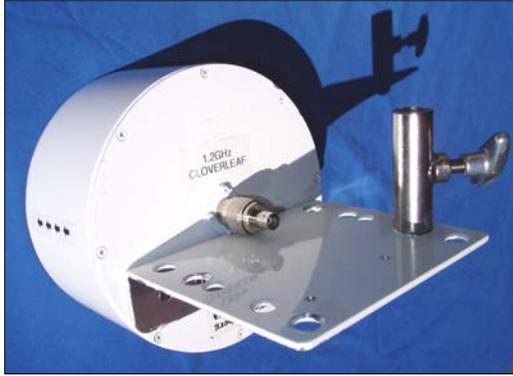


Cloverleaf Antenna

Near Diversity quality reception without the price!



This antenna is fragile and is therefore housed in an indestructible radome (a white plastic housing) that is transparent to RF energy. Each antenna is handmade individually and hand-tuned to a specified center frequency. The receiver of a radio mike system (or video receiver) can be mounted on the back of this antenna, the 6" shelf will keep antenna cable length and loss from this to a minimum. A female baby spud is provided for easy mounting to a "C" stand. We suggest for you to build yourself a harness that powers your radios and sends audio back to you. This leaves the antenna cable as short as possible and the audio or video out can be extended for many hundreds of feet. . Alternatively a preamp will allow hundreds of feet of cable between antenna and receiver. This can be cheaper "standard" cable, not the expensive low loss kind you would use between antennae and remote receiver. Without a preamp don't think of more than 50 feet

of cable in the UHF range. We suggest not using more than 50 feet of good 50 Ω RG8X cable between antenna and receiver without a preamp.

Circular Polarized 180° Beam Width

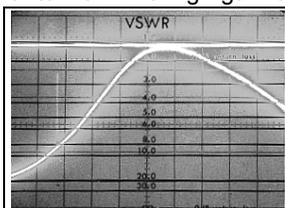
Designed for wide angle Video reception/transmission and FM Radio Microphone reception, the Cloverleaf Antenna is truly a unique antenna: it is circularly polarized. Its performance approaches diversity reception without the price.

Radio mike transmitters (or video transmitters) radiate in many different and unpredictable directions causing polarizations at the receiver antenna to shift and cancel. This is due to the close proximity of the transmitter's antenna to the human body (a reflector and an absorber). Also, the energy from the radio mike will reflect off all surfaces in proximity of the wearer and the receiving antenna. This phenomena is multiplied by the motion of the transmitter which creates continuously changing radiation and reflection patterns. These many paths taken by the signal are called multipath propagation.

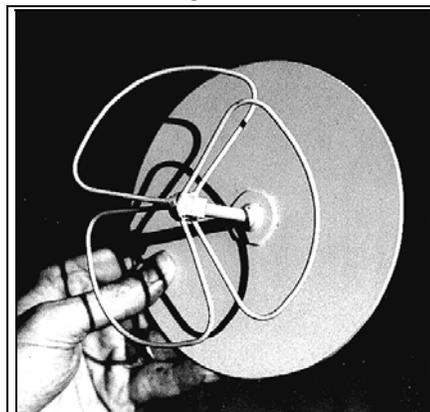
These incident and reflected radio waves arrive at the receive antenna out of phase (at different times) which causes various distortions: A mild cancellation causes fading and hissing of the audio. In extreme cases, the two signals arriving 180 degrees out of phase will cause complete cancellation that is heard as a bad hit or total squelch, total muting. A video signal rolls and goes black momentarily. A radio wave being perfectly reflected off a clean surface will reverse phase by 180° just like water waves will! Ceilings covered with aluminum foil are deadly to RF propagation; they are perfect mirrors. The only thing worse than ceilings are large spaces with chicken-wire on the walls. You are in a perfect reflecting metal box. Its really hard to get decent video transmission of any kind in this environment.

The Cloverleaf Antenna turns these otherwise deadly problem into an advantage: This Antenna is sensitive to many different polarizations of incoming energy and adds them electrically thus turning the deficiencies of the environment into an advantage.

The Yagi type of antenna (like the TV antenna on your rooftop) normally used with radio mike systems for better gain will not do this; it is uni-polarized. In addition it has as a very narrow angle of acceptance and must be aimed. Yagis are limited to one polarization. Other polarizations cause the familiar hissing, fading, etc., because they cancel the primary signal electrically at the antenna. The high gain of a Yagi is useful only at the extreme end of the radio mikes range. In the typical near field applications the gain is wasted.



550-650 MHz
10MHz/Div.
Center=600MHz



Inside view of Cloverleaf Antenna

The Cloverleaf Antenna has 5.15 dBi gain on axis. It is circularly polarized to accept both vertical and horizontal polarizations with the same signal strength. There is a smooth transition of the polarization characteristics from front to side. The polarization of the central 90° is circular (ours are RH). The polarization on the sides is parallel to the orientation of the back plane. So if you point the antenna at the North Star it is horizontally polarized to

mortals on the surface of the earth.

Cloverleaf specifics: The bandwidth at the 2:1 VSWR points is 25 MHz. At the 7.0:1 VSWR points (where reception starts to degrade due to the antenna being non-resonant) the bandwidth is -25 +55 MHz this is between 100MHz and 2 GHz. Individual Network Analysis photos (above left) are supplied with each antenna. The terminal impedance is 50 ohms and provides a DC short to negate interference due to static buildup. It is painted hi-tech white and supplied with a female "N" connector. We can manufacture custom versions for any UHF center frequency with and without the plastic radome. This antenna is not available anywhere else.

Antenna Splitter with the usual connectors are available

Sample

630 MHz Antenna :

Diameter: 10", Depth: 7 1/2", Additional rear shelf depth: 5"

Antenna splitter BNC in x 4 BNC out:

Cables 8" or 12" from "N" antenna output to BNC in (low loss RG 8X)

Price

\$ 400.00

\$ 250.00

\$ 90.00

For a 4 Radio Mike Receive Package you need:

1 Cloverleaf Antenna	\$ 400.00
1 Antenna Splitter	\$ 250.00
4 BNC-BNC cable	\$ 360.00

TOTAL approx. \$ 1010.00

Field Experience: Comparing 10dB gain Log Periodic Yagi with 5dB gain Cloverleaf

Small moving UHF video transmitter (AM!) at end of range. The Yagi was much harder to orient (5° accuracy in far field) and harder to find a good position for (up-down-right-left by 6" was critical). It never lost its many "ghosts." The Cloverleaf had no ghosts; was easy to point (90° accuracy was all required) and the position it was in was not as critical. The Sharkfin (flat Log-periodic) antennae has a much broader frequency bandwidth but behaves just like a Yagi otherwise!

FM radio mike test: audio loss was abrupt and total with Yagi where Cloverleaf gave much earlier warning and never lost the signal totally. Yes, the Cloverleaf has less range! It's not gain that is important (most radio mic use is so close anyway), nor the cancellation of out of band signals that tuned Yagis can provide. (This is taken care of by the advanced front ends of new receivers.) What is important is being able to handle signals of different and changing phase at the receive antenna. You get a solid signal for many more conditions at slightly less range than the Yagi. The cloverleaf cancels ghosts, multipath, hissing, phasing and popping. If you have diversity radio mike receivers you might do better with a Yagi.

So -- take your Yagis to the recycling center; buy a Cloverleaf!

Hints: Remember generally antennae do much better the higher they are above ground and the fewer obstructions they have between receiver and transmitter. Keep 'em close and high to avoid those early reflections of the earth. Keep antenna cable short!

Test Hint: Best way to test Radio equipment: have everything identical except for the one element you are testing, i.e., the antenna. Feed one signal into your right ear and the other into the left one. Let someone uninvolved decide which ear hears what and it is a double blind test. Your prejudices will not influence the result. Make the transmitters as dirty as possible. (Wrap antenna around transmitter and stuff into socks of test walker, and let him walk between metal objects such as cars, metal objects, etc.) You will notice a shifting of the stereo image to one side; the one with the better signal.

DIVERSITY FM AUDIO SWITCHING DECISIONS

Some tuners decide which antenna to select by comparing signal strength. Others decide by a signal to noise analysis. If you use 2 antennas of uneven gain, some receivers will lock to the highest RF signal, even if signal to noise is poor due to multipath. So check with your manufacturer.

Example: feed the Cloverleaf antenna to one side of diversity and a Yagi to other. The Yagi will provide approx. 8dB more gain, but will be much worse in terms of multipath. So a receiver that cannot tell signal strength from signal to noise is not the proper tool with mixed antennae.

Read Me: "Wireless Microphone Systems"

Another must read manual. Nothing too sophisticated but covering a lot of solid ground of operational basics and practices. With a better understanding, better operating methods (and tools) it's so much easier to get decent results, especially in difficult situations. A solid foundation makes life so much better. Published by Lectrosonics,

Wolf Seeberg Tel: (310) 822-4973 www.wolfvid.com

Inc., (800) 821-1121 FAX: (505) 892-6243. Price \$15.95 or free download from the net:

Diversity reception:

<http://www.lectrosonics.com/WPapers-Magazines/ReceptionTechniques/ReceptionTechniques.htm>

Radio mike guide:

<http://www.lectrosonics.com/wg/wg2000.pdf>

Testimonial from Larry Fisher, General manager and RF guru at Lectrosonics:

"We played with the [cloverleaf] antenna and found that it is indeed not as sensitive to polarization effects as a dipole when you are line of sight at closer distances. We didn't find any improvement at long distances. This is exactly as you described. In fact we tried to generate dropouts at a 20' distance while observing the RF level lights on our studio receiver. Though difficult to do this with a dipole antenna at that close a range, it was possible. The trick to creating a drop out with our dipole antenna was to turn the transmitter so that the polarization was horizontal with the antenna in a vertical position. This makes good sense, of course. With the cloverleaf, it was much more difficult to cause a drop out since you didn't have the polarization card to play, but had only amplitude to work with. I would agree with your recommendation for use by someone with a single channel receiver to help prevent dropouts at close to moderate distances." From a letter 2/12/01



Eggbeater Antenna. No gain. Circular polarized in all directions: 360 degree. The box on the bottom has nothing in it, it is only a mount. The pictured one is for 1.2 GHz. This is a low gain CP antenna that gives good non-rolling pictures at short range. Of course it's a little fragile. It's a unique beast and not seen much because its hard to build. It works well. Great for car top, or boat, or plane bottom. **Price approx. \$ 400.00**



900 MHz Cloverleaf with shelf for Transmitter and holes for U-bolts to mount on pipes. Good for Coherent channels 7-0, this is a printed circuit antenna and it has slightly less bandwidth than the wired ones above.

Price approx. \$ 400.00

You are looking at http://wolfvid.com/datasheets/Antenna_Cloverleaf.pdf

Read more: http://wolfvid.com/datasheets/Antenna_UHF_flat_panel.pdf

Home page: www.wofvid.com

Prices and specs change constantly. 06/29/09

