

# Emergency Communications Portable Base Stations I & II

Dr. John A. Allocca, WB2LUA

## Introduction

Recently, I had to cover a local race. We needed an operator at each mile marker, EMS dispatch, and various other locations. I was net control. I encountered 2 major problems. First, I was surrounded by a crowd of about 200 people cheering and screaming. Additionally, they had a loud P.A. system and a helicopter passing overhead. I had a great deal of difficulty hearing the radio even with an earbud. The second problem I had was being in the middle of tall buildings with an 5 watt H.T. My power was low and it was often difficult to hear others with their 5 watt H.T.

Although this was a non-emergency event, it was a viable scenario for an emergency event. These problems needed to be solved for future events and for emergencies.

Requirements:

- 5 to 50 watts of power
- Base station antenna
- 2 meter / 70 cm operation
- Voice, Packet, APRS operation
- Battery or AC supply operation
- Noise canceling headset
- Portability

To solve these problems, I decided to build a portable base station that can be used for voice, packet and APRS on 2 meters and 70 cm. This station can be used for emergencies and non-emergency community service. Packet is often used when there is a lot of details to be transmitted, such as hospital supplies. APRS is a mode we are beginning to experiment with. It can be valuable to know where your operators are if they had a field assignment during a disaster.

The radio, a Kenwood D700, is capable of 5, 10, and 50 watts. The station has a notebook computer for sending and receiving packet, and to view APRS locations on a map. The radio has a built-in TNC for packet and APRS. When it came to the antenna, I had a lot of decisions to make. Taller is better. But, taller is less portable. I finally decided on the Diamond X50A base station antenna, which is about 5.5 feet tall and a 1.25 inch aluminum tube that is 6 feet tall for the mast. All can fit into a car. The mast slides into a PVC pipe mounted on the side of the station. I replaced the U bolts on the antenna with 1/4-20, 2.5 inch bolts and wing nuts so that it will be easy to assemble and disassemble. The station weighs 116 pounds and has four handles. Two people can easily lift it in and out of a car. Once out of the car, it can be easily moved on its large wheels.

The station can be operated from 120 VAC or from a 31 AH gel cell battery. A battery charger is located in the battery compartment. A 12 Volt, 23 Amp switching AC power supply is used. The station has a 12 Volt / 120 VAC inverter so that the computer can be operated from the battery. I also included an MFJ 2 meter / 70 cm antenna tuner for best SWR. The Garmin Emap GPS receiver can be seen from the side view. I also built a switchbox so that I can turn the charger on and off, turn the inverter on and off, and switch from battery to AC.

To solve the problem of noise, I used the Heil Pro-Set headset with microphone. They work quite well at reducing background noise.

## Emergency Communications Portable Base Stations I – September 2003

All of the shelves slide in and out for easy access to components. The computer shelf had to be a double sliding shelf so that the computer can be opened.



The station consists of a 12 volt gel cell battery, battery charger, 50 watt 2 meter / 70 cm FM radio, switching power supply, notebook, 12 v / 120 vac inverter, external speaker, GPS receiver, and base station antenna, 6 foot aluminum mast, 2 meter/70 cm antenna tuner, and switchbox. The antenna and mast are broken down by turning wing nuts. The system weighs 116 pounds. The station is capable of 2 meter / 70 cm voice, packet, and APRS communications on battery or AC supply.



A Diamond X50A antenna is used with a 6 foot aluminum mast.



All shelves slide in and out for easy access to components.  
The top shelf contains the notebook computer.  
The second shelf contains the radio, speaker, antenna tuner, and external speaker.  
The third shelf contains the switchbox, power supply, and inverter.  
The fourth shelf contains a clipboard and manuals.



The station is mounted on a steel cart with wheels and four handles.



The bottom compartment contains the 12 volt gel cell battery and battery charger.



Side view.



Station with doors closed.



The notebook computer is mounted on a double sliding shelf system. The computer shelf height is 26.75", which is good for typing. This height determined the total height of the station.

## Emergency Communications Portable Base Station II – October 2003

The Emergency Communications Portable Base Station had several advantages and several disadvantages. It had the advantage of everything being contained in a single package. The disadvantage is that it required two people to transport and a larger vehicle. The advantages of the Emergency Communications Portable Base Station II is that it can be transported by one person, the modular design allows for only transporting the equipment that is required for a particular event. For example, if AC power is available, the battery module will not be required, and so on. At the time of this writing, it was too cold to paint the station.



Battery Mounting (bracketed to the bottom)



Battery inside the Battery Module



Inverter, Battery Charger, Switchbox, Shelf  
(Charger On-Off, AC-Battery, Inverter On-Off)



Component Cases  
(Radio, Computer, Accessories)



Case 1  
(Radio, AC Power Supply mounted on a board)



Case 2  
(Computer and cables)



Case 3  
(Accessories - cables, tools, headset, etc.)



Battery Module (fits in a car)



Battery Module with Radio Equipment on top



Second shelf added with latches



Complete station



Antenna mounted on a PA Speaker Stand



Speaker Stand



Diamond X50A Antenna