7. PARTS LIST/TUNE-UP INFO

7.1 Parts List

The translator, can be subdivided as follows:

Receiver Tray:

- VHF filter
- Dual stage amplifier board
- Channel oscillator Assembly
- Channel oscillator multiplier board
- Downconverter/amplifier board
- IF filter/ALC board
- SAW filter amplifier board
- Power supply board

Exciter Tray:

- IF Processor Module
- L.O. / Upconverter Module
- Control & Monitoring / Power Supply Module
- Power Amplifier Module

External Amplifier Tray:

- 4-Way Splitter
- Power Amplifier Module (Qty of 4)
- Power Supply Module (Qty of 2)
- 4-Way Combiner

7.2 Tune-up Information

The LU1000AL translator was aligned at the factory and should not require additional alignments to achieve normal operation.

The UHF/VHF Receiver Tray w/(Optional) Frequency Correction selects the desired UHF or VHF On Channel Input Signal and converts it to a Combined IF Signal of 45.75 MHz Visual + 41.25 MHz Aural. The Tray also has provisions for a Frequency Correction Option that consists of a VCXO Channel Oscillator Assembly with a PLL Circuit which maintains an exact IF Output Frequency, over the capture range of the PLL circuit, even if the Input UHF or VHF Frequency may vary.

7.2.1 RF Input Signal Path (Receiver)

The RF Input to the Tray, (-61 dBm to -16 dBm in Level), is fed through J1 for 50Ω to (A7) the input 50Ω Filter, DC Multiplexed (1035-1204 UHF, 1035-1902 VHF LB or 2065-1024 VHF HB) or through J5 for 75Ω to (A7) the 75Ω input Filter, DC Multiplexed (1035-1207 UHF, 1035-1903 VHF LB or 2065-1023 VHF HB), which is of a double tuned design that is adjusted to the desired Input UHF or VHF Channel Frequency. Note: If the input signal is greater then -25dBm, an attenuator should be used to limit the level to -25dBm. +12 VDC, for use by an (Optional) external Preamplifier Assembly, connects to the filter through F1 a 1 Amp Fuse. This +12 VDC is DC Multiplexed onto the input signal cable from the Preamplifier. DS1 a Red LED located on TB1 in the Tray will be lit if the +12 VDC is present on the input cable. If a Preamplifier is not used, F1 should be removed and DS1 should not be lit.

The signal is next amplified +12 dB to approximately the -49 to -4 dBm level by a low noise amplifier located on (A8-A1) the Dual Stage Amplifier Board (1227-1501) that is contained in (A8) the Dual Stage Amplifier Assembly (1227-1503). The board has approximately +13 dB or +26 dB of gain, depending on whether Jumper W1 on J5 is in place. The signal is then filtered in (A9) a Channel Filter (1007-1101 UHF, 1034-1202 VHF LB or 2065-1000 VHF HB) and then applied back to (A8-A1) the Dual Stage Board where the same amplification takes place. Jumper W1 on J7, located on the Dual Stage Board, should be removed if the Receiver Input level is greater than -40dBm. The output is connected to (A10) the Downconverter Amplifier Assembly (1227-1505) that contains (A10-A1) the Downconverter Amplifier Board (1227-1502). The RF, at the -47 dBm to -2 dBm Level, connects to the "R" Input Jack of the Mixer Z1 located on the Downconverter Amplifier Board.

7.2.2 Local Oscillator Signal Path (Receiver)

The Local Oscillator Signal is derived from a cut to channel crystal mounted in an oven that is factory set at 45° C. The Oscillator operates at 1/8 for UHF, 1/4 for VHF High Band or 1/2 for VHF Low Band of the desired local oscillator frequency. The crystal is mounted on (A4-A1) the Channel Oscillator Board, Dual Oven (1145-1201), that is part of the Channel Oscillator Assembly (1145-1202). The oscillator circuitry is a modified Colpitts design operating in a separate oven set at 50° C. for improved stability. If the Frequency Correction Option is purchased, the VCXO Channel Oscillator Assembly (1145-1206), which contains the VCXO Channel Oscillator Board (1145-1204), is used in place of the standard Channel Oscillator Assembly, and an AFC voltage from the PLL circuit maintains the frequency of the VCXO.

The output of the Channel Oscillator is connected to the (A5-A1) the x8 Multiplier Board (1227-1002) for UHF, the x4 Multiplier Board (1227-1525) for VHF HB or the x2 Multiplier Board (1227-1524) for VHF LB, which is located in (A5) the Multiplier Enclosure (1265-1125). The proper multiplier board takes the output of the Channel Oscillator (+3 dBm) and multiplies it eight, four or two times by a series of three, two or one x2 Broadband Doublers (2x2x2 = x8), which produces the L.O. signal on the desired frequency needed for the upconversion process. The signal is then amplified to the +16 dBm level. A sample of the multiplied L.O. Signal is fed to a detector circuit, which lights the Green LED DS1 that indicates that the L.O. is present at the Output Jack J2 of the Multiplier Board. This Green LED is seen through a hole in the lid of the Multiplier Assembly and is an indication, when lit, that there is a signal present at the output of the Multiplier Board. The L.O. signal is filtered in (A6) a L.O. Filter 1007-1101 UHF, 2065-1000 VHF HB or 1034-1211 VHF LB) and then sent (+15 dBm) to J2 on (A10-A1) the Downconverter Amplifier Board. The L.O. Input to the Downconverter Amplifier Board is connected thru a 3 dB matching pad to the "L" Input of the Mixer (Z1) at a +12 dBm level.

7.2.3 Combined IF Signal Path (Receiver)

The L.O. and the RF signals are mixed in the Mixer Stage of the Downconverter Amplifier Board to produce the desired IF difference frequency at -55 dBm to -10 dBm in level, depending on the RF Input Level. The Combined IF Signal is routed to (A11-A1) the IF Filter/ALC Board (1227-1504), which is mounted in (A11) the IF Filter/ALC Enclosure (1265-1105). The IF Filter/ALC Board contains a Pin Diode Attenuator circuit, which is part of the Automatic Level Control (ALC) that controls the level of the IF Signal to the two stage amplifier ICs U1 and U2.

The (Optional) (A11-A2) SAW Filter/Amplifier Board (1035-1211) is also contained in the

IF Filter/ALC Enclosure. The SAW Filter/Amplifier Board connects to J5 and J6 of the IF Filter/ALC Board if more attenuation of the Out Of Band products is needed. If the SAW Filter/Amplifier Board is not needed, a jumper connects the Combined IF from J5 to J6 on the IF Filter/ALC Board.

The Combined IF is then bandpass filtered to the needed 6 MHz IF bandwidth around the 41.25 MHz + 45.75 MHz Combined IF signal and amplified by U3 to the -41 dBm to +4 dBm Level before it is split. One output is detected by U4 for use as the ALC reference level to the Pin Diode Attenuator Circuit. The ALC comparator drives the Pin Diode Attenuator Circuit to maintain the desired output level, typically +2 dBm. The other split output connects to J2 the Combined IF Output of the board that is cabled to the IF Output Jack of the Tray at J4 (+2 dBm).

7.2.4 Frequency Correction Option (Receiver)

If the Frequency Correction Option (1227-1528) is purchased, (A13) the IF Filter/Limiter Board (1109-1001), (A14) the IF PLL Board (1109-1002), the (A15) IF Carrier Oven Oscillator Board (1100-1206), (A4) the VCXO Channel Oscillator Assembly (1145-1206) and (A16) an IF Amplifier Board, High Gain (1197-1126) are part of the System.

A Sample of the amplified and ALC controlled signal from the IF Filter/ALC Board is directed to the IF Amplifier Board, High Gain (1197-1126) where it is amplified and connected to J2 on (A13) the IF Filter/Limiter Board (1109-1001). The IF is filtered by a SAW Filter, which passes Visual Carrier and Aural Carrier only, and amplified before it is split. The Aural IF Output is not used in this Tray. The other output of the splitter is amplified and applied to a Notch Filter. The Notch Filter is tuned to the Aural Frequency by C17 and R10, which reduces or eliminates the Aural IF from the Visual IF signal. The Visual IF Only signal then connects to a video detector circuit, which in conjunction with U5 strips the video from the Visual IF signal. The IF CW Signal is amplified and buffered before it is connected to the output of the board at J6. The IF CW connects to J2 of (A14) the IF PLL Board (1109-1002).

The IF CW Signal (+3 dBm) on the IF PLL Board is wired to U1 a Divider IC, which, in conjunction with U2, sets up one of the reference signals to the comparator circuit. The other reference signal is derived from the 50 kHz reference Input at J4, which is a divided down 50 kHz sample of the 38.9 MHz signal generated on (A15) the IF Carrier Oven Oscillator Board (1100-1206). The 38.9 MHz IF Carrier Oven Oscillator Board is used instead of the 45.75 MHz IF Carrier Oven Oscillator Board to minimize the interference between the generated 45.75 MHz IF and the signal generated on the (A15) IF Carrier Oscillator Board. The 38.9 MHz signal itself is not used, just the divided down 50 kHz reference of the 38.9 MHz Signal is used. The two reference signals applied to the IF PLL Board are compared by U2 and a difference voltage (AFC) is produced. The difference voltage (AFC), approximately -3 VDC, is fed from J3 of the board to FL2 of (A4) the VCXO Assembly. If the frequency of the VHF or UHF Input to the Tray should drift, the ALC voltage will change to increase or decrease the output frequency of the VCXO Assembly which increases or decreases the L.O. Frequency that maintains the IF Frequency at the standard 45.75 + 41.25 MHz Frequency. If the frequency of the Input Signal should drift out of the capture range of the PLL Circuit, DS1 the Red LED Unlock Indicator, located on the IF PLL Board, lights.

7.2.5 Voltages for Operation of the Tray (Receiver)

The AC input to the Tray is 117 VAC or 230 VAC and is directed thru Jack J2, of the (A1) Power Entry Module (1265-1104), to the step down Toroid (A2). The Power Entry Module contains an On/Off Switch, a 4 Amp Slo-Blo Fuse and three MOVs which protect the Tray from transients or surges which may occur on the AC Input Lines. When the On/Off Switch is switched On, AC is applied to the (A2) Toroid. The Toroid steps down the voltage into two 16 VAC outputs which are fed to (A3) the +12V(3A)/-12V Power Supply Board (1092-1206). The 16 VAC Inputs are connected to the two full wave bridge networks one for +12 VDC and one for -12 VDC. The output of the +12 VDC rectifier is fed to three 7812 IC regulators (U1, U2 and U3) and the output of the -12 VDC rectifier is fed to one 7912 IC regulator (U4). The ±12V Power Supply Board provides the voltage regulated and current limited +12 VDC and -12 VDC to the rest of the boards in the Tray.

7.2.6 +12VDC for External Preamplifier (Receiver)

+12 VDC is also applied through a 1 Amp Fuse F1 to (A7) the input DC Multiplexed UHF or VHF Filter. The +12 VDC is multiplexed in the Filter onto the input coaxial cable that connects from the (Optional) Remote Preamplifier Unit to the Receiver Tray. This supplies the Preamplifier with the +12 VDC needed for operation. The Red LED DS1 mounted on the Terminal Block TB1 will be lit if the +12 VDC is applied to the coaxial cable. **Note**: If the Red LED, DS1, is lit, the +12 VDC may damage Test Equipment that is connected to the input of the Receiver Tray. If a Preamplifier Assembly is not part of your System, F1 should be removed, therefore DS1 should not be lit and the +12 VDC is not multiplexed onto the input coaxial cable. A spare Fuse for F1 is supplied and stored near the fuse holder for F1.

Connect a UHF or VHF Input with a Multiburst Test signal applied, that is at the desired Channel Frequency, to J1 50Ω or J5 75Ω located on the rear of the (A3) VHF/UHF Receiver Tray. Check that the On/Off Switch located on the rear of the Tray is On.

Note: If the Red LED, DS1 is lit, +12 VDC is present at the input of the Receiver Tray and may damage any test equipment connected to it. Remove the fuse F1, DS1 will not be lit, before connecting test equipment to the input jack of the Receiver Tray.

7.2.6.1 (A7) UHF Filter, DC Multiplexed (1035-1204, 50Ω or 1035-1207, 75Ω), VHF Filter, LB, DC Multiplexed (1035-1902, 50Ω or 1035-1903, 75Ω) or VHF Filter, HB, DC Multiplexed (2065-1024, 50Ω or 2065-1023, 75Ω)

The input UHF or VHF signal (-61 dBm to -16 dBm) is fed to the filter which has been factory swept for 6 MHz Bandwidth at the Channel frequency and should not be tuned in the field. The output of the filter is directed to the J1 input of (A8) the Dual Stage Amplifier Assembly.

7.2.6.2 (A8-A1) Dual Stage Amplifier Board (1227-1501)

Mounted in: (A8) a Dual Stage Amplifier Assembly (1227-1503). The Dual Stage Amplifier Board has been factory set to the channel frequency and contains no customer tuning adjustments. The board has approximately +13 dB or +26 dB of gain, depending on whether Jumper W1 on J5 is in place.

7.2.6.3 (A9) UHF Filter (1007-1101), VHF LB Filter (1034-1202) or VHF HB Filter (2065-1000)

The UHF or VHF Filter has been factory swept for 6 MHz Bandwidth at the Channel Frequency and should not be tuned in the field. The output of the filter (-50 dBm to -5 dBm) is fed either through the additional amplifier stage on the Variable Gain Amplifier

Board or to (A10-A1) the Downconverter/Filter Board.

7.2.6.4 (A4) Channel Oscillator Assembly, Dual Oven (1145-1202)

Contains: The Channel Oscillator Board, Dual Oven (1145-1201).

1. Connect the main output of the Channel Oscillator (J1) to a spectrum analyzer, adjusted to view the crystal frequency, and peak the tuning capacitors C6 and C18 for maximum output. Then tune L2 and L4 for maximum output. The output level should be approximately +5 dBm and the Oven Temperature should be maintained at 50°C.

   If a spectrum analyzer is not available, connect a DVM to TP1 on the x8, x4 or x2 Multiplier Board. Tune capacitors C6 and C18 for maximum voltage at TP1. Then tune L2 and L4 for maximum voltage at TP1.

2. Connect the sample output of the Channel Oscillator at J2 to a suitable counter and tune C11, Coarse Adjust, and C9, Fine Adjust, to the crystal frequency. Do not re-peak C6, C18, L2 or L4 because this may change the output frequency.

Note: While adjusting C9 and C11 to the crystal frequency the peak voltage monitored at TP1 of the Multiplier Board should not decrease. If a decrease does occur a problem with the crystal is likely.

3. Reconnect the main output at J1 of the Channel Oscillator to the Input Jack J1 of the Multiplier Board.

Note: If the Optional Frequency Correction Kit is purchased a VCXO Assembly (1145-1206), containing a VCXO Board (1145-1204), will be used instead of the standard Channel Oscillator Board. The adjustment will be the same as above except that the frequency is adjusted by moving the Jumper W1 on Jack J6, located on the IF PLL Board (1109-1002), to Pins 2 & 3, Fixed Bias, and adjusting R15 on the IF PLL Board for -3 VDC at FL2 of the VCXO Assembly. Move the Jumper W1 on Jack J6 to between Pins 1 & 2, AFC. Connect the Oscillator Sample output, at (J2) of the Channel Oscillator or the Front Panel Sample Jack (J9), to a suitable Frequency Counter and tune C11, Coarse Adjust, to the desired frequency. Do not re-peak C6, C18, L2 or L4 because it may change the output frequency.

Reconnect the main output (J1) of the Channel Oscillator (+5 dBm) to the input (J1) of the Multiplier Board. DS1 the Red Unlock Indicator, located on the IF PLL Board, should not be lit.

7.2.6.5 (A5-A1) x8 Multiplier Board (1227-1002), x4 Multiplier Board (1227-1525) or x2 Multiplier Board (1227-1524)

Mounted in (A5) a Multiplier Enclosure (1265-1125). During Normal operation, the Green LED DS1, which can be seen through the access hole in the Enclosure Assembly, will be lit to indicate that the L.O. is present at the output of the x8 Multiplier Board.

1. Connect a Spectrum Analyzer to the Output Jack (J2) of the board.

2. Tune C4, C6, C10, C12, C18 and C20 on the x8 and the appropriate caps on the other boards for maximum output. Readjust all the Capacitors to minimize the seventh and the ninth harmonics, they should be at least -30 dB down, without affecting the x8 Multiplier Output.

If a Spectrum Analyzer is not available a DC voltmeter can be used as follows but the harmonic frequencies must be minimized to prevent interference with other Channels.

1. While Monitoring each Test Point with a DC voltmeter, maximize the voltage by tuning the Broadband Multipliers in the following sequence.

2. For x8 Multiplier Board: Monitor TP1 with a DVM and tune C4 for maximum. (Typical .6 VDC)
   Monitor TP2 and tune C6 and C10 for maximum. (Typical 1.2 VDC)
   Monitor TP3 and tune C12 and C18 for maximum. (Typical 2 VDC)
   Monitor TP4 and tune C20 for maximum.
   Re-peak C12 and C10 while monitoring TP4. (Typical 3.5 VDC)

   For x4 Multiplier: Monitor TP1 with a DVM and tune C4 for maximum. (Typical .6 VDC)
   Monitor TP2 and tune C6 and C10 for maximum. (Typical 1.2 VDC)
   Monitor TP3 and tune C12 for maximum.
   Re-peak C12 and C10 while monitoring TP3. (Typical 2 VDC)

   For x2 Multiplier: Monitor TP1 with a DVM and tune C4 for maximum. (Typical .6 VDC)
   Monitor TP2 and tune C6 for maximum.
   Re-peak C4 and C6 while monitoring TP2. (Typical 1.2 VDC)

The Green LED DS1 should be lit which indicates that the L.O. is present at the Output Jack J2 of the Multiplier Board. The output of the Multiplier at J2 is connected to (A6) a UHF or VHF Filter.

7.2.6.6 (A6) UHF Filter (1007-1101), VHF LB Filter (1034-1211) or VHF HB Filter (2065-1000)

This filter has been factory swept at the L.O. frequency and should not be tuned without proper equipment. The output of the filter (+15 dBm) is connected to J2 on (A10) the Downconverter/Filter Assembly.

7.2.6.7 (A10-A1) Downconverter/Amplifier Board (1227-1502)

Mounted in: The (A10) Downconverter/Amplifier Assembly (1227-1505).

The Mixer contains no adjustments and has a L.O. input of approximately +12 dBm in level applied to J2 and a -47 dBm to -2 dBm RF input applied to J1. The output IF level at J3 will be -55 dBm to -10 dBm.

1. Connect a Spectrum Analyzer to the Output Jack J3 and adjust L1, C2 and L3 for best frequency response.

2. Adjust C8 and R3 to notch out the Aural IF Frequency.

The IF output at J3 (-55 dBm to -10 dBm) is fed to the IF Filter/ALC Board. If needed a 10 dB Pad can be added to the circuit by moving the jumpers on J4 and J5 to the In position.

7.2.6.8 (A11-A1) IF Filter/ALC Board (1227-1504)

Mounted in: The (A11) IF Filter/ALC Enclosure (1265-1105).

1. Check that Switch S1, located on the IF Filter/ALC Board, is in the Auto ALC and that the output of the Board at J2 is approximately 0 dBm Output, adjust R23 if needed.

7.2.6.9 (Optional) (A11-A2) SAW Filter/Amplifier Board (1035-1211)

Mounted in: The (A11) IF Filter/ALC Enclosure (1265-1105).

This board is used for additional adjacent Channel rejection only if needed and may not be part of the Tray.

The board contains no tuning adjustments. The Jumpers W1 and W2 on J4 and J5 are placed for Attenuator In or Attenuator Out as needed to give the same output level at J2 as was at J1.

7.2.6.10 (A2) ±12V Power Supply Board (1092-1206)

This board contains no adjustments.

Note: If the (Optional) Frequency Corrector Kit is part of the tray, perform the following adjustments. If the Frequency Corrector Kit is not part of the tray, the tray is aligned and ready for normal operation.

7.2.7 Exciter/Amplifier Chassis Assembly

The exciter/amplifier chassis assembly operates using an external IF input from an external receiver tray. The IF source connects to J6, the modulated IF Input jack, on the rear of the chassis assembly, which is cabled to the IF Processor Module.

On the LCD Display, located on the Controller/Power Supply Module, push the button to switch the translator to Operate. The setup of the RF output includes adjustments to the drive level of the Power Amplifier, the adjustment of the linearity and phase predistortion to compensate for any nonlinear response of the Power Amplifier on the front panel of the IF Processor module.

Verify that all red LEDs located on the IF Processor front panel are extinguished. The following details the meaning of each LED when illuminated:

- DS1 (input fault) – Indicates that either abnormally low or no IF is present at the input of the module.
- DS2 (ALC fault) – Indicates that the ALC circuit is unable to maintain the signal level requested by the ALC reference. This is normally due to excessive attenuation in the linearity signal path or the IF phase corrector signal path, or that switch SW1 is in the Manual ALC Gain position.
- DS4 (Mute) – Indicates that a Mute command is present to the system.

Switch the translator to Standby. The ALC is muted when the translator is in Standby. To monitor the ALC, preset R3, manual gain adjust, on the front panel of the Upconverter module, fully CCW. Move switch SW1, Auto/Man AGC, on the front panel of the Upconverter module, to the Manual position. Place the translator in Operate. Adjust the

ALC GAIN pot on the front panel of the IF Processor to obtain +0.8 VDC on the LCD Display on the Controller/Power Supply in the ALC screen. Move the MAN/AUTO ALC switch back to Auto, which is the normal operating position.

To adjust the AGC Cutback setting, raise the output power of the translator to 110%. Adjust R2, AGC Cutback, located on the front panel, CCW until the LED DS1, AGC Cutback, just starts to flash. Return the output power of the translator to 100%.

7.2.8 Linearity Correction Adjustment

As shipped, the exciter was preset to include amplitude and phase pre-distortion. The pre-distortion was adjusted to approximately compensate the corresponding non-linear distortions of the Power Amplifier.

NOTE: On the IF processor board inside the module the correction enable/disable jumper W12 on J30 will be in the Enable position, on pins 2 & 3.

Set up a spectrum analyzer with 100 kHz resolution bandwidth and 100 kHz video bandwidth to monitor the intermodulation products of the RF output signal of the Power Amplifier. There are three Linearity Corrector stage adjustments located on the front panel of the IF Processor Module. The adjustments are threshold settings that are adjusted as needed to correct for any amplitude or phase intermod problems. Adjust the top linearity correction adjustment R211 threshold cut in for the in phase amplitude distortion pre-correction that is needed. Next adjust the middle linearity correction adjustment R216 threshold cut in also for the in phase amplitude distortion pre-correction that is needed. Finally adjust the bottom linearity correction adjustment R231 threshold cut in for the quadrature phase distortion pre-correction that is needed. The above pots are adjusted for the greatest separation between the peak visual carrier and the intermod products.

7.2.9 Frequency Response Delay Equalization Adjustment

The procedure for performing a frequency response delay equalization adjustment for the translator is described in the following steps:

The center frequency for the first stage is 45 MHz. Adjust R103, the top frequency response equalizer pot, located on the front panel of the IF Processor Module, for the best depth of frequency response correction at 45 MHz.

The center frequency for the second stage is 43.5 MHz. Adjust R106, the middle frequency response equalizer pot, located on the front panel of the IF Processor Module, for the best depth of frequency response correction at 43.5 MHz.

The center frequency for the second stage is 42 MHz. Adjust R274, the bottom frequency response equalizer pot, located on the front panel of the IF Processor Module, for the best depth of frequency response correction at 42 MHz.

After the three delay attenuation equalizers have been adjusted, fine tune, as needed, for the best frequency response across the channel.

Note: The frequency response adjustment is done at IF, so the frequency cut-in points will be reversed at the UHF frequencies.

7.2.10 Calibration of the Translator Forward Output Power Level

Note: Perform the following procedure only if the power calibration is suspect.

Switch the translator to Standby and preset R51, the aural null pot on (A4) the visual/aural metering board, fully CCW. Switch the LO/Upconverter sled to Manual Gain. Adjust R48, the null offset pot on the visual/aural metering board, full CW. Adjust CCW until 0% visual output is displayed on the LCD Display in the System Visual Power position. Perform the following adjustments with no aural present by removing the jumper cable, the aural IF loop-through, that is connected on the rear of the exciter/driver chassis. Connect a sync and black test signal to the video input jack of the exciter/driver. Switch the translator to Operate.

Next, set up the translator for the appropriate average output power level using the Manual Gain pot on the LO/Upconverter sled:

Example is for 500-Watt translator.

- Sync + black 0 IRE setup/wattmeter=300 watts
- Sync + black 7.5 IRE setup/wattmeter=275 watts

Note: The translator must have 40 IRE units of sync.

Adjust R28, visual calibration, on the (A4) visual/aural metering board for .8V, at TB30-14 and TB30-12 return, on the exciter/driver assembly, then adjust display to read 100% on the front panel meter in the System Forward Power position.

With the spectrum analyzer set to zero span mode, obtain a peak reference on the screen. Reconnect jumper cable on the rear of the exciter/driver. While in the Visual Output Power position, adjust L3 for a minimum visual power reading on the LCD display. Turn the power adjust pot on the LO/Upconverter sled front panel until the original peak reference level is attained. Peak L1 and C8 for a maximum aural power reading, then adjust R20 for .8V, at TB30-15 and TB30-12 return, on the exciter/driver assembly, then adjust LCD display for 100% system aural power reading. Switch to the Visual Output Power position and adjust R51 for 100% visual power on system LCD display.

7.2.11 Calibration of the Translator Reflected Output Level

On the meter, in the Visual Power position, turn the power adjust pot to 25%. Move the Reflected cable on the (A11) coupler to the unused "INC" port on the coupler. Then adjust R39 on (A4) the visual/aural metering board for a .2VDC, at TB30-13 and TB30-12 return, on the exciter/driver assembly. Then adjust the LED display for 25% reading in the System Reflected Power position. At this 25% reference power reading a reflected power fault should appear on the System Errors Menu. Turn the power adjust pot slightly CCW and the fault should be clearable on the System Error Menu. Turn the pot CW until the Fault appears. The reflected output power is now calibrated.

Switch the translator to Standby and move the Reflected power cable on the A11 Coupler back to the "Reflected Port". Switch the translator to Operate and adjust the front panel power pot for a 100% visual power reading. Switch the LO/Upconverter to the Auto AGC position and adjust the ALC Gain adjust pot on the front of the IF Processor module for 100% visual power reading, if needed.

7.2.12 (A9) Bandpass Filter Assembly

The Bandpass Filter Assembly is tuned to reject unwanted distortion products generated when the signals are diplexed and also during the amplification process.

The Bandpass Filter is factory tuned to the proper bandwidth and should not need tuned. If you think tuning is needed consult Axcera Field Support Department before beginning the adjustment.

7.2.13 (A10) UHF Trap Filter Assembly

The Traps on the output Trap Filter are labeled with their Center Frequency relative to the Frequency of the Carrier. (For Example: The Traps labeled -4.5 MHz are tuned for a Center Frequency of 4.5 MHz Lower than the Frequency of the Visual Carrier.) The first section of the Trap Filter filters out the Visual Carrier plus 9 MHz (f_v+9 MHz). The second and fourth sections work together to filter out the lower spurious product (f_v-4.5 MHz). The third section is tuned to remove the (f_v+8.08). The output of the Trap Filter is an "N" Type Connector.

The Trap Sections have been factory tuned and should not need major adjustments. The Trap Filter is comprised of four trap sections connected to the main transmission line.

The Trap Sections are Reflective Notches, adjustable across the entire UHF Frequency Band. The electrical length of the Outer Sleeve and the Center Rod of the Notch can be adjusted to Tune the Notch Frequency. The Depth of the Notch is set by the gap between the Center Conductor of the Trap Section and the Center Conductor of the Main Line. Tight Coupling makes a Deep Notch, while Loose Coupling makes a Shallow Notch.

FINE TUNING of the Notches Center Frequency can be accomplished with the Tuning Bolts located on the side of the Filter Section. Loosen the nut locking the Bolt in place and adjust the Bolt to change the Frequency of the Notch. Monitor the output of the Translator with a Spectrum Analyzer and Null the Distortion Product with the Bolt. Red Field is a good Video Test Signal to use to see the +8.08 MHz Product. Tighten the nut when the tuning is completed. Hold the bolt in place with a screwdriver as the nut is tightened to prevent it from slipping.

MAJOR TUNING, such as changing the Notch Depth or moving the Notch Frequency more than 1 MHz, the Outer Conductor and the Center Conductor of the Trap Section must both be moved. This requires a RF Sweep Generator to accomplish. Apply the Sweep signal to the Input of the Trap Filter and monitor the Output. Loosen the Clamp holding the Outer Conductor in place and make the length longer to Lower the frequency of the Notch or shorter to Raise the frequency of the Notch. Loosen the Center Conductor with an Allen Wrench and move it Deeper for a Lower Frequency Notch or out for a Higher Frequency Notch. These adjustments must both be made to change the Notch Frequency. Moving only the Center Conductor or the Outer Conductor will effect the Notch Depth in addition to the Center Frequency. The variable that is being adjusted with this procedure is the length of the Center Conductor inside the Trap Filter. The gap between the Trap and the Main Line should not be changed. Moving only the Inner or the Outer Conductors by itself will effect the Gap and the Notch depth.

To effect the Notch Depth Only, both sections will have to be moved. The Notch Depth is controlled by the Gap between the Center Conductor and the Trap Section. This Gap also has an effect on the Center Frequency. To Deepen the Notch, Shorten the Outer Conductor and pull the Center Conductor Out until the Notch is back in the same place. Move the Sections in the opposite direction to make a Shallow Notch. **NOTE**: **THE TRAP**

FILTER IS TYPICALLY ADJUSTED FOR A NOTCH DEPTH OF 10 dB.

7.2.14 The Effects of Tuning the Output Trap Filter

Lengthening Outer Conductor Only - Notch Frequency Up, Shallower Notch.

Shortening Outer Conductor Only - Notch Frequency Down, Deeper Notch.

Inserting Inner Conductor Deeper - Notch Frequency Down, Deeper Notch.

Inserting Less Inner Conductor - Notch Frequency Up, Shallower Notch.

Tuning Bolt In - Notch Frequency Down.

Tuning Bolt Out - Notch Frequency Up.

Moving both Inner and Outer Conductors to keep the Same Gap inside - Center Frequency Moves, Notch Stays the Same.

After tuning has been completed, tighten the Clamp and the Allen Screws that hold the Conductors. Use the Fine Tuning Bolts to bring the Frequency In. The Final Tuning Adjustments should be completed with the Translator driving the Output Trap Filter for at least one hour to allow for warm-up drift.

The Translator is ready for normal operation.
This completes the detailed alignment procedures for the LX Series translator.