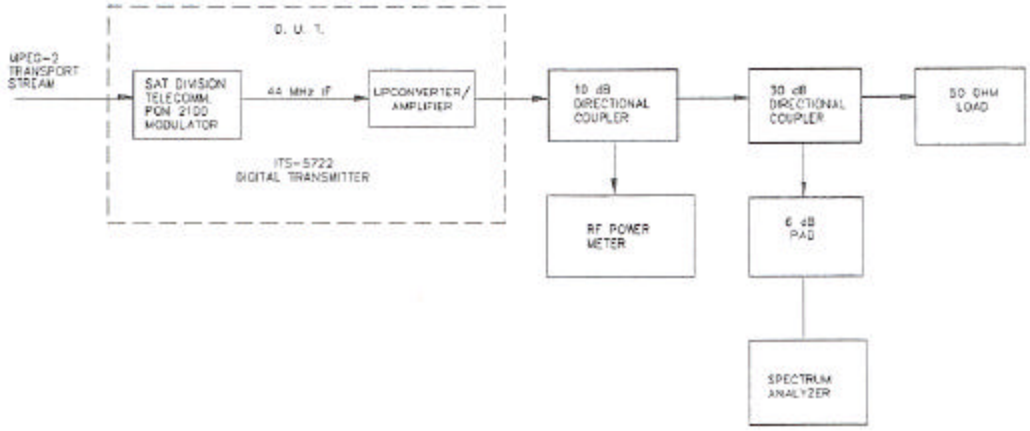
Power Amplifier Module (A6) 1585-1136

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

2.0 TECHNICAL DESCRIPTION

2.4 Alignment Procedure - continued

Connect the ITS-5722 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 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 font 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 Spectrum Analyzer for the following settings:

Span	10MHz
Resolution BW	100KHz
Video BW	100 KHz
Center Frequency	Channel Frequency

2. Adjust the four Frequency Response potentiometers on the front panel of the IF Processing module for flat response on spectrum analyzer.