

Chapter 3 Installation and Setup Procedures

There are special considerations that need to be taken into account before the 837B can be installed. For example, if the installation is completed during cool weather, a heat-related problem may not surface for many months, suddenly appearing during the heat of summer. This section provides planning information for the installation and set up of the translator.

3.1 Site Considerations

The Translator consists of three cabinet assemblies, the Exciter Cabinet Assembly and two Amplifier Array Assemblies. The Exciter Cabinet Assembly requires an AC Input of 208/240 VAC, Single Phase with a rating of 20 Amps. Each of the Amplifier Array Assemblies requires an AC Input of 208/240 VAC, three Phase with a rating of 55 Amps or Single Phase with a rating of 100 Amps. Check that the site has the voltage requirement needed.

The 837B is designed and built to provide long life with a minimum of maintenance. The environment in which it is placed is important and certain precautions must be taken. The three greatest dangers to the translator are heat, dirt, and moisture. Heat is usually the greatest problem, followed by dirt, and then moisture. Over-temperature can cause heat-related problems such as thermal runaway and component failure. Each amplifier tray in the translator contains a thermal interlock protection circuit that will shut down that tray until the temperature drops to an acceptable level.

A suitable environment for the translator can enhance the overall performance and reliability of the translator and maximize revenues by minimizing downtime. A properly designed facility will have an adequate supply of cool, clean air, free of airborne particulates of any kind, and no

excessive humidity. An ideal environment will require temperature in the range of 40° F to 70° F throughout the year, reasonably low humidity, and a dust-free room. It should be noted that this is rarely if ever attainable in the real world. However, the closer the environment is to this design, the greater the operating capacity of the translator.

The fans and blowers designed and built into the translator will remove the heat from within the trays, but additional means are required for removing this heat from the building. To achieve this, a few issues need to be resolved. The first step is to determine the amount of heat to be removed from the translator room. There are generally three sources of heat that must be considered. The first and most obvious is the heat from the translator itself. The following example is for a 5000 Watt Transmitter. The heat can be determined by subtracting the average power to the antenna (3225 watts) from the AC input power (20,000 watts). This number in watts (16,775) is then multiplied by 3.41, which gives 57,202.75, the BTUs to be removed every hour. 12,000 BTUs per hour equals one ton; as a result, a 5-ton air conditioner will cool a 5-kW transmitter.

The second source of heat is other equipment in the same room. This number is calculated in the same way as the equation for BTUs. The third source of heat is equally obvious but not as simple to calculate. This is the heat coming through the walls, roof, and windows on a hot summer day. Unless the underside is exposed, the floor is usually not a problem. Determining this number is usually best left up to a qualified HVAC technician. There are far too many variables to even estimate this number without reviewing the detailed drawings of the site that show all of the construction details. The sum of these

three sources is the bulk of the heat that must be removed. There may be other sources of heat, such as personnel, and all should be taken into account.

Now that the amount of heat that must be removed is known, the next step is to determine how to accomplish this. The options are air conditioning, ventilation, or a combination of the two. Air conditioning is always the preferred method and is the only way to create anything close to an ideal environment.

Ventilation will work quite well if the ambient air temperature is below 100° F, or about 38° C, and the humidity is kept at a reasonable level. In addition, the air stream must be adequately filtered to ensure that no airborne particulates of any kind will be carried into the translator. The combination of air conditioning for summer and ventilation during the cooler months is acceptable when the proper cooling cannot be obtained through the use of ventilation alone and using air conditioning throughout the year is not feasible.

Caution: The use of air conditioning and ventilation simultaneously is not recommended. This can cause condensation in transmitters. For tube-type transmitters, this can be especially serious if the condensation forms in the tube cavity and creates damaging arcs.

The following precautions should be observed regarding air conditioning systems:

1. Air conditioners have an ARI nominal cooling capacity rating. In selecting an air conditioner, do not assume that this number can be equated to the requirements of the site. Make certain that the contractor uses the actual conditions that are to be maintained at the site in determining the size of the air conditioning unit. With the desired

conditioned room temperature under 80° F, the unit must be derated, possibly by a substantial amount.

2. Do not have the air conditioner blowing directly onto the translator. Under certain conditions, condensation may occur on, or worse in, the translator.
3. Do not separate the front of the translator from the back with the thought of air conditioning only the front of the unit. Cooling air is drawn in at the front of all translators and in the front and back of others. Any attempt to separate the front of the translator from the rear of the unit will adversely affect the flow of cooling air.
4. Interlocking the translator with the air conditioner is recommended to keep the translator from operating without the necessary cooling.
5. The periodic cleaning of all filters is a must.

When using ventilation alone, the following general statements apply:

1. The blower, with attendant filters, should be on the inlet, thereby pressurizing the room and preventing dirt from entering the translator.
2. The inlet and outlet vents should be on the same side of the building, preferably the leeward side. As a result, the pressure differential created by wind will be minimized. Only the outlet vent may be released through the roof.
3. The inlet and outlet vents should be screened with 1/8-inch hardware cloth (preferred) or

- galvanized hardware cloth (acceptable).
4. Cooling air should enter the room as low as practical but in no case higher than four feet above the floor. The inlet must be located where dirt, leaves, snow, etc., will not be carried in with the cooling air.
 5. The exhaust should be located as high as possible. Some ducting is usually required to insure the complete flushing of heated air with no stagnant areas.
 6. The filter area must be large enough to insure a maximum air velocity of 300 feet per minute through the filter. This is not a conservative number but a never-exceed number. In a dusty or remote location, this number should be reduced to 150 CFM.
 7. The inlet and outlet(s) must have automatic dampers that close any time the ventilation blower is off.
 8. In those cases in which translators are regularly off for a portion of each day, a temperature-differential sensor that controls a small heater must be installed. This sensor will monitor inside and outside temperatures simultaneously. If the inside temperature falls to within 5° F of the outside temperature, the heater will come on. This will prevent condensation when the ventilation blower comes on and should be used even in the summer.
 9. A controlled-air bypass system must be installed to prevent the temperature in the room from falling below 40° F during translator operation.
 10. The blower should have two speeds, which are thermostatically controlled, and be interlocked with the translator.
 11. The blower on high speed must be capable of moving the required volume of air into a half inch of water pressure at the required elevation. The free air delivery method must not be used.
 12. Regular maintenance of the filters, if used, can not be overemphasized.
 13. Tube translators should not rely on the internal blower to vent the cooling air at elevations above 4000 feet. For external venting, the air vent on the cabinet top must be increased to an 8-inch diameter for a 1-kW transmitter and to a 10-inch diameter for 4, 5, 6 and 10-kW transmitters. An equivalent rectangular duct may be used but, in all cases, the outlet must be increased by 50% through the outlet screen.
 14. It is recommended that a site plan be submitted to Axcera for comments before installation begins.
- In calculating the blower requirements, filter size, and exhaust size, if the total load is known in watts, 2000 CFM into ½ inch of water will be required for each 5000 watts. If the load is known in BTUs, 2000 CFM into ½ inch of water will be required for each 17,000 BTUs. The inlet filter must be a minimum of seven square feet, larger for dusty and remote locations, for each 5000 watts or 17,000 BTUs. The exhaust must be at least four square feet at the exhaust screen for each 5000 watts or 17,000 BTUs.
- The information presented in this section is intended to serve only as a general guide and may need to be modified for unusually severe conditions.

A 1 kW typical layout for a combination of air conditioning and ventilation is shown in Figure 3-1.

System interlocking and thermostat settings should be reviewed with Axcera.

As with any equipment installation, it is always good practice to consult the manufacturer when questions arise. Axcera can be contacted at (724) 873-8100

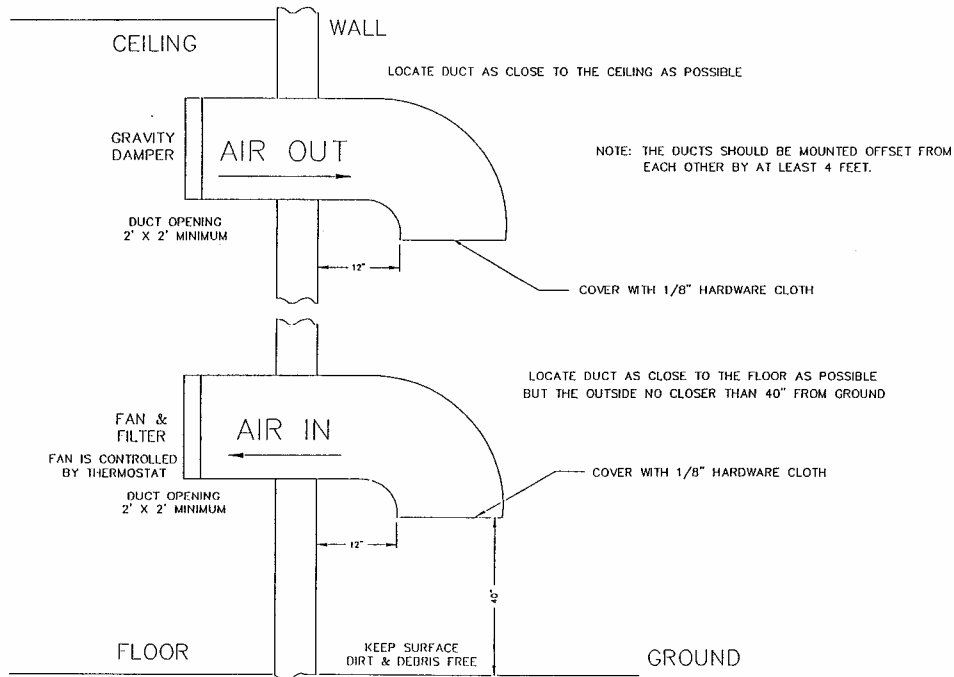


Figure 3-1. 1 kW Minimum Ventilation Configuration

3.2 Unpacking the Cabinets and Trays

Note: Air conditioning and any related heat exhaust ducts should be in place before continuing with the installation of the translator.

Thoroughly inspect the cabinets and all other materials upon their arrival. Axcera certifies that upon leaving our facility the equipment was undamaged and in proper working order. The shipping containers should be inspected for obvious damage that indicates rough handling. Check for dents and scratches or broken switches, meters, or connectors. Any claims against in-transit damage should be directed to the carrier. Inform Axcera as to the extent of any damage as soon as possible.

Remove the Cabinets with Trays, Hybrid Combiner and Output Coupler along with the Installation Material that make up the 837B from the crates and boxes. Remove the straps that hold the cabinets to the shipping skids and slide the cabinets from the skids. Remove the plastic wrap and foam protection from around the cabinets. Do not remove any labeling or tags from any cables or connectors; these are identification markers that make assembly of the translator much easier.

There are three Cabinets, (A1) the Single UHF Exciter Assembly, (A2) the Side A 2-3 kW Amplifier Array Assembly and (A3) the Side B 2-3 kW Amplifier Array Assembly. These Cabinets should be arranged from left to right with you facing the front, the A1 Single UHF Exciter Cabinet, the A2 Side A Amplifier

Cabinet and the A3 Side B Amplifier Cabinet. The Amplifier Arrays may have an (Optional) External Exhaust Kit for connection to duct work and the outside of the building.

The cabinets should be positioned with consideration taken for adequate air intake and exhaust to the duct work, the opening of the rear door, access to the Trays including sliding them out for testing, the AC hook up and the installation of the Output Transmission Line. The Cabinets should be Grounded using copper strapping material and also should be permanently mounted to the floor of the Site using the holes in the bottom of the Cabinets.

Remove the two L-brackets, mounted on the front panel rails of the Single Exciter Cabinet and Amplifier Cabinets, which hold the Trays in place during shipment. Inspect for any loose hardware or connectors, tightening where needed. Open the rear doors, the key to unlock the door, if the door has the Optional lock, is found in a tan envelope taped to the door, and inspect the interior for packing material. Carefully remove any packing material that is found. Slowly slide each Tray in and out to verify that they do not rub against each other and have no restriction to free movement.

Note: The UHF Amplifier Trays, if removed, must be placed into the Cabinets in the proper location according to the labeling on each Tray or the Gain and the Phasing will not be maximized.

The UHF Amplifier Trays are labeled to indicate where they are positioned in the Side A or the Side B Amplifier Cabinets. They are mounted in each Cabinet from bottom left to top right, with A1 the bottom left Tray and A6 the top right Tray. The Tray labeled A1 is in the Side A Cabinet, bottom left position. The Tray labeled A2 is in the Side A Cabinet, bottom right position. The Tray labeled A3 is in the Side A Cabinet, center left position. The Tray labeled A4 is in the Side A Cabinet, center right position. If present, the Tray labeled A5 is in the Side A Cabinet, top left position. If present, the Tray labeled A6 is in the Side A Cabinet, top right position.

The UHF Amplifier Tray labeled B1 is in the Side B Cabinet, bottom left position. The Tray labeled B2 is in the Side B Cabinet, bottom right position. The Tray labeled B3 is in the Side B Cabinet, center left position. The Tray labeled B4 is in the Side B Cabinet, center right position. If present, the Tray labeled B5 is in the Side B Cabinet, top left position. If present, the Tray labeled B6 is in the Side B Cabinet, top right position.

The trays are mounted in the cabinet using Chassis Trak cabinet slides as shown in Figure 3-2.

The tray slides are on the top and the bottom of the UHF amplifier trays and on the sides of the UHF exciter tray and the Variable Phase/Gain Trays. Inspect the trays for any loose hardware or connectors, tightening as needed.

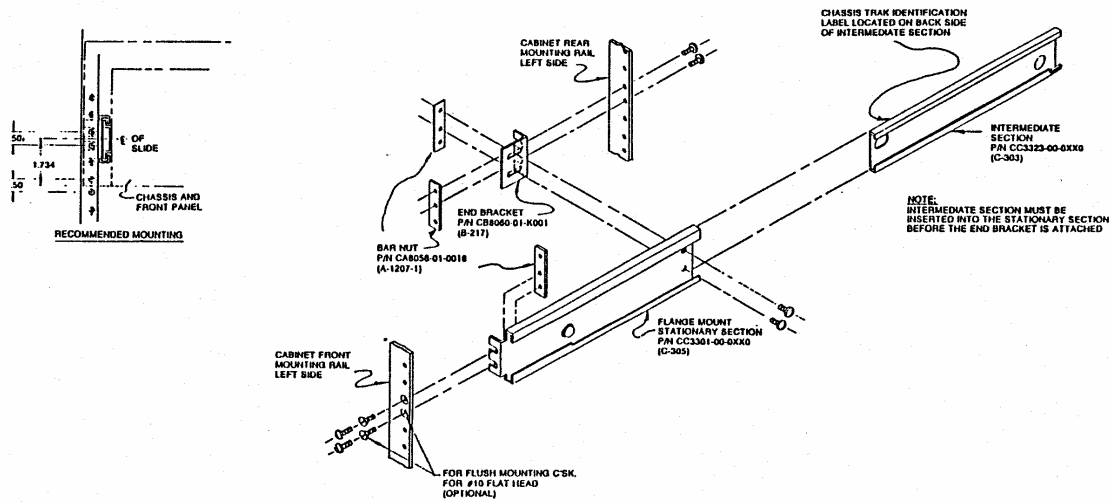


Figure 3-2. Chassis Trak Cabinet Slides

3.3 Installing the Cabinets and Trays

Caution: Each UHF amplifier tray has a hardline coaxial cable connected to the rear panel. The trays will not slide out unless this connection is removed.

To pull out the UHF amplifier trays for test purposes, use the coaxial cable included in the installation material kit to make the connection from the tray to the output cable.

It may be necessary to adjust the position of the trays to keep them from rubbing. This is accomplished by loosening the cabinet slide mounting bolts that hold the front of the slide to the mounting frame of the cabinet and moving the tray up or down, as needed, to correct for the rubbing.

Once the cabinets are in place, and the trays are checked for rubbing, the main AC hookup can be made.

Caution: Before connecting the 208/240 VAC, make certain that all of the circuit breakers associated with the translator have been switched off.

There are three AC Input circuits to the Translator, one 208/240 VAC single phase 20 Amp for the Exciter Cabinet and two 208/240 VAC 55 Amp three phase or 100 Amp single phase for each of the Amplifier Array Cabinets.

3.3.1 AC Connection to the UHF Exciter Cabinet

In the Exciter Cabinet, the 20 Amp, 208/240 VAC Input connections are made to the Terminal Block A8-TB1, which is part of the AC Distribution Assembly, Exciter Cabinet (1245-1500), located near the center right hand side, rear portion of Cabinet #1. AC connections are, Line 1 to TB1-1A, Line 2 to TB1-3A and Chassis Ground to TB1-2A).

3.3.2 AC Connection to the Amplifier Cabinets

3.3.2.1 Three Phase AC Connection to the Amplifier Cabinets

Connect one of the 55 Amp, 208/240 VAC Inputs to the Terminal Block A10-TB1, which is part of the AC Distribution Assembly, Amplifier

Assembly (1278-1100), located near the center right hand side, rear portion of Cabinet #2. Connect Line 1 to TB1-1A, Line 2 to TB1-2A, Line 3 to TB1-3A and Safety Ground to TB1-4A.

Connect the other 55 Amp, 208/240 VAC Input to the Terminal Block A10-TB1, which is part of the AC Distribution Assembly, Amplifier Assembly (1278-1100), located near the center right hand side, rear portion of Cabinet #3. Connect Line 1 to TB1-1A, Line 2 to TB1-2A, Line 3 to TB1-3A and Safety Ground to TB1-4A.

3.3.2.2 Single Phase AC Installation to the Amplifier Cabinets

Connect one of the 100 Amp, 208/240 VAC Inputs to the Terminal Block A10-TB1, which is part of the AC Distribution Assembly, Amplifier Assembly (1278-1200), located near the center right hand side, rear portion of Cabinet #2. Connect Line 1 to TB1-1A, Line 2 to TB1-3A and Safety Ground to TB1-4A.

Connect the other 100 Amp, 208/240 VAC Input to the Terminal Block A10-TB1, which is part of the AC Distribution Assembly, Amplifier Assembly (1278-1200), located near the center right hand side, rear portion of Cabinet #3. Connect Line 1 to TB1-1A,

Line 2 to TB1-3A and Safety Ground to TB1-4A.

3.3.3 Output Connections

(Refer to Figure 3.3)

The RF Output of the (A2) Amplifier Assembly connects through (A5) a 1-5/8" to 3-1/8" Adapter to J1 on (A4) the Hybrid Combiner. The RF Output of the (A3) Amplifier Assembly connects through (A6) a 1-5/8" to 3-1/8" Adapter to J2 on (A4) the Hybrid Combiner. The Reject Output of the combiner at J4 connects through (A12) a 1-5/8" to 3-1/8" Adapter to (A7) a Directional Coupler (1016-1043) to (A8) a 2500 Watt Reject Load. The combined RF Output of the Combiner at J3 (3-1/8") connects through (A9) the Bandpass Filter, (A10) the Output Trap Filter to (A11) the Output Coupler Assembly (1020-1002). The output of the coupler at J2 (3-1/8") connects to the Transmission Line that is connected to your Antenna System.

This completes the unpacking and installation of the 837B UHF television translator. Refer to the setup and operation procedures that follow before applying power to the translator.

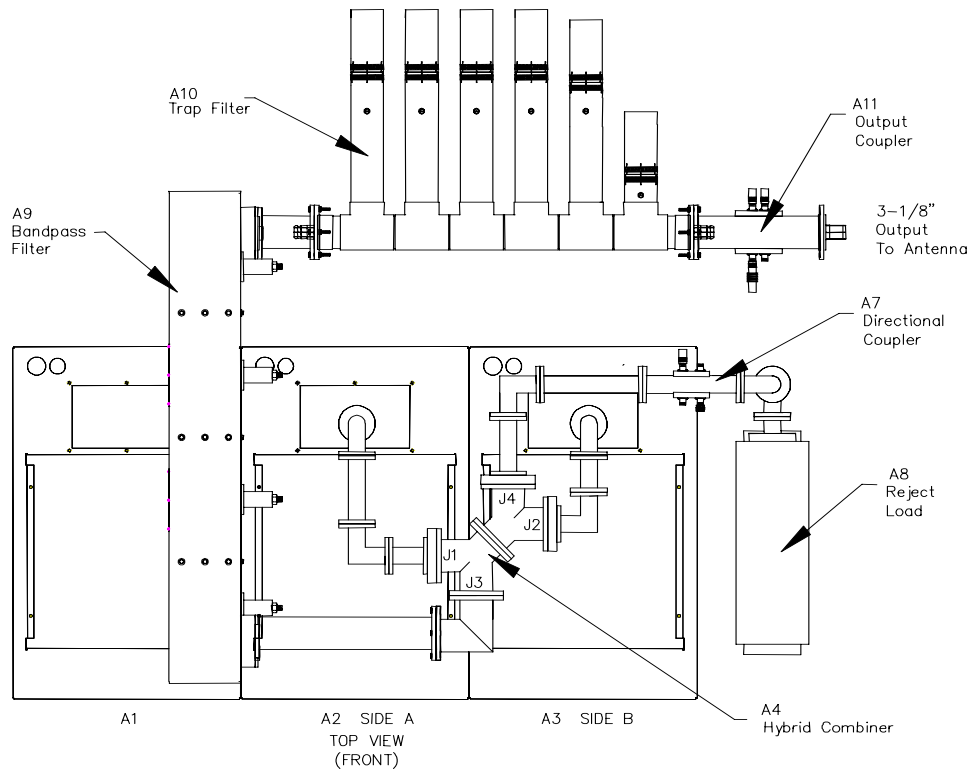


Figure 3-3 Typical Rigid Coax Reconnection Drawing

3.4 Setup and Operation

Initially, the translator should be turned on with the RF output at J2 of (A11) the coupler assembly terminated into a dummy load of 4 to 6 kW, depending on output power of your system. If a load is not available, check that the output of the coupler assembly is connected to the antenna.

Connect the on channel RF Input to the F connector J3 for 75Ω or to the N connector J1 for 50Ω located on (A9) the Remote Interface Assembly, mounted on the top, rear of the UHF Exciter Cabinet. If the Optional Modulator is present, connect the baseband audio to TB1 on the A9 remoter interface assembly. If composite audio is used instead of Balanced Audio, connect the Composite Audio Input to the BNC Jack (J6).

Connect the Baseband Video Input to the BNC Jack (J2) also located on (A9) the Remote Interface Assembly.

Switch On the Main AC Circuit Breaker located on the AC Distribution Assembly mounted toward the rear of the Single UHF Exciter Assembly. Switch On the Main AC Circuit Breakers located on the AC Distribution Assemblies mounted toward the rear of the Amplifier Cabinets. Switch On the CB2-CB9 Circuit Breakers, for the individual UHF Amplifier Trays and Reject load fans, located on the AC Distribution Assemblies mounted in each Amplifier Cabinet.

Switch the Operate/Standby Switch located on the UHF Exciter to Standby and the Auto/Manual Switch also on the UHF Exciter to Auto. Normal operation of the Translator is with the switch in

Automatic. Automatic operation of the Exciter uses the Video Input to the Exciter as an Operate/Standby Switch. In Auto, if the Input Video is lost, the Exciter automatically reverts the Translator to Standby and when the Video Signal is restored, the Exciter will automatically return the Translator to Operate.

Move the Operate/Standby switch on the UHF exciter tray to Operate. Observe the power supply reading, >+30 VDC(+32 VDC), on the front panel of the UHF amplifier trays. If present, the (Optional) External Exhaust Fan on the roof of each Amplifier Array Cabinet will operate.

Note: If the translator does not switch to Operate when the Operate/Standby switch is placed in Operate, check that an external interlock plug, with a jumper wired from pins 1 to 2, is connected to jack J7 on (A9) the A/V input and remote interface assembly.

Observe the Front Panel Meter located on the Metering Panel with the switch in the Combined Visual Output Power position, it should read 100%. If needed, adjust the Power Adjust screwdriver pot located on the front panel of the UHF Exciter to attain 100% Output on the Front Panel Meter located on the Metering Panel with the switch in the Combined Visual Output Power position.

As you are checking the output Power Level, check the Meter Readings on the Metering Panel in the % Reflected Power Position for the Side A and also the Side B Amplifier Assemblies and the Combined position for the Translator. If the % Reflected Power for any of the readings is very high, above 20%, a problem with the Output Coaxial Lines in the problem Side Amplifier Assembly or in the Output Lines for the System is present and needs to be checked and corrected. A center bullet missing from

the 1-5/8" or 3-1/8" Rigid Coax Lines or loose bolts on the connections can cause this problem.

Observe the % Exciter Power reading of the Meter on the Exciter, it should read the same as written on the Test Data Sheet for your Translator. Move the Operate/Standby Switch, located on the Exciter, to Standby.

The Gain and Phase controls located on the front panels of the individual UHF Amplifier Trays were adjusted at the factory to attain 100% Output of the Translator and should not need readjusted. The Forward Meter readings for Side A and for Side B may not be the same but should be the same as, or close to the values written on the Test Data Sheet for your Translator. Side A and Side B are combined to give the correct Peak of Sync Output, which is 100% in the Combined Visual position.

The readings on each of the individual UHF Amplifier Trays may not be the same. Refer to the Test Data Sheet for your Translator and compare the final readings from the Factory on the Test Data Sheet with the readings on each of the Trays after the Set Up. They should be very close to the same. If a reading is way off, refer to the Phasing and Power Adjustment Procedure for the UHF Amplifier Trays in the Detailed Alignment Procedure before trying to adjust.

If a dummy load is connected to the Translator, switch the Translator to Standby and switch Off the Main AC Circuit Breakers found on the AC Distribution Panels in each Cabinet. Remove the dummy load and make all connections needed to connect the Translator to the Antenna for your System. Switch the Main AC Circuit Breakers On and the Operate/Standby Switch to Operate. Adjust the Exciter Power Adjust pot to attain 100% Combined Output.

If the Translator is already connected to the Antenna, check that the Combined Output is 100%. If needed, adjust the Power Adjust Pot located on the UHF Exciter for 100% in the Combined Output position.

This completes the translator setup and operation procedures for the 837B UHF

solid state translator. The translator can now be operated normally.

If a problem occurred during the setup and operation procedures, refer to Chapter 5, Detailed Alignment Procedures, of this manual for more information.