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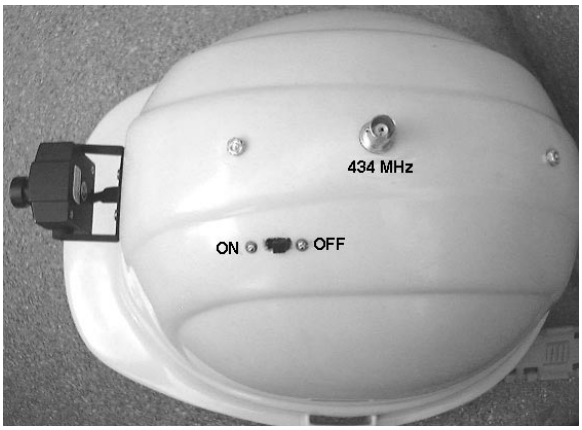
ATV Hard Hat Cam

There are many emergency service applications where the on site commanders must remain in an emergency operations vehicle but would love to see what others are seeing. This is especially true when decisions must be made quickly and cannot wait for a voice description or interpretation. The Hard Hat Cam is ideal for transmitting to a portable repeater back to an emergency operations center. A picture *is* worth a thousand words.

This application note describes how to build into a hard hat a 50-100 milliwatt 434 MHz battery operated ATV transmitter and color camera. One should note, however, that by building this ATV gear into the hard hat, it can reduce the amount of impact protection and therefore the user should take that factor into account if used in a dangerous area. Snow free line of sight DX from the hard hat to a 8 dBd omni or 5 element beam is about 1/2 mile. Both the Videolynx ATV transmitter and CG-35 mini color camera are powered by two 9V alkaline batteries in parallel which can give over 10 hours of continuous operation.

I purchased a plastic hard hat at Home Depot because I could not find a metal one. Metal would make a much better ground plane, but instead, I glued two 1.5x13 inch strips of aluminum foil in the shape of an X inside the plastic hard hat after drilling.

A 3/8 diameter hole is drilled in the top center for the antenna Radio Shack BNC connector. This jack is preferred because it has a ground solder lug on the end. Next drill 1/8" diameter holes for the 9 Volt battery holders with one 3" to the rear of the BNC and the other 2" to the front. I used 4-40x3/8 screws with the nut and lock washer on the outside of the hard hat to mount the battery holders. 1/16" holes are drilled for the slide switch approximately 1.5" forward and to one side from the BNC.



Drilling for the CG35 mini color camera is a little more involved. A hole must be drilled in both the camera bracket and hat with a .312 dia. drill so that the cable plug can be fed through from inside the hat. Drill 1/8" holes for the two camera bracket mounting holes, mount the bracket using two 4-40x3/8 screws, lock washers and nuts, then drill out the bracket and hat thus insuring good alignment of the holes. Remove the bracket. Remove the connectors on the camera cable.

Next, cut two 1.5x13" strips of aluminum foil and glue to the hat inside and centered on the antenna jack hole. Let it completely dry then cut the holes free with an Exact-O knife.

Make a 1" wide sheet aluminum or brass bracket for the Videolynx transmitter by first drilling a 3/8" diameter hole centered and 1/2" from one end. Make a right angle bend 1" from the drilled end. Loosely mount the bracket on the BNC jack. Then place the Videolynx against the bracket with the leads pointing toward the BNC and bend the metal tight around the transmitter module.

Mount the power slide switch, battery holders, and camera. Connect the camera red power cable and Videolynx power leads to each side of the dpdt slide switch on one end. Connect both of the 9V battery clip leads to the respective center lugs - red +9 V on one side, black or ground on the other. Rather than splice the yellow video coax I put a RCA plug on the cable and plugged into the Videolynx video jack. The line audio cable is not used. Use a good resonant 50 Ohm antenna plugged into the BNC jack such as the Diamond RH519 available from us. You can also take the hard hat off and plug in a small beam like the OAL 5L-70cm to more than double the distance for fixed portable applications.

Parts list and sources:

Videolynx transmitter - P. C. Electronics $99
CG-35 mini color camera - P. C. Electronics $99
Diamond RH519 whip antenna - P. C. Electronics $28
BNC jack - Radio Shack 278-105
RCA Plug - Radio Shack 274-339
DPDT slide switch -Radio Shack 275-403
9V battery clips - Radio Shack 270-324
9V battery holders - Radio Shack 270-326

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