Protection Box for Camera Against Heat & Cold

Camera
Box

Spot Light
9W LED

Convex
Mirror

12 Inch
heated
tripping
bucket
rain
gauge

Outdoor Speaker

The 9 watt LED spot light used to illuminate the convex mirror at night.

Close-up of the Camera Protection Box

2 inches
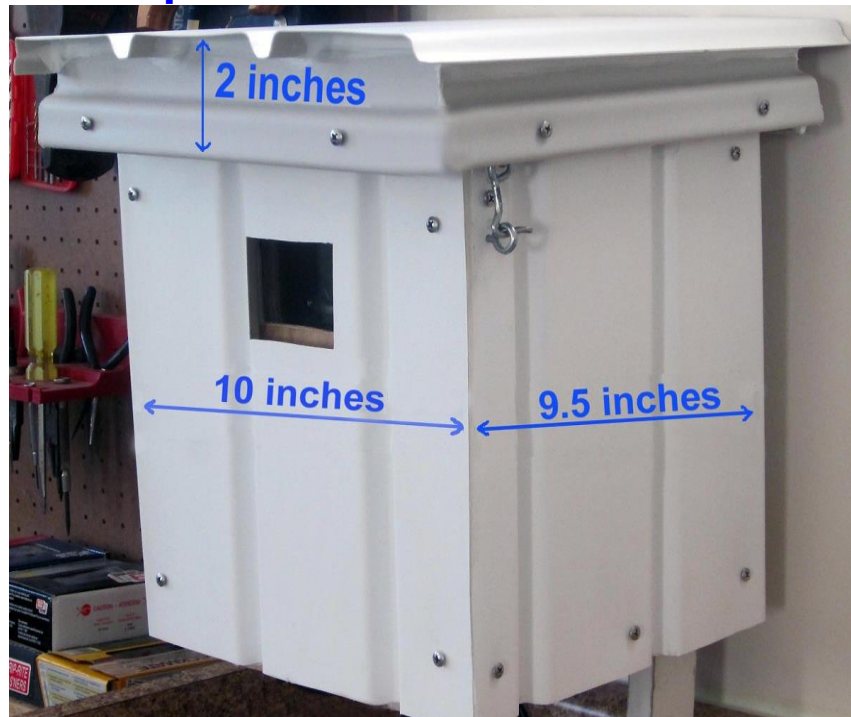
10 inches

9.5 inches

Note the thickness of the roof 2.0 inches

Levels of the Camera Box

Bottom
      A screen and foam filter has been placed over the fan entrance at the bottom of the camera box to keep out insects and lessen the dust build-up on the camera lens.

Level I
      The thermostatic controlled outlet located on the bottom floor turns the heater on when the temperature drops to 38°F. The heater is made up of two 7 watt bulbs located on the fourth level. The 3.5 inch 12 volt computer fan is also located on level I to draw air in from the bottom of the box when the thermostatic outlet in the roof of the box reaches 120°F.

Level II
      This small three-quarter inch level is where the fan blows in the air from the bottom of the box that is circulated between the ½ inch gap from the outside vinyl wall and the inside wooden wall. This air drawn from the outside exits into level IV to cool the camera then is forced out along the base of the roof.

Level III
       This compartment was made to the house most of the wires and contains a regular 6 foot extension cord with three outlets that is plugged into an outdoor covered deck outlet. One outlet of the extension cord has the plug from the AC/DC adapter that controls the fan in level 1. The second outlet is used to power the two 7 watt bulbs that are the heat source for the box in level 4.

Level IV
   This is a level where the two 7 watt bulbs heat the Canon A300 PowerShot camera during cold weather. During the coldest winter months insulated petitions will close off the circulation between the outside walls of level 4 to conserve the heat from the 7 watt bulbs.

Top
      Under and against the vinyl top of the box is the thermostatically controlled outlet that turns on when the sun heats the roof to 120 degrees F and it will stay on keeping the fan running until it cools to 100 degrees F. The sun should turn the fan on before the camera level reaches a temperature of 100 degrees F. The reason for the 2 inch roof is not only to house the thermostatically controlled outlet but to insulate it well from the camera level. If the temperature in the camera level runs too high in the summer some black tape or black paint on the vinyl roof directly above the thermostatically controlled outlet should solve the problem. The extra solar energy absorbed by the black surface will cause the controlled outlet to turn the fan on sooner cooling the camera to a lower temperature. I have recorded roof temperatures in the heat of the summer of over 150 degrees F.

Hinged top with ac/dc adaptor and thermostatically controlled outlet mounted in the roof
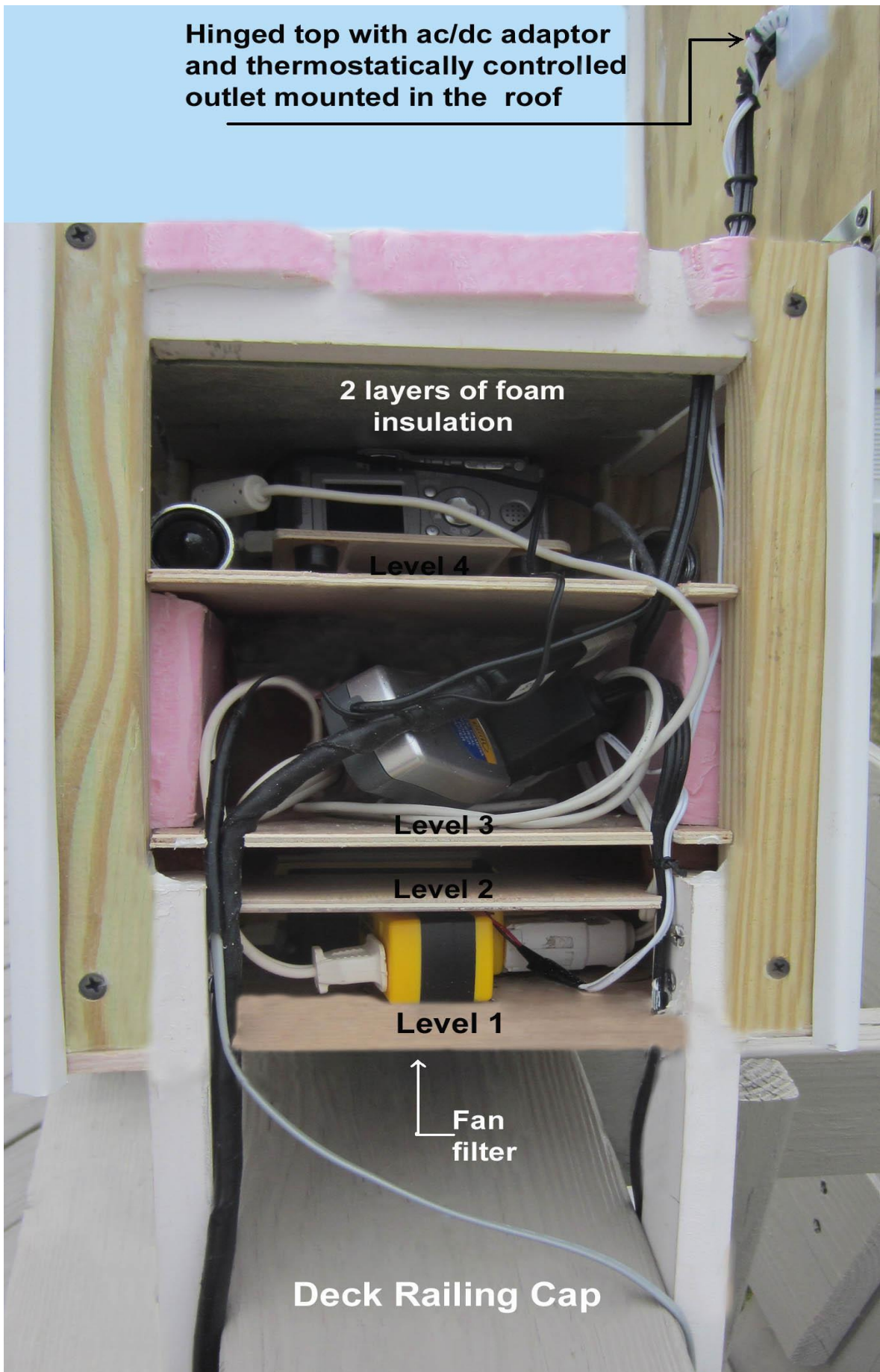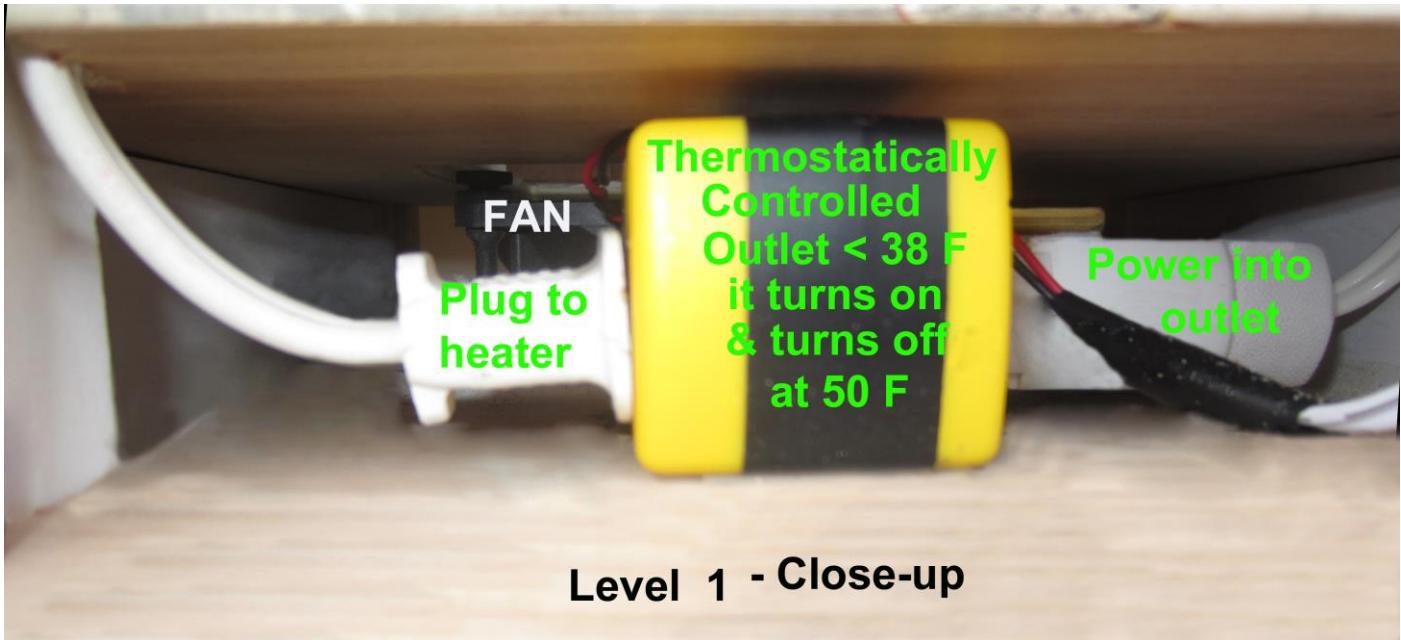
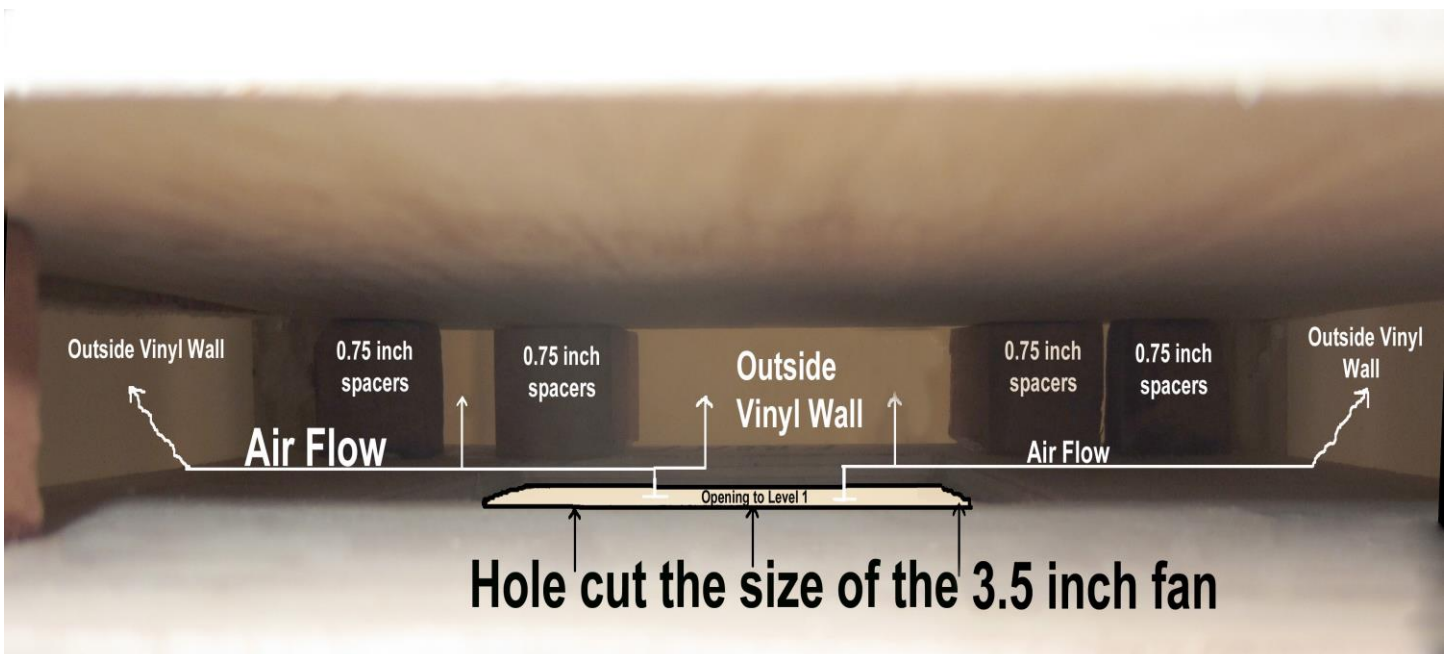**2 layers of foam insulation**

Level 4

Level 3

Level 2

Level 1

Fan filter

Deck Railing Cap

Close-up of
Level 1

FAN

Plug to heater

Thermostatically Controlled Outlet < 38 F it turns on & turns off at 50 F

Power into outlet

Level 1 - Close-up

Close-up of
Level 2

Outside Vinyl Wall

0.75 inch spacers

0.75 inch spacers

Outside Vinyl Wall

0.75 inch spacers

0.75 inch spacers

Outside Vinyl Wall

Air Flow

Air Flow

Opening to Level 1

Hole cut the size of the 3.5 inch fan

Close-up of
Level 3

Wrapped Active USB Cable

Extention Cord with
3 Outlets

Camera AC/DC Power
Adapter

Level 3

Close-up of
Level 4

Air Flow

Power Cable to Camera from Level 2

A300 PowerShot

Outside Vingl Wall

0.5 inch Gap between
Walls
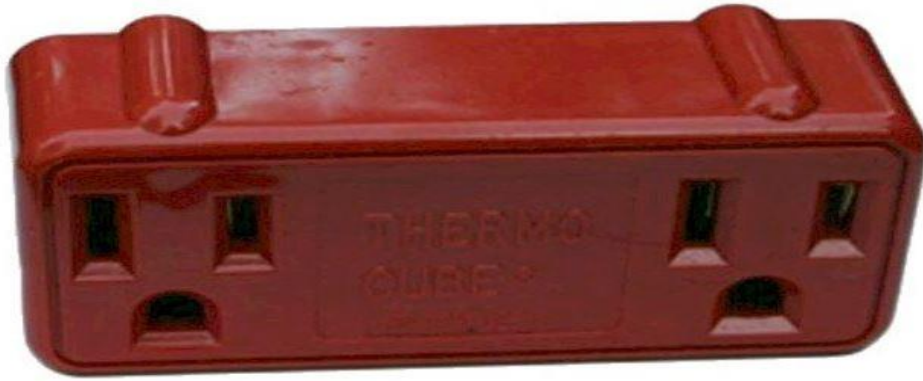
Inside Wooden Wall

Thermometer cable

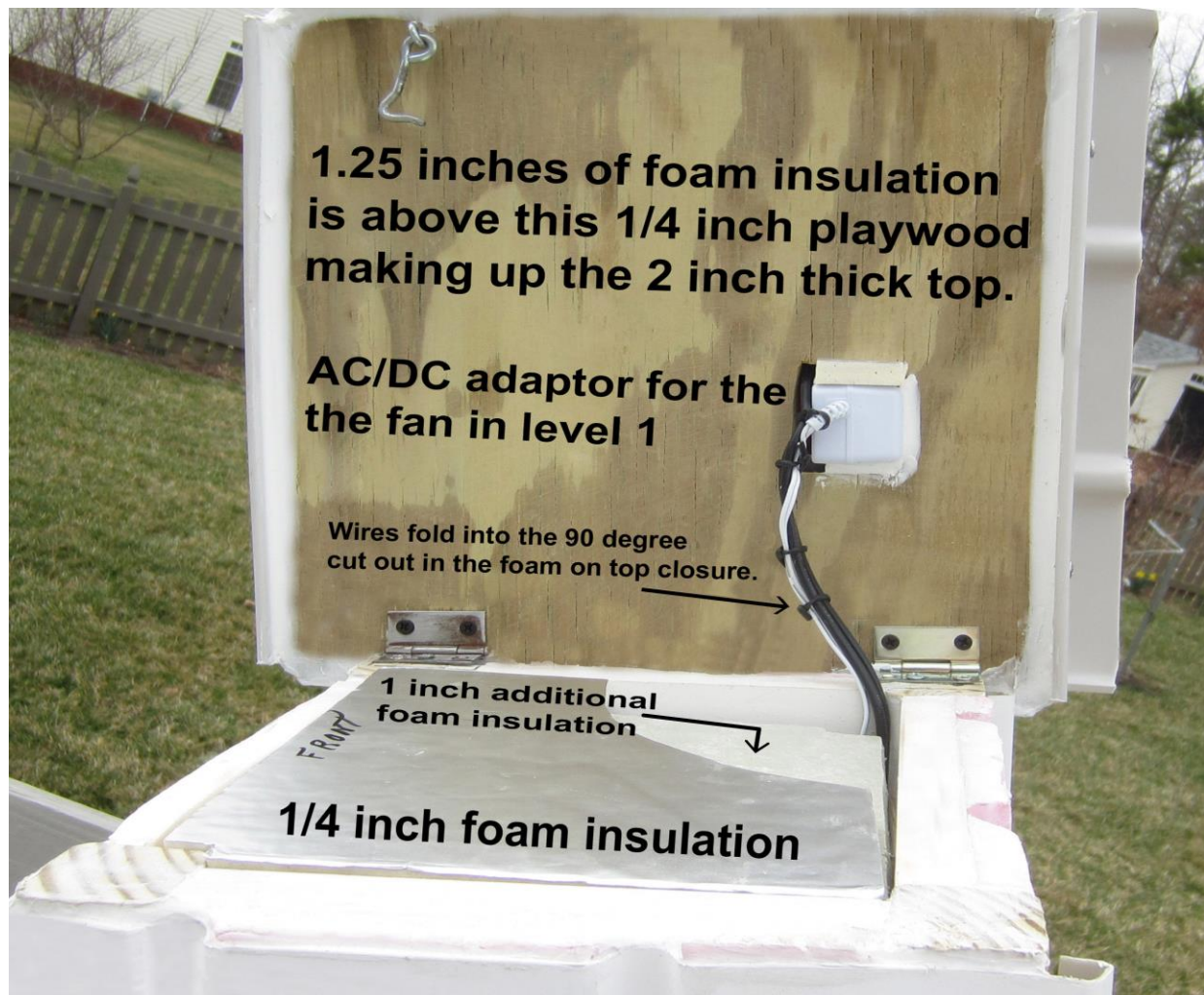7 watt bulb in 3/4 inch coupling

Level 4

120 Degree F Temperature Controlled Outlet
This is inside the roof of the camera box.

38 Degree F Temperature Controlled Outlet
This is located in level 1 of the camera box.

Foam Filter

Screen to hold the Filter in Place

Railing Cap to the Deck

Bottom View of the Camera Box

1.25 inches of foam insulation is above this 1/4 inch playwood making up the 2 inch thick top.

AC/DC adaptor for the the fan in level 1

Wires fold into the 90 degree cut out in the foam on top closure.

1 inch additional foam insulation

FRONT

1/4 inch foam insulation

Top View of the Camera Box

Additional Information

The camera box is made of white vinyl siding on the outside and the inner wall is made of one eighth inch thick plywood wood. <mark>The air space between these two walls is what provides the good insulation.</mark> When this box was first constructed three 7 watt bulbs were used as the heaters but it was found to be too much. The three turned on when the temperature fell below 38°F and as the outside temperature fell to 30° the inside thermometer indicated a temperature of 92°F. This is more than was needed so the heat source was reduced to two 7 watt bulbs. Even with small 7 watt bulbs it is necessary to put some kind of nonflammable shielding around the bulbs to keep them from melting cords or the Styrofoam insulation.

It is very important to use an active universal bus extender cord if you're placing the camera box more than 15 feet from the computer. Finding that this cable could be damaged by moisture and sunlight with time, it was first wrapped with Scotch's 2228 moisture sealing electrical tape then a second wrapping with just regular electrical tape. I use my camera at a distance of 80 feet with 40 feet exposed outside and the other in the crawl space leading to the weather room.

It is good to have a thermometer so you know the temperature in the box and you don't get the camera too warm or let it get too cold. For example, if one of the 7 watt bulbs burns out you would soon know by checking the box temperature. Most digital cameras will operate well between 32 °F and 105°F. I used a Taylor wired thermometer to keep track of the temperature and ran this cable along with the active universal bus cable. I discovered that the AC/DC power adapter that came with the camera was not sufficient amperage and was causing a camera to fail so I replaced it with a RadioShack universal digital 2 amp. – 3 volt camera power adapter number 273 -333 which has worked very well. I used a Canon PowerShot A300 camera as it could be bought for a reasonable price on the Internet yet had a high enough megapixel resolution to give a sharp image. You need to buy a Canon camera unless you're going to

write your own software for remote shooting. You also need to devote one computer per web camera as it needs to run a lot of software for this operation. The computer needs to run Canon remote sensing software. The ImageSalsa-Weather Edition software with the weather module accesses the weather information from another computer on the network and places it on the image that the camera takes. This software also saves the image in a folder called a sequential folder and saves a fixed save and FTP software uploads the image to the server. ImageSalsa is a great piece of software. It even controls when images will be saved in the sequential file and when images will be taken and when images will be uploaded to the server. Then you need still another piece of software called MovieSalsa which takes the daytime images that are stored in the sequential file and converts them into a movie after dark. Then you need an FTP program like cute FTP scheduled to upload the movie to the server in the correct file during the night so the movie will be ready for viewing the next morning on your website.