Remote Tuner Mounting System for the MFJ-998RT

DXE-MBV-ATU-2

DXE-MBV-ATU-2-INS Revision 0a

DXE-MBV-ATU-2 shown mounted to an optional DX Engineering Vertical Antenna with optional DX Engineering Radial Plate

© DX Engineering 2013
P.O. Box 1491 ∙ Akron, OH 44309-1491 USA
Phone: (800) 777-0703 ∙ Tech Support and International: (330) 572-3200
Fax: (330) 572-3279 ∙ E-mail: DXEngineering@DXEngineering.com
Introduction

The DX Engineering ATU-2 Remote Tuner Mounting System provides an easy method of mounting an MFJ-998RT to your radial system for your HF vertical antenna. This system will work with any the non-resonant, random height verticals, especially 43 feet tall verticals from DX Engineering and other manufacturers, for full power multi-band operations at maximum efficiency. This system will also expand the tuning range in the original resonant operating bands on Hustler 4-BTV, 5-BTV and 6-BTV, Hy-Gain, Butternut and similar HF vertical antennas that are installed with their required radial system.

ATU-2 mounting kits are the perfect solution for the DX’er who wants to take full advantage of an HF vertical and all of the great auto-tuning features offered by MFJ-998RT Legal Limit IntelliTuner™ Remote Automatic Antenna Tuners.

The ATU-2 is specifically designed to mount an MFJ-998RT to an optional DX Engineering Radial Plate (RADP-3) for an efficient and secure connection of the tuner to the ground radial system. The ATU-2 features an adjustable height foot, to level the MFJ-998RT tuner and to provide a sturdy platform. Please refer to the MFJ-998RT manual for its tuning range and band coverage capabilities.

The DXE-ATU-2 includes:
- Custom laser-cut stainless steel bracket assembly for the MFJ-998RT tuner that mounts to your DX Engineering Radial Plate (DXE-RADP-3).
- Adjustable foot support for the MFJ-998RT
- All Stainless Steel Hardware
- Feedpoint extension bracket
- One 12-gauge insulated stranded copper feedpoint wire with ring terminals attached
- Right Angle PL-259 to SO-239 UHF connector
- Complete installation manual

The DXE-MBV-ATU-2 includes:
- Everything listed in the DXE-ATU-2 (above) plus:
- MFJ-998RT MFJ Remote IntelliTuner™ Remote Automatic Antenna Tuner with Bias-Tee power injector for +12 VDC

Tools Required

Nut Drivers 5/16”, 3/8”, 7/16”
Open End Wrenches 7/16”
**Please** read and understand the instruction manual that comes with the **MFJ-998RT** Remote IntelliTuner™ Automatic Antenna Tuner. There is information included in that manual that is critical to proper operation of both the IntelliTuner™ Automatic Antenna Tuner and the Bias "T". There is also troubleshooting information and tuner reset information that may be very helpful.

**Manual Updates**

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.

**Assembly Steps**

The **DXE-MBV-ATU-2** Remote Tuner Mounting System for the **MFJ-998RT** is assembled in the following steps:

- Assemble the hardware in the Right and Left Brackets
- Assemble the hardware in the Foot Bracket
- Assemble the Feedpoint Extension Bracket and Wire Assembly
- Mate the bracket assembly to the Radial Plate
- Adjust the Foot Bracket
- Install the Feedpoint Bracket on the MFJ-998RT
- Install the SO-239 to PL-259 Right angle UHF Connector on the **MFJ-998RT**
- Mate the **MFJ-998RT** to the bracket assembly
- Connect the feedline to the antenna
- Bias-Tee connections
- Follow the MFJ instructions that come with the **MFJ-998RT**, and make contacts!
Installation Notes

- These installation instructions are written for the customer that has a DX Engineering Multi-Band Vertical antenna with the DXE-RADP-3 Radial Plate properly installed.

- The MFJ-998RT uses a Bias-Tee (located in your radio room) to supply the +12 VDC power needed at the remote tuner. The Bias-Tee uses the coaxial cable so no other control lines or power lines are needed between the radio room and the MFJ-998RT Remote tuner.

- Ensure the power source for the Bias-Tee will supply the needed +12 VDC and has enough current capability to properly power the MFJ-998RT. The length of your coaxial cable from the Bias-Tee to the MFJ-998RT will determine the voltage and current needed. Long runs of coaxial cable (same as long runs of copper wire) will have inherent losses. Your voltage in the shack will not be the same at the other end of long run of coaxial cable at the MFJ-998RT.

- Since the MFJ-998RT uses a Bias-Tee for power on the coaxial cable feedline, PolyPhaser DC blocked lightning protectors cannot be used. The AlphaDelta line of DC pass through lightning protectors will work since they will pass the required +12 VDC to the MFJ-998RT.

- Please read and understand the instruction manual that comes with the MFJ-998RT Remote IntelliTuner™ Automatic Antenna Tuner. There is information included in that manual that is critical to proper operation of both the IntelliTuner™ Automatic Antenna Tuner and the Bias-Tee. There is also troubleshooting information and tuner reset information that may be very helpful.

Recommended Optional Items

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DXE-RADP-3 Radial Plate</td>
</tr>
<tr>
<td>1</td>
<td>DXE-SSVC-2P V-Clamp for the Radial Plate</td>
</tr>
<tr>
<td>1</td>
<td>UMI-81343 Anti-Seize, 1 oz Squeeze Tube</td>
</tr>
<tr>
<td>1</td>
<td>DXE-3M2155 3M Temflex™ 2155 Rubber Splicing Tape</td>
</tr>
<tr>
<td>1</td>
<td>TRM-06132 Scotch® Super 33+ Vinyl Electrical Tape</td>
</tr>
<tr>
<td>1</td>
<td>UMI-22058 Dielectric Grease</td>
</tr>
</tbody>
</table>

Note: UMI-81343 Anti-Seize should be used on all stainless steel hardware to prevent galling.
### Parts List for the DXE-ATU-2

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Optional DXE-RADP-3 Radial Plate</td>
<td>Customer Supplied</td>
</tr>
<tr>
<td>2</td>
<td>1/4-20 Stainless Steel Hex Nut</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>1/4&quot; Stainless Steel Flat Washer</td>
<td>32</td>
</tr>
<tr>
<td>4</td>
<td>1/4&quot; Stainless Steel Split Washer</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>1/4-20 x 3.75&quot; long Stainless Steel Hex Bolt</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>1/4-20 x 1&quot; long Stainless Steel Hex Bolt</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>1/4-20 x 7&quot; long Stainless Steel Hex Bolt</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Tuner Bracket, Left Side, Laser Cut Stainless Steel</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Tuner Bracket, Right Side, Laser Cut Stainless Steel</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Foot Bracket, Laser Cut Stainless Steel</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>1/4&quot; Stainless Steel External Tooth Star Washer</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>Feedpoint Bracket</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Wire Assembly with Ring Terminals</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>#10-24 x 3/4&quot; Stainless Steel Hex Bolt</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>#10 Stainless Steel Flat Washer (thick)</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>#10 Stainless Steel Split Washer</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>#10 Stainless Steel External Tooth Star Washer</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>10-24 Stainless Steel Hex Nut</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Right Angle UHF Adapter, PL-259 to SO-239</td>
<td>1</td>
</tr>
</tbody>
</table>

The DXE-MBV-ATU-2 includes everything above, plus the MFJ-998RT Remote Tuner with the MFJ Bias-Tee.
[The numbers shown on this drawing match the numbers on the parts list]
Exploded View (shown rotated)

Shown with optional DXE-RADP-3 Radial Plate

Assembled View

Shown with optional DXE-RADP-3 Radial Plate
Right and Left Brackets

Assemble the 1/4-20 x 3.75” long Hex Head Bolts with the 1/4” hardware into the Right and Left Brackets as shown below.
Foot Bracket

Assemble the 1/4-20 x 7” long Hex Head Bolts with the 1/4” hardware into the Foot Bracket as shown below.
Foot Bracket to Right and Left Brackets

On the Foot Bracket 7” long Hex Head Bolts, thread a Hex Nut on to 2” (as shown). Assemble the Foot Bracket to the Right and Left Brackets using the 1/4” hardware as shown below. Snug the hardware in place - it will be tightened in a later step when you level the assembly while attaching to the optional DXE-RADP-3 Radial Plate.
Feedpoint Extension Bracket

Assemble the #10 Feedpoint Hardware to the Feedpoint Extension Bracket as shown below.

Note the 12” Wire Assembly has two different sized Ring Terminals. The smaller Ring Terminal is attached to the Feedpoint Extension Bracket.

Using this bracket allows the wire feedline to clear any sharp edges found on the hole in the MFJ-998RT chassis/bracket.
Mate the Foot Bracket, Right & Left Bracket Assembly to the optional Radial Plate

**Note:** The assembly can be mounted in the opposite direction or off the rear or sides of the antenna - just make sure that the tilt mechanism will still operate properly and not hit the remote tuner. Also the holes used on the Radial Plate can be off from what is shown, but again, make sure the tilt operation works properly and parts do not hit each other.

For antenna systems that have an existing radial plate, move the radial wires in the holes to adjacent positions to make room for the new assembly.

Mate the assembled foot bracket-right/left bracket assembly to the existing optional Radial Plate using the 1/4” hardware as shown below.

You will adjust the height of the foot bracket to keep the left/right brackets parallel. Tighten all hardware.

---

**Exploded Views**

**Assembled Views**

Two Views showing the Right/Left Bracket & Foot Assembly mounted to Radial Plate
More Views showing bracket assembly mounted to antenna system

Install the Feedpoint bracket on the MFJ-998RT

Remove the hardware for the feedpoint wire assembly installed on the MFJ-998RT as shown.

Install the feedline bracket assembly with the new external tooth washer and the hardware previously removed as shown. Tighten the wing nut. Using this bracket allows the wire feedline to clear any sharp edges found on the hole in the MFJ-998RT chassis/bracket.
Install the new UHF Right Angle PL-259/SO-239 connector.

Mate the MFJ-998RT to the bracket assembly

Place the MFJ-998RT on the bracket assembly aligning the four mounting holes. Use the 1/4” hardware to secure the MFJ-998RT as shown below.

Connect the feedpoint wire to the vertical antenna feedpoint

Route the feedpoint wire with the round terminal and connect it to the feedpoint of the vertical antenna. Ensure the wire route does not interfere with the tilting action of the vertical antenna.
Coaxial Cable Installation

The customer supplied coaxial cable should be run from the operating position (radio room) to the base of the MFJ-998RT. Ideally, the coaxial cable is buried below the radial field. This will help prevent RF currents being fed back into the coaxial cable by the radial wires.

The coaxial cable is connected to the MFJ-998RT tuner using the supplied right angle UHF connector previously installed.

Use the optional UMI-22058 Dielectric Grease on the PL=259 connectors and install the coaxial cable. Use the optional DXE-3M2155 3M-Temflex and TRM-06132 tape to weatherproof the connections.

Bias-Tee Connections

Refer to the MFJ-998RT manual for details on the Bias-Tee. The Bias-Tee supplies the DC power required in the remote tuner using the coaxial cable that goes from the Bias-Tee to the remote tuner. The Bias "T" is usually located in the radio room and has +12 VDC connected to it. Make certain the coaxial cables are properly connected to the Bias "T" as shown below. Ensure the ON/OFF switch on the Bias "T" is turned ON when using the system.

Using the MFJ-998RT Auto-Tuner

When using the tuner, refer to the MFJ-998RT manual. If you try tuning and it seems that the tuner will not tune up as it should, try 'band switching'. Band switching for this means going up or down one band, re-tune, and then go back to the desired band and re-tune again. Another option is to disable memory storage of tuning solutions. This would force the MFJ-998RT tuner to re-tune every time it is used on a different band or frequency. Refer to the MFJ-998RT manual for details.

Please read and understand the instruction manual that comes with the MFJ-998RT Remote IntelliTuner™ Automatic Antenna Tuner. There is information included in that manual that is critical to proper operation of both the MFJ-998RT Remote IntelliTuner™ Automatic Antenna Tuner and the Bias "T". There is also troubleshooting information and tuner reset information that may be very helpful.
Optional Items

DXE-RADP-3 - Radial Plate (patented):
Made from Laser Cut Stainless Steel with 20 Sets of Stainless Steel Radial Attachment Hardware. The DX Engineering Radial Plate is meant for those of you having a vertical antenna and want an easy, neat and effective way to connect those essential radial wires to your antenna system for the highest efficiency and strongest signals.

DXE-SSVC-2P - Stainless Steel V-Clamp for 1 to 2 inch steel pipe
This V-Clamp is made in one size that fits Steel tubing or pipe from 1 to 2” OD as used in antenna construction. The supplied V-bolt is long enough to attach tubing to thick plates and is made with anti-corrosive properties. The special Stainless Steel saddle has serrated teeth will clamp to the pipe securely by biting into the surface. For this reason, it is not recommended for softer aluminum tubing or pipe.

UMI-81343 - Anti-Seize, 1 oz. Squeeze Tube
1 oz squeeze tube of Anti-Seize. Protects metal parts against rust, corrosion, and seizure. Particularly effective on stainless steel bolts and nuts which have a high likelihood of seizure.

- Squeeze tube - Lubricant and sealant
  This part is classified hazardous and is limited to domestic UPS Ground shipping only

TRM-06132 - Scotch Super 33+ Vinyl Electrical Tape
Scotch® Super 33+ is highly conformable and super stretchy in all weather applications. This tape provides flexibility and easy handling for all around performance. Recommended as a protective overwrap for DXE-3M2155 rubber splicing tape in RF connector weatherproofing.

DXE-3M2155 - Temflex™ 2155 Rubber Splicing Tape
3M Temflex™ 2155 Rubber Splicing Tape is a conformable self-fusing rubber electrical insulating tape. For outdoor use, it should be protected from UV deterioration with an overwrap of TRM-06132.

UMI-22058 - Permatex Dielectric Grease
Permatex Dielectric Grease may be used in RF connectors to prevent moisture ingress. Feedlines and connectors will last longer, providing peak performance for many more years with the use of dielectric grease on the threads of RF connectors.

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.

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.

©DX Engineering 2013

DX Engineering®, DXE®, DX Engineering, Inc.®, Hot Rod®, Maxi-Core®, DX Engineering THUNDERBOLT®, DX Engineering Yagi Mechanical®, EZ-BUILD®, TELREX®, and Gorilla Grip® Stainless Steel Boom Clamps, are trademarks of PDS Electronics, Inc. No license to use or reproduce any of these trademarks or other trademarks is given or implied. All other brands and product names are the trademarks of their respective owners.

Specifications subject to change without notice.