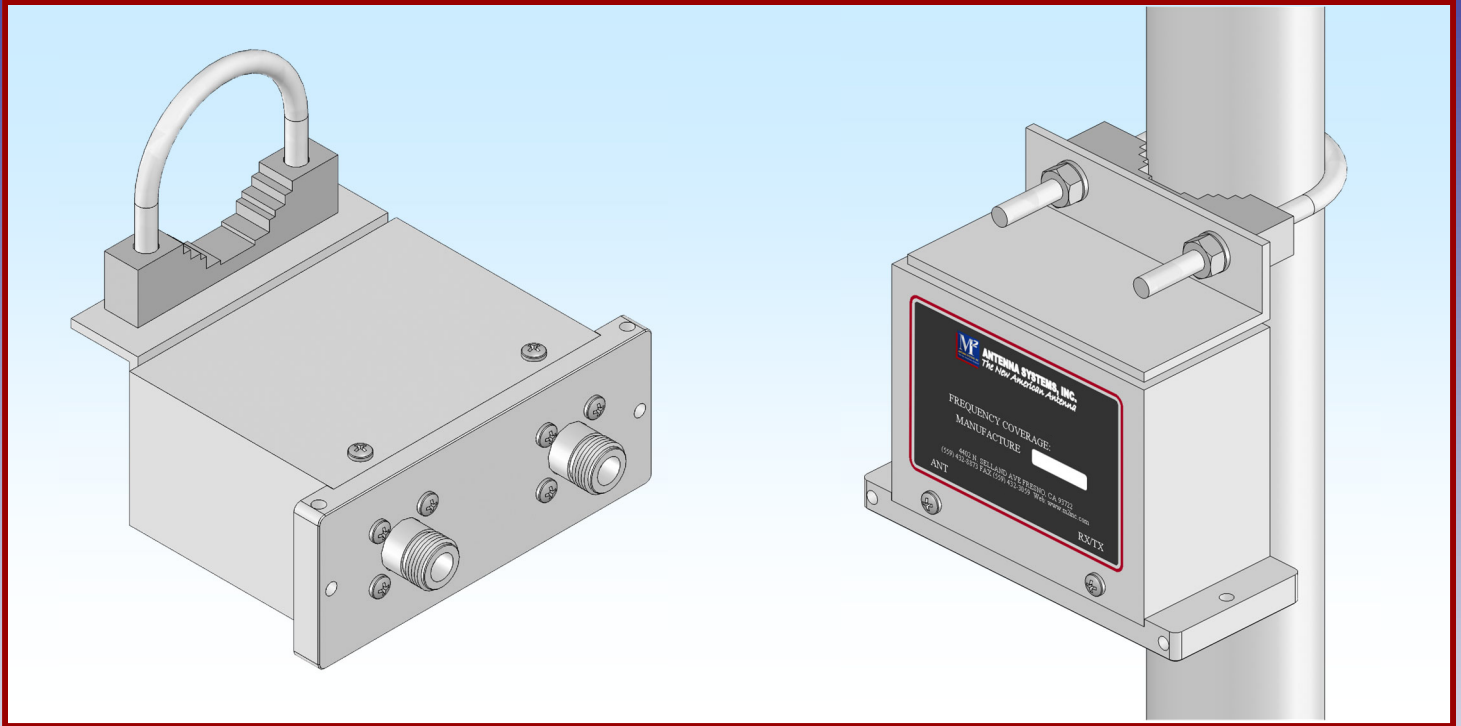




**M2 Antenna Systems, Inc.**

**Model No: PA-50-500**

**VHF / UHF Low Noise Preamp (LNA)**



**SPECIFICATIONS**

Model .....	PA-50-500
Frequency Range .....	50-500 MHz / useable up to 700 MHz
Noise Figure .....	0.5/.8 dB
Gain .....	20 dB Nominal
Insertion Loss .....	0.2 dB Nominal
Inline SWR .....	< 1.2:1
Voltage .....	+11 to +18 V DC
Current .....	150 mA
Mast Size.....	1-1/4" (30 mm) - 2" (50 mm)
.....	2-1/4" (57 mm) Hole Spacing
.....	(Also available without mounting tab)
Device details .....	Avago ATF 54143 E-PHEMT
.....	Output 20mW @ 60 mA, Dissipation = 725 mW

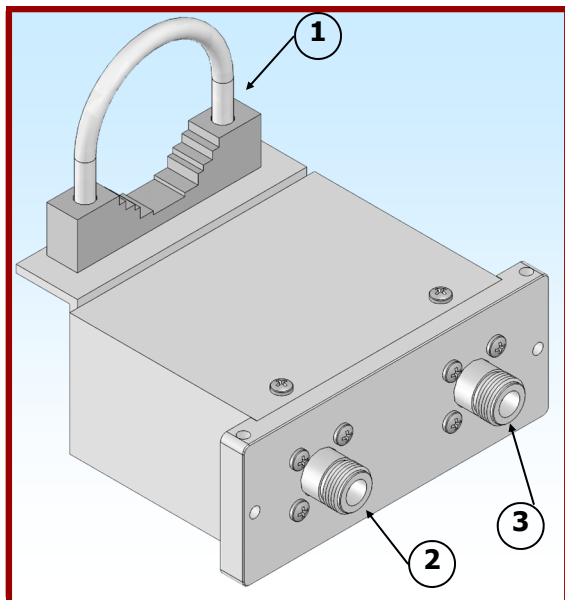
**M2 Antenna Systems, Inc. 4402 N. Selland Ave. Fresno, CA 93722**  
**Tel: (559) 432-8873 Fax: (559) 432-3059 Web: www.m2inc.com**

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# OVERVIEW

## MAJOR COMPONENTS



1. **U-Bolt and Uni-cradle.** (Mast mount units) Will accommodate most diameters from 1-1/4" (30mm) up to 2" (50mm). This will fit many masts, tower legs and cross-booms. Mount the preamplifier close to the antenna, and for maximum weather protection keep it vertical as much as practical.
2. **RX OUT (J3).** Type "N" connector, used to connect the receiver to the preamp.
3. **ANTENNA IN (J2).** Type "N" connector, used to connect to the antenna. Use a quality coax with as short a run as possible to minimize loss and noise.

## THEORY OF OPERATION

Feedline loss is an inevitable factor in any antenna system. What is heard by the antenna may not make it to the receiver, resulting in lower a signal to noise ratio on critical communications paths, such as with weak signal work, Earth-Moon-Earth, satellite or even distant repeater work. A good low noise amplifier, or preamp, overcomes those losses and improves the signal-to-noise ratio at the receiver.

### WHY USE A MAST-MOUNTED PREAMP?

Even the highest quality feedline and connectors exhibit some loss. Energy that is lost becomes thermal noise, which degrades overall receiver performance and crushes weaker signals. By placing the preamp close to the antenna feed point, signals are amplified by up to 20 dB, overcoming those losses and pulling weak signals right out of the noise.

### HERE'S HOW IT WORKS

#### Receive

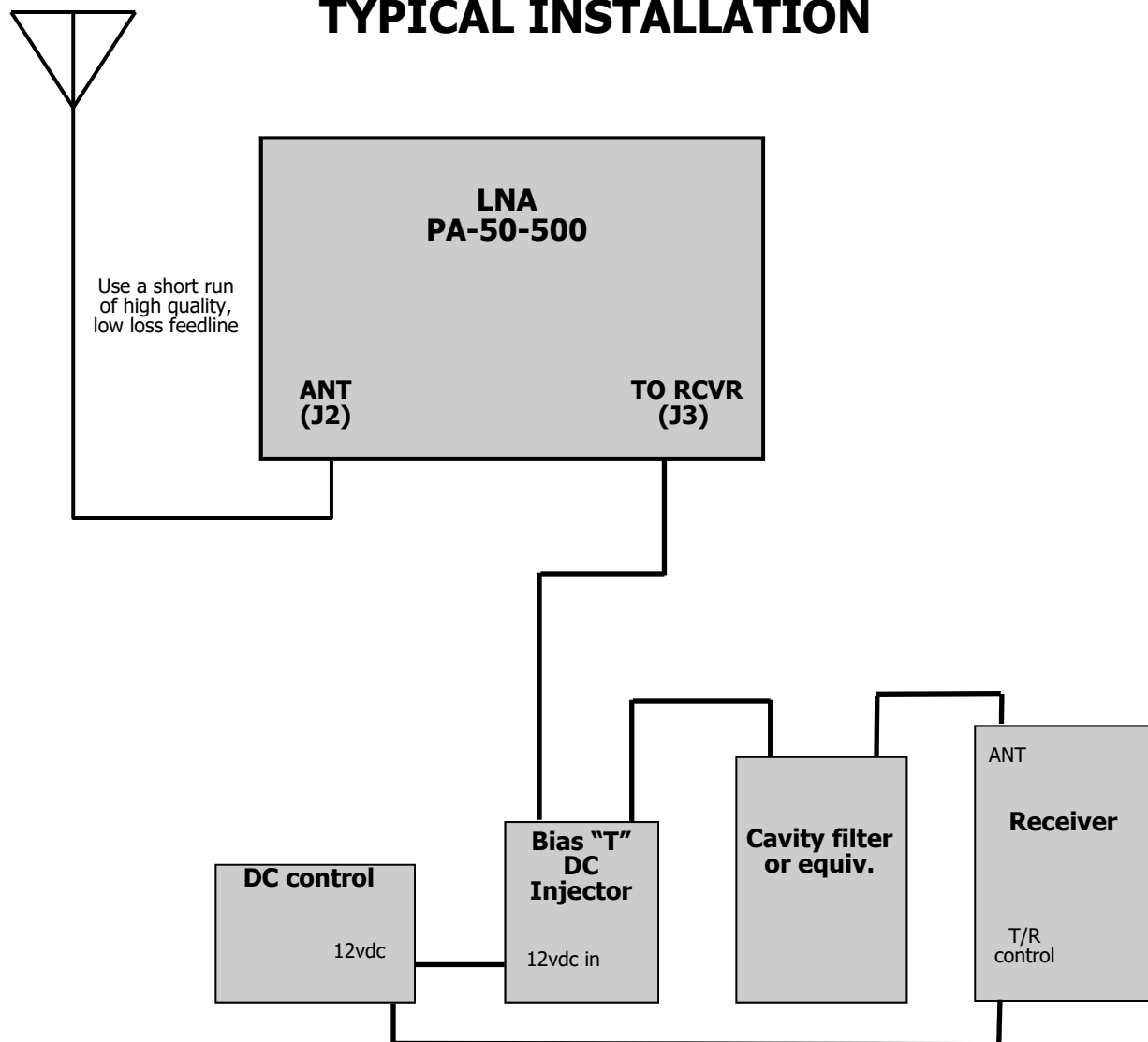
During receive, with power on, the internal receive input protection relay is energized allowing the preamplifier to receive signals. The receive signal is fed to the PHEMT device where it is amplified. The resulting signal is then sent back down the feedline to the receiver, with a gain of 20 dB and a noise figure of approximately 0.6 dB.

#### Transmit

**WARNING:** THE M2 PA-50-500 IS A RECEIVE ONLY PREAMP, NEVER TRANSMIT THROUGH THIS MODEL PREAMP. On transmit, turn the power off to the preamp. This De-energizes the preamp circuit, while de-energizing RY3 and shorting the preamp input to ground. It is always a good idea to use a cavity or notch filter between the preamp and receiver to protect transmit signals from damaging or over loading the front end of your receiver.

# INSTALLATION

## TYPICAL INSTALLATION



## INSTALLATION CONSIDERATIONS

- **WARNING:** SAFETY IS ALWAYS A PRIORITY! ALWAYS OBSERVE APPROPRIATE CLIMBING AND ELECTRICAL SAFETY PRECAUTIONS WHEN INSTALLING ANTENNAS AND RELATED EQUIPMENT.
- **CAUTION:** THE USE OF LIGHTNING PROTECTION DEVICES ON ALL CABLES ENTERING ANY BUILDING IS STRONGLY ENCOURAGED. CONSULT LOCAL ELECTRICAL CODES FOR INSTALLATION REQUIREMENTS.
- Always mount the preamp in an upright position. Failure to do so may reduce its water resistance.
- Use weather resistant tape on the coax and control connectors. While the control connector and type N connectors are inherently water resistant, proper application of standard waterproofing measures ensures the long life of your preamp.
- Use a SHIELDED control line with at least 20 AWG (.5 mm<sup>2</sup>) or larger.
- A sequencer, such as the M<sup>2</sup> S2 EME Sequencer, or the S3 Sequencer will help manage transmit/receive timing to ensure that outgoing RF is not inadvertently transmitted through the preamp.
- When using high power (above 160W), the use of external high power coaxial relays to bypass RF in excess of 150W will ensure that proper isolation is maintained. The HPR-1 made by M<sup>2</sup> is an excellent choice.
- Should a mast mount installation not be practical, the preamp will work close to the receiver too. While it will not be able to recover signals lost by a long transmission line run, it can go a long way toward boosting the signal to noise ratio of signals above the noise floor but below the receiver threshold—perfect for receivers with weak front end sensitivity!

# PA-50-500 PARTS LIST

<b>DESCRIPTION.....</b>	<b>QTY</b>
PA-50-500 LOW NOISE PREAMPLIFIER.....	1
PA-50-500 OPERATING INSTRUCTIONS.....	1
<b>HARDWARE BAG (FOR MAST-MOUNT UNITS):</b>	
UNI-CRADLE (M2AMC0076) .....	1
U-BOLT, 2", SS .....	1
LOCK WASHER, 1/4" SS.....	2
NUT, 1/4-20, SS .....	2

## SUPPORT, SERVICE AND RETURNS

If you have followed the provided troubleshooting steps and your product is still not performing as specified, please contact us for further technical support. You may email us any time, or call between 8:00 am and 4:00 pm Pacific Time (UTC -7 / -8). Our contact information is:

**M<sup>2</sup> Antenna Systems, Inc.**  
**4402 N. Selland Ave.**  
**Fresno, CA 93722 USA**  
**Tel: (559) 432-8873**  
**Email: sales@m2inc.com**

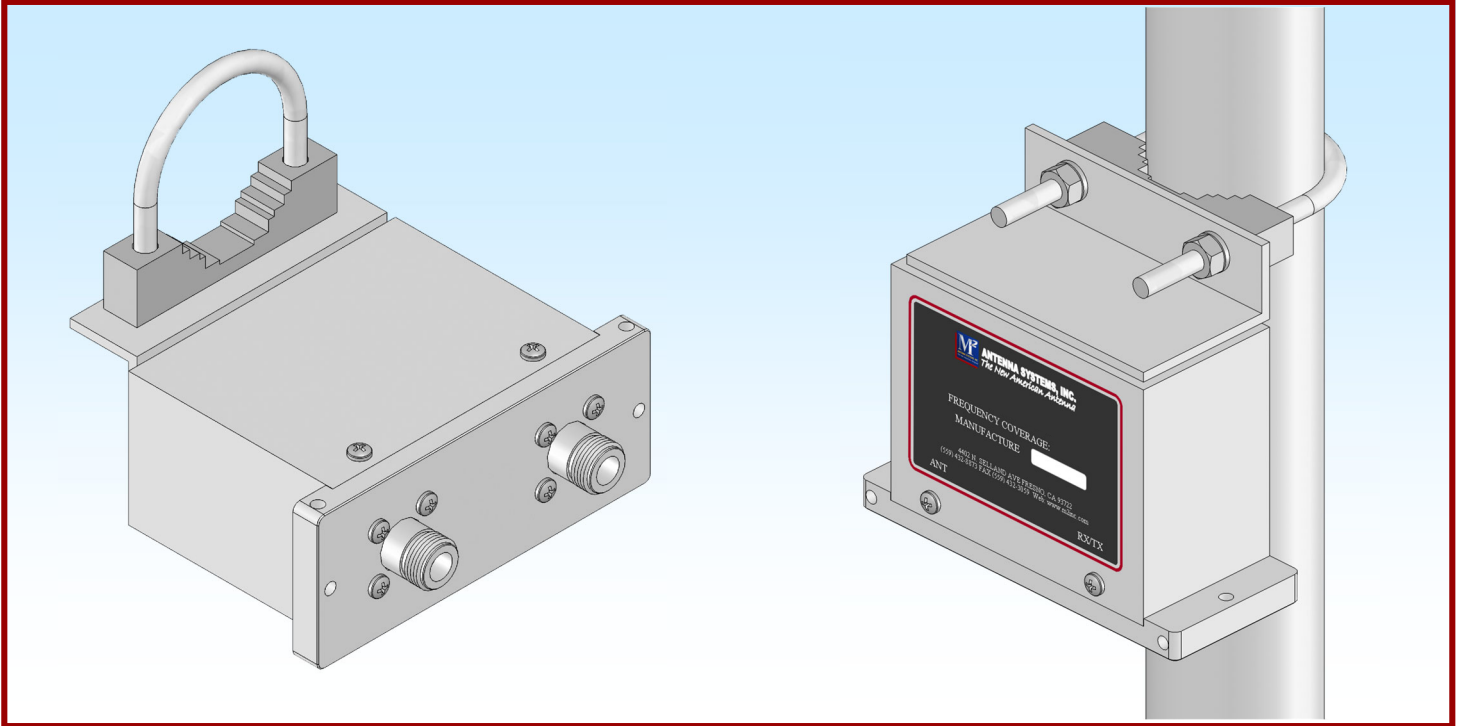
When writing, please include the following:

- Your name and contact information
- The product you are writing about
- A synopsis of the problem
- The troubleshooting steps you have already taken

Should you require factory service, we will be happy to provide you with a Return Authorization. If the item is outside the warranty period, an estimate of the repair costs will be provided once the item has been examined by a technician.

Contacting us before returning any products to our factory will not only prevent lost items, but also expedite their repair.

# 12 MONTH LIMITED WARRANTY



This warranty gives you specific legal rights. You may also have other rights which will vary from state to state or province to province.

**M2** warrants the **PA-50-500** preamplifier against defects in material and workmanship for a **period of 12 months** from date of purchase. During the warranty period, **M2** will, at its option, either repair or replace products or components which prove to be defective. The warranty shall not apply to defects or damage resulting from:

- Improper or inadequate maintenance by user
- Improperly prepared installation site
- Unauthorized modifications or misuse
- Accident, abuse, or misapplication
- Normal wear

**M2** specifically does not warrant this product for any direct, indirect, consequential, or incidental damages arising from the use or inability to use the product. Some states or provinces do not allow the exclusion or limitation of liability for consequential or incidental damages so the above limitation may not apply.

In the event repair or replacement are necessary, purchaser shall contact **M2** for return authorization. In many cases this contact can simplify and expedite the repair/replacement process and help reduce costs and downtime.

The purchaser shall be responsible for packing the product properly for return and for charges to ship the product to **M2**. Always include with the shipment a statement detailing the problem or failure and any other pertinent observations. Insuring the product for shipment is recommended. Use the original packing materials whenever possible. **M2** is responsible for charges (**in the United States**) to return the repaired or replaced product only where warranty service is involved.