Chapter 3
Installation and Setup Procedures

There are special considerations that need to be taken into account before the 420A transmitter 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 information that will assist in planning for the installation and set up of the transmitter.

3.1 Site Considerations

The transmitter requires an AC input line of 115 or 230 VAC with a rating of 10 amps. Make sure that the proposed site for the transmitter has the voltage requirements that are needed.

The 420A 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. Overtemperature 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 its overall performance and reliability 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 without excessive humidity. An ideal environment requires temperatures 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 your environment is to this design, the greater the operating capacity of the transmitter.

Although the fans and blowers designed and built into the transmitter will remove the heat from within the cabinet, additional means are required for removing 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 100-watt transmitter itself. This can be determined by subtracting the average power to the antenna (69.5 watts) from the input power (750 watts). This number in watts (680.5) is then multiplied by 3.41, which gives 2320, the BTUs to be removed every hour.

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 kept at a reasonable level. In addition, the air must be adequately filtered to ensure that no airborne particulates of any kind will be carried into the transmitter. A 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 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 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. Under certain conditions, condensation may occur on, or worse in, the transmitter.

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 of the transmitter from the rear of the unit 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, with attendant filters, should be on the inlet, thereby pressurizing the room and preventing the ingress of dirt.

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" 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 applies 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 transmitter operation.

10. The blower should have two speeds that 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, cleaning, and/or replacement of the filters can not be overemphasized.

13. It is recommended that a site plan be submitted to ADC Telecommunications for comment before installation commences.

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 Telecommunications. As with any equipment installation, it is always good practice to consult the manufacturer when questions arise. ADC Telecommunications can be contacted at (724) 941-1500.

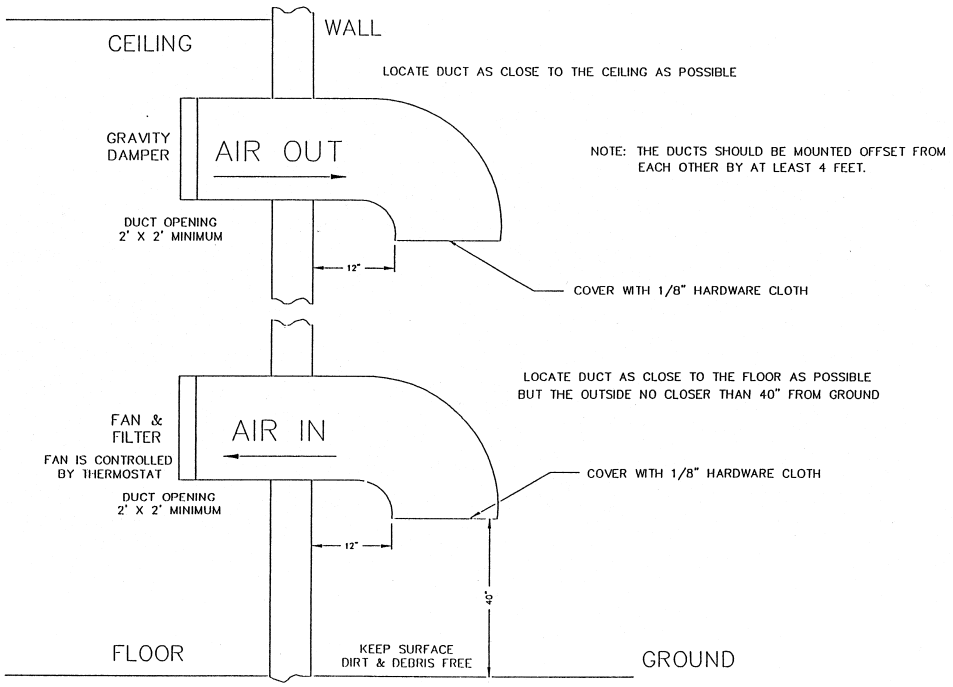

Figure 3-1. 1 kW Minimum Ventilation Configuration

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 cabinet (if provided), 100-watt tray, and all other shipped material upon their arrival. ADC Telecommunications 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 is indicative of 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 Telecommunications as to the extent of any damage as soon as possible.

Remove the cabinet (if provided) and the 100-watt tray, as well as any installation materials that make up the 420A, from the crates and boxes. Remove the straps that hold the 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 the cabinet as well as any cables or connectors. These are identification markers which make reassembly of the transmitter much easier.

3.3 Installation of the Trays Not Supplied With a Cabinet

The trays are to be mounted in a standard 19" cabinet using Chassis Trak cabinet slides (see Figure 3-2). The side rails are pre-mounted on the sides of the trays. Install the tray slides found in the installation materials into the left and right side of a standard 19" cabinet, as shown in Figure 3-3. Check that the tray slides are mounted in line with each other. Secure the slides by connecting them to the front and rear mounting bars by using the No. 10 bolts and bar nuts that have been provided. Insert the tray(s) onto the tray slides and slide the tray(s) into the cabinet. 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 to the position of the trays may be necessary. This can be 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. Retighten the bolts after making any adjustments. If multiple transmitters are purchased, refer to the tray layout drawing for that specific system for the proper position of each tray.

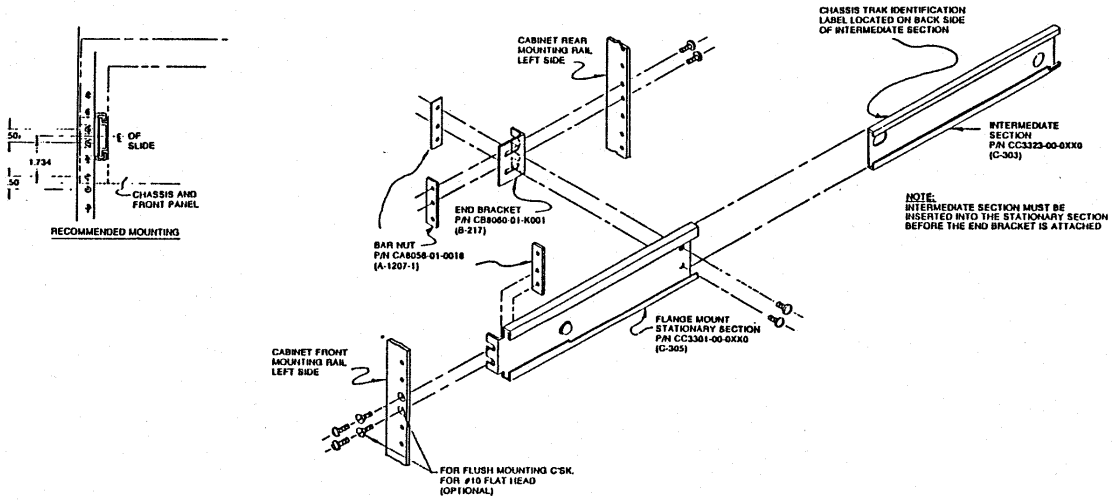

Figure 3-2. Chassis Trak Cabinet Slides

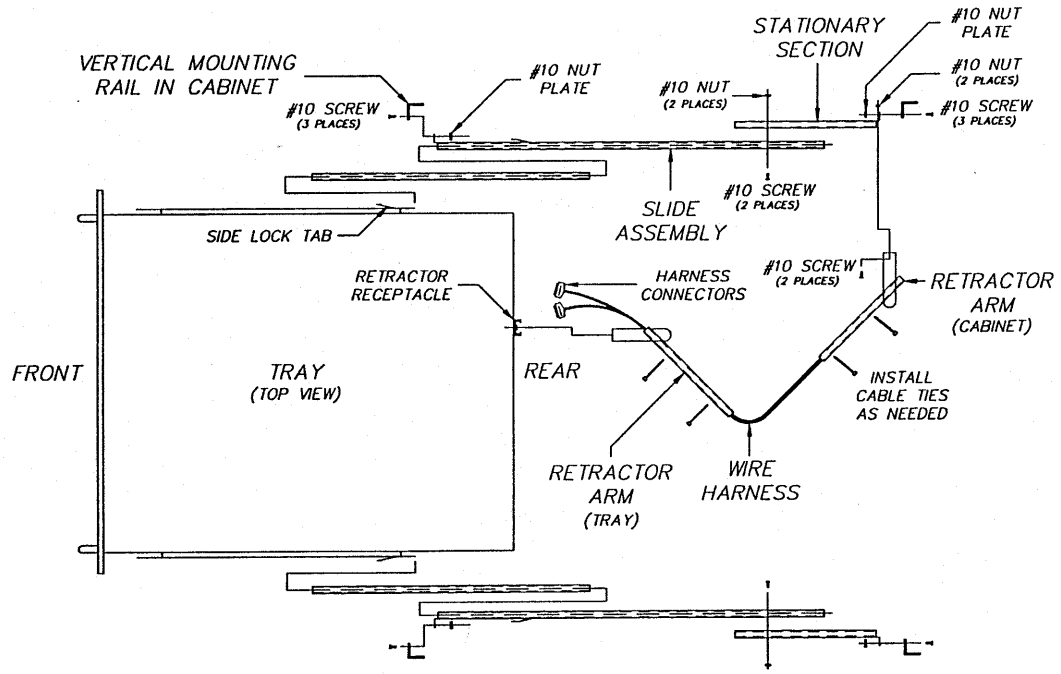

Figure 3-3. Cabinet Mounting Diagram

Connect the baseband video input to J2 on the rear of the tray.

Note: J2 is a loop-through connected to J1. It can be used as a baseband video source if the jumper W1 on J3 of the sync tip clamp/modulator board is removed.

Connect the baseband balanced audio to the terminal block (TB1) or connect the composite audio (stereo) to the BNC jack (J13).

NOTE: J13 is a loop-through connected to J3. It can be used as a composite audio source if the jumper W4 on J12 of the aural IF synthesizer board is removed.

Connect the transmission line of the antenna to the bandpass filter assembly output A2-A2-J2.

If the remote power raise/lower kit (1227-1039) is purchased, the external power raise/lower control connects to jack (J10), a 25-position, "D"-type connector, on the rear of the tray. Other remote control functions also connect to J10 and J11 of the transmitter. The remote power raise/lower switch connects to the J10 jack at J10-11 power raise, J10-13 power raise/lower return, and J10-12 power lower.

Connect the AC line cord into jack (J14) on the rear of the tray. Connect the other end of the AC line cord into an AC outlet capable of supplying at least 10 amps of current.

Note: If the incoming AC requires a reconfiguration, see Chapter 2, System Description, for information on the AC input.

This completes the unpacking and installation procedures for the 420A. Refer to the system setup and operation procedures which follow before applying power to the transmitter.

3.4 Setup and Operation Procedures

Initially, the transmitter should be turned on with the RF output at the bandpass filter asssembly terminated into a dummy load with a rating of at least 100 watts. If a load is not available, check that the output is connected to the antenna.

Connect the baseband video or the (optional) 4.5 MHz composite input to J2 on the rear of the tray.

Note: J2 is a loop-through connected to J1. It can be used as a baseband video source if the jumper W1 on J3 of the sync tip clamp\modulator board is removed.

Connect the baseband audio, if it is balanced audio, to the terminal block (TB1) or connect the composite audio (stereo) to the BNC jack (J13).

Note: J13 is a loop-through connected to J3. It can be used as a composite audio source if the jumper W4 on J12 of the aural IF synthesizer board is removed.

Note: To operate using the baseband video input with the (optional) 4.5 MHz composite input kit, the baseband select must be present at J18-6 and 7 on the rear of the tray. To operate using the 4.5 MHz composite input, the baseband select must be removed from J18-6 and 7 on the rear of the tray.

Switch on the AC circuit breaker CB1 on the rear of the tray. Switch the Operate/Standby switch to Standby and the Auto/Manual switch to Manual. Normal operation of the transmitter is in Automatic and the video input to the transmitter is used as an Operate/Standby switch. In Auto, if the input video is lost, the transmitter will automatically revert to Standby. When the video signal is restored, the transmitter will automatically return to Operate.

Move the Operate/Standby switch, located on the front of the tray, to Operate.

Note: If the transmitter does not switch to Operate when the Operate/Standby switch is switched to Operate, check that the external interlock plug, with a jumper from pins 23 to 24, system interlock, is connected to jack (J11) on the rear of the tray.

Observe the % Visual Power reading on the front panel meter; it should read 100%. If needed, set the power adjust pot located on the front panel. As you are checking the power level, also check the meter reading in the % Reflected Power position. If the % Reflected Power is very high, above 20%, a problem with the output coaxial line is present and needs to be checked. Return the Operate/Standby switch to Standby.

If a dummy load is connected to the transmitter, switch off the on/off AC circuit breaker on the rear of the 100-watt tray. Remove the dummy load and make all connections needed to connect the transmitter to the antenna. Switch the AC circuit breaker on and the Operate/Standby switch to Operate. Adjust the output power front panel adjustment to attain 100% output. Return the Operate/Standby switch to Standby.

This completes the setup and operation procedures for the 420A transmitter.

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