Active Receive Antenna
Horizontal Configuration

ARAH3-1P - Horizontal Active Antenna
Export Model: ARAH3-1PE

Used under US Patent No. 7,423,588

DXE-ARAH-INS-Revision 3a

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Introduction

Ideal for Amateur Radio or Shortwave Listening, the DXE-ARAH3-1P Active Receive Antenna system (ARAH) offers excellent receiving performance from 100 kHz to 30 MHz using two 102 inch whip antenna elements. DX Engineering’s unique design makes it vastly superior to traditional active antennas in both strong signal handling and feedline decoupling, providing significantly better weak signal reception due to lower spurious signal interference and reduced noise.

Location Considerations

The best place to install your active antenna is where you have the recommended space away from power lines and away from your house, tower or any structures which are excellent sources of noise. Even passive wiring in a building or metal fencing can act as a pickup antenna and re-radiate of noise.

The ARAH systems can be affected by local noise sources. Local noise can be random or directional in nature. Every effort must be made to locate sources of noise that could be eliminated at the source. Dimmer switches, electric timers, photocell-operated security lights, and many other items can be sources of unwanted noise. Plasma-screen television receivers are a known generator of unwanted noise interference. Most modern LED or LCD flat panel televisions are not broadband noise generators.

If the noise source is external and single directional in nature, using two ARAH antennas in conjunction with the DXE-NCC-1 Receive Antenna Variable Phasing Controller could allow the user to phase out the noise being received.

Large transmit antennas are a very good source of re-radiated noise.

Ideally your receive antenna should be a minimum of 1/2-wavelength away from any transmit antenna (on the lowest frequency) to avoid mutual coupling and the transfer of any noise being re-radiated by the transmit antenna. If the unit is located 1/10-wavelength to 1/2-wavelength from a transmitting antenna, the unit must be powered off at least 5 ms before transmitting on the transmit antenna. However, with this close spacing, coupling from the nearby transmit antennas becomes more pronounced. At higher frequencies, where the active element length becomes a partial wavelength, coupling increases further.

To assure highest protection for the active antenna, a sequencer such as the DXE-TVSU-1A should be used to ensure the correct transmit-to-receive switching. The ARAH series active horizontal antenna system grounds the antenna element when power is turned off.

Placing a DXE-ARAH3-1P on the same mast or tower as a Yagi or other transmitting antenna is not recommended for this reason.
WARNING!
INSTALLATION OF ANY ANTENNA NEAR POWER LINES IS DANGEROUS

Warning: Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death.

General Information

**THIS IS A RECEIVE-ONLY SYSTEM**

*You should never attempt to transmit through the system.*

*The use of bypass relays and sequential timing is required to avoid damage to the receiver and active antennas in the proximity of transmit antennas.*

*Placing any active receive system on the same mast or tower as the transmit antenna is not recommended.*

A horizontally configured system makes a very sensitive horizontally polarized receiving antenna that is ground independent. Horizontal polarization will greatly reduce ground-wave propagated noise in congested urban environments. Light weight and low wind resistance reduces support requirements and if rotation is desired, you can use a lightweight antenna rotator. The inconspicuous whip antenna elements also have excellent wind survivability.

This compact receiving antenna system operates over a very wide bandwidth with superior strong signal performance. The output Third Order Intercept (TOI) is approximately +30 dBm. This is significantly better than most aftermarket preamplifiers and receivers - making it one of the cleanest active antennas on the market, reducing or eliminating spurious signals.

Feedline decoupling, absent in some other popular designs, is also exceptionally good. Decoupling the shield greatly reduces feedline conducted noise and unwanted signal interference

The **ARAH** systems can be affected by local noise sources. Local noise can be random or directional in nature. Every effort must be made to locate sources of noise that could be eliminated at the source. Dimmer switches, electric timers, photocell-operated security lights, and many other items can be sources of unwanted noise. If the noise source is directional in nature, using two **ARAH** antennas in conjunction with the **DXE-NCC-1** Receive Antenna Variable Phasing Controller would allow the user to phase out the noise being received. Plasma-screen television receivers are becoming more popular and are a known generator of unwanted noise interference.

Two active antennas can be used with the **DXE-NCC-1** Noise Canceling Receive Antenna Controller to make a steerable horizontal array. The **DXE-NCC-1** can also provide power for the active antennas and the proper transmit power-off sequencing.

The **DXE-ARAH** active antennas may be used in installations when spacing from transmit antennas is at least 1/10-wavelength or more. Ideally you should be a minimum of 1/2-wavelength away from any transmit antenna (on the lowest frequency) to avoid mutual coupling and the transfer of noise.
being re-radiated by the transmit antenna. The **DXE-ARAH** series active horizontal antenna system also grounds the antenna element when power is turned off for protection of the active devices.

When using transmitting radio systems and RF amplifiers a sequencer such as the **DXE-TVSU-1A Time Variable Sequencer Unit** should be used to ensure the correct timing while switching from receive to transmit, and back to receive.

**DXE-ARAH3-1P** and **DXE-ARAH3-1PE** are the two Horizontal Active Receive system packages. The export version **DXE-ARAH3-1PE** has an "E" after the model number and contains two three piece antenna elements -vs- one piece antenna elements. This was done to take advantage of lower export shipping costs for the antenna elements and to allow DXpeditions to take the three piece whip antennas in normal luggage.

**Features**
- Sensitive – weak signal sensitivity rivaling full size antennas
- Wide Bandwidth – 100 kHz to 30 MHz
- Excellent Strong Signal Handling – outstanding Third Order Intercept of +30 dBm
- Reduced Noise – quiet FET followers and exceptional feedline shield isolation
- Close Spacing from Transmit Antennas – element grounded at power-off
- Long Life – high quality stainless and brass mounting hardware, metal enclosure
- Compact – stainless steel tapered element has low visual and environmental impact
- Easy Mounting and Installation Flexibility – pre-drilled mounting plate and universal V-saddle clamps

**Parts Included with the ARAH System**
- Non-conductive mounting plates
- Solid brass element mounting blocks
- Two high quality 102 in. tapered stainless steel elements
- Active matching system w/ Internal Antenna Disconnect Relay
- Feedline Voltage Injector – powers the AVA unit and provides the radio connections
- Two element connection wires
- **DXE-SSVC-2P** V-Bolt Mounting Clamps and hardware for mounting

**Additional Items Needed, But Not Supplied**
- Mast pipe
- **DXE-F6 - 75Ω F-6 Style, Direct Bury Coaxial Cable: Full Spool or Custom Cable Assemblies.** Flooded coaxial cable is recommended. CATV F-6 is a high quality 75Ω flooded coaxial cable. Flooded coaxial cables automatically seal small accidental cuts or lacerations of the cable jacket. Flooded cables also prevent shield contamination and can be direct-buried. Contact DX Engineering to have custom lengths of CATV F-6 cable manufactured with **DXE-SNS6 - Snap-N-Seal 75 ohm Coaxial Connectors** installed.
- **DXE-CPT-659 - Coax Cable Stripper for CATV F-6, RG-6 and RG-59 coaxial cable.** DX Engineering’s economical stripping tool prepares CATV F-6 style coax for connectors in one operation and includes an extra cutting cartridge.
- **DXE-SNS6-25 - Watertight Coaxial Connector, Snap-N-Seal for CATV F-6 Cable, 25 pieces**

The feedline shield is used as the ground return for the active antenna power, so the feedline...
connections must be high quality and weather resistant. For this reason, it is recommended using **Snap-N-Seal** type F connectors.

- **DXE-SNS-CT1 - Compression Tool for Snap-N-Seal 75Ω Coaxial Connectors.** The DXE-SNS-6-25 connectors cannot be installed with normal crimping tools or pliers. An installation tool such as the DXE-SNS-CT1 is essential for proper connector installation.
- **UMI-82180 - DX Engineering Approved RTV Sealant.** Permatex Black RTV Sealant, Non-Acetic. Avoid using any corrosive sealant which has a vinegar-like smell.
- **UMI-81343 - Anti-Seize** should be used on stainless steel hardware (small amount on threads) to prevent galling.

**Technical Description**

This compact receiving antenna system is designed to operate over a very wide bandwidth from the broadcast band to 30 MHz with superior strong signal performance. The Third Order Intercept (TOI) is approximately +30 dBm, reducing or eliminating spurious signals.

Exceptional feedline decoupling, absent in some other popular designs, greatly reduces feedline conducted noise and unwanted signal interference.

The active matching system requires well filtered +10 to +15 Vdc @ 50 mA nominal current. This power must be supplied through the feedline using the included **DXE-FVI-1 Feedline Voltage Injector** and wall mounted transformer power supply (also included). Alternatively, well filtered station power may be used with a 1 amp in-line fuse. If used, the **DXE-TVSU-1A Time Variable Sequencer Unit** or **DXE-NCC-1 Receive Antenna Variable Phasing Controller** will supply power for multi-element arrays. The DXE-TVSU-1A Time Variable Sequencer Unit and the DXE-NCC-1 Receive Antenna Variable Phasing Controller will interrupt the power to the ARAH for proper grounding during the transmit operation of the transceiver.

**Basic Tools Required**

- 5/16", 7/16", 1/2" wrenches or nut drivers, and a 5/8" wrench
- # 2 Phillips Head Screw Driver

**Manual Updates and Information**

Every effort is made to supply the latest manual revision with each product. Occasionally a manual will be updated between the time your DX Engineering product is shipped and when you receive it. Please check the DX Engineering web site (www.dxengineering.com) for the latest revision manual.

**Installation**

**Location**

The best place to install your active antenna is where you have the recommended space. The ARAH should be located a minimum of 1/2-wavelength (at the lowest transmit frequency used) away from any transmit antenna. The ARAH antenna should be mounted on its own mast at a minimum elevation of 20 feet.
If the unit is located 1/10-wavelength to 1/2-wavelength from a transmitting antenna, the unit must be powered off at least 5 ms before transmitting on the transmit antenna. The sequencer such as model DXE-TVSU-1A must be used to ensure the correct transmit-to-receive switching.

With this close spacing, coupling from nearby transmit antennas or metal structures becomes more pronounced. At higher frequencies, where the active element length becomes a partial wavelength, coupling increases further. Placing an ARAH on the same mast or tower as a Yagi or other transmitting antenna is not recommended for this reason.

The mounting plate assembly consists of two DXE-SSVC-2P V-Bolt Mounting Clamps, two black polymer plates, 4 polymer spacers and two brass whip-mounting blocks and the associated stainless steel hardware.

Use UMI-81343 - Anti-Seize on all stainless steel hardware threads to prevent galling when tightening.

**Active Matching Unit**
The Active Matching Unit (ARAH) mounts to the front mounting plate. Mount the ARAH with the ANT – terminal up towards the six element block holes, using 5/8" bolts and hardware. Use a flat washer under each bolt and a flat and split washer under each nut (See Figure 1).

![Figure 1](image1.jpg)

**Brass Element Blocks**
The ARAH uses two 102 inch whip elements in a dipole configuration. The brass element blocks that hold the whip elements can be mounted using the pre-drilled holes either horizontal or at a 30° up angle. The up angle allows the natural droop of the whip elements to be even with the horizontal plane of the ARAH. The following describes assembly with the 30° up angle. Once the mounting plates are assembled, the orientation may be changed by loosening the mounting hardware and moving the brass blocks to the lower holes and re-assembling the hardware.

Turn the black front mounting plate over so the ARAH is on the bottom or back side. Orient the black front mounting plate with the six brass element mounting block holes closer to the top, as shown in Figure 2. Attach the antenna wires to the brass element blocks using the 5/16" x 1/2"bolt, nut, one flat and one star washer. Use the 7/16" x 1-1/2" bolts, flat washers, split washers, and nuts to mount the brass element blocks to the mounting plate.

Make sure the threaded hole in the element blocks for the antenna elements are facing up and outward. Use a flat washer under each bolt and a flat and split washer under each nut. Do not overtighten.
Spacers and Rear Mounting Plate
The rear mounting plate is held to the front mounting plate using spacers to allow room for the Brass Element Blocks. The four polymer spacers are installed using the smaller 1-3/4" bolts and hardware as shown in Figure 3 and 4. Oversize fender washers go under each bolt, and on the opposite side against the polymer mounting plate. The lock washers and nuts go on last. Tighten all hardware used to assemble the mounting plate.

Figure 3

The two DXE-SSVC-2P V-Bolt Mounting Clamps are inserted from the opposite side of the mounting plate from the ARAH. The aluminum backing plate (Figure 3) is used between the saddle clamps and the mounting plate assembly as shown. The large holes in the front mounting plate (Figure 2) are used for tightening the clamp hardware. These clamps accept mast sizes from 1" to 2". The mast should not extend more than 2" beyond the top clamp to prevent unwanted interference with the active elements. Tighten each side of the clamps evenly, but do not over tighten. Use Anti-Seize on the clamp threads to prevent galling when tightening.

Figure 4

Referring to Figure 5 connect the element feed wires from the brass element blocks to the ANT+ and ANT- terminals on the ARAH. The ring terminal on the feed wire should go between the flat washers. Do not use pliers or other tools to tighten the wing nuts on the ANT terminals; hand-tighten them only.
Three Piece 102" Receiving Elements - WP-102E (Export version)
The 102" Stainless Steel Tapered Receiving Elements come in two configurations. The ARAH3-1P has the single piece elements and the ARAH3-1PE has the three piece elements. The three piece antenna element was manufactured to take advantage of lower export shipping costs for the antenna elements and to allow DXpeditions to take the three piece whip antennas in normal luggage.

Assembly is required for the three piece version.

The base has the 3/8" thread mount for attaching to the ARAH, there is a middle section, and the top section has a ball on the end (Figure 6).

The sections are connected using the stainless steel couplers with hex Allen screws. Since the whip is tapered, there are two different sized couplers. The one with a stripe around the middle is drilled to fit the lower and middle sections together. The other connector has smaller holes for joining the middle to the upper section.

![Figure 6 - Three Section Stainless Steel Tapered Whip Antenna](image)

Once fitted together, use the supplied hex Allen wrench and tighten the hex Allen screws.

Firmly install the receiving element whips in the Brass Element Blocks.

Mounting Mast
Mounting height depends on local operating conditions, but in general the ARAH should be at least 20 feet above ground.

Attach the mounting plate to the mast using the two DXE-SSVC-2P V-Bolt Mounting Clamps through the holes directly below the ARAH. The clamps should already be inserted from the opposite side of the mounting plate (see Figure 7). The clamps can work with mast sizes from 1" to 2". The mast should not extend beyond the top of the mounting plate. This prevents unwanted interference with the active element. Do not over-tighten the clamps or stress the mounting plate.

![Figure 7 - V-Saddle Clamp Mounting Side View](image)

After final testing (and setting of jumpers if needed - refer to Figure 9) to enhance weather resistance, place a bead of non-corrosive, UMI-82180 -
Approved RTV Sealant along the seams where the two halves of the ARAH case meet. Leave small openings in the two bottom seams to allow any condensation to drain. Do not use sealants that have a vinegar-like smell because they contain acetic acid which will corrode aluminum.

**Ground System**

The DX Engineering Horizontal Active Antenna system operates independently from a ground system. However, steps should be taken to properly protect the mounting mechanism, tower, etc from lightning by implementing a proper ground system. The 75 Ω coax feedline can be protected using a DXE-RLP-75FF lightning protector, available from DX Engineering.

*Note: DO NOT attach a ground system to either terminal or the case of the ARAH unit.*

**Connections**

The feed line should be run away from the antenna at the exact center and at right angles to the antenna elements. If possible, bury the feed line for some distance from the antenna when the feed line reaches the ground. This helps to decouple the feedline from unwanted noise. A DX Engineering Receive Feedline Choke, part number DXE-RFCC-1 will also ensure feedline decoupling.

Connect a suitable 75 Ω feedline to the type F connector OUTPUT. Leave a small loop in the feedline to relieve stress on the AVA connection and securely attach the feedline to the mast below the mounting plate. Route the feedline away from the antenna at the exact center and at right angles to the antenna elements. When using a rotator, allow enough slack in the feedline so the antenna rotates without binding.

For single antenna installations, the DXE-FVI-1 Feedline Voltage Injector is usually installed near the operating position. When using the Active Receive Antenna, the DXE-FVI-1 powers the ARAH active matching amplifier through its ANT feedline connection. See Figure 8.

![Figure 8 - Connections from the DXE-FVI-1 to the DXE-ARAH](image)

**Important Note:** DO NOT connect the ANT terminals to the feed line shield or attach the feed line shield to the amplifier case.

The feedline connectors must remain dry. Do not place any intentional DC shorts or opens on the feedline between the FVI-1 and the ARAH. This includes lightning arrestors, splitters, or any other accessory not intended for feedlines that carry power or control voltages.
The included 120 VAC 60 Hz, +12 Vdc wall mounted transformer power supply connects to the +12 Vdc input. The center of the 2.1mm power plug is positive. Larger power supplies or station power may also be used provided there is an in-line 1 ampere fast-blow fuse. The RCA phono-style plug connects to the receiver antenna input.

See Appendix A for Radio Interface Options

Coaxial Cable Feedline
Flooded 75 Ω CATV type feedline cable (F-6) is strongly recommended for use with the ARAH systems. DXE-F6 Flooded 75 Ω CATV type feedline cable has a bonded foil to improve shielding. Moisture typically seeps in around the shield and can cause increased noise. Flooded style cables have the distinct advantage of automatically sealing small accidental cuts or lacerations of the jacket. Flooded cable also prevents shield contamination and has a gummy liquid inside that seals cuts or nicks, displaces water, and can be direct buried.

The feedline is used to provide power for the ARAH matching unit. We recommend the use of DXE-SNS6-25 Snap-N-Seal type F connectors to ensure high quality and weather resistant feedline connections. Use the proper tool to crimp these connectors.

To help decouple the feedline from radiated noise, bury the feedline for some distance from the antenna when the feedline reaches the ground. A DXE-RFCC-1 DX Engineering Receive Feedline Choke will also ensure feedline decoupling.

Low Frequency Response - Internal Jumpers
The sensitivity response of the ARAH System does not need to be changed for most installations above 3.5 MHz.

However, if you are interested in primary frequencies below 3.5 MHz, some adjustment may be required to increase sensitivity or eliminate interference from strong broadcast stations. Refer to Figure 9 for various jumper settings.

<table>
<thead>
<tr>
<th>Frequency MHz</th>
<th>Inductor Jumpers</th>
<th>Capacitor Jumpers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L1MF</td>
<td>L1HF</td>
</tr>
<tr>
<td>3.10</td>
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<td>●</td>
</tr>
<tr>
<td>2.90</td>
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<td>●</td>
</tr>
</tbody>
</table>

Figure 9
For access to the jumpers, remove
the two #2 Phillips Screws on each side of the ARAH unit and remove the bottom. The circuit board and jumper headers will be visible as shown in Figure 8. The ARAH has five internal jumpers that modify frequency versus gain response. The L jumpers change the inductance values and C jumpers change the capacitance values.

As shipped, all jumpers are deactivated.

Installing jumpers in L1MF, L1HF or both, will configure the antenna for a sensitivity peak near the frequencies listed in Figure 9. The frequency response above the peak frequency does not change significantly. Below the peak frequency, sensitivity reduction is reasonably fast. Installing a jumper in any C1 position when jumpers are being used in L1 will move the peak response lower in frequency, decreasing sensitivity at higher frequencies.

To enhance weather resistance after the jumper settings are finalized, run a bead of non-corrosive silicone (UMI-82180) along the upward facing seams of the aluminum housing. Leave a small opening in the lower seams to function as a condensation drain.

**Troubleshooting Information**

When using the DXE-ARAH3-1P Active Receive Horizontal antenna, the actual received signal level will be lower than a transmit antenna. Depending upon a few variables, including the frequency of the measured signal, your DXE-ARAH3-1P Active Receive Horizontal antenna is probably operating normally.

The DXE-ARAH3-1P is designed to be a very low to no gain, low noise system for greatly improved signal-to-noise performance over a very wide range of frequencies.

The installation location should be away from towers, transmitting antennas, metal structures and metal fencing in order to take advantage of the DXE-ARAH3-1P Active Receive Horizontal antenna capabilities. The antenna should be mounted on its own mast at a minimum of 20 feet in height.

Normally the Active Receive Horizontal antenna will properly reject high angle sky wave signals, which is the goal for a low band DXing receive antenna. Low angle, long range DX signals are easier to copy using an Active Receive Horizontal antenna system.

Here are a few things that you may check to be sure that the Active Receive Horizontal antenna is operating normally:

1) Measure the voltage arriving at the antenna end of the feedline. The DXE-FVI-1 Feedline Voltage Injector unit should be providing in excess of +13.5 Vdc, and the Active is expecting around +11 Vdc or more for proper function. Bench tests on the DXE-ARAH3-1P are normally about 60 mA, so with some voltage drop on the line, 40 to 50 mA should be okay. If the measured voltage at the end of the line is under +11 Vdc, then there may be a resistive connection along the feedline being used. As a point of reference, DX Engineering has many customers using the DXE-F6-CTL/1000 high quality 75 Ω “flooded” F6 type coax. Flooded
style cables have the distinct advantage of automatically sealing small accidental cuts or lacerations of the jacket. Flooding also prevents shield contamination and can be direct-buried. This low-loss cable features dual shields and an 85% Velocity Factor and is ideal for long runs on four and two antenna arrays without trouble.

2) Double check the jumpers inside the AVA2 unit. As shown in the manual, for full range coverage, a default condition of no jumpers installed should be found and used for broadcast band reception. If any jumpers are installed, you can expect signal levels to be dramatically reduced in the broadcast band. However, even with no jumpers, there is a significant roll-off of signal level from the top to the bottom of the broadcast band.

3) After tuning in a steady, non-fading reference signal on the broadcast band and noting the signal level, add 4 radials that are about 15 feet long to the negative terminal ground rod connection on the AVA2. If this significantly increases signal level, then adding another ground rod and/or more radials, as described in the manual for the DXE-ARAH3-1P, should improve your signal results for all bands.

4) When disconnecting the power to the Active Receive Horizontal antenna, there should be very little or no signal. In other words, verify that powering the Active Receive Vertical antenna results in improved signal level and signal-to-noise enhancement, without a large increase in noise. If there is almost the same amount of signal without and with power, there are two possible issues:

   a) Proper operating voltage is not arriving at the Active Receive Horizontal antenna, or;

   b) If you seem to have a high amount of common mode signal or noise arriving on the shield of the Active Receive Horizontal antenna feedline that is running on or above ground or similar noise as your transmit antenna, for some installations the DXE-RFCC-1 Receive Feedline Current Choke may help. The use of the DXE-RFCC-1 Receive Feedline Current Choke will remove common mode signal and noise collected by the shield of the feedline in order to realize normal signal-to-noise improvements available from an Active Receive Horizontal antenna.

Given that all connections are good, voltage at the AVA2 is good and that the other tests indicate everything is normal, it is likely the signal level you are receiving is normal.

In most circumstances, the DXE-ARAH3-1P Active Receive Horizontal antenna used singly, or in two and four antenna arrays, offers low level low band signals that have significantly improved signal-to-noise. It is sometimes necessary to enhance these results to listening levels by using the DXE-RPA-1 Receive Pre-Amplifier in line, without losing the signal-to-noise benefits of the no-gain Active Receive Horizontal antenna. Only the DXE-RPA-1 Receive Pre-Amplifier operates with a third order intercept and dynamic range that is far superior to most receiver front-ends.
Appendix A - Radio Interface Diagrams

The following shows typical interface diagrams for the **ARAH3-1P Active Receive Horizontal Antenna System**. Every radio manufacturer and every amateur radio operator's location is different. The following is only a suggestion, and you should consult your radio manufacturer's manual for details and further requirements.

![Diagram of ARAH3-1P Active Receive Horizontal Antenna System]

**ARAH3-1P Active Receive Horizontal Antenna System** (two ARAH Receivers) configured as a rotating receive only dipole.
ARAH system located greater than 1/2-wavelength from any transmitting antenna, connected to a transceiver with a receive input.
ARAH system located between 1/10-wavelength and 1/2-wavelength from the transmitting antenna, connected to a transceiver with a receive input using the **DXE-TV SU-1A** Time Variable Sequencer Unit for proper switching.
Optional Items

**DXE-F6 - 75 Ω F-6 Style, Direct Bury Coaxial Cable: Full Spool or Custom Cable Assemblies**

DX Engineering recommends using a high quality 75 Ω “flooded” F6 type coaxial cable. Flooded style cables have the distinct advantage of automatically sealing small accidental cuts or lacerations of the jacket. Flooding also prevents shield contamination and can be direct-buried. This low-loss cable features dual shields and an 85% Velocity Factor.

**Custom cable assemblies are available, Call DX Engineering for details.**

DXE-SNS6 Snap-N-Seal connectors are recommended for use with this coaxial cable to ensure a high quality and weather resistant feedline connection. The proper tool DXE-SNS-CT1 must be used to install these connectors.

**DXE-CPT-659 - Coax Cable Stripper for CATV F-6, RG-6 and RG-59 coaxial cable.**

Cox Cable Stripper for CATV F-6, RG-6 and RG-59 coaxial cable. Includes 1 Replacement Blade - DXE-CPT-659

Prepares CATV F-6, RG-6 and RG-59 coaxial cable for the installation of "F" type connectors - One-step cutting motion

- Precision cut
- No nicks or scratches to conductor

**DXE-SNS6-25 - Watertight Coaxial Connector, Snap-N-Seal for CATV F-6 Cable, 25 pieces**

Snap-N-Seal connectors are recommended for use with this coaxial cable to ensure a high quality and weather resistant feedline connection. The proper tool DXE-SNS-CT1 is required to install these connectors. Normal crimping tools or pliers will not work.

**DXE-SNS-CT1 - Compression Tool for Snap-N-Seal 75 Ω Coaxial Connectors**

Ratchet compression tool for installing DXE-SNS6 Snap-N-Seal coaxial connectors. Ordinary pliers will not install these connectors properly.

**DXE-RPA-1 - Receiver Preamplifier 0.3-35 MHz**

This is the best HF low noise amplifier available. The RPA-1 is optimized for 0.3-35 MHz operating range. The push-pull amplifier design and robust components enable it to withstand high signal levels and operate when you need it most. The dynamic range of the RPA-1 is better than most receivers. The RPA-1 is suitable for indoor or outdoor installation, with the option of being powered through the coaxial feed. The metal housing provides shielding and improved lifespan. The unit uses RCA type phono jack and CATV F connector for the input and output connections, and has a relay that automatically bypasses the amplifier when dc power is removed.

**Benefits:**

- Push-pull operation eliminates harmonic distortion
- High quiescent current increases ability to handle strong signals without distortion or overload
- Meticulous craftsmanship and durable components provide superior dynamic range
- RCA type phono jack and type F connector ease installation
- Simplified switching - automatic bypass eliminates gain when dc power is off
- 10-18 Vdc power using power connector or through the coax
- 10-18 Vdc through coax enables remote operation at antenna
DXE-TVSU-1A - Time Variable Sequencer Unit

The DX Engineering TVSU-1A **Time Variable Sequencer Unit** is a microprocessor-based transmit / receive control-signal delay unit. It provides 0-30 ms of delay, programmable in 2 ms increments, to as many as five outputs tied to the CW keying or push-to-talk (PTT) lines. By controlling the receive-to-transmit (and back) timing of linear amplifiers, preamplifiers, and other sensitive equipment, damage caused by improper switching can be eliminated. This sequencer improves CW performance by eliminating annoying leading edge chopping or truncating of Morse characters. This is especially important in contests or pileups where sending accuracy is critical.

Now RoHS compliant, the TVSU-1A can also control external devices such as preamps, active antennas, or external relays that need to have power removed during transmit. Separate power-in and power-out jacks on the front panel are used to control external power in this type of application. Two 2.1 mm power plugs and two 3.5mm stereo plugs are provided.

**Benefits**
- Control timing of PTT turn-on, hang delay of PTT, amplifier hang delay, external antenna relay hang delay and turn-on delay of auxiliary output
- Dip switch settable delays of 0-30 milliseconds in 2 millisecond steps
- Side tone generator that follows input of keyer or hand key not transmitter
- Side tone pitch can be programmed from 300 to 1000 Hz in 50 Hz steps, front panel headphone jack with adjustable volume
- Supports CW full break in
- Can control external power to our Active Receive Antennas and permit operation in closer proximity to transmit antennas

DXE-NCC-1 - Receive Antenna Variable Phasing Controller

**Noise Canceling Receive Antenna Controller**
- Reduce overload or interference by nulling a strong local signal or noise before it gets to your receiver
- Better and more stable nulling than any other noise canceller on the market
- Peak weak signals hidden under a strong signal on the same frequency
- Null out local AM broadcast stations
- Null out noise from power line arcing, lamp dimmers, motors and consumer electronics arriving from a single direction

**Antenna Phasing Controller**
- Best alternative to DX Engineering's Receive Four-Square antenna
- Combine two antennas to create a directional pattern
- The NCC-1 enables you to adjust the antenna array pattern as if you were moving the antennas
- Use for direction finding

**Special Features**
- Exceptional Dynamic Range, nearly 1000 times better than nearest competitor
- Phasing is voltage controlled allowing precise resetting of phase
- Phasing rotates more than 360 degrees with smooth control
- Built-in two channel voltage controlled attenuator system
- Low noise, high dynamic range amplifiers
- Vastly superior dual channel complementary phasing system
- Very low noise floor
- Separate controls for reversing channel and phase
- Works on all modes, 300 kHz to 30 MHz
- Provides power for external active antennas
- Input for mute on transmit
DXE-RFCC-1 - Receive Feedline Current Choke, 50 to 75 ohm 300 kHz to 30 MHz

If you wish to reduce feedline radiation and improve reception, a Feedline Current Choke is recommended if your SWR is already low. Adding a DX Engineering Feedline Current Choke at the point where the feedline exits the area of the antenna will substantially reduce unwanted feedline radiation or reception without the need for improved station grounding.

The advantages of using an FCC:

- Prevents unwanted RFI by eliminating feedline current and radiation
- All power goes to the antenna, improving efficiency
- Reduces noise or unwanted signals picked-up by the feedline
- Overcome a less than optimal ground system

The DX Engineering RFCC-1 receive feedline common-mode choke is the most effective solution to common-mode noise or unwanted signal ingress available to date. The DX Engineering RFCC provides thousands of ohms isolation between the input and output coaxial shield connections while passing desired signals, including dc or low frequency ac control signals. The RFCC has extremely high isolation impedance which effectively blocks common-mode noise or unwanted signals, even in the presence of very poor grounding. Low noise receive antennas are traditionally located away from electrical wiring and other noise sources. Unfortunately, noise and other unwanted signals have a direct path to your low-noise antenna through the feedline shield connections between the station equipment and antenna. Unwanted signals can also energize the outside of the feedline shield, and this undesired signal energy can be conducted directly to the receiving antenna. This can reduce antenna directivity. Unless you have a perfect zero-resistance RF ground at the antenna, some of the common-mode noise or unwanted signals from the feedline shield will make it into the antenna. The RFCC is effective from 300 kHz to 30 MHz. It comes with standard CATV type “F” female connectors, although it can be used in any 50 to 75 ohm receiving system. The RFCC is a passive device, therefore requires no power to operate.

UMI-81343/81464 Never-Seez and DXE-NSBT8/NMBT8 Anti-Seize

An Anti-seize compound MUST be used on any Stainless Steel nuts, bolts, clamps or other hardware to prevent galling and thread seizure. Any of these products can be used for this purpose.

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*UMI-81343</td>
<td>Anti-Seize, 1 oz. Squeeze Tube</td>
</tr>
<tr>
<td>*UMI-81464</td>
<td>Anti-Seize, 8.5 oz. Aerosol Can</td>
</tr>
<tr>
<td>*DXE-NSBT8</td>
<td>Never-Seez, 8 oz. Brush Top</td>
</tr>
<tr>
<td>*DXE-NMBT8</td>
<td>Never-Seez, 8 oz. Brush Top, Marine Grade</td>
</tr>
</tbody>
</table>

* These products are classified hazardous and are limited to domestic UPS Ground shipping only
Technical Support

If you have questions about this product, or if you experience difficulties during the installation, contact DX Engineering at (330) 572-3200. You can also e-mail us at:

DXEngineering@DXEngineering.com

For best service, please take a few minutes to review this manual before you call.

This unit is RoHS (Reduction of Hazardous Substances) compliant. The components, including the solder used are all lead free. If you decide to do any modifications or internal repairs, you should use only lead free solder and lead free soldering tools. Lead free solder melts approximately 100 degrees higher than the old leaded solder, so you may need to upgrade your current soldering system.

Warranty

All products manufactured by DX Engineering are warranted to be free from defects in material and workmanship for a period of one (1) year from date of shipment. DX Engineering’s sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by DX Engineering. If DX Engineering’s products are claimed to be defective in material or workmanship, DX Engineering shall, upon prompt notice thereof, issue shipping instructions for return to DX Engineering (transportation-charges prepaid by Buyer). Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing. The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation, damaged from severe weather including floods, or abnormal environmental conditions such as prolonged exposure to corrosives or power surges, or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer’s specifications. In addition, DX Engineering’s warranties do not extend to other equipment and parts manufactured by others except to the extent of the original manufacturer’s warranty to DX Engineering. The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR DX ENGINEERING ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.

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