7. PARTS LIST/TUNE-UP INFO

7.1 Parts List

The transmitter, can be subdivided as follows:

Axciter Digital Modulator Tray

Exciter Tray, consisting of:
- Axciter Upconverter Module
- Axciter Downconverter Module
- Control & Monitoring / Power Supply Module

External Amplifier Tray

7.2 Tune-up Information

The DT325B transmitter was aligned at the factory and should not require additional alignments to achieve normal operation.

7.2.1 Axciter Modulator

Please refer to the Axciter Modulator User Manual for more information.

7.2.2 Exciter Assembly

This transmitter takes the IF from the Axciter digital modulator and converts the signal to the desired Low-Band VHF On-Channel RF Output at the systems output power level.

Switch On the main AC for the system and the individual circuit breakers on each assembly. Check that AC is present to the system.

Check that the RF output of the post-filter coupler assembly is terminated into a dummy load of at least the rated output of the system or connected to the antenna for your system. While performing the alignment, refer to the Test Data Sheet for the transmitter and compare the final readings from the factory with the readings on each of the modules. The readings should be very similar. If a reading is way off, the problem is likely to be in that module.

This transmitter operates using a SMPTE 310 input that connects to J27, the MPEG Input Jack, located on the rear of the Axciter Modulator Tray. Check that the MPEG input is present. If used, check that the 10 MHz input from the GPS is connected to J9 on the Axciter Modulator.

The check of and the setup of the drive level and output power of the transmitter are completed using the LCD Display on the control/power supply module. In the Transmitter Set-Up menu and the Power Control Screen, set the output power to 100% or the drive level needed to attain the desired output power of the transmitter. The transmitter must be in the Manual Gain position when readjusting the Forward Power.

The adjustment of the linearity and phase pre-distortion to compensate for any nonlinear response of the Power Amplifiers are controlled within the Axciter Modulator Tray.

7.2.2.1 Upconverter Downconverter Module Adjustment

On the Axciter Modulator, activate the Upconverter Main screen by selecting Upconverter, using the button next to Upconverter on the right side of the Axciter Main Screen. Activate the Downconverter Output Gain by pushing 2 on the key board entry pad. Monitor the DTVision Linear Display by pushing the button next to the DTVision Linear display on the right side of the Axciter Main Screen. At the bottom of the DTVision linear screen, locate the reading next to RMS. If this reading is between –10 dBm and 0 dBm no adjustment is needed. If it is not, adjust the "Downconverter Gain", then view the RMS value until it is within the –10 dBm to 0 dBm range.

7.2.2.2 Control & Monitoring Module

This module requires no adjustments.

7.2.2.3 Power Supply Module

This module requires no adjustments.

7.2.3 VHF LB External Amplifier Tray

The Tray has been adjusted at the factory to meet all specifications, including Phase Adjustment to match the multiple Trays in an Amplifier Array when combined, and should not need adjusted to attain normal operation. Any adjustment of the Boards should be accomplished in Manual Gain, S1 on (A5) AGC Control Board (1306482) in Manual. The Idling Currents for the amplifier boards are adjusted with no RF Drive applied. For Normal Operation, S1 should be in the Auto AGC position.

Connect a Dummy Load rated of at least 350 Watts to J2 the RF Output Jack of the Tray.

7.2.3.1 AGC Control Board

Using a calibrated Wattmeter, check that the Tray is operating at rated power. Remove the Sample Forward Power connection J4 from the board. The Output Power Level should drop to 20 % because of the VSWR Cutback and DS4 should light. The front panel Module Status LED should not be illuminated.

Reconnect J4 and adjust R59 to begin cutting back the Output Power Level when the Reflected Level increases above 20 %. The front panel Meter in the Power Supply Voltage position is calibrated to +32 VDC using R86 located on the AGC Control Board.

7.2.3.2 Phase Shifter Board

This board has no adjustments on it. The Front Panel has adjustments for Phase that are adjusted during the Amplifier Array Set Up Procedure. With +4 dBm input typical output is +4 dBm.

7.2.3.3 Filter/Amplifier Board

This board has a maximum of 15 dB gain. Typically with +4 dBm input an output of +16.5dBm is expected. Tune the channel filter capacitors C20 (input loading) & C29 (output loading), C23 & C26 (center frequency) and C24 (coupling) for best response at J6 the RF output jack of the filter portion of the board. Set the Voltage Adjust Pot R19 for +24 VDC at the Anode of CR5.

The idling current, no RF Drive applied, of the Device Q1 is set for 250 mA. To set the current, remove the RF Drive, measure the voltage across R16, a 1 Ω resistor on the Filter/Amplifier Board, and adjust R13 for .25 Volts. Using Ohms Law: (E = I x R) : (E = 250 mA x 1 Ω) : E = 250 mV.

7.2.3.4 VHF Low Band Amplifier Board

This board has 20 dB of gain and is biased for 3 Amps of Idling Current, no RF Drive applied. To set the Bias, remove RF Drive and switch the front panel Current Meter to the I_D position. Adjust the Bias Adjustment R4 on the Amplifier Board for 3 Amps on the meter.

Connect a Spectrum Analyzer to the Output Jack J2 of the Board and adjust C1 for peak output. Typical output level is +38.5 dBm.

7.2.3.5 Overdrive Protection Board

The RF Input and Output of the board should be approximately +38.5 dBm during normal operation.

To set up the Overdrive circuit, check that the Output Power Level of the Transmitter is at 100 % and adjust R11, on the Board, for a reading of .4 VDC at TP1. Increase the Output power level of the Transmitter to 120 % and adjust R12 until the Output Power begins to Drop Off. Return the Output Power Level of the Transmitter to 100 %.

7.2.3.6 3-Way Splitter Board

This board contains no tuning adjustments. The board takes the +38.3 dBm input and splits it into three equal +33.3 dBm outputs.

7.2.3.7 VHF LB Output Amplifier Pallets

The pallets are supplied by Delta RF Technology, Inc. Refer to the data sheets in the subassembly section of this manual for more information. Each pallet has approximately 18 dB of gain. With +33.3 dBm input an output of +51.3 dBm is typical.

7.2.3.8 3-Way Combiner Board

There are no adjustments on this board. The three +51.3 dBm Inputs are combined to produce the 375 Watts (+55.8 dBm) Output at J4 that connects to the RF output jack J2 located on the rear panel of the tray.

7.2.3.9 Calibration of the Output Power of the VHF Amplifier Tray

Check that a Dummy Load of at least 400 Watts is connected to the Output of the Tray that is to be calibrated. Switch S1 located on the AGC Control Board to the **Manual** position before beginning the set up. Adjust the front panel Meter for 100% Forward Output Power with R5, Manual Gain Adjust, located on the AGC Control Board.

Readjust the Manual Gain Pot for same Spectrum Analyzer Reference Level. Adjust R44 for 100% Forward Power Reading. Calibrate the Front Panel Output Power Meter to 100 % with R44, Forward Power Meter Adjust, located on the AGC Control Board. Lower the

Forward Power reading to 80% on the front panel meter using R5, Manual Gain Adjust, located on the AGC Control Board. Adjust R65, AGC Fault Adjust, located on the AGC Control Board until DS3 the Green Module LED mounted on the front panel just lights. Readjust the Forward Power to 100 % using R5.
Switch the Tray Off and reverse the J6 and J7 cables located on the 3 Way Combiner Board. Switch the Tray On and adjust the front panel meter in the Reflected Output Power Position to a 100 % reading using R53, Reflected Power Meter Adjust, located on the AGC Control Board. Adjust the Reflected Output Power to a 20 % reading using R5 located on the AGC Control Board. Then adjust R59, VSWR Cutback Adjust, located on the AGC Control Board until DS4 the Red VSWR Cutback LED mounted on the front panel lights. This sets up the VSWR Cutback Circuitry.

Readjust R5 for 100 % on the Meter for 250-Watts Output. Switch the Tray Off and return the J6 and J7 Cables located on the 3 Way Combiner Board back to their original positions. Switch S1 located on the AGC Control Board to the AGC position, which is the normal operating position, after the set up is completed.

There is a spare 1 Amp and 20 Amp Fuse, located on the top, right rear of the Tray, for replacement of the Fuses on the Current Metering Board.

The VHF Low Band Amplifier Tray is aligned and calibrated and ready for normal operation.

7.2.4 Setting Up the Output Power of the Transmitter

The following adjustments are completed using the LCD screen located on the front panel of the Axciter Modulator Tray. On the Axciter Main Screen, push the button next to the Up/Downconverter tab on the right side of the screen. This will open the Upconverter/Downconverter Main Screen. Set the AGC to Manual by selecting 3 on the key board entry. The screen will now indicate AGC Manual. Set the transmitter to full power using the Driver/Amplifier LCD display while viewing the Power Control Screen in the Set Up Menu and adjusting the level as needed to attain 100% output power.

7.2.4.1 Setting up of AGC 1

To set up the AGC, first the AGC must be activated. Locate the 8 position DIP switch SW1 mounted on the Control Board in the Axciter Upconverter Sled, mounted in the Driver/Amplifier Assembly. The Upconverter DIP Switch Position 6 must be switched ON which allows the user to modify the AGC 1 gain through the Axciter Modulator.

See Figure 5-1 for an example of the Axciter Upconverter/Downconverter Main Screen. On the Axciter Upconverter Screen set AGC 1 to 1.5 Volts, by selecting 4 on the key board entry. This will cause a detail screen to appear prompting you to enter a number value. Monitor the AGC 1 Gain Value on the screen and increase or decrease the value of the number entered until the monitored reading is 1.5 Volts.

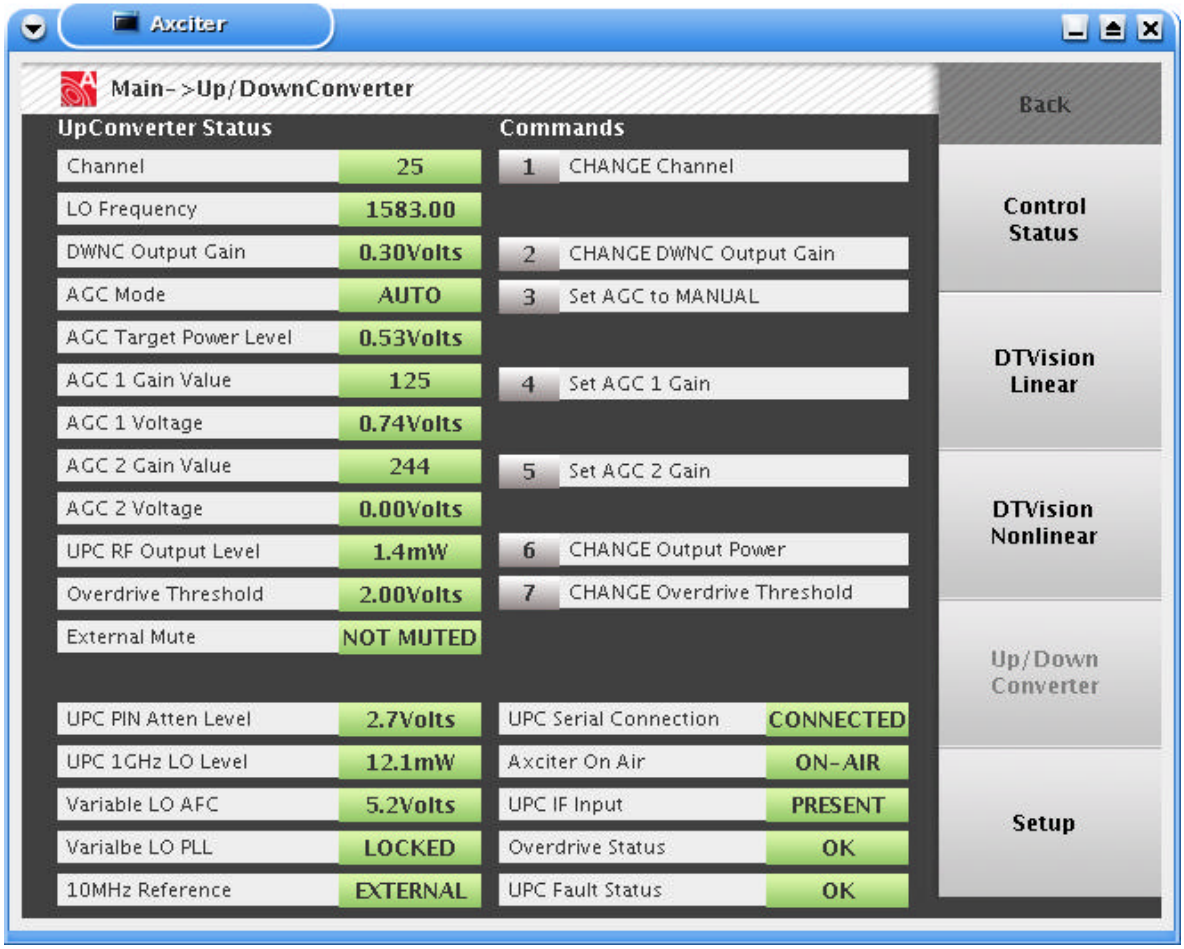

Figure 5-1: Axciter Upconverter/Downconverter Main Screen

7.2.4.2 Setting up of the Overdrive Threshold

On the Axciter Upconverter/
Downconverter Screen set the Overdrive Threshold to 1.7 Volts, by selecting 7 on the key board entry. This will cause a detail screen to appear. Increase or decrease the voltage as needed until the monitored reading is 1.7 Volts.

Place the Transmitter into AGC by pushing the 3 of the key board entry on the AxciterUpconverter Screen. This will place the Transmitter AGC into Auto

7.2.4.3 Forward Power Calibration

Check that the transmitter is at 100% output power, as shown on the LCD display on the Driver/Amplifier in the Set Up menus.

Measure with a VOM, TP31-14, Red, and TP31-12, Black, on the terminal block TP31, located on the rear chassis of the Driver/Amplifier Chassis Assembly. Adjust R9, Forward Calibration Adjustment, on the Dual Peak Detector Board (1159965) for a reading of .8VDC on the VOM. Locate the Forward Power Adjust screen on the Driver/Amplifier LCD display in the Set Up menus and adjust the up or down arrow as needed to achieve 100 % output power. This completes the forward power set up.

7.2.4.4 Reflected Power Calibration

Switch the transmitter to Standby. Remove the connector that is on Jack J2, on the Dual Peak Detector Board, and replace with the connector now on J1, also inserting a 10 dB pad in series. Switch the transmitter to operate. Then adjust R10, Reflected Calibration Adjustment, on the dual peak detector board for a .32VDC reading, at TB31-13 and TB31-12 return, on the terminal block TB31 mounted on the rear of exciter/driver chassis assembly. Switch the transmitter to Standby. Move the connector back to J1 while removing the 10 dB pad. Replace the original connector onto J2.

This completes the set up and adjustment of the DT325B transmitter.