

Active Receiving Antennas



ARA 2000 shown

Dressler Active Receiving Antenna Installation Information

New Installation information: (See page 4)

The ARA 60 and HDX 100 antennas operate very well when mounted at ground level. Low mounting greatly reduces the possibility of the coax reacting with the RF signal to inadvertently increase the effective length of the monopole antenna and minimizes man made noise pickup by the antenna and coax. Read more in the ARA 60 and HDX 100 mounting section on page 4.

Introduction:

The Dressler ARA "Active Receiving Antenna" products are an excellent investment for your shortwave listening pleasure. Our customers routinely tell us that they consider them to be the best commercially available "active" antenna product on the market. The ARA antennas are small, light and very easy to install. Even indoors, they provide excellent performance across their entire band ranges without any tuning. The ARA 60 compares favorably with long wire antennas in terms of signal strength. In addition, the ARA products are "Electrically Short" and offer the advantage of receiving a lower level of disturbances due to electrostatic discharge and other man made (QRM) noise. The ARA low profile also offers wind resistance to 100 MPH, when mounted on a suitable structure.

All standard ARA models provide about 7-14 dB of gain and low noise figures which can enhance the sensitivity of virtually any shortwave receiver. We now offer LMR-240 (Ultra-Flex) low loss cable as an option for the ARA UHF products. The low loss cable typically increases signal sensitivity by about 6 dB* as compared to using standard RG-58/U cable. The HDX models are designed to withstand a higher level of ambient signal level and are best suited for urban locations with high ambient RF levels or any other site in close proximity to high power broadcast or other communication transmission services. All UHF HDX models are supplied with the LMR-240 low loss cable.

Dressler ARA products offer several models, all designed to provide you with the best possible reception in two basic frequency ranges, 40 kHz - 60 MHz and 50 MHz - 2000 MHz. A mast-mounted preamplifier (EWPA 5200) is offered for those using "Discone" or high gain antenna types for special applications. All ARA products are connected in the same manner, using the same basic power supply and cabling components.

The ARA products are designed to operate with telecommunication receivers and wideband scanner receivers with coaxial antenna inputs. Portable receivers with the internal telescopic or loop antennas are difficult to connect to the ARA products and may not offer the level of performance associated with the ARA product name.

*Based on loss factors for a 40' length of coax at 2 GHz.
LMR-240 - 4.6 dB
RG-58 - 11 dB



Products -

ARA-60

The ARA-60 provides seamless receiving capability across the entire frequency range of 40 kHz to over 60 MHz, without any tuning and will typically work well through the FM broadcast band. The ARA-60 has an integral RG-58 coaxial cable and is designed for vertical mounting to achieve an omni-directional reception capability. Though the antenna is “electrically short” as compared to long wire aerials, the reception is of nearly the same signal strength and quality.

ARA- 100 HDX

The ARA 100-HDX covers 40 kHz to 100 MHz and is specifically designed for use in locations with high ambient RF signals levels. The HDX preamplifiers have a higher third order intercept point allowing them to withstand higher signal levels with minimum intermodulation distortion. Locations near radio or television broadcast antennas, cellular communication or paging sites typical of urban locations require the added dynamic range of the HDX preamplifiers. Intermodulation distortion is generally indicated by the appearance of multiple “Images” of a real signal as you tune across the band. See the troubleshooting section for additional information.

ARA-2000LL

The ARA-2000LL covers the range from 50 MHz to 2000 MHz with the full receiving sensitivity and 50 to 80 MHz and 1500 to 2000 MHz with a slight reduction in sensitivity. The ARA-2000LL has been developed for vertical mounting to achieve an omni-directional reception capability with a vertical polarization. The ARA-2000LL includes the LMR-240 "Ultra-Flex" cable that provides added sensitivity. The ARA-2000LL provides the same excellent receiving sensitivity as its predecessors, the ARA-900 and 1500, but now offers extended frequency coverage to 2000 MHz.

ARA-2000 HDX

The ARA 2000-HDX covers 50 to 2000 MHz and is specifically designed for use in locations with high ambient RF signals levels. The HDX preamplifiers have a higher third order intercept point allowing them to withstand higher signal levels with minimum intermodulation distortion. Locations near radio or television broadcast antennas, cellular communication or paging sites typical of urban locations require the added dynamic range of the HDX preamplifiers. Intermodulation distortion is generally indicated by the appearance of multiple “Images” of a real signal as you tune across the band. See the troubleshooting section for additional information. The HDX 2000 is supplied with the low loss LMR-240 "Ultra-Flex" coaxial cable.

EWPA-5200LL (Unavailable, replacement forthcoming)

The EWPA-5200LL is a mast mountable preamplifier covering the frequency range of 50 to 2000 MHz. Like the ARA-2000LL, it allows the low noise preamplifier to be located very close to the antenna, to optimize sensitivity. The EWPA-5200LL is specifically designed to accommodate the needs of users with specialty antennas like the Discone, Yagi or log periodic. It will operate effectively on broadband or narrowband antennas. The EWPA-5200LL version includes LMR-240 "Ultra-Flex" coax cables. (antenna to preamp and main RF cable) The EWPA-5200 is protected against damage from static discharge. Antennas designs with the receiving elements at DC ground are recommended in locations subject to high wind and low relative humidity.



The DC Power Supply -

The ARA series antennas utilize a wall plug adapter power supply. When connected to a main voltage of 120 VAC, it delivers a regulated 12 VDC with a maximum current of 1.0 amp. The antennas typically require between 70-100 mA. This conservative power rating has been selected to provide a safe and reliable supply that can be reliably used for the life of the installation.

The ARA series products require a minimum voltage 11 VDC and the maximum should not exceed 13 VDC. If you would like to supply ARA products with other DC power supplies do not attempt to operate the ARA products outside of their specified voltage range. The inner ring of the connecting 5.5 X 2.5 mm plug is the POSITIVE polarity while the outer shaft lead is NEGATIVE polarity.

The wall plug adapter is connection to the RSM-2000 INTERFACE. The INTERFACE allows the DC to be applied to the center conductor of the coaxial cable, eliminating the need of an additional power supply lead.

The RSM-2000 -

The RSM-2000 is basically a diplexer that allows the DC current for the preamplifier to be applied to the center conductor of the RF coax, eliminating the need for an additional DC power feed conductor. The RSM-2000 contains an internal fuse and a user variable attenuator to adjust the signal level of the preamp in the event of signal overload conditions. The DC power connection is a 5.5 X 2.5 mm receptacle.

The user replaceable fuse located under the top cover and can be accessed by removing the two Philips screws located on the top cover. In the event that the fuse is found to be open (evidenced by having no +12 VDC voltage at the center pin of the BNC(F) output connector), it can be replaced with a Radio Shack P/N 279-1062, 0.75 A, slow-blow, 5X20 mm, GMA type.

The RSM-2000 also contains a high quality RF attenuator allowing received signals to be attenuated over the entire frequency range of 50 kHz to 2000 MHz. The RF adjustment range is about 0-20 dB with minimum insertion loss (maximum gain) in full clockwise position. The attenuator allows matching the gain of the antenna to the receiver in use allowing reduction of gain for receivers that are sensitive to additional gain placed at the RF input. It can also be used to reduce the effects of overdrive from local broadcast stations.

The attenuator is adjusted via the blue adjustable screw located on the side of the Interface unit. To reduce the gain, turn the attenuator counter clockwise, to increase the gain turn it clockwise. Additional information can be found in the troubleshooting section.

Installation -

Where to Place the Antenna -

The UHF models, (ARA-2000, 2000-HDX) and antennas using the EWPA-5200 should be mounted as high as possible above ground level and away from structures (towers), trees and other obstacles. A clear view of the horizon in all directions will insure optimum reception. Installation of the ARA active antenna outside the building structure will assure you of the best possible reception quality. Attic or closet mounting although slightly less effective provides good performance for those not able to mount the antennas outside.



Installation continued.... (new information)

The ARA-60 and the 100-HDX operate in the HF frequency range where height is far less important as compared to the VHF and UHF models. The HF models should still be mounted as far as possible away from metal structures and if possible dress the coax away from the antenna base at a 90 degree angle. This will help to minimize the effects of the coax artificially increasing the effective length of the antenna. Although more signal sounds interesting it generally causes the antenna to overload sooner in large cities or other RF rich locations. Mounting the ARA 60 and 100 HDX low on the roof will help to accommodate the right angle coax placement. Mounting at or near ground level is being reported to significantly reduce man made noise levels and performance is still excellent due to most HF signals arriving at a relatively high angle. Height is not as important for "skip" signals or ground waves at these frequencies.

All of the ARA products operate very well when mounted indoors, like in the attic or in a closet. This ability is very useful for those who may have outside antenna mounting restrictions. If you mount indoors, maintain at least 10 feet between the antenna and the receiver to minimize the possibility of the antenna receiving any signals (local oscillator?) that may be emitted from the radio.

Mounting ARA Antennas -

Mounting hardware is provided with each ARA antenna. The brackets/clamps are designed for masts with diameters of 28-50 mm, depending on the model. The ARA 60 should be located at the top of the mounting mast and as far away from other metal structures like masts and towers. If the ARA must be mounted along the side of a mast or tower, offset the mounting by at least 1 meter (3 feet) if possible. Locating the antenna at a closer distance will degrade performance, but not to the extent of making the antenna performance unsatisfactory. The ARA-2000 mounting brackets should be located at a distance of no more than 25 mm (1 inch) between each other with the lower bracket located at the bottom end of the antenna tube.

The ARA antennas are designed to withstand wind velocity up to 100 MPH. In order for the antenna to survive such conditions, you must be sure that the mounting system design is capable of withstanding similar stress. The ARA antennas and the EWPA-5200 preamplifier are protected against damage from static discharge. Eternal antenna designs with the receiving elements at DC ground are recommended for use in locations subject to high wind and low relative humidity or in areas subject to severe thunderstorms.

If you would like to install a proper arrestor, please contact your local specialist to make sure that you understand and can conform to regional code standards. Connecting the ARA antennas to Earth ground does not improve the reception quality. To ground the ARA, connect an approved wire (braid) between the metallic mast and the outer shell of the antenna coax connector. Use adjustable clamps to connect the conductor to the mast and the outside shell of the antenna connector.

Connection -

After the ARA antenna has been mounted properly, please use the attached diagrams to connect the power supply to the antenna and then to the radio.

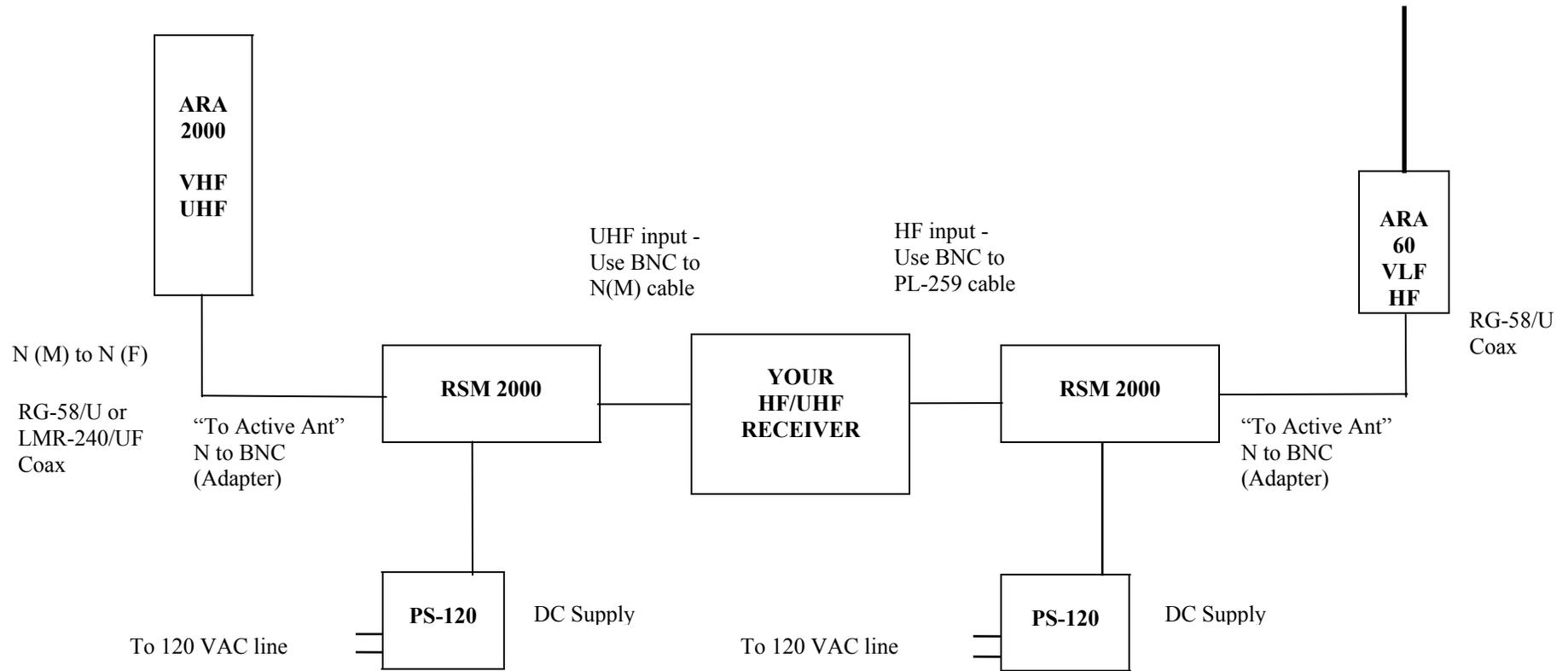
Warning!

Be sure to connect the RSM-2000 properly. Reversing the connections of the active antenna port and receiver output will apply +12 VDC to the receiver input. This may cause damage to the receiver system.



Interconnect Diagram for the Dressler ARA 60 and ARA 2000 antenna Installation

Provides continuous coverage from 40 kHz to 2000 MHz

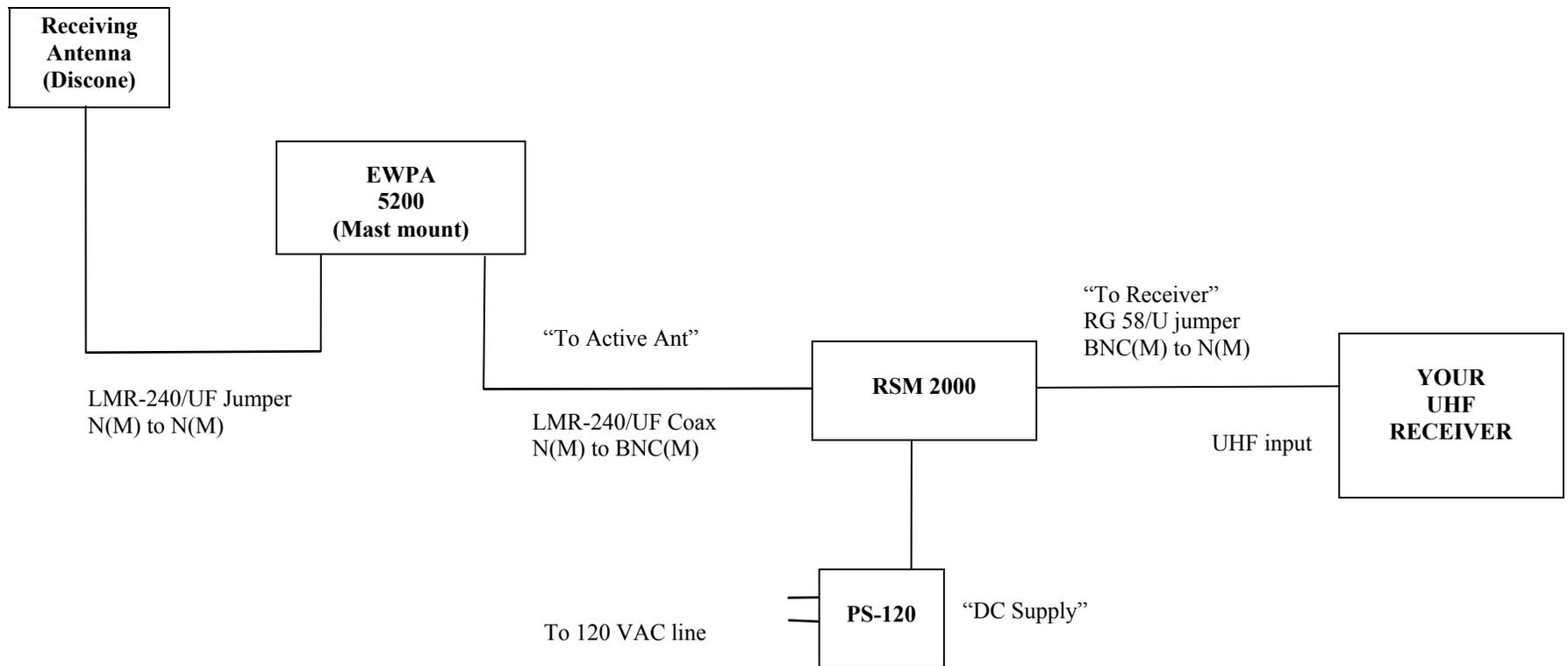


Notes:

1. A 0.75 amp slow-blow fuse is located inside of the RSM-2000 unit. This may be accessed for inspection or replacement by removing the top cover on the RSM unit. Replacement fuses are available from BPT or you may use Radio Shack (or equivalent) P/N 279-1062 0.75 A, slow-blow, 5X20 mm, GMA type.
2. The RSM-2000 also contains a variable RF attenuator for use when the receiver in use has a low tolerance for external gain. The unit is set for maximum signal at the time of test. To decrease the signal, turn the blue slug (located on the side of the RSM-2000) in the counter clockwise direction. The attenuation range is typically about 0-20 dB.



Interconnect Diagram for EWPA 5200 Pre-amplifier Installation



Warning!

Rough handling during the Installation of the coax cables may create the possibility for open or short circuits within the coax and connectors. **Do not attempt to apply DC power until all cables have been checked for continuity and short circuits with an ohmmeter.** A short circuit in the main coax will cause the protective fuse in the RSM-2000 to fail.

Do not attempt to connect or disconnect the main RF cable from the ARA antenna while the power is on. Although the power supply is rated for continuous heavy duty and is current limited at 1000 ma, it is possible to induce failure of the fuse in the RSM-2000 unit if the center conductor of a connector on the main RF cable momentarily touches a case or another grounded component. Failure of the fuse will render the ARA antenna totally inoperative until the fuse is replaced. In this event, use a Radio Shack (or equivalent) P/N 279-1062, 0.75 A, slow-blow, 5X20 mm, GMA type.

Operation -

Once the ARA antenna system has been installed and the cables checked, the system can be powered up. Apply power to the radio system and set the band and frequency to a location where signals will be found in your time zone. Plug in the ARA power supply and you should immediately hear signals loud and clear. If this is not the case please refer to the troubleshooting section and contact your local distributor for addition service support.

A key feature of the ARA products is that they are broadband and require no tuning. After successful installation, you can count on enjoying continual high performance for years and years without ever having to adjust your ARA antenna system. We do advise that you make a routine annual inspection of the external connections to detect any serious degradation in the connections or cabling.

Troubleshooting -

The following information is provided as suggestions to be used in the event that an ARA does not appear to be performing in a normal manner. A good "go - no go" performance test is to disconnect the power supply from the wall while listening to the signals on the radio. You should hear a major increase in signal level when the power is reapplied to the antenna. If you do not hear any increase in noise or signal level please use the following procedure as a guideline to help you to troubleshoot your system.



No signal output from the antenna -

- Using a Volt Ohm Meter (VOM), check the DC supply output at the connector. The output voltage should be 12 VDC +/- 0.5 V. The center connection is positive.
- Check the "To active antenna" output of the RSM-2000 +12V in the same manner as the DC power supply. The center pin of the BNC output connector is positive. If no voltage is present, the fuse has probably failed and must be replaced. In the event of a failed fuse in the RSM-2000 unit, replace with a Radio Shack P/N 279-1062, 0.75 A, slow-blow, 5X20 mm, GMA type.
- Check the connector at the antenna, the center pin of the coax connector should be at 12 VDC also. If no voltage is present and the RSM-2000 output is 12 VDC then the main RF cable may have an intermittent condition.

If all tests indicate that the coax or antenna is at fault, please contact your distributor for replacement parts.

In case of Intermodulation products or "Receiver Overload" -

Receiver overload will appear as hearing the same signal at several frequencies or tuner settings at the same time. You may have to listen for a while to determine if a signal is being received at the correct receiver frequency. In the event that you detect intermodulation effects in the receiver, the source of the problem can be easily located. Turn the attenuator at the Interface fully counter clockwise.

- If the level of the intermodulation image signals decrease as the attenuation is increased, even the signal drops down, the source of overload is poor large signal handling capability of the receiver itself.
- If the level of the intermodulation image signals stays the same, without regard to the attenuator setting, the source of overloading is probably due to antenna preamplifier overloading and can not be easily corrected.

The most common reason for having intermodulation image signals produced within the antenna is the presence of a high level signal from a local TV or FM broadcast station. These signals can be so strong, that the preamplifier circuit operation becomes non-linear and begin to act as a mixer instead of a linear amplifier. This mixing action causes high-level signals to mix or "beat" with other signals producing sum and difference signals that are seen by the receiver as being real.

Relocating an antenna to a lower elevation or a location somewhat more shielded from the suspect signals may reduce overloading. Mounting an HF vertical active antenna on the top of an antenna tower will only slightly enhance the antenna's ability to pick up signals while increasing the risk of intermodulation distortion effects. Mounting the antenna just above the roof of the building or above the ground is one of the best solutions to all vertical active antennas without dramatically degrading reception. Height is everything from the VHF and UHF models as the signal propagation is line of site.

If signal overload appears to be the cause of your problem, please consider the possibility of upgrading to an HDX model, which is far more tolerant of high signal areas. Low frequency signals or noise sources can also induce common mode signals onto the coax. These signals can be coupled into your receiver and cause intermodulation problems. Placing one or more suitable ferrite type cores onto the coax at the base of the antenna can reduce this type of undesirable signal pickup. Please contact us for additional information if you suspect this to be a problem in your installation.