5. AN-50 Terminal Installation

This section describes the easy steps to follow to install the AN-50 terminal and associated equipment. A Class A digital device that is marketed for use in a commercial, industrial or business environment.

Figure 3 illustrates the three primary cables that are required to complete the installation including; Power, IF and CAT 5 (not included). The power cord connects to a standard North American 120 VAC power outlet, the IF cable connects the terminal (located indoors) to the transceiver (located outdoors), and the CAT 5 which connects the terminal to a switch or router for interface to the core network.

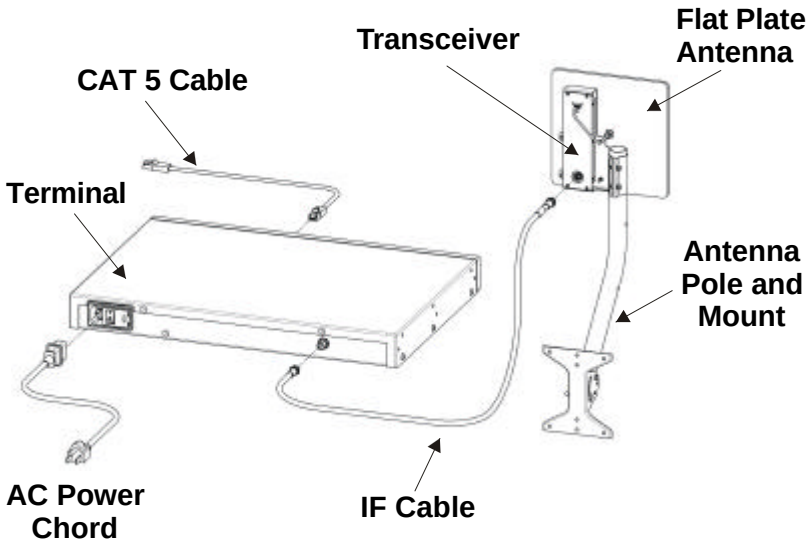


Figure 3 AN-50 installation.

The terminal is for indoor installation only while the transceiver and antenna are mounted externally. The principal steps in installation are:

1. Conduct a general site survey
2. Install the antenna
3. Run the IF cable
4. Install the terminal

Each step is addressed in more detail below.

5.1. General Site Survey

The first step in installing the AN-50 system is to conduct a general site survey. Although the installation steps are relatively straightforward, they do involve

some construction and electrical work, which can be best performed by professional installers.

The following site survey steps should be followed:

Determine the optimum location: The first key step in the deployment exercise is to determine and identify building candidates that can be used to support the PTP link. A critical parameter to consider is the range at which the two terminals are required to operate. Range performance is determined by empirical formulas that consider a number of equipment and environmental factors described in Section 8 of this manual. Ensure that the installation sites meet the above range performance requirements before moving to the next step. There are a number of cell planning tools available in the market today, which make use of topographic data to help with the cell planning.

Obtain a copy of the facility blueprints and verify their accuracy. The installation process will require penetrating the building to run the IF cable between the outdoor and indoor units. In this regard, it is imperative that the blueprints of the building are up to date and accurate.

Identify a Clear Line of Sight Path. For maximum performance, it is recommended to mount the antenna in a location where there is line of sight to the remote terminal. If possible, the antenna should be positioned such that there is maximum clearance within the first Fresnel zone of the direct path. Refer to Section 8 for a full description of Fresel zone clearance and its impact on signal propagation. The best means of achieving Fresnel zone clearance is to mount the antennas as high as possible, on either a tall building or tower, as shown in Figure 4. Although the system is designed to operate in obstructed line of sight (NLOS) conditions, as a result of the OFDM technology it incorporates, LOS deployments provide much greater throughput capability.

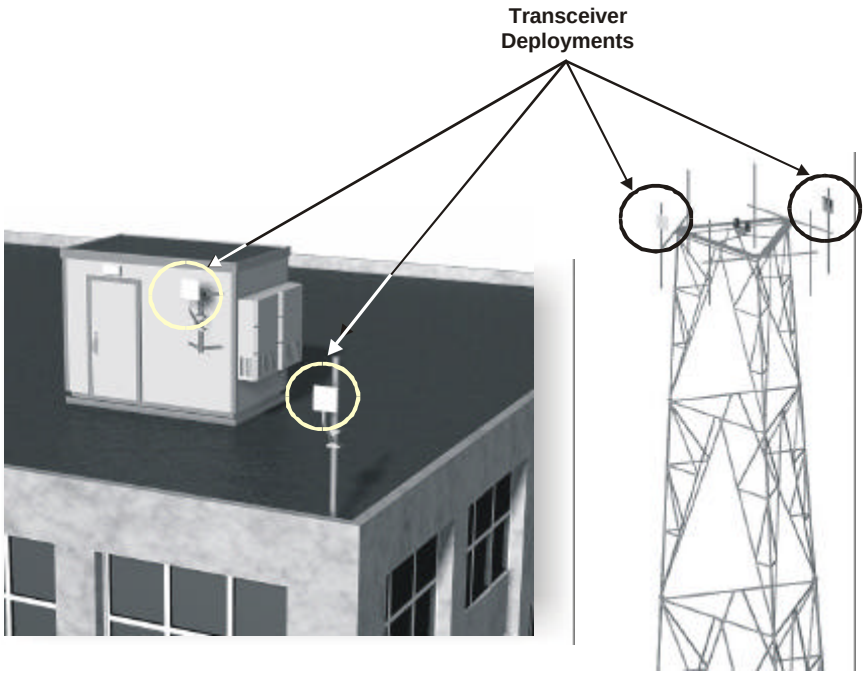


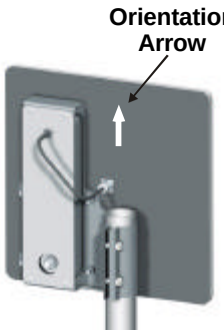
Figure 4 Antenna deployment options.

Identify potential sources of RF interference. Measure for any possible RF interference on the roof-top or tower by utilizing a RF power meter or spectrum analyzer. RF interference arises from any other wireless system operating within the same frequency band of the AN-50. Note that the AN-50 can operate in any one of the four channels designated for UNII band, therefore, there is some flexibility in addressing or avoiding the interference should other transmitters, in relatively close proximity, pose a problem.

Verify the location of access points. With the remote terminal transmitting, use a spectrum analyzer to ensure there is adequate signal strength arriving at the candidate location for the antenna.

5.2. Installing the Antenna

Once the site survey has been completed, and the exact location of the antenna identified, the next step is to mount the AN-50 transceiver/antenna onto either a building structure or pole. The antenna and mounting brackets have been designed to withstand strong winds (see specifications at the end of this user guide). It is imperative that all bolts and nuts are securely fastened to avoid any movement that could introduce misalignment. Note that there is an arrow on the back of the antenna, which must be pointing upwards to indicate proper orientation when the antenna is deployed.



For building mounts, ensure the surface to which the mounting bracket will be attached is flat and vertical (use a level). Install the bracket using four lag screws, with washers. There are two center holes that can be used to mount the bracket onto a 2x4 stud. Make sure the surface to which the bracket is attaching is structurally sound and can withstand the specified wind loading.

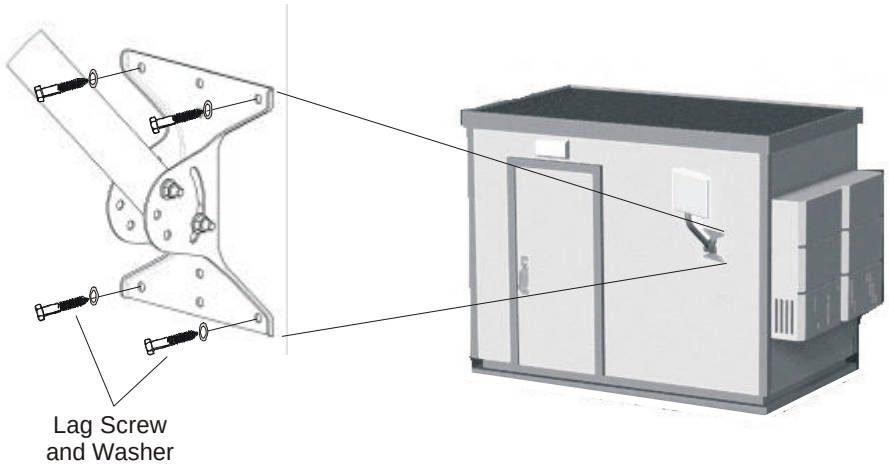


Figure 5 Mounting the antenna on a building structure.

Once the antenna is mounted, it has to be aligned in both the azimuth and elevation planes. The elevation alignment is accomplished by loosening the two bolts attached to the mounting bracket, as shown in Figure 6, and slanting the pole until the antenna is aligned in elevation towards the remote terminal. The azimuth alignment is achieved by loosening the two bolts on the antenna bracket, and rotating the antenna until alignment is achieved.

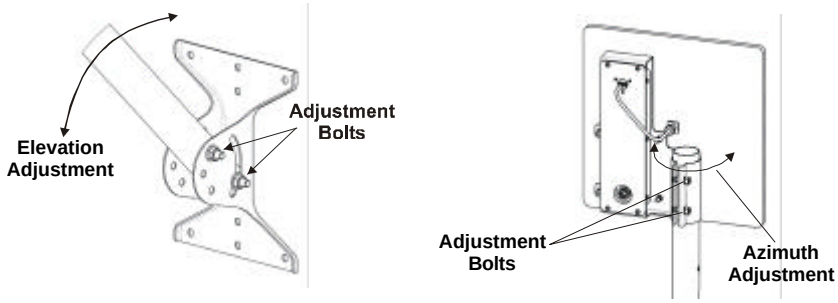


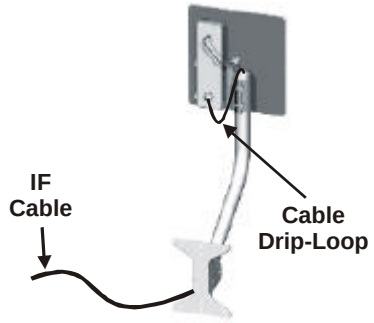
Figure 6 Aligning the antenna.

Note that the antenna can also be mounted onto another pole separate from the one supplied with the system. Contact Redline for different antenna mounting options.

5.3. Running the IF Cable

The system is equipped with a 100 foot of RF cable to interconnect the transceiver and terminal. The following steps define the cable installation:

1. Run the cable through the antenna pole as shown below. Add extra cable length to produce a drip-loop, as shown, to prevent water from accumulating onto the connector. The IF cable is equipped with 75 ohm F-type connectors at both ends, however, it is important to note that one end of the cable is designated for outdoors, as it is a specialized weather proof design, while the other end is to be connected to the indoor terminal unit. A label is attached to one end of the cable to clearly indicate the connector that is intended for outdoors. Make certain the 'Outdoor' label is attached to the end of the cable that you plan to connect to the radio.



2. Connect the F-type male connector from the cable to the female connector attached to at the bottom of the transceiver. Note the connector at the top end of the transceiver is connected via cable to the antenna itself.

3. Run the cable into the building by drilling a hole in the wall, where you want the RG-6 to enter, or through an existing conduit. Local codes require, at a minimum, that a ground cable be used, with a grounding block installed as close as possible to the point of cable entry. An optional lightning arrester may be used to protect the terminal and other indoor equipment from sudden electrical surges. There are a variety of choices for lightning arresters – it is recommended to use a professional installer to determine the optimized solution.

4. Once inside the building, connect the cable to the F-type female connector located on the back of the terminal.

5.4. Install the Terminal

Once the IF cable is connected, the terminal is ready to be installed and configured. The first step is to connect a CAT 5 cable from the Ethernet port to the host IP appliance. Note a CAT 3 cable can be used if the terminal operates in 10BT mode (10 Mb/s data rate). However, even with 10BT connections today, it is recommended to use CAT 5 cabling initially in anticipation for the increased speed in the future. As noted previously, the data rate is determined automatically, depending on the type of IP device connected to the system.

If the terminal is used for connection to a core network, then the IP appliance is likely to be a router or switch as shown in Figure 7. In this configuration, a cross-over Ethernet cable is required.

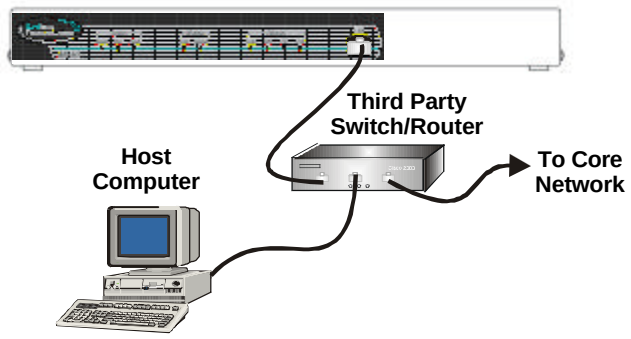


Figure 7 AN-50 connected to switch/router

For the remote terminal, the AN-50 may be connected directly to the host computer, as shown in Figure 8. In this configuration, a straight-through Ethernet cable is required.

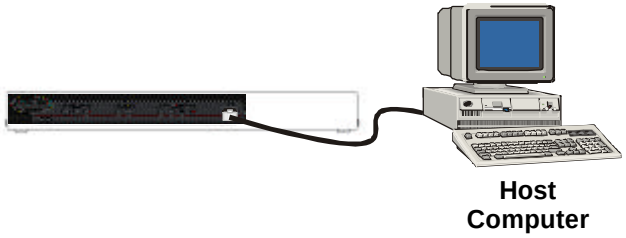


Figure 8 AN-50 connected to host computer.

The remote terminal may also be connected to a simple hub, for distribution to several computers in a local network configuration, as shown in Figure 9. If the terminal is connected to simple, hub, then a cross-over cable is required.

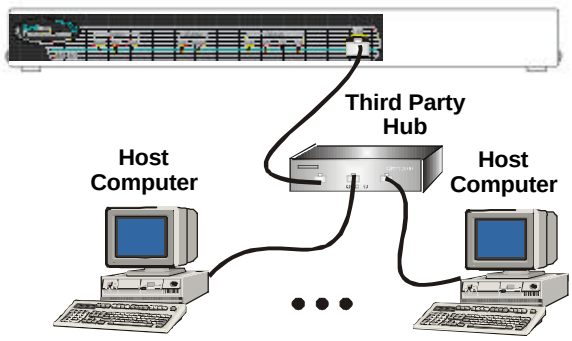


Figure 9 AN-50 connected to a hub.

Figure 10 provides an illustration of the pin-out designation for the AN-50 LAN interface, to help you establish other implementations that are not addressed in this manual.

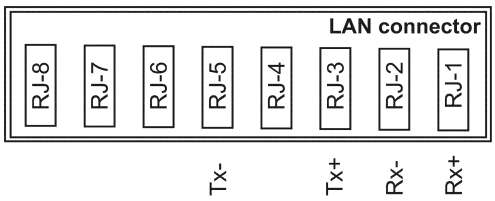


Figure 10 AN-50 LAN Ethernet Port pin-out.

Now connect the AC cord to the 120 VAC outlet and turn the terminal on using the toggle switch at the rear of the unit. The system "Pwr" LED should illuminate green to indicate proper power to the unit. If this LED is not on and/or the "Fault" LED illuminates red, then there is a problem with the unit. Refer to the diagnostics section, Section 7 on page 32, for further details on how to address system faults. The system is now ready to be configured.

NOTICE

1 - The Model AN-50 is used as a fixed, point-to-point device that required to be professionally installed by Redline Communications Inc. or trained professional sub-contractors.

2 - For Compliance with FCC RF Exposure Requirements, the transmitting antenna is required to be mounted outdoor on the building roof or antenna tower and located at a safety distance of more than 1.5 meters (5 feet) from the transmitting antenna to any person's body

3 - The Model AN-50 is a fixed, point-to-point device that is certified by FCC and Industry Canada with the 5.8 GHz Directional Antennas, Models MT-486001 (28 dBi Gain) and MT-485002 (23 dBi)