BN-86 Upgrade Balun for Yagi Antennas

DXE-BN86-UPG-15T, 15B, 20T and 20B

DXE-BN86-UPG-INS Revision 0b

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1200 Southeast Ave. - Tallmadge, OH 44278 USA
Phone: (800) 777-0703 ∙ Tech Support and International: (330) 572-3200
Fax: (330) 572-3279 ∙ E-mail: DXEngineering@DXEngineering.com
Introduction

The DXE-BN86-UPG Balun upgrade kits for Yagi antennas are designed for antennas that use the BN-86 type balun. This kit can also be used with other Yagi antennas that have either a 1-1/2” or 2” diameter boom. Included in this upgrade kit is the high quality COMTEK balun and specialized (patented) mounting system. The proven performance of the COMTEK 1:1 balun will provide long term performance to ensure you are getting the best performance from your Yagi antenna.

The DXE-BN86-UPG kit comes with a COMTEK 1:1 Balun with weep holes drilled in the Balun enclosure (position dependent on model selected), a patented Poly Resin Balun Mounting Plate, Feedline Connection Wire, Ring Terminals, two Stainless Steel Studded Band Clamps to fit the existing antenna boom and all Stainless Steel Hardware.

There are four BN-86 Balun Upgrade Kits available:

<table>
<thead>
<tr>
<th>DX Engineering Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>DXE-BN86-UPG-15B</td>
<td>Bottom Mounted Balun for 1.5” Boom Diameter</td>
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<tr>
<td>DXE-BN86-UPG-15T</td>
<td>Top Mounted Balun for 1.5” Boom Diameter</td>
</tr>
<tr>
<td>DXE-BN86-UPG-20B</td>
<td>Bottom Mounted Balun for 2” Boom Diameter</td>
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<tr>
<td>DXE-BN86-UPG-20T</td>
<td>Top Mounted Balun for 2” Boom Diameter</td>
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</tbody>
</table>

Features

- **COMTEK 1:1 Current Balun, Single Core**
  - Power handling from 3 kW CW to 5 kW SSB
  - Typical insertion loss is less than 0.2 dB
  - Unique high-voltage compensating capacitor for unequaled SWR bandwidth
  - Outstanding ferrite mix coated toroid core with special design to accommodate close coupling without excessive stress
  - Special wire size selection and Teflon-insulated wire sleeves provide exact impedance matching and superb insulation, unlike common Thermaleze wire
  - Gasketed SO-239 connectors are silver plated and have PTFE insulation
  - Sealed in a weatherproof 4 in. x 4 in. x 2-1/2 in. NEMA box with 4 weep holes to help remove any condensation (weep holes positioned on the top or bottom depending on the kit specified)
  - Stainless steel hardware

- **DX Engineering Balun Mounting Plate**
  - Custom DX Engineering design (*US Patent No D597,086*)
  - UV resistant Poly-Resin
  - Two Stainless Steel Studded Band Clamps for attachment to a 1.5” or 2” diameter Yagi Boom (depending on the kit specified) with Nyloc hex nuts added to the kit
  - All Stainless Steel Hardware for mounting the custom COMTEK Balun

- **Feedline Wire - User configured**
  - For connecting the custom COMTEK Balun to the Yagi feedpoints for long-term reliability
  - Comes with stainless steel hardware and choice of two different sized Ring Terminals
  - The custom COMTEK Balun includes Nyloc hex nuts and external tooth washers that ensure excellent electrical and RF contact of the feedline wires even on a vibrating Yagi system.
DXE-BAL-YAGI-UPG Parts List

Differences between the kits available are:
- Top Mount - Weep Holes are drilled in the side facing down on the Balun when mounted
- Bottom Mount - Weep Holes are drilled in the cover (side facing down) on the Balun
- Studded Band Clamps sized for the Boom OD chosen (1-1/2” or 2”)

The use of **JTL-12555 - Jet-Lube™** Anti-Seize compound on the threads of all Stainless Steel Hardware is highly recommended to prevent galling and aid in proper tightening torque.

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<tbody>
<tr>
<td>1</td>
<td>Custom COMTEK 1:1 Balun</td>
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<tr>
<td>1</td>
<td>Balun Mounting Plate (US Patent No. D597,086)</td>
</tr>
<tr>
<td>2</td>
<td>Studded Band Clamp, Stainless Steel</td>
</tr>
<tr>
<td>1</td>
<td>Hardware and Feed Wire Pack</td>
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</tbody>
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**Balun Mounting Plate Assembly**

Attach the COMTEK Balun to the Balun Mounting Plate using the hardware as shown below. Tighten the hardware in place. **Note** - There are extra flat washers (included in this kit) to have 2 flat washers between the four Balun mounting tabs and the Balun Mounting Bracket. These extra washers help to ensure water is not trapped between the Balun and the mounting bracket.
Mount the two Studded Band Clamps in place as shown below. **Note** - Use the included Nyloc hex nuts in this kit instead of the regular hex nuts that are with the studded band clamps. Tighten the hardware in place.

![Studded Band Clamp Diagram](image)

**Balun Feedline Wires**

Determine the lengths for the feedline from the balun to your antenna connections required for your installation. Once confirmed, cut the wire to length, crimp and solder the appropriate ring terminals in place.

The larger Ring Terminals fit the balun connections.

Attach the two balun feedline wires to the balun feedline connections using the hardware as shown below. Leave this hardware slightly loose so you can adjust the fit after the Balun is mounted in place on your antenna.

![Balun Feedline Wires Diagram](image)
Attaching the BN86 Balun assembly to your existing Yagi antenna

Remove the existing balun from your antenna and replace with the new Balun bracket assembly.

Open the two studded band clamps and place them around the antenna boom. Just slightly snug the band clamps so you can adjust the Balun position. The two feedline wires previously made are connected to the antenna feedline connections. Avoid areas that may short the connection wires.

Connect the PL-259 from your coaxial cable to the balun. Once everything is in place, tighten all of the hardware.

In the photos below are examples showing the COMTEK Balun mounted in various positions. Other Yagi antennas would be similar.

(Feed wires are shown as red for visibility in this manual)

The coaxial cable connection should be weather proofed using and TES-2155 - 3M Temflex Rubber Splicing Tape with an overwrap of TES-06132 - 3M Super 33+ Premium Vinyl Electrical Tape for UV protection.
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.

Additional Material Needed but not Supplied:

- **JTL-12555 - Jet-Lube™** Anti-Seize compound - used on the threads of Stainless Steel Hardware to prevent galling and aid in proper tightening torque.

- **TES-2155 - 3M Temflex Rubber Splicing Tape** for weatherproofing.

- **TES-06132 - 3M Super 22+ Premium Vinyl Electrical Tape** for weatherproofing.

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**JTL-12555 Jet-Lube™ SS-30 Pure Copper Anti-Seize 12555**

Jet-Lube™ SS-30 Pure Copper Anti-Seize is the top choice of engineers and technicians in government, industry and leading Amateur Radio contest stations, for protecting mechanical assemblies of aluminum tubing, general hardware and copper grounding systems. On bonded metal surfaces Jet-Lube™ SS-30 assures electrical and RF conductivity while preventing oxidation and corrosion. Surpassing the capabilities of other aluminum anti-oxidants, the wide temperature range of Jet-Lube™ SS-30 prevents long-term drying and caking, and allows easy disassembly and effortless cleaning of parts. An environmentally preferred thread lubricant and conductive termination compound, Jet-Lube™ SS-30 helps keep your equipment in serviceable condition. It contains a high concentration of copper flakes, a requirement for heavy loads or compression; controlled frictional characteristics allow the surfaces of nuts and bolts to be tightened to their design torque specifications. This anti-seize product assures full hydraulic efficiency by allowing the metal surfaces to slide over each other without damaging metal-to-metal contact. Jet-Lube™ SS-30 is also designed to work as a similar and dissimilar component between two metal surfaces to prevent seizing and galvanic action. The SS-30 compound formula improves conductivity and ground continuity - and will not melt in high temperatures.

Jet-Lube™ SS-30 Pure Copper Anti-Seize Features include:

* Meets MIL-PRF-907E spec
* K-factor: 0.13
* Service rating: -65 degrees F (-54 degrees C) to 1800 degrees F (820 degrees C)
* SS-30 Resistivity (ohm-CM x 108) 5
TES-2155 - 3M Temflex™ 2155 Rubber Splicing Tape.
Conformable self-fusing rubber electrical insulating tape. Designed for low voltage electrical insulating and moisture sealing applications. For outdoor use, it should be protected from UV deterioration with an overwrap of TES-06132.

TES-06132 - Scotch® Super 33+.
Highly conformable super stretchy tape for all weather applications. This tape provides flexibility and easy handling for all around performance. It also combines PVC backing with excellent electrical insulating properties to provide primary electrical insulation for splices up to 600V and protective jacketing.
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.

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