New Magnetic Loop for Improved Reception and Noise Rejection
Model: RF PRO-1A (Receive-Only Antenna)

Shielded Active Broadband Magnetic “Moebius Loop” Antenna

MSRP: $399.99

TO ORDER: Call (303) 526-1965 or e-mail: info@PixelSatRadio.com
Also available online at www.HighGainStore.com

Figure 1. Loop Antenna Pattern (looking down) edge – on from above antenna

- Unique Moebius Loop architecture provides enhanced performance over standard loops
- Very low IMD, 30 dB Low-Noise Preamp insures good performance in both strong and weak signal environments
- Up to 30 dB rejection of locally radiated noise compared to whip antennas
- Figure eight directivity and deep nulls to further reduce interference.
- Useable coverage range: 50 kHz to 30 MHz
- Rejects power line noise
- Rugged construction, easily mounts to a pole or flat vertical surface, 38 inch dia. aluminum loop, supplied with LNA, power inserter and DC power supply
- No manual tuning necessary
- No Home Owners Association problems; low profile, easy to camouflage and works at ground level
- Modular design for easy installation and maintenance
- Internal Transmit / Receive Switch disconnects Antenna / Preamp from receiver when transmitting
- Made in the USA

NOT YOUR FATHER’S LOOP ANTENNA
Based on the work of Dr Carl Baum for the US Air Force his “Moebius Strip Shielded Magnetic Loop Antenna” architecture provides superior performance over that of other commercially available wide-band loop antennas in the 100 kHz to 30 MHz range (see attached user evaluation).

Dr Baum was a Senior Scientist at the US Air Force Research Laboratory and is the recipient of several awards from the IEEE (Institute of Electrical and Electronic Engineers) for his work. Originally developed for a classified US Air Force project involving the measurement of EMP (Electro Magnetic Pulse) from nuclear weapons, this design has wide application to antennas for low-noise, interference-free radio reception over a wide frequency range. Pixel has coupled this antenna with a low-noise amplifier with very high intermodulation distortion (IMD) specifications (OIP3 = +48 dBm, OIP2 > +100 dBm) that can operate without saturating in high AM and FM broadcast band signal environments.

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MAGNETIC LOOP ANTENNA ADVANTAGE

Most active antennas are the whip type and respond mainly to the electrostatic-field portion of an electro-magnetic radio wave. The Magnetic Loop responds primarily to the magnetic-field and this ensures high rejection of nearby electric-fields. The intensity of the electric field is usually higher than the magnetic-field when an antenna is close to interference sources such as TVs, florescent lamps, power line wiring etc. By rejecting the electric-field there is a reduction in local interference compared to other types of active and passive antennas. Interference reduction is further enhanced by the deep nulls of the antenna’s ‘Figure-Eight’ directivity pattern (see Figure 1) that can be used to null out or reduce interference coming from a specific localized direction.

INTERMODULATION

Some active antennas generate intermodulation products which can appear as spurious signals interfering with reception. This interference or second and third order intermodulation is caused by non linearity in the amplifier producing signals which are usually the sum and difference of strong AM or FM Broadcast stations and their harmonics. The RF PRO-1A Moebius Loop has been specifically designed to reduce intermodulation products to a minimum. The third order intercept point is typically +48 dBm (OIP3) and the second order intercept point is greater than +100 dBm (OIP2). The 1 dB compression point of this amplifier is + 27 dBm making the levels of the intermodulation products generally far below the atmospheric and man-made noise.

ANTENNA DESIGN

The RF PRO-1A Moebius Loop Antenna consists of a rigid light-weight ¾” diameter anodized aluminum 38 inch diameter loop and a balanced broadband amplifier that is housed in a separate enclosure that can be mounted close to the antenna on its mast or to any nearby flat surface. This configuration permits the insertion of optional AM broadcast band elimination filters ahead of the amplifier. This is not normally required for good performance, but is available to provide the ultimate performance in extremely high RF signal environments. A 20 volt DC regulated power supply and power inserter unit are provided. The antenna and amplifier have been designed to permit the use of low-cost 75 ohm cable (RG-6 quad-shield recommended). The maximum length is 1000 feet, but the frequency response will be a function of the cable loss vs. length specifications. For best results the antenna should be positioned approximately 15 feet away from any buildings or other sources of interference.

TECHNICAL INFORMATION

Frequency response: 100 kHz – 30 MHz (Gain = 30 dB ±3 dB)
DC power: 20 volts at 240 mA
LNA OIP3: +48 dBm
LNA OIP2: > 100 dBm (typically 110 dBm)
1dB compression point: +27 dBm
NF: typically 2 dB (at 10 MHz)
Antenna Diameter: 38 inches
Maximum cable length between antenna and power inserter: 1000 feet

Available RG-6 Quad-Shield Lead-In Cable with attached waterproof connectors:

<table>
<thead>
<tr>
<th>Part #</th>
<th>Length</th>
<th>Price</th>
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<tbody>
<tr>
<td>C-50</td>
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<td>C-200</td>
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Supplied Components

<table>
<thead>
<tr>
<th>QTY</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Loop antenna</td>
</tr>
<tr>
<td>1</td>
<td>30 dB preamplifier</td>
</tr>
<tr>
<td>1</td>
<td>L-bracket</td>
</tr>
<tr>
<td>2</td>
<td>Saddle clamps</td>
</tr>
<tr>
<td>2</td>
<td>U-bolts</td>
</tr>
<tr>
<td>1</td>
<td>Mounting Screws and washers</td>
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<tr>
<td>1</td>
<td>CoAx Seal package</td>
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<tr>
<td>1</td>
<td>24 VAC wall mount transformer</td>
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<tr>
<td>1</td>
<td>3 ft F-male to F-male jumper cable</td>
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<tr>
<td>1</td>
<td>1 ft F-male to F-male water-proof jumper cable</td>
</tr>
<tr>
<td>1</td>
<td>PL-259 Adapter</td>
</tr>
<tr>
<td>1</td>
<td>20 VDC power inserter</td>
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<tr>
<td>1</td>
<td>Twin lead to F-female adapter</td>
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<tr>
<td>1</td>
<td>RCA- plug to RCA- plug cable</td>
</tr>
<tr>
<td>1</td>
<td>Grounding Lug</td>
</tr>
<tr>
<td>1</td>
<td>Nylon shoulder washers (.375 inch)</td>
</tr>
<tr>
<td>1</td>
<td>Nylon washers (.25 inch)</td>
</tr>
<tr>
<td>1</td>
<td>Instruction Manual</td>
</tr>
</tbody>
</table>

www. PixelSatRadio.com
Phone: (303) 526 – 1965
Golden, Colorado

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Also available on-line at www.HighGainStore.com
Stop the Static, Knock-off the Noise, Redeem your Reception!

New Shielded Broadband Magnetic Moebius Receive Loop Kills Local Interference

Model RF PRO-1A
- Outperforms much larger antennas
- Covers 50 kHz to 30 MHz
- No tuning required
- Works great at ground level
- Includes high performance low-noise preamp with super-low intermod distortion
- Perfect antenna for SDR receivers
- Includes T/R switch

Only 38 Inches Diameter
See us in Dayton!

Check Out Our Rave Reviews!

“The results are simply amazing. This little antenna at ten feet off the ground out-receives my dipole on 40 and 75 meters at 34 feet and is much quieter to listen to……I recommend it whole-heartedly.” Ron Gould, KD7RJ

“This might well be the best $400 you’ve put out on a compact shortwave antenna. Highly recommended. Especially for small lots, apartments, or ornamentally territorial wives.”

“I was impressed by its performance .... I’ve been able to work more stations on 30, 40, 80 and 160 ... it consistently hears better than my Bazooka.” Tad Williamson, WF4W

“I got my PRO-1 loop a couple of weeks ago and my friends and I are flat-out blown away with its performance. It’s super quiet. Period.”

RF PRO-1A Active Loop Antenna Wiring Diagram

Input

1 Ft Jumper Cable

30 dB Amplifier

Output

RG-6 Cable (Not Supplied)

MODEL P-92 POWER INserter

TO AMP OUTPUT (20 VDC) TO RADIO

KEY

PL-259 ADAPTER

RADIO RECEIVER

Supplied Twin Lead Adapter

Alternate Interface for Radios with Twin Lead Antenna Input

115 VAC

24 VAC Wall Mount Transformer

To KEY output of transceiver (optional)

Loop Antenna Pattern (looking down edge – on from above antenna)
Connect to preamp output

ANT Power Indicator (illuminates when the preamp is powered)

Connect to Receiver Antenna Input

Power Inserter

IN FROM ANTENNA
PRE AMP OUTPUT (+20 VDC)

OUT TO RADIO

Connect to KEY output of Transceiver (Optional)

Master Power on/off
Loop Antenna Mounted on Rotator

- Loop Antenna
- 1 foot Jumper
- L-Bracket
- Preamplifier
- Coax-Seal
- Service Loop
- RG-6 Cable to Power Inserter (Not Supplied)
- Rotor (Not Supplied)
Supplied Accessories

- Receiver
- Connect cable
- Power Inserter
- 115: 24 VAC wall mount transformer
- Antenna Preamp
- Miscellaneous mounting hardware, cables and adapters
Magnetic Shielded Loop Antenna User Review and Evaluation

Wellbrook Model ALA-1530+ vs. Pixel Technologies RF PRO-1

By Ned Mountain, WC4X 5/1/2010

Introduction

The objective of this evaluation was to perform a side-by-side unbiased comparison between the Wellbrook ALA1530+ broadband loop antenna and the Pixel Technologies RF PRO-1 loop (a pre-production prototype). Their performance was also compared to a 550 foot bi-directional Beverage antenna at my QTH 100 miles north of Atlanta in the North Georgia Mountains.

Both of these antennas are 1 meter diameter loops with low-noise high gain amplifiers and are designed to cover the range of 100 kHz to 30 MHz. The objective of this evaluation was to determine how well these antennas operate in the HF amateur bands up to 30 MHz and to identify the differences between each. Both of these antennas are the “receive-only” broadband variety that require no external manual tuning adjustments and are primarily designed for outdoor installation at ground level but also can be used indoors. (Many people install them in attics or lofts). Because these antennas are optimized to respond primarily to the magnetic component of electromagnetic radio waves, they exhibit excellent rejection of localized (near field) QRM from computers, flat panel TV’s, light dimmers, switching power supplies, etc. that is dominated by the electro-static component of the electromagnetic emissions. In this regard, the substantial QRM reduction advantages of these types of antennas have been well reviewed and documented:


http://www.wellbrook.uk.com/reviews/SWM2001Nov.pdf

Both loops have a broad figure-eight reception pattern (or more accurately a fat figure eight) with sharp 20 - 30 dB nulls (about 2-5 degrees wide) at right angles to each side of the plane of the loop which are useful for nulling or reducing localized interference coming from a specific direction. Although to take advantage of this feature, you may need to mount the antenna on a standard rotor for precision alignment.

Wellbrook, a U.K company, has been producing the Model ALA 1530 since 1999 and the Model 1530+ is the latest version. The Wellbrook antenna has been well reviewed and is highly regarded in the amateur community. Pixel, located near Denver, Colorado is a manufacturer of antennas and RF distribution accessories for high-end home, professional and commercial applications. The RF PRO-1 is an extension of their highly regarded AM-1 MW shielded magnetic loop antenna and utilizes a “Moebius Loop” architecture that was originally developed for a US Air Force project in the sixties and declassified in 1994. (http://www.ece.unm.edu/summa/notes/SSN/note7.pdf).

The bottom line is that, as expected, neither loop antenna was as good as my 550 foot Beverage. But the loops were not that far behind and for their size, in locations with limited space, they provide remarkable reception capability. In every case (reception sensitivity, interference rejection, mechanical design, ease of use, and ease of installation) the Pixel antenna was the clear winner between the two loops.

Evaluation Details

Sensitivity and Signal-to-Noise

In my test setup I mounted both loops outdoors to a wooden fence about 5 feet high and oriented the loops in the exact same direction. They were connected to either of my transceivers (Kenwood TS870 and ICOM 756 Pro 3) through identical 50 foot runs of quad shield RG-6 cable via an A/B switch. I tested them both side by side for about a month in April 2010. Almost everything I was able to receive on the Beverage was also readable with the Pixel Loop except some very weak low frequency signals. As expected, the S/N was not as good as the Beverage. On the other hand, S-meter readings and listening tests confirmed that almost across the entire 100 kHz to 30 MHz spectrum, the Wellbrook’s performance was noticeably less than the Pixel loop. To be fair there were some cases where the Pixel and Wellbrook antennas were about equal below 1 MHz, but above this frequency, the Pixel Loop was the clear winner by as much as 10 dB. This seems to verify Pixel’s claims that their “Moebius Loop” architecture outperforms conventional loops.
Interference Rejection, IMD and Noise Figure

To test interference rejection, I used a particularly noisy fluorescent light located in my shack to evaluate this. While not an exhaustive scientific test, the Pixel exhibited noticeably greater resistance to this noise source than the Wellbrook. As far as the capability of these antennas to operate well with low intermodulation distortion (IMD) in the presence of very high level RF signals (such as a typical local AM broadcast station), both antennas have impressive specifications better than most receivers. The Pixel IMD specs are some 10 dB to 7 dB better than the Wellbrook in this regard. Because the Wellbrook amplifier is integrated inside the loop in a sealed and potted enclosure, I was unable to verify its claimed IMD specifications. The Pixel amplifier was tested by an independent laboratory and certified to meet its published specs and it also exhibited a noise figure in the vicinity of 2 dB (at 10 MHz) which is excellent. Wellbrook does not publish its noise-figure specifications. The Pixel amplifier that was tested was pre-production prototype.

Mechanical Integrity & Mounting Provisions

From a mechanical design perspective the Pixel Loop is much more rugged and easily mounts to any pole (up to 2 inches in diameter) with standard pole-mount hardware that is included. The Pixel Loop can also be mounted to any flat vertical surface with the included high strength L-bracket. On the other hand, the Wellbrook is particularly deficient in this regard. The user is advised in the Wellbrook instruction sheet to improvise a wooden or bamboo pole for mounting. Many previous reviewers have commented on this. The Wellbrook also utilizes a BNC connector to mate with the outdoor antenna. The BNC is a reasonable connector to use in low-stress indoor applications, but for outdoor use, its environmental and mechanical attributes are completely unacceptable. Many previous Wellbrook reviewers have also commented on this and have had to improvise various environmental improvements and had to performed frequent outdoor connector maintenance. The BNC connector is potted into the antenna’s base and there is no way to change or modify it. The Pixel Loop, on the other hand, uses readily available high quality F-connectors tried and proven by the DBS and Cable TV industries. The Pixel antenna can also be used with relatively low-cost quad-shield RG-6 cable. The Pixel interface / power inserter unit that mates with the radio has an internal 75 to 50 ohm matching transformer with a PL-259 or F-connector output to the radio.

Service Features and Configuration Flexibility

Another positive note for Pixel is that because the Low Noise Amplifier (LNA) is a separate modular unit that mounts to the antenna mast or nearby flat surface, it’s much easier to replace if it ever goes bad. The Wellbrook requires replacing the entire antenna. Also an AM band reject filter can, in the case of extremely high-powered very close-by transmitters, be installed up-stream of the amplifier to make the antenna meet its ultimate specifications although this is generally not required. A few users have reported that the Wellbrook is inoperable in such situations, particularly when there are nearby high-powered commercial FM transmitters. With the Wellbrook there is no way to fix this problem.

Summary

The loops do an impressive job of minimizing local QRM as advertised. The Pixel RF PRO-1 beats the Wellbrook across the board and although it’s not a 550 ft Beverage spread out over several acres, in most cases it’s not far behind the Beverage. Admittedly, additional quantitative measurements should be done to validate my qualitative observations, but in a smaller QTH with antenna restrictions, the Pixel RF PRO-1 would be my number one choice for a low frequency receive antenna.

Ned Mountain, WC4X
5/1/2010
To My Fellow Elecraft K3 Owners, Wantabees, and Others,

Last year I went to Dayton where I ordered the KRX3 second receiver and some 8 pole filters so I could try diversity receive. Just around the corner or so from them was a new vendor I had never heard of before, Pixel Technologies. I spent some time talking and getting a demonstration of their newly announced product The Model RF PRO-1A. “It is a New Shortwave Magnetic Loop Antenna for Improved Reception and Noise Rejection Shielded Active Broadband Magnetic ”Moebius Loop” Antenna” - MSRP: $399.99 and their Website: www.PixelSatRadio.com

It took a while for me to take delivery of the antenna and several months went by before I tried it and honestly was not very impressed with the results so I contacted them on the telephone. I explained the antenna was noisy and did not receive anywhere as good as my dipole at 34 feet on 75 meters. I was informed somehow I had not been notified, but that some new designs had been implemented and they wanted to send them out and have me try them. They told me if I were not satisfied, they would refund my full purchase price. A few weeks later I installed the new parts to the antenna.

The results are simply amazing. This little antenna at ten feet off the ground out receives my dipole on 40 and 75 meters at 34 feet and is much quieter to listen too. As a matter of fact, I now listen to it more than the dipole simply because it’s nicer to listen too and it receives better. This antenna has electronic circuits that are housed in weather tight enclosures and the circuit boards are conformal coated. The power supply has an RCA connector to connect to the amp key output so power is cut off to it when transmitting—a very handy thing when using power to protect the front end of the K3. I have not tried it on other bands but expect the results would be just as good. It would also make a great antenna for SWL due to its very small size and performance. There is no way I am going to give up on this little gem.

I contacted Wayne Burdick at Elecraft and told him how happy I was with the K3, the KRX3, and the RF PRO-1A combination using diversity receive and that the results were spectacular. I also told him if anyone wanted a
great suggestion on an antenna for diversity mode to go with the second receiver in the K3, this antenna was a great performer. He responded back stating, "Sounds like a great antenna! Would you mind posting about it to our email reflector? We don't sell any competing products, so I'd have no qualms about having you pitch it there. Glad you like the sub-RX, too. It's a great tool."

So there you have it folks. For those of you who decide to look into this I recommend it whole-heartedly and if you do not like it, the company offers a 30-day money back guarantee. I offer this advice to fellow hams and have no affiliation whatsoever with Pixel Technologies or Elecraft other than being a very satisfied customer.

Ron Gould KD7RJ