

MFJ

4:1 Current Balun Kit *1.8-30 MHz*

Model MFJ913K



INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

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Introduction

A current balun can reduce or eliminate stray RF often found on coax. Installation of an MFJ-913 current balun can increase the efficiency of any amateur station. MFJ 4:1 current baluns are designed to replace the center insulator of a dipole antenna. They are made up of two large low-permeability ferrite cores. The MFJ-913 is rated at 300 watts. The SO-239 coax connectors have Teflon™ internal insulation for maximum insulation and extended life of the product. Unlike some other baluns, the MFJ-913 makes direct electrical connections to the antenna with #14 stranded copper wire and enclosed in Schedule-40 PVC for maximum strength and support of a dipole antenna.

Construction Area

This kit construction requires a clean, smooth, well-lit area where you can organize and handle small parts. Diffused overhead lighting is best, but a small high-intensity desk lamp is also handy for close-up work and inspection. Safety is important, so use a high-temperature stand for your soldering iron and make sure the iron is unplugged when you're not working. Finally, keep the area free of clutter.

Construction Tools

In order to complete the project, you'll need the following:

- [] Soldering iron in the 20-30 Watt range
- [] De-soldering braid or a solder sucker for removing excess solder
- [] Diagonal pliers or wire shears for trimming wire ends
- [] Wire strippers for stripping outer insulation
- [] Needle-nose pliers for holding and bending leads
- [] Small Philips-head screwdriver
- [] 1/4" wrench or nut driver
- [] 3/8" wrench or nut driver

The Parts Inventory

Your kit should contain all of the items listed below. If any part is missing or damaged, please refer to the warranty for specific replacement instructions. If you can't positively identify an unfamiliar item, set it aside until all other items are checked off. You may be able to identify it through process of elimination. Use the check-off boxes on the parts list to confirm that each item or group of identical items has been found and identified.

Parts List:

[X]	Quan.	Part Description	Part Number	Designator
[]	1	SO-239 Connector	620-2005	S1
[]	1	Solder Lug	720C-0621	SL1
[]	2	Toroid	420-6114	T1,T2
[]	1	White, 20AWG, 24"	870-2099	W1
[]	1	Black, 20AWG, 24"	870-2000	W2
[]	2	1/2" x 4-40 SS Screw	654-0500S	
[]	2	4-40 SS Kep nut	705-0440K	
[]	6	10-24 SS nut	705-1024S	
[]	3	10-24 Eye Bolt	661-1000S-EB	
[]	2	# 10 Fender Washer	710-1810S	
[]	6	# 10 Lock Washer	711-1037-SL	
[]	1	Top PVC Cap (Eye Bolts)	765-2512-2	
[]	1	Bottom PVC Cap (SO-239)	765-2512-1	
[]	1	PVC Enclosure	884-7125-0275	
[]	2	12" #14 bare copper wire.	871-0014	

Construction Tips

There are four common mistakes builders make when constructing kits:

1. **Installing the Wrong Part:** It always pays to double-check each step.
2. **Reverse Installation:** Always double-check the orientation
3. **Faulty Solder Connections:** Inspect for cold-solder joints. Cold solder joints may result if you don't fully heat the connection when applying solder, or when metallic oxides contaminate a surface preventing solder flow.
4. **Omitted Step:** Easier to do than you might think! Always double-check to confirm completion of every step.

Soldering Tips

Cleanliness and good *heat distribution* are the keys to professional soldering. Before you install each part, inspect leads or pins for oxidation. If the metal surface is darkened or crusty, buff it with fine emery paper until shiny. Also, use the wet sponge to clean oxidation and excess solder from the soldering iron tip. Surfaces must become hot enough for solder to *flow smoothly* (a process called wetting). Feed solder to the opposite side of the lead from your iron tip and allow it to wick around the lead toward the tip, wetting all exposed surfaces. Apply solder sparingly and avoid touching solder wire directly to the hot iron tip.

Step-By-Step Assembly Instructions

If the construction area is set up and the parts are organized, you're ready to begin assembly. Check off each step after completing it.

BALUN ASSEMBLY

[] Locate the 2 pieces of 24" *White 20 AWG single strand Teflon wire*

[] Locate the 2 pieces of 24" *Black 20 AWG single strand Teflon wire*

[] Locate the 2 *Toroids*

[] Wind a set of paired black and white wires around the toroid number 1 (T1) 15 turns (see Figure 1-1)

[] Wind a second set of paired black and white wires around the toroid number 2 (T2) 15 turns (see Figure 1-1)

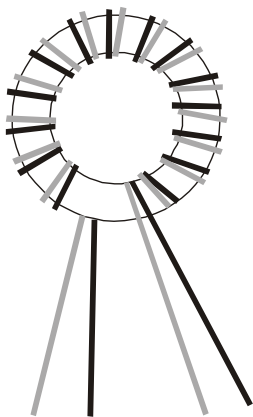


Figure 1-1: Toroid Winding Assembly (T1 & T2)

[] Trim the excess wires on Toroid 1 (T1) according to Figure 1-2. This will match the wire lengths making them easier to connect and solder.

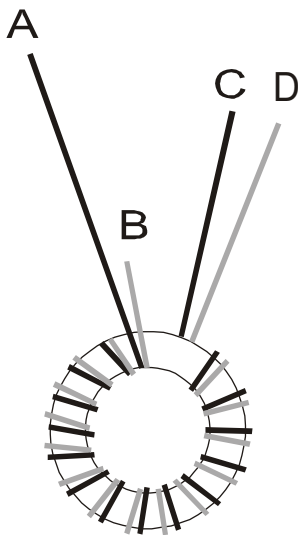


Figure 1-2: Toroid 1(T1)

[] Trim the excess wires on Toroid 2 (T2) according to Figure 1-3. This will match the wire lengths making them easier to connect and solder.

[] Using the wire strippers, strip back $\frac{1}{4}$ " of the insulation on the end of the wire exposing some wire on all four wires of each toroid.

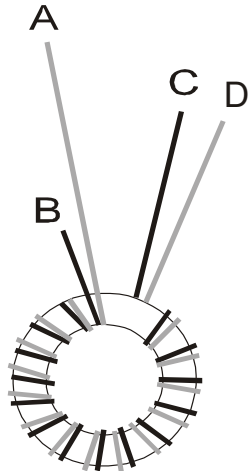


Figure 1-3: Toroid 2(T2)

[] Match T1 to T2 by connecting “B”, “C”, and “D” from T1 to “B”, “C”, and “D” from T2 leaving “A” unconnected. (see Figure 1-4)

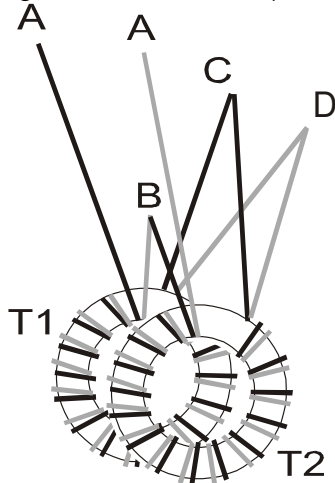


Figure 1-4: Matched T1 and T2

[] This balun assembly will be used to make the completed 4:1 balun. "C" will be connected to the Ground of the Transmitter SO-239 Connector. "D" will be connected to the center pin of the Transmitter SO-239 Connector. "A" will be connected to one side of the wire supported by the I bolts, while the other "A" will be connected to the other side of the wire supported by the Eye Bolts

[] Twist the stripped ends of the wires B, C, and D together.

[] Solder wires B together and snip off the excess wire making sure it does not touch anything. Leave C and D unsoldered. You will connect these to the SO-239 Connector. See below (Figure 1-5) for a picture of the completed 4:1 Balun assembly.

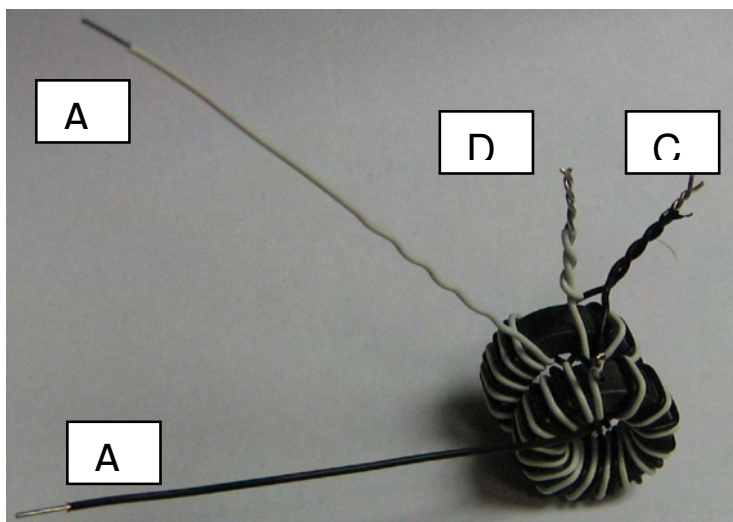


Figure 1-5: Picture of 4:1 Balun assembly

ENCLOSURE ASSEMBLY

- **Bottom Cap**

[] Locate the *PVC Bottom Cap* (SO-239)

[] Locate the *SO-239 Connector*

[] Locate the (2) *1/2" x 4-40 screws*

[] Locate the (2) *4-40 nuts*

[] Locate the *Solder Lug*

[] Using a small Philips head screwdriver and a 1/4" wrench or nut driver, mount the SO-239 connector onto the PVC bottom cap using the 1/2" x 4-40 screws and 4-40 nuts. Attach the solder lug to the inside of one of the 4-40 screws using the 4-40 nut. See Figure 2-1 for a picture of this SO-239 assembly.

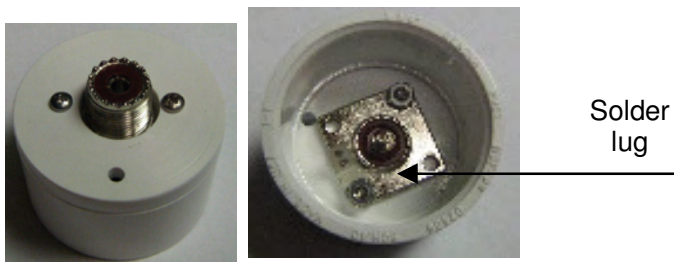


Figure 2-1: View of the PVC Bottom Cap Assembly

- **Top Cap**

[] Locate the *PVC Top Cap* (Eye-Bolts)

[] Locate the (3) *10-24 Eye Bolts*

[] Locate the (6) *10-24 Nuts*

[] Locate the (6) *#10 Split Lock Washers*

[] Locate the (2) *Fender Washers*

[] Using a 3/8" wrench or nut driver, mount the eye bolt onto the PVC top cap using a 10-24 nut, #10 split washer and #10 fender washer on the outside and a 10-24 nut, #10 split washer and #10 fender washer on the inside

[] Using a 3/8" wrench or nut driver, mount the eye bolts onto each side of the PVC Top Cap using a 10-24 nut and #10 split washer on the outside and a 10-24 nut and a #10 split washer on the inside
See Figure 2-2 for a picture of this Eye Bolt Assembly.

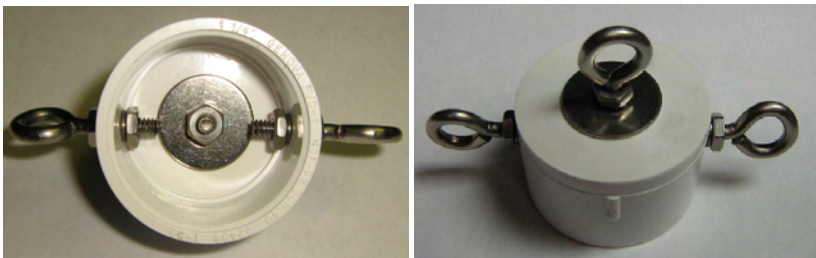


Figure 2-2: View of the PVC Top Cap Assembly

[] Using your soldering iron, solder “C” of the Balun Assembly (Figure 1-4) to the solder lug of the Transmitter SO-239 Connector. Solder “D” to the center pin of the Transmitter SO-239 Connector.

[] Solder one 12” 14 gauge bare copper wire to the “White A” and solder the other 12” 14 gauge bare copper wire to the “Black A”.

[] Slide the PVC Enclosure down onto the soldered Balun Assembly with the two holes towards the top Eye Bolts cap side. Fit the PVC enclosure into the PVC Bottom Cap and glue it if you want

[] Fit the 12” 14 gauge bare copper wire that is soldered to “White A” through one of the holes of the PVC enclosure

[] Fit the 12” 14 gauge bare copper wire that is soldered to “Black A” through the remaining hole of the PVC enclosure

[] Fit the PVC Top Cap assembly onto the PVC enclosure until the edge of the PCV Top Cap touches the stranded copper wire. Glue it if you want.

[] You can use the attached eye bolts to wrap the excess wire, make connection and provide additional support. You can solder a wire to the attached 14 gauge bare copper wire and support it with the eye bolts. You can also hang the balun using the top eye bolt. See Figure 2-3 for the complete Balun assembly picture.



Figure 2-3: Completed Balun Assembly

Inspection

Give your unit a thorough QC (quality control) inspection before moving on.

[] Was each part installed in the right place with the correct orientation? Recheck the assembly check list to verify completion of each step.

[] Inspect for cold-solder joints. Use a bright light to see if all joints are smooth, indicating good wetting and solder flow. Re-solder any beaded, grainy, or incomplete connections

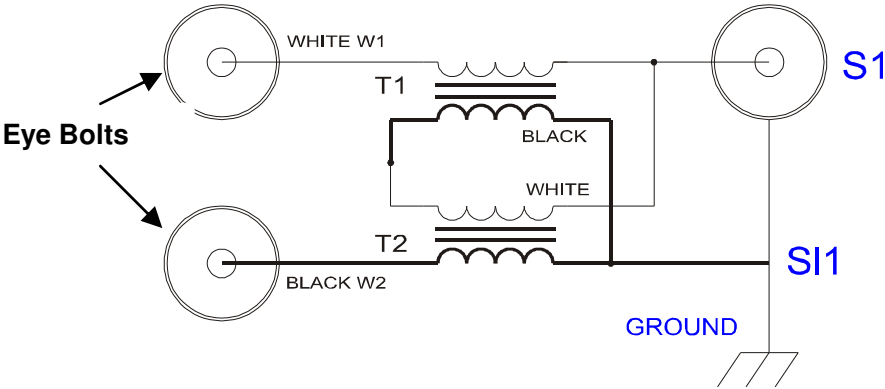
Testing

[] Connect a HF SWR analyzer to the transmitter connection.

[] Connect a 50 Ohm load across the two Eye-bolt connections

[] The SWR analyzer should read 12.5 Ohms. (R=25) on HF frequencies

Schematic Diagram



MFJ-913
4:1 CURRENT BALUN

Notes:

FULL 12 MONTH WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free from defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original of machine reproduction or such proof of purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product under warrantee provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **\$7.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof of purchase and a **\$5.00** personal check, cashiers check, or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board product is returned**. Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, or cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaid.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ products.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.
9. This warranty is given in lieu of any other warranty expressed or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.



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