Chapter 3
Installation and Setup Procedures

There are special considerations that need to be taken into account before the 840A 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 transmitter.

3.1 Site Considerations

The 840A transmitter requires two main AC input lines, a 3-phase 208/240 VAC, 60 Hz input of at least 100 amp rating that connects to the high-voltage power supply assembly and a single-phase 208/240 VAC, 60 Hz input of at least 40 amp rating that connects to the exciter/driver assembly. Make sure that the proposed site has the necessary voltage requirements.

The cabinets should be positioned with consideration given for adequate air intake and exhaust. In addition, installation planning should take into account the amount of space required for the opening of the front of the metering control panel on the 10-kW amplifier; the opening of the rear doors on the 10-kW amplifier and exciter/driver cabinets; access to the trays, including sliding them out for testing; the main AC hook-up to the high-voltage power supply assembly; and the installation of the output transmission line, including the trap filters and the directional coupler.

The 10-kW amplifier cabinet contains a tube cavity air exhaust stack that is a 10.5-inch chimney mounted on the roof of the cabinet. Forced air flows though this chimney from the blower assembly that cools the tube mounted in the cavity assembly (1,100 CFM at 30° C rise).

The 10-kW amplifier cabinet also has two exhaust fans, rated at 240 CFM, mounted in the top cover assembly of the cabinet. Air intake for the tube cavity blower assembly is through the large filter mounted on the bottom rear of the cabinet.

The high-voltage power supply cabinet has two exhaust fans, each rated at 550 CFM, mounted in the top cover assembly of the cabinet. Air intake for the cabinet is through the two filters mounted on each side of the cabinet.

The 840A 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 transmitter 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 transmitter 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 transmitter can enhance the overall performance and reliability of the transmitter and maximize revenues by minimizing down time. 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 transmitter.

The fans and blowers designed and built into the transmitter 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 considerations should be taken into account. The first step is to determine the amount of heat to be removed. There are generally three sources of heat that must be considered. The first and most obvious is the heat from the transmitter itself. This can be determined by subtracting the average power to the antenna (6950 watts) from the AC input power (25,000 watts). This number in watts (18,050) is then multiplied by 3.41, which gives 61,550, the BTUs to be removed every hour. 12,000 BTUs per hour equals one ton, so a 6-ton air conditioner will cool a 10-kW transmitter that is vented into the room. If the air exhaust will be vented externally, a 1.5-ton air conditioner will be needed to properly cool the 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 detailed drawings of the site showing all construction details. The sum of these three sources is the total amount of 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 if the ambient air temperature is below 100° F, or about 38° C, and the humidity is be 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 transmitter. 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 operation 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 when using 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 transmitter. Condensation may occur on, or worse in, the

transmitter under certain conditions.

3. Do not isolate the front of the transmitter 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 transmitters and in the front and back of others. Any attempt to isolate the front from the rear will adversely affect the cooling air flow.

4. Interlocking the transmitter with the air conditioner is recommended to keep the transmitter 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 and its filters should be on the inlet. This will pressurize the room and prevent dirt from entering the transmitter.

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 should be released through the roof.

3. The inlet and outlet vents should be screened with 1/8" 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 adequate 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 transmitters 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 when the transmitter is operating.

10. The blower should have two speeds, which are thermostatically controlled, and interlocked with the transmitter.

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 transmitters should not rely on the internal blower to exhaust cooling air at elevations above 4000 feet. For external venting, the air vent on the cabinet top must be increased to an 8" diameter for a 1 kW transmitter and to 15" for a 10-kW transmitter. An equivalent rectangular duct may be used but, in all cases, the outlet must be increased in area by 50% through the outlet screen.

14. It is recommended that a site plan be submitted to ADC for comments before installation commences.

To calculate the blower requirements, filter size, and exhaust size if the total load is known in watts, 2000 CFM into 1/2" of water will be required for each 5000 watts. If the load is known in BTUs, 2000 CFM into 1/2" 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 outlet for 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 combination of air conditioning and ventilation should not be difficult to design (see Figure 3-1). System interlocking and thermostat settings should be reviewed with ADC. As with any equipment installation, it is always good practice to consult the manufacturer when questions arise. ADC can be contacted at (724) 941-1500.

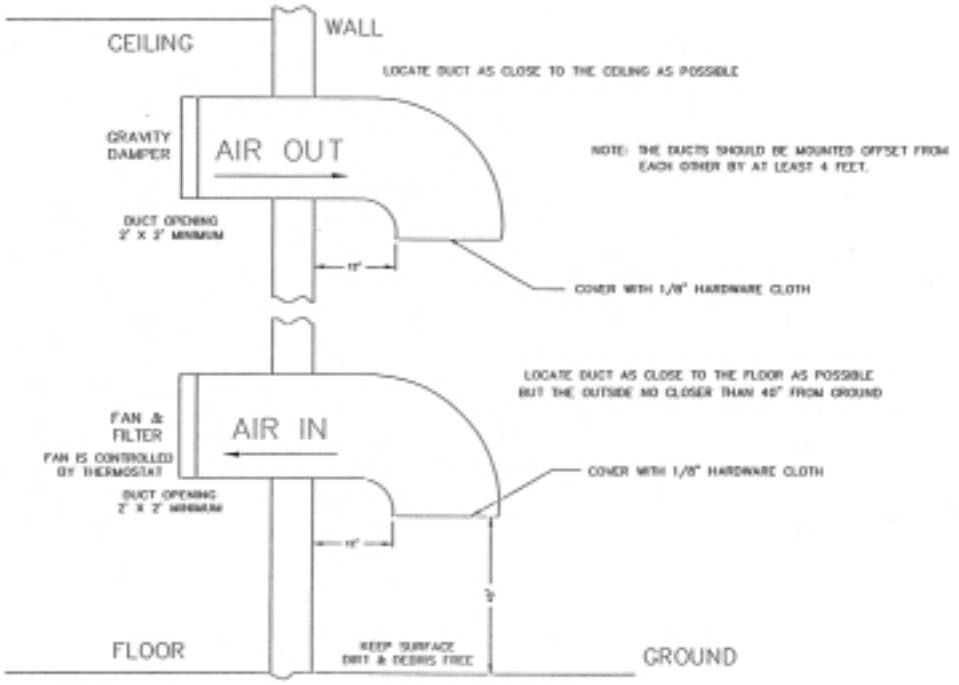

Figure 3-1. 1 kW Minimum Ventilation Configuration

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 transmitter.

Thoroughly inspect the cabinets and all other materials upon their arrival. ADC 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 ADC as to the extent of any damage as soon as possible.

Remove the exciter/amplifier cabinet with trays, the 10-kW amplifier cabinet, the high-voltage power supply cabinet, conduit pieces, directional couplers, output trap filter, all of the hard line and coaxial cables, as well as any installation material, from the crates and boxes.

Remove the straps that hold the exciter/amplifier cabinet to the shipping skid and slide the cabinet from the skid. Remove the plastic wrap and foam protection from around the cabinet. Do not remove any labeling or tags from any cables or connectors, as these are identification markers which make re-assembly of the transmitter much easier. Remove the two L-brackets, mounted on the front panel rails, that held the trays in place during shipment. The trays are mounted in the cabinet using Chassis Trak cabinet slides (see Figure 3-2). Open the rear 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 restrictions to free movement. Adjustments may be necessary and are accomplished by loosening the front cabinet slide mounting bolts and moving the tray up or down as needed. Inspect the trays for any loose hardware or connectors and tighten where needed.

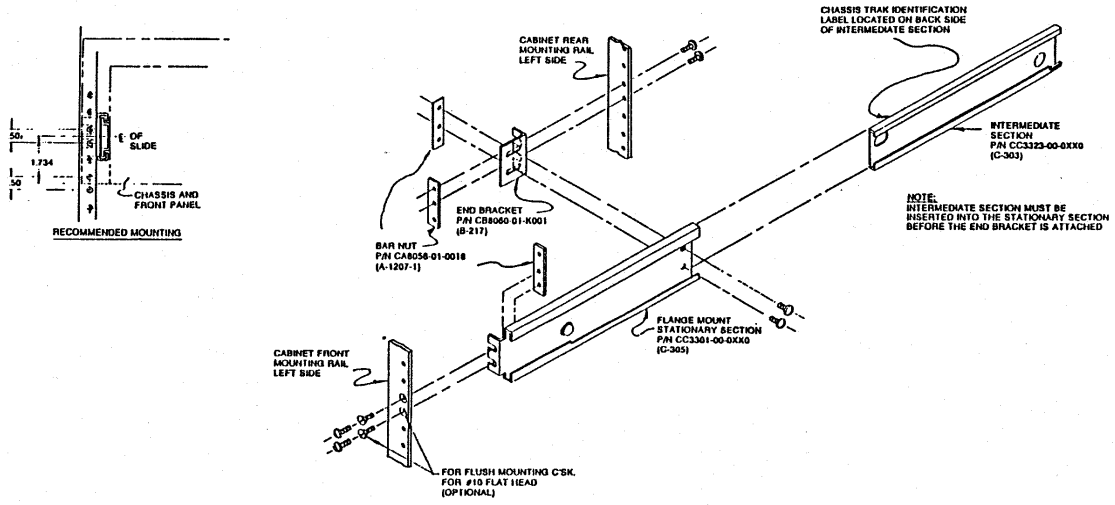

Figure 3-2. Chassis Trak Cabinet Slides

Remove the straps that hold the 10-kW amplifier cabinet to the shipping skid and slide the cabinet from the skid. Remove the plastic wrap and foam protection from around the cabinet. Do not remove any labeling or tags from any cables or

connectors, as these are identification markers that make assembly of the transmitter much. Open the metering control panel and the rear door of the 10-kW amplifier. Inspect the interior for any packing material and carefully remove any that is found.

Remove the straps that hold the high-voltage power supply cabinet to the shipping skid and slide the cabinet from the skid. Remove the plastic wrap and foam protection from around the cabinet. Do not remove any labeling or tags from any cables or connectors, as these are identification markers that make assembly of the high-voltage power supply and its connection to the 10-kW amplifier cabinet much easier.

3.3 Installation of the Cabinets and Trays

The cabinets should be positioned with the exciter/amplifier cabinet to the left of the 10-kW amplifier cabinet when the operator is facing the front of the cabinets. The high-voltage power supply cabinet should be placed at the rear of the 10-kW amplifier cabinet.

Note: Refer to the specific floor plan or the racking plan for the site for information on cabinet placement. The cabinets should be mounted, using bolts, to the floor of the site.

Caution: If the exciter/driver cabinet is not mounted to the floor, the entire cabinet may tip over if the trays are all pulled out at the same time. Ground each of the cabinets together by connecting a ground strap between each of them and then connecting the strap to ground.

Locate the 1/2" heliax cable labeled from (A11-J2) of the exciter/driver cabinet to (A2-A1-J1) the RF input jack of the tube cavity assembly in the 10-kW amplifier assembly cabinet. Connect one end of the 1/2 " heliax to the output at the top of the exciter/driver cabinet and the other end through the top of the amplifier cabinet to the bottom of the tube cavity.

3.4 Output Trap Filter, Output Coupler, and Transmission Line Installation

The specific floor plan and interconnect drawings for the transmitter site should be consulted as the transmitter and transmission lines are assembled. These drawings provide the "A" numbers and location designations of the different length transmission lines, the output trap filter, the output coupler assembly, and the proper connections between the cabinets. Each transmission line section is labeled in its shipping container as to its respective location in the 10-kW assembly.

The installation of the 3-1/8" EIA transmission line begins at the output of the 10-kW tube cavity assembly and proceeds through (A2-A2) an output directional coupler, mounted in the cabinet, to the outside of the cabinet. The 3-1/8" hard line connects to the input of the output trap filter. The output at J2 of the output trap filter connects to the input of the next trap filter, to another directional coupler, and then to the connection for the antenna.

To connect the harnesses between the cabinets, reference the system interconnect drawing for the transmitter. Connect the harnesses to the proper terminations as shown in the drawing.

3.5 Installation of the High-Voltage Power Supply Assembly

While performing the following installation procedure, refer to the high-voltage power supply interconnect drawing (1293-8100) for the proper connections.

The location drawing for this assembly is representative of a typical 10-kW high-voltage power supply assembly, with

208/240 VAC 3-phase input service. The primary and secondary terminals of the transformer are clearly labeled for the reconnection of the wires.

The 10-kW high-voltage power supply consists of three main assemblies, each of which are packed separately for shipment: (1) the cabinet enclosure, which has components mounted to its sides and top; (2) the high-voltage transformer, which, because of its weight (approximately 300 lbs), is shipped in a separate crate; and (3) the dolly-mounted tray, which contains the high-voltage choke and filter capacitors. When reassembled, these three assemblies become the high-voltage power supply.

To reassemble the high-voltage power supply, first locate the three assemblies that make up the high-voltage power supply assembly. Set the high-voltage transformer (A1) in the proper location (according to the floor plan drawing). Because of its weight, the transformer will sit directly on the floor and be held in place by the mounting brackets. Find the dolly-tray assembly and roll it into place to the left of the transformer. The transformer and the dolly tray are then enclosed by sliding the high-voltage cabinet assembly over them. Make sure that the transformer or the tray does not hit the high-voltage rectifier boards, mounted on the back of the cabinet, or the contactor on the side of the cabinet.

Reconnect the primary and secondary terminals of the high-voltage transformer and the wires to the 5-henry choke and the four 5 mF capacitors. All nine wires that are marked with an "X" in the high-voltage power supply assembly drawing are to be reconnected. The wires are labeled to show where they are to be connected.

The primary connections are three 6-AWG wires, two of which originate at the step-start contactor (K3) and one at the high-voltage contactor (K1). They should be reconnected to the three 240-VAC primary connections of the high-voltage transformer. There are additional taps located on the high-voltage transformer to accommodate different line voltage inputs. The taps that are used are chosen at the site in order to attain a plate voltage output of 5500 volts. The wire lengths will allow only one way of connecting the wires. The secondary connections are three, red high-voltage wires. They are connected to the E1 connections of the three high-voltage rectifier boards (A5, A6, and A7). These three red wires connect to the secondary terminals of the high-voltage transformer labeled 2.6 kV. The wire lengths will allow only one way of connecting the wires. After completion of the above steps, the high-voltage transformer is reconnected.

The dolly tray has five reconnections that need to be made: two to the 5-henry choke, one to the 5 mF capacitors, and two ground cables. The connection to the 5 mF capacitors is made to the E3 terminals of the high-voltage rectifier boards. The black high-voltage wire is reconnected to terminal #2 of the (A8) capacitor, as labeled. The black wire should be jumpered to terminal #2 of the other three capacitors.

There are two reconnections that must be made to the (A16) 5-henry choke. The one red wire is from the 10Ω/30-watt resistor (R19) mounted on the back panel; this wire must be connected to the terminal of the choke with no other wires connected to it. The other terminal of the choke will have a red wire connected to it that originates at the #1 terminal of (A8) the 5 mF capacitor. The red wire that is connected to the junction of the 10Ω/300-watt resistor (R2) and metering resistor (R5) is reconnected to terminal #2 of the choke. The two ground cables need to be reconnected to the ground stud, on the side of the high-voltage cabinet, labeled GND. One of the cables is for (A21) the grounding rod assembly and the other is the ground connection to

the dolly tray. Reconnect both of these cables.

The high-voltage power supply is now fully reassembled and ready for the main AC hookup.

3.6 Installation of the High-Voltage Power Supply to the 10-kW Interface Control Cables

While performing the following installation procedure, refer to the interconnect drawing (1094338) for the 10-kW transmitter.

The high-voltage interface control cables are inside the 3/4" conduit that runs from the 10-kW amplifier cabinet to the high-voltage power supply. To reinstall these cables, connect the conduit between the high-voltage power supply and the 10-kW amplifier cabinet, using the floor plan drawing as a reference. Connect the three alpha wires and the three other wires to the proper terminals of TB2 on the roof of the high-voltage power supply assembly and on the other end to (A10-J2) of (A10) the remote control and cabinet interface assembly in the 10-kW amplifier cabinet.

3.7 Installation of the High-Voltage Wire Harness

The anode (plate) voltage cables connect the high-voltage output of the high-voltage power supply to the anode voltage connector of the tube cavity in the 10-kW amplifier cabinet. The two wires are labeled, wrapped, and stored inside of the 10-kW amplifier cabinet for shipment. The installation of the 1" conduit between the high-voltage power supply assembly and the 10-kW amplifier cabinet must be performed first. Locate the 1" conduit labeled for the high-voltage power supply. Using the floor plan drawing as a guide, connect the conduit between the high-voltage power supply and the 10-kW amplifier cabinet. Now feed the red and the black high-voltage wires through the conduit from the connected side at (A8-S11-E and F) the high-voltage interlock switch of the 10-kW amplifier to the high-voltage power supply assembly. After the two wires are fed through the conduit, connect the black ground wire to the chassis ground bolt labeled High-Voltage Power Supply RTN on the high-voltage power supply. Solder the red plate (anode) wire to the fuse holder, terminal #2 (F1-2), in the high-voltage power supply cabinet.

3.8 AC Interface Harness

The AC interface harness provides AC voltage from the high-voltage power supply assembly to the 10-kW amplifier cabinet. To hook up the AC interface harness, locate the 1-1/2" conduit labeled High-Voltage Power Supply. The six, AWG-14 wires of the harness will already be inside the conduit. Mount the conduit onto the high-voltage power supply assembly and the 10-kW amplifier cabinet according to the top view of the 10-kW transmitter and the floor plan drawing. Four of the wires inside of the high-voltage power supply assembly connect to TB6 on the side of the cabinet according to the labeling on the wires. Two of the wires inside of the high-voltage power supply assembly connect to TB4 on the side of the cabinet according to the labeling on the wires.

This completes the connections inside of the high-voltage power supply assembly. To connect the harness to the 10-kW amplifier cabinet, the six wires are connected to the terminal block, TB1. These wires should be connected according to the labeling of the wires and the terminal block.

3.9 Main AC Connections

Caution: Check that all circuit breakers are off (Down) before making the main AC connections.

The AC feeds for the 840A 10-kW transmitter consist of two main circuits as described in Table 3-1.

Table 3-1. 840A Main Circuits

CABINET ASSEMBLY	CIRCUIT	WIRE SIZE
Exciter/Driver Assembly	40 amp, 208/240 VAC	AWG 6, 1-1/4" Conduit
High-Voltage Power Supply/10 kW	100 amp, 208/240 VAC	AWG 2, 2" Conduit

The AC is connected to (A1) the exciter/amplifier assembly through an opening in the roof assembly of the cabinet. A 1-1/4" conduit should be used for running the AC line to the cabinet. The single-phase AC is connected to terminal block TB1 of (A2) the AC distribution assembly directly under the opening. The single-phase 208/240 VAC is connected to terminals 1A, 2A, and 4A. The neutral is connected to terminal 2A and the safety ground is connected to terminal 3A.

Note: In 240 VAC, connect the high leg (L1) TO TB1-1A.

The 3-phase AC input to the high-voltage power supply cabinet is connected to the 100-amp main AC breaker (CB1) on the inside, top right of the cabinet. A 2" conduit should be used for running the AC line to the cabinet. The AC is connected to CB1 according to the local wiring codes. Connect L1 to CB1-2, L2 to CB1-4, and L3 to CB1-6 with the safety ground connected to the ground stud near the circuit breaker.

Note: In 240 VAC, connect the high leg (L1) to CB1-2.

Refer to section 3.5 of this manual for information on the three-phase connections and see Appendix A for the interconnection drawings for the high-voltage power supply assembly.

After the cabinets and the transmission lines have been installed, and during the test and setup procedure, the system should first be connected to a 10-kW test load and not the antenna. The transmitter should be operated in this mode until testing and setup are completed. After the initial turn-on and setup procedures are completed, the output of the transmitter can be connected to the antenna for normal operation.

3.10 Installation of the Tube into the 10-kW Tube Cavity Assembly

To install the TH610 tube into the 10-kW tube socket assembly, first remove the cover to the chimney. Raise the chimney until it reaches the top and then turn it to lock it in place. This will allow access to the top cover of the tube cavity. The upper anode section can then be removed by loosening the two 6-mm hex bolts on the top of the assembly and pulling up the upper anode section. Once the section is removed, inspect the socket assembly by looking down inside the assembly. Check closely around the finger stock for any foreign material that may have fallen into this area during installation.

Remove the TH610 tube from the shipping box and carefully place the tube, with the small end (filament) down, into the socket assembly. Using the tube puller that has been supplied with the tube, seat the tube into the socket

assembly by putting a firm, even downward pressure onto the top of the tube. The tube puller should be mounted onto the right, front corner of the tube cavity assembly.

Caution: Do not turn or twist the tube while seating it. This will damage the finger stock.

Snugly replace the upper anode assembly. After the cover is seated, the 6-mm hex bolts must be tightened to hold it in place.

3.11 Initial Turn-On Procedure

Note: Make sure that all of the installation procedures described earlier in this chapter have been completed before proceeding with the initial turn-on of the transmitter.

Caution: Check that all of the circuit breakers on the exciter/amplifier assembly, the 10-kW amplifier, and the high-voltage power supply cabinets are off.

Check that the combined RF output of the (A18) coupler assembly is terminated into a dummy load with a rating of at least 10,000 watts. If the individual assemblies are tested one at a time, check that the visual + aural RF output of the 10-kW amplifier assembly or the 250-watt amplifier trays in the exciter/amplifier assembly are terminated into appropriate dummy loads.

3.11.1 Exciter/Amplifier Assembly Initial Turn-On Procedure

For the initial turn-on of the exciter/amplifier assembly, the 10-kW amplifier does not need to be enabled, but the Driver Mode Select switch on the metering control panel of the 10-kW amplifier must be in the Test position. For the normal operation of the transmitter, the switch must be in the Normal position.

Note: In order to proceed, the output of the exciter/amplifier cabinet at the top of the cabinet must be terminated into a 500-watt load.

Switch on the main AC, exciter, switcher (if used), precise frequency tray (if used), 3-watt amplifier, and 250-watt amplifier circuit breakers on the AC distribution panel of the exciter/amplifier assembly. Switch on the on/off AC circuit breaker on the AC distribution panel in the rear of the cabinet.

Switch on the circuit breaker on the rear of the 250-watt amplifier trays. The circuit breakers should light to indicate that the AC is present to that tray. Move the Operate/Standby switch on the UHF exciter front panel to Operate and observe the front panel power supply meter readings for the 250-watt amplifier trays; a typical reading is ≈+27 VDC. Return the Operate/Standby switch to Standby.

3.11.2 10-kW Amplifier and High-Voltage Power Supply Assembly Initial Turn-On Procedure

Caution: Check that all of the circuit breakers associated with the high-voltage power supply and the 10-kW amplifier are switched off before installing the tube.

3.11.2.1 10-kW Amplifier Initial Turn-On Procedure

The 10-kW transmitter is equipped with a video presence detector that is part of the transmitter control system. Check that switch S6, the Mode Select (Auto/Manual) on the metering control panel of the 10-kW amplifier, is in the Manual position for normal operation of the transmitter. When the switch is in the Auto position, the transmitter will not operate unless the video input is present to the exciter(s). This method can be

used for the automatic turn-on and shut down of the transmitter (translator control mode).

The initial turn-on of the 10-kW amplifier assembly should begin by first applying AC power to each cabinet, in sequence, beginning with the high-voltage power supply and then the 10-kW amplifier. The high voltage that operates the 10-kW amplifier is supplied by the separate high-voltage power supply assembly.

Note: Verify that the front cover of the high-voltage power supply is in place before continuing. If it is not in place, an interlock switch will keep the high-voltage power supply from operating.

Table 3-2 shows the initial switch positions for the 10-kW transmitter.

Table 3-2. Initial Switch Positions for the 10-kW Transmitter

CABINET	PANEL OR TRAY MODE/POSITION	SWITCH/BREAKER
Exciter/Amplifier	AC Distribution Panel On	On/Off
Exciter/Amplifier	AC Distribution Panel On	Exciter AC On/Off
Exciter/Amplifier	AC Distribution Panel On	Amp(s) AC On/Off
Exciter/Amplifier	Exciter(s) On	AC On/Off
Exciter/Amplifier	Precise Frequency Tray	AC On/Off
Exciter/Amplifier	Exciter(s) Standby	Operate/Standby
High-Voltage Power Supply	Side Panel On	Main AC On/Off
High-Voltage Power Supply	Side Panel On	High Voltage On/Off
High-Voltage Power Supply	Side Panel On	10-kW Cabinet AC On/Off
High-Voltage Power Supply	Side Panel On	Blower AC On/Off
10-kW Amplifier	AC Control Assembly On	Control On/Off
10-kW Amplifier	AC Control Assembly On	Filament On/Off
10-kW Amplifier	AC Control Assembly On	Bias On/Off
10-kW Amplifier	AC Control Assembly On	Screen On/Off
10-kW Amplifier	Metering Control Panel Manual	Mode Select Auto/Manual
10-kW Amplifier	Metering Control Panel Manual	High Voltage Enable/Disable
10-kW Amplifier	Metering Control Panel Normal	Driver Mode Normal/Test
10-kW Amplifier	Metering Control Panel Standby	Operate/Standby

The system control logic and status indications for the exciter/amplifier and the 10-kW amplifier assemblies will now be operational.

Note: The filament of the tube requires ten minutes of black heat (1.5 volts) before any Operate commands will occur.

Switch the Operate/Standby switch on the metering control panel of the 10-kW amplifier assembly to Operate. Verify that the Blower, Filament, and Bias On Command LEDs are illuminated on the front panel, indicating that the command to have these components begin their operations has been initiated. The Blower Status LED should be lit when the blower is on and the Filament Operating Status LEDs should be lit after a three-minute ramp-up cycle for the filament voltage. After the filament has been on for approximately three minutes, the Bias On

Operating Status LED will light, indicating that bias is present at the tube. Open the hinged door of the metering control panel and verify that the status of the LED indicators on the control logic board (1137-1402) is as shown in Table 3-3.

Table 3-3. Status of the LED Indicators Mounted on the Control Logic Board

LED	FUNCTION	GREEN LED
DS1	Operate	Illuminated
DS2	Interlock	Illuminated
DS3	Air Flow	Illuminated
DS4	Filament	Illuminated
DS5	Filament UV	Illuminated
DS6	Bias	Illuminated
DS7	Interlock	Illuminated
DS8	HV	Extinguished
DS9	Interlock (Not used)	Illuminated
DS10	RF	Extinguished

When the filament circuit breaker on the front panel is activated, the filament control board requests an output from the power supply of +1.5 VDC. After ten minutes of valid operation at this reduced, or float, voltage the transmitter can be placed in Operate. Once the Operate switch has been enabled at the front panel, the power supply controller gradually increases the filament operating voltage. After three minutes, the filament voltage should read +5.2 VDC. Switch the voltage meter on the metering control panel of the 10-kW amplifier to the Filament Voltage position and verify that the filament voltage has a reading of +5.2 VDC.

Turn the Voltage Metering switch to the Bias Voltage position and verify a reading of approximately -80 VDC.

The 10-kW amplifier is now ready for the high voltage to be applied.

3.11.2.2 High-Voltage Power Supply Initial Turn-On Procedure

Verify that the high-voltage Enable/Disable switch on the metering control panel is disabled. Move the Voltage Metering switch to the Plate Voltage position. While observing the plate voltage metering, move the High-Voltage Enable/Disable switch on the metering control panel to the Enable position. The plate voltage reading should take two steps and be approximately 5200 VDC.

Move the Voltage Metering switch to the Screen Voltage position. Switch the screen voltage AC circuit breaker on the AC control assembly to the On position. The screen voltage reading should be approximately 500 VDC.

All of the power supply voltages for the 10-kW amplifier should be present at this time and the following front panel command status LEDs should be illuminated: Blower, Filament, Bias, High Voltage, Screen, and RF Request.

The following front panel operating status LEDs should also be illuminated: Blower, Filament, Bias, High Voltage, and Screen. The RF Present will remain off until the exciter/amplifier assembly is enabled.

Move the Operate/Standby switch to the Standby position and observe the off cycle of the 10-kW amplifier. The front panel command status LED sequence should occur as shown in Table 3-4.

Table 3-4. Command Status LED Sequence for the 10-kW Amplifier Off Cycle

LED (GREEN)	STATUS
RF Request Removed	Extinguished
Screen V Removed	Extinguished
HV Removed	Extinguished
Bias V Removed	Extinguished
Filament V Removed	Extinguished

A delay in the off cycle will maintain a Blower On command, for cooling purposes, for approximately three minutes after the ramp-down of the filament voltage. The blower will remain on while the filament is on black heat.

Switch on the 10-kW amplifier once more by moving the Operate/Standby switch to Operate. This time, as the 10-kW amplifier cycles on, check the static currents of the grid, plate, and screen to verify that they are within 10% of those recorded on the Test Data Sheet. Turn the Current Metering switch on the 10-kW metering control panel to the Plate I (Current) position and verify a reading of approximately 1.5 amps. Then switch to the Screen I position and verify a reading of approximately 5 mA. Turn the Current Metering switch on the 10-kW metering control panel to the Control Grid I position and verify a reading of approximately 2 mA. The Meter Reverse switch must be in the Up position. The normal position for the switch is in the Down position.

The system requires the presence of filament voltage for a three-minute ramp up (after 10 minutes of black heat) before the bias voltage, the plate voltage, and the screen voltage are applied to produce an RF Request command.

After completing the initial turn-on procedure for the 10-kW amplifier, the transmitter can be operated by using the 10-kW Operate/Standby switch on the metering control panel of the 10-kW amplifier assembly.

This completes the initial turn-on procedures for the 840A UHF transmitter. Proceed to the setup and operating procedures to attain normal operation of the transmitter.

3.12 Setup and Operation Procedures

Initially, the transmitter should be turned on with the RF output at J2 of the (A18) coupler assembly terminated into a dummy load of at least 10,000 watts. If a load is not available, check that the output of the coupler assembly at J2 is connected to the antenna.

Connect the baseband balanced audio input to the terminal block (TB1) on (A12) the remote interface assembly (1293-1204) at the rear of the exciter cabinet. If composite audio, stereo, 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) that is also on (A12) the remote interface assembly.

Switch on the main AC circuit breaker on the AC distribution panel assembly

mounted toward the rear of the single UHF exciter/amplifier cabinet. Also switch on the circuit breakers for the 250-watt amplifier trays.

Turn the Operate/Standby switch on the exciter to Standby and the Auto/Manual switch on the UHF exciter to Auto. Normal operation of the transmitter 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 video input is lost, the exciter will automatically revert the transmitter to Standby and, when the video signal is restored, return the transmitter to Operate.

Move the Operate/Standby switch on the exciter front panel and the metering control panel on the amplifier assembly to Operate and enable the high voltage. After allowing a warm-up period of several minutes, verify that the front panel meter on the amplifier assembly metering panel, with the switch in the Visual Output Power position, is reading 100%. If necessary, with the switch in the Visual Output Power position, adjust the Power Raise/Lower switch on the front panel of the amplifier assembly metering control panel to attain 100% output on the front panel meter.

As the output power level is being observed, check the meter readings on the 10-kW metering panel in the % Reflected Power position. If the % Reflected Power for the readings is high, above 10%, a problem exists with the output coaxial lines for the system and needs to be checked and corrected. A center bullet missing from the 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 be the same as on the Test Data Sheet for the transmitter.

The gain control on the front panel of the exciter tray was adjusted at the factory to attain 100% output of the transmitter and should not need to be readjusted. Refer to the Test Data Sheet for the transmitter and compare the final readings from the factory on the Test Data Sheet with the readings on the tray after the setup. They should be very similar. If a reading is significantly different, refer to the power adjustment procedure for the exciter tray in Chapter 5, Detailed Alignment Procedures, of this manual before trying to make any adjustments.

If a dummy load is connected to the transmitter, switch the transmitter 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 of the connections needed to connect the transmitter to the antenna. Switch on the main AC circuit breakers and move the Operate/Standby switch to Operate. Tune the exciter power adjust pot to attain a 100% combined output.

If the transmitter is already connected to the antenna, check that the combined output is 100%. If needed, tune the power adjust pot on the 3-watt tray for a reading of 100% in the Visual Output position.

This completes the transmitter setup and operation procedures for the 840A 10-kW UHF transmitter. The transmitter can now be operated normally. For normal operation, the exciter should be in Operate and the Auto/Manual switch should be in Auto.

If a problem occurred during the setup and operation procedures, refer to Chapter 4, Detailed Alignment Procedures, of this manual for more information.