W2FMI-2.25:1-LU112.5

A) Description

The W2FMI-2.25:1-LU112.5 is a low-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 112.5 ohms to 50 ohms. It has a impedance transformation ratio of 2.25:1 from 1MHz to 30MHz. A conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Ten trifilar turns of No. 18 Formvar SF wire are wound on an Amidon PN FT-125-K

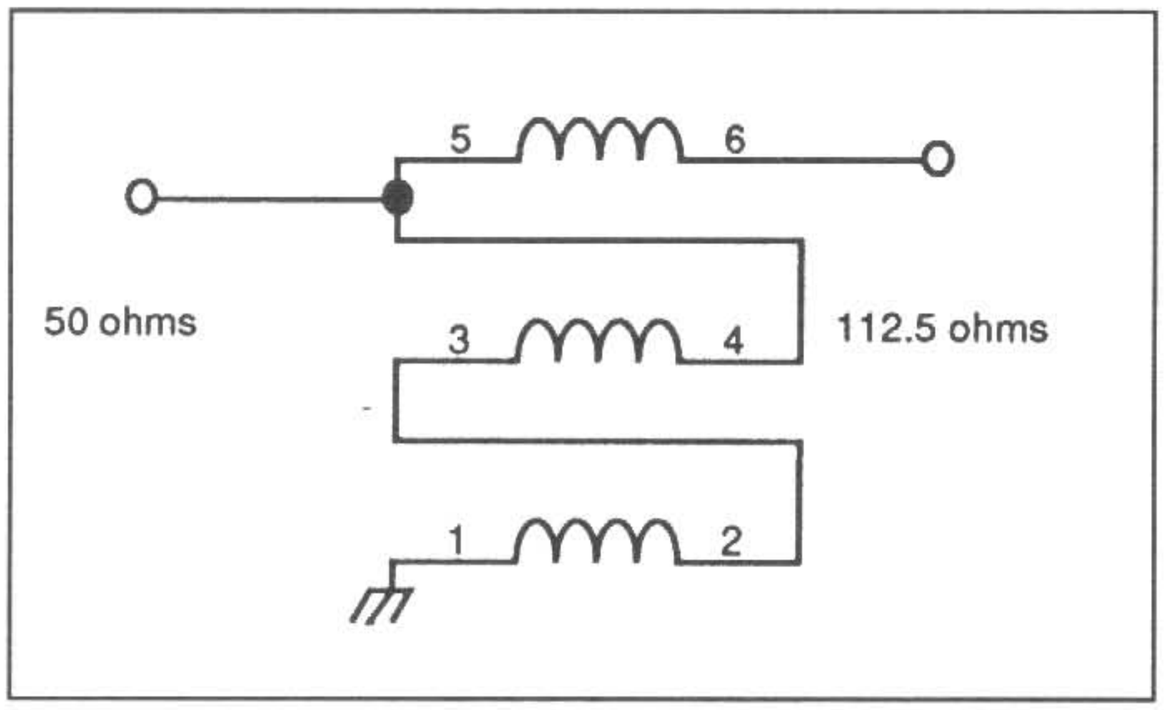

Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 112.5 ohms to 50 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

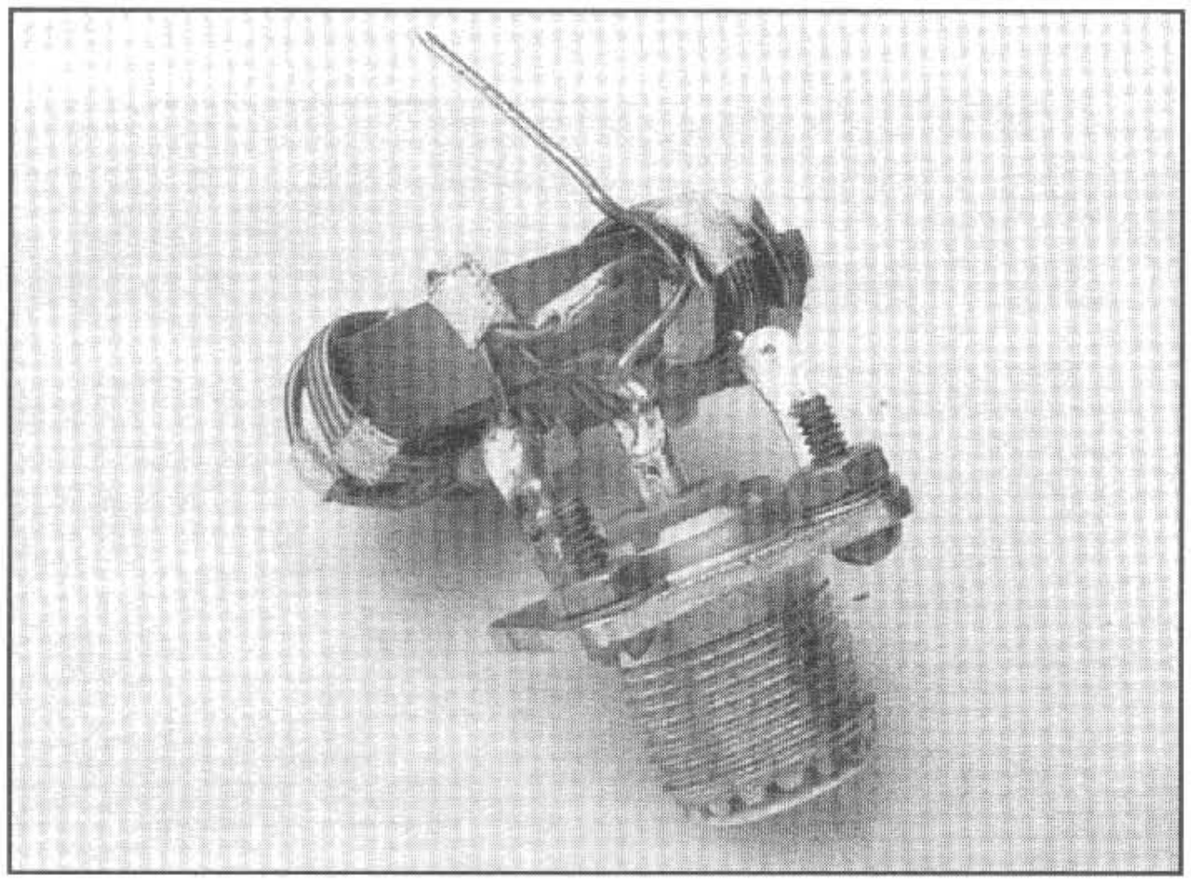

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-2.25:1-LU112.5 transformer.

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A) Description

The W2FMI-2:1-LU100 is a low-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 100 ohms to 50 ohms. It has a constant impedance transformation ratio of 2:1 from 1MHz to 25MHz. A conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Ten trifilar turns of No. 18 Formvar SF wire are wound on an Amidon FT-125-K. The top winding in Figure 1 is tapped at eight turns from terminal 5 resulting in the 2:1 ratio

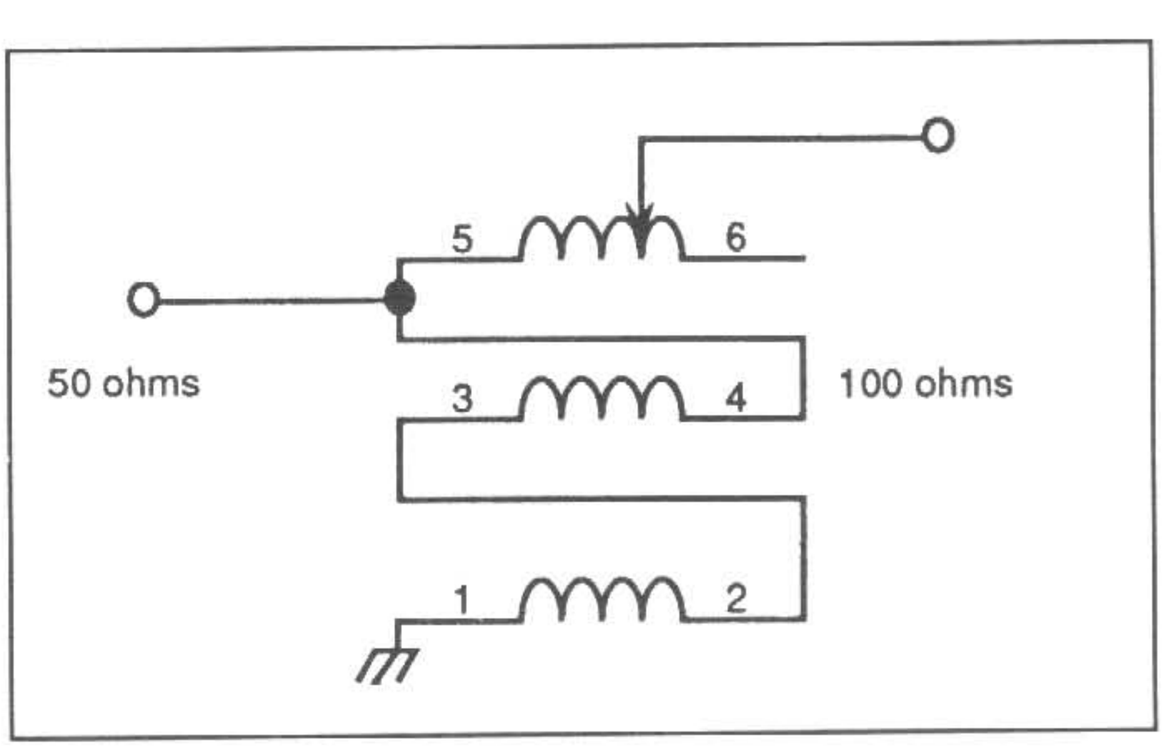

Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 100 ohms to 50 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

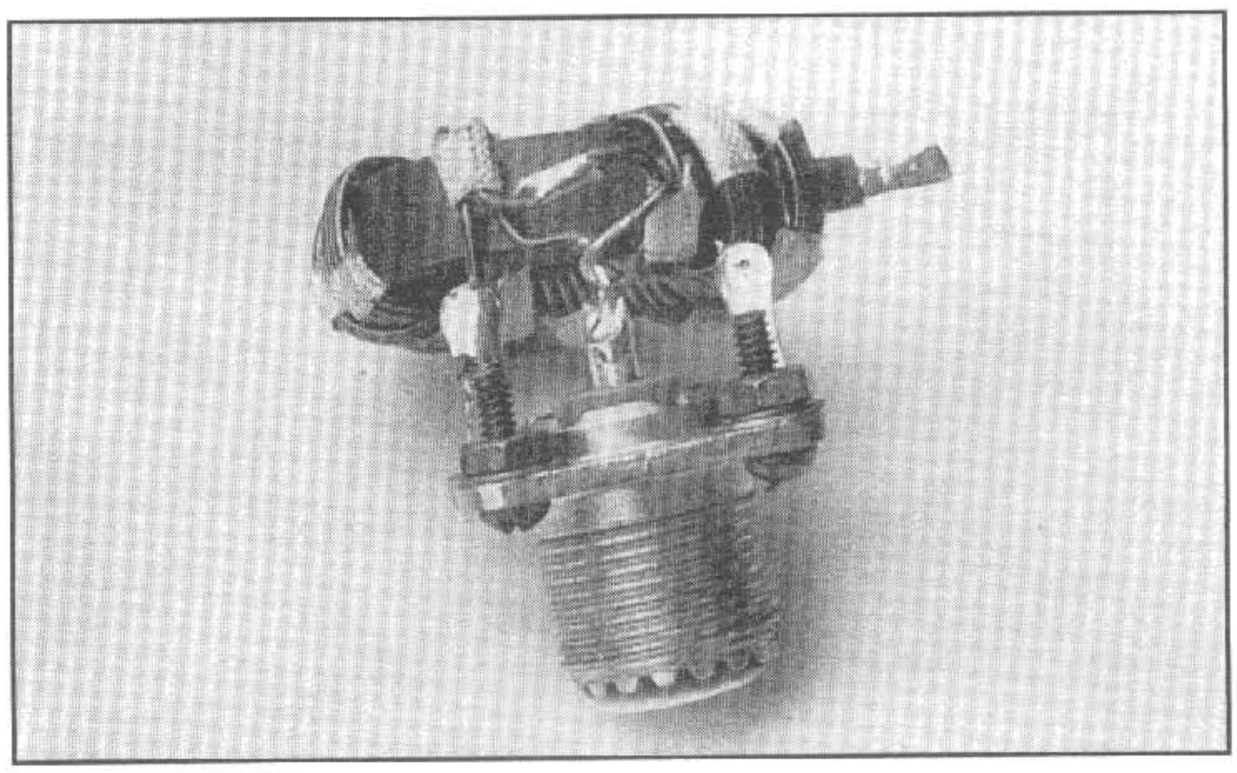

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-2:1-LU100 transformer.

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W2FMI-2:1-LDU100

A) Description

The W2FMI-2:1-LDU100 is a low-power, dual-output unun (unbalanced-to-unbalanced) transmission line transformer designed to match 112.5 ohms to 50 ohms or 100 ohms to 50 ohms. In matching 112.5 ohms to 50 ohms, the impedance transformation ratio of 2.25:1 is constant from 1MHz to 30MHz. In matching 100 ohms to 50 ohms, the ratio of 2:1 is constant from 1MHz to 25MHz. A conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Ten trifilar turns of No. 18 Formvar SF wire are wound on an Amidon PN FT-125-K. The top winding in Figure 1 is tapped at eight turns from terminal 5 giving the 2:1 ratio (connection A). With connection B, the impedance ratio is 2.25:1.

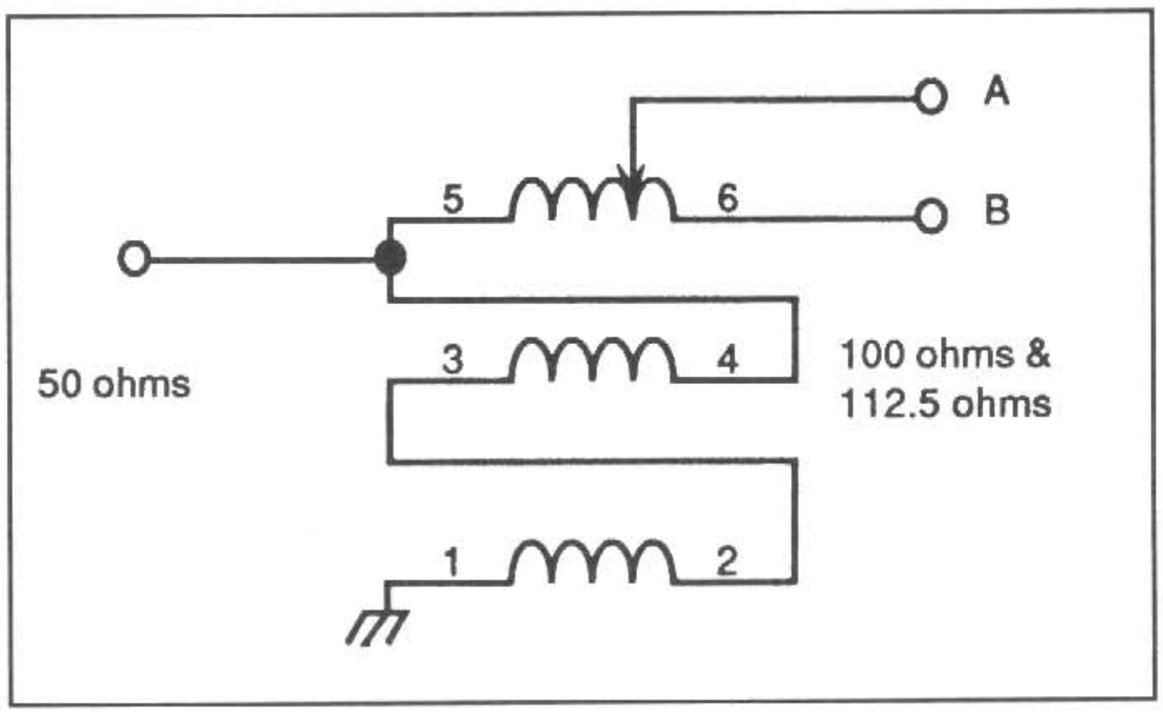

Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 50 ohms to 25 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

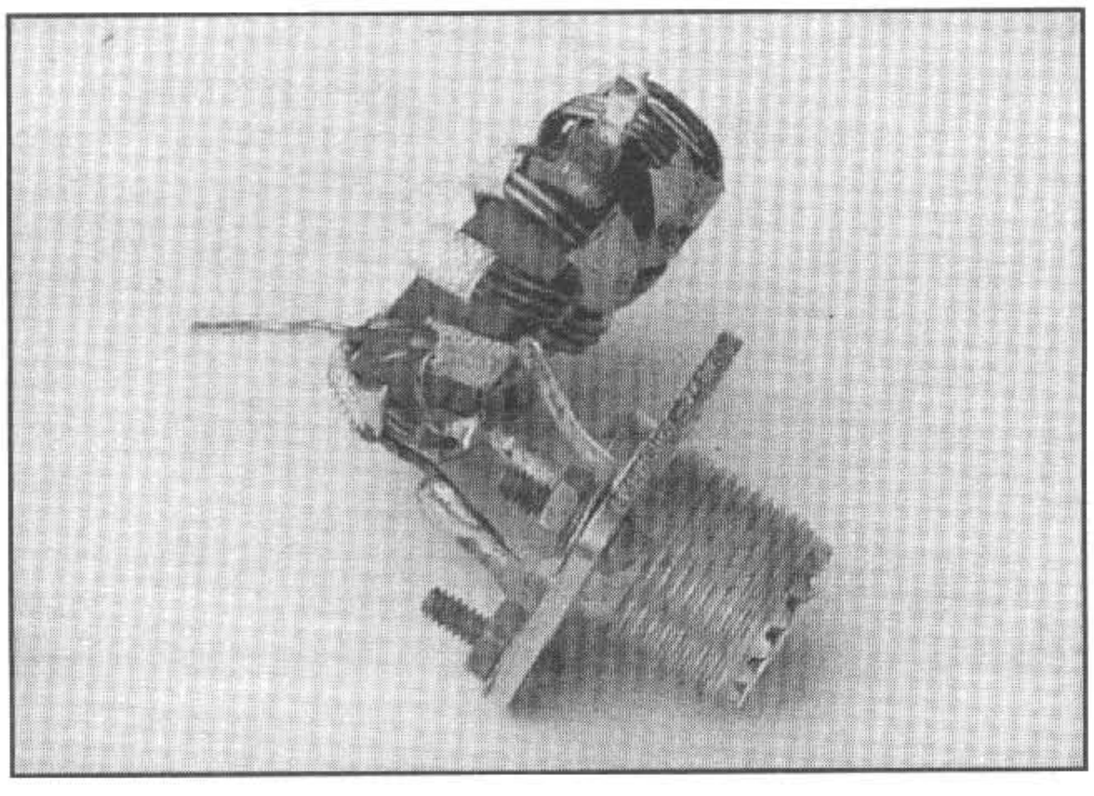

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-2:1-LDU100 transformer.

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A) Description

The W2FMI-2:1-LRU50 is a low-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 12.5 ohms. It uses a tight bifilar winding on a rod core resulting in the optimized characteristic impedance of 25 ohms which is required in a 50:12.5-ohm transformer (for maximum high-frequency response). When matching 50 ohms to 12.5 ohms, the impedance transformation ratio is constant from 1MHz. A very conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. It is the Ruthroff 4:1 unun which uses a single transmission line in the "boot-strap" configuration. There are twenty bifilar turns of No. 16 Formvar SF wire on an Amidon PN R61-025-400 (3.5-inches long, ferrite rod with a permeability of 125).

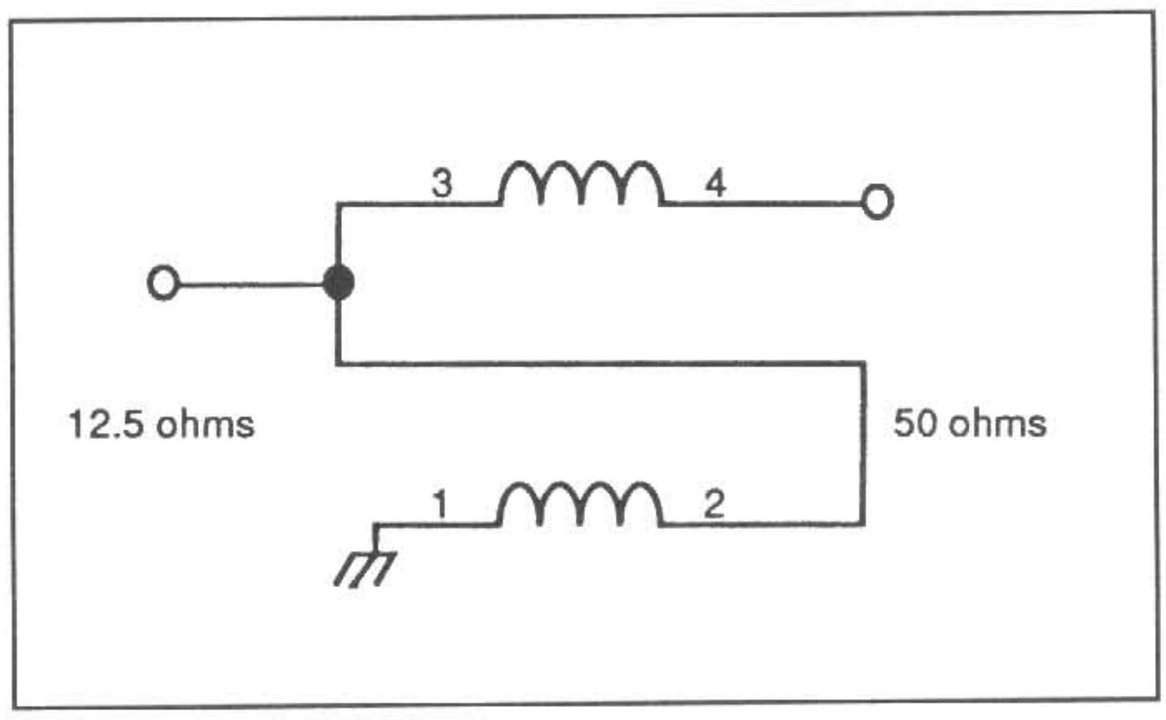

Figure 1. Schematic diagram of the Ruthroff UNUN transformer designed to match 50 ohms to 12.5 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

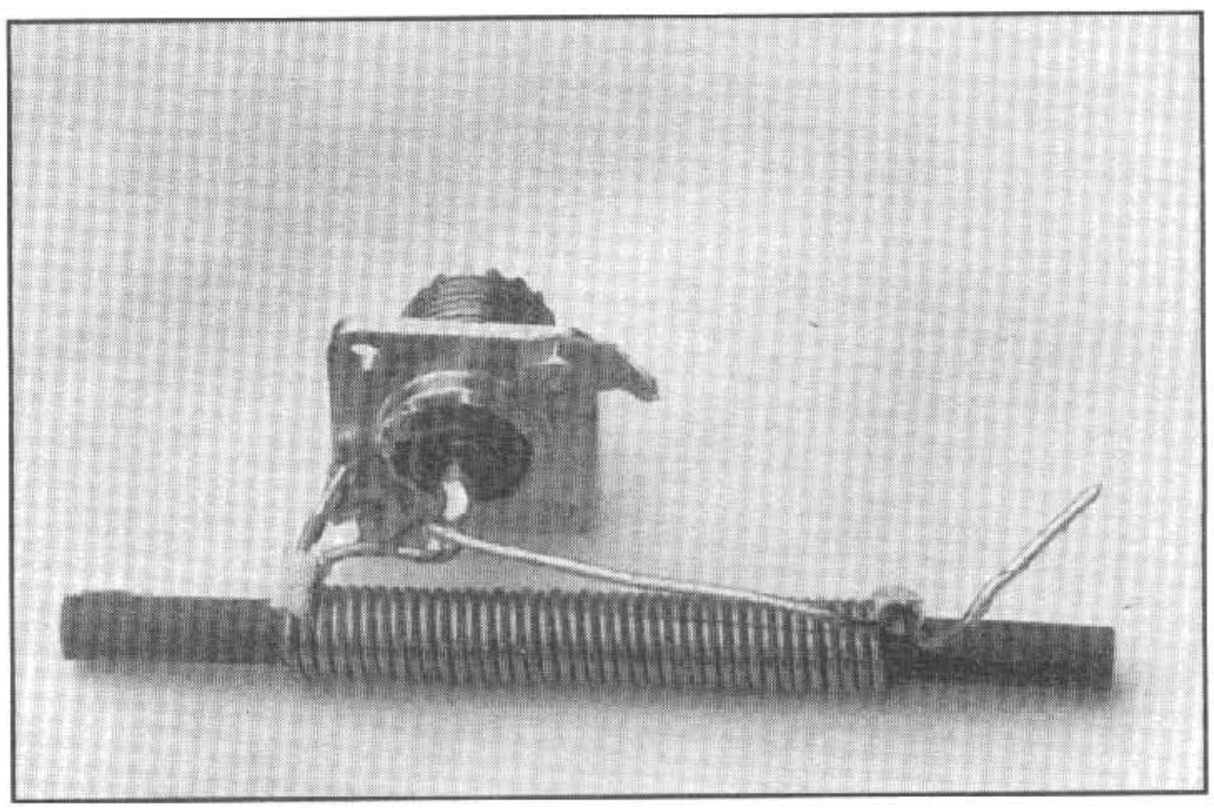

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-4:1-LRU100 transformer.

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W2FMI-4:1-LFU50

A) Description

The W2FMI-4:1-LFU50 is a low-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 12.5 ohms. It uses the trifilar, "floating-third-wire," winding. This results in a characteristic impedance, on a toroid, near the 25 ohm which is optimum in a 50:12.5-ohm transformer. At this impedance ratio level, the transformation ratio of 4:1 is constant from 1MHz to 40MHz. A very conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. It is the "floating-third-wire" configuration which results in a trifilar winding (on a toroid) approaching the optimized value of 25 ohms for a 50:12.5-ohm transformer. There are eight trifilar turns of No. 16 Formvar SF wire on an Amidon FT-125-K.

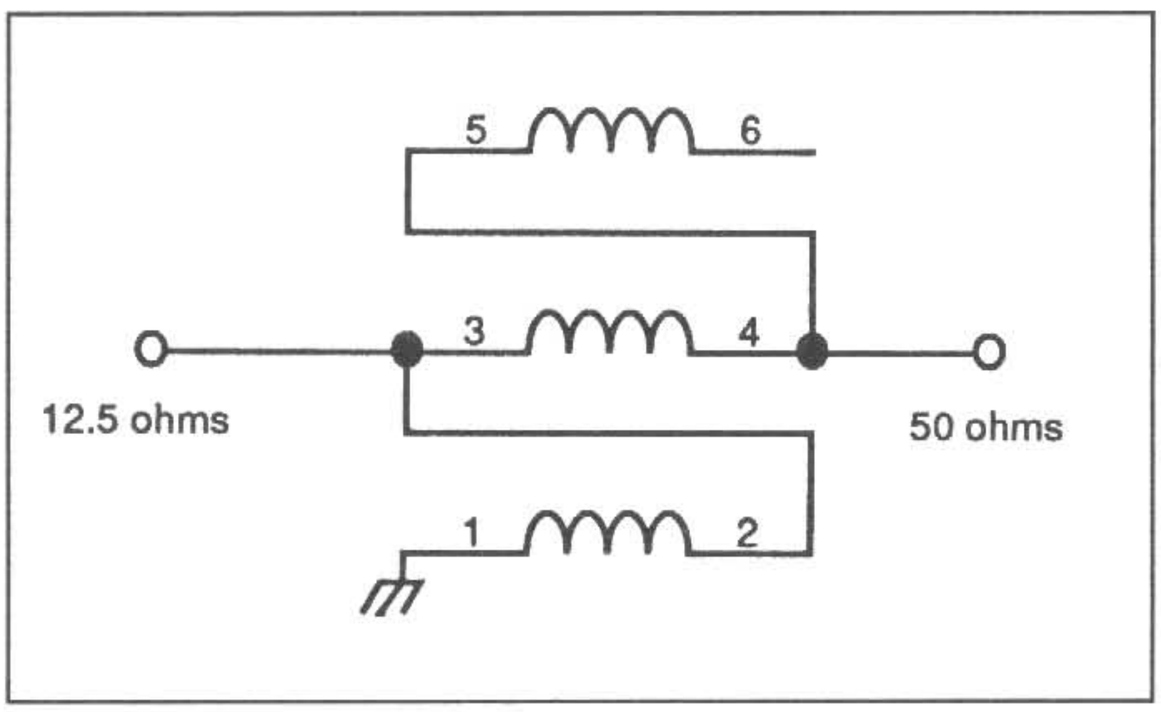

Figure 1. Schematic diagram of the “floating-third wire” UNUN transformer desinged to match 50 ohms to 12.5 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

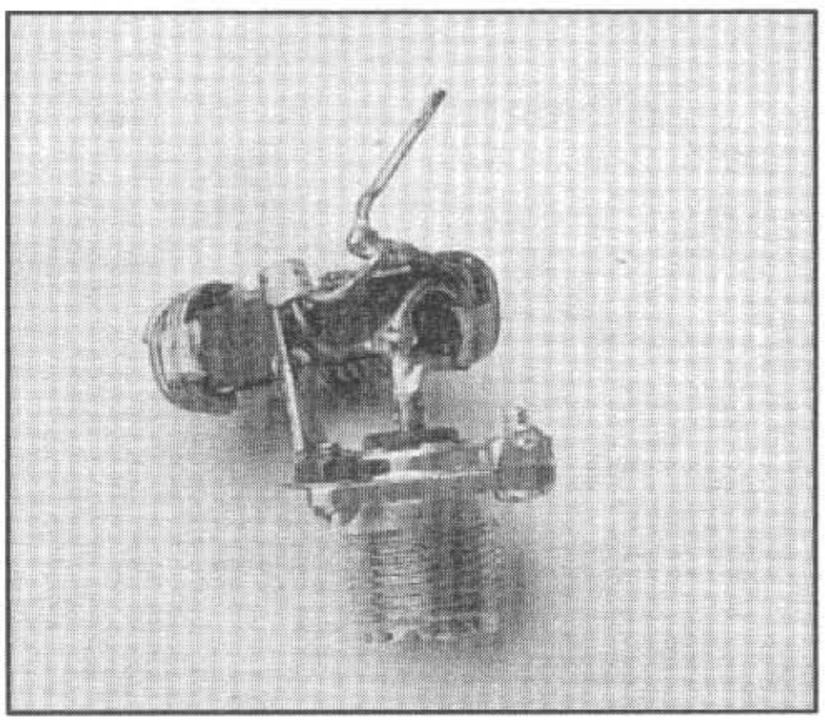

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-4:1-LFU50 transformer.

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A) Description

The W2FMI-4:1-LCU50 is a low-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 12.5 ohms. It uses a low-impedance coaxial cable (22 ohms) in the Ruthroff "boot-strap" configuration. Because of lower parasitic capacitance, it has a higher frequency capability than its bifilar-wire counterpart. In matching 50 ohms to 12.5 ohms, the impedance transformation ratio of 4:1 is constant from 1MHz to 50MHz. A very conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this very broadband and highly efficient transformer. There are eight turns of low-impedance coaxial cable on an Amidon FT-125-K. The inner-conductor of No. 16 H.Imideze wire has two layers of Scotch No. 92 tape. The outer-braid is from RG174/U cable. The characteristic impedance is 22 ohms.

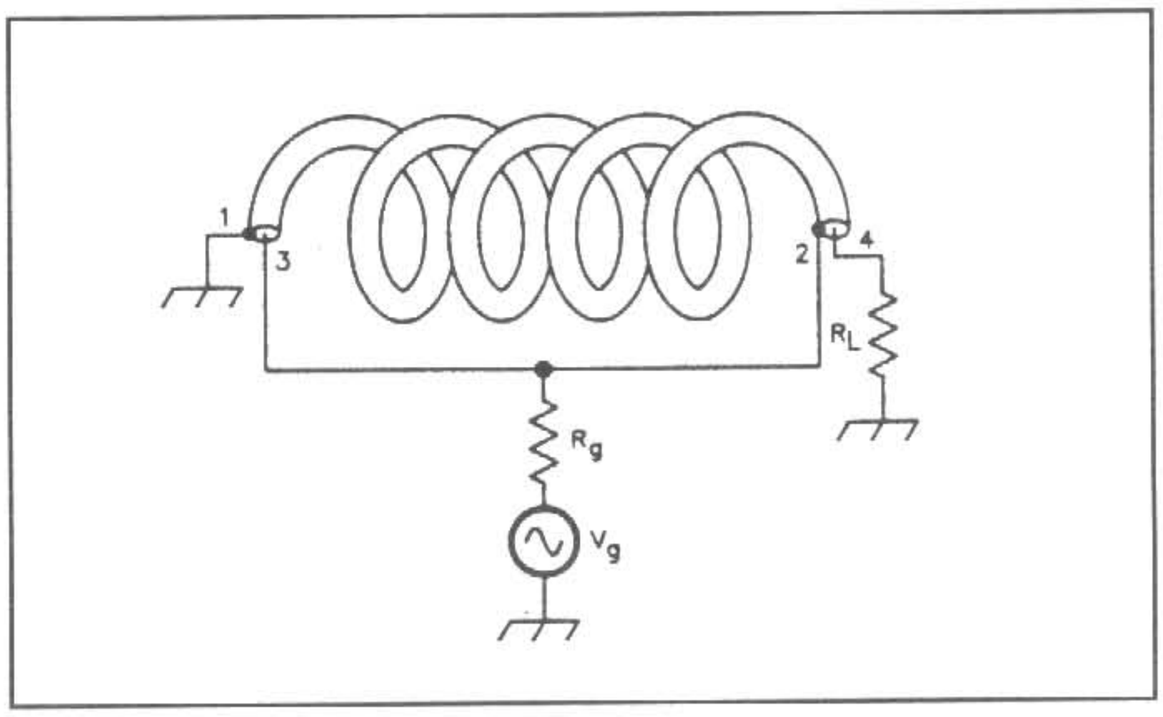

Figure 1. Schematic diagram of the coaxial cable version of the Ruthrof 4:1 UNUN transformer designed to match 50 ohms to 12.5 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

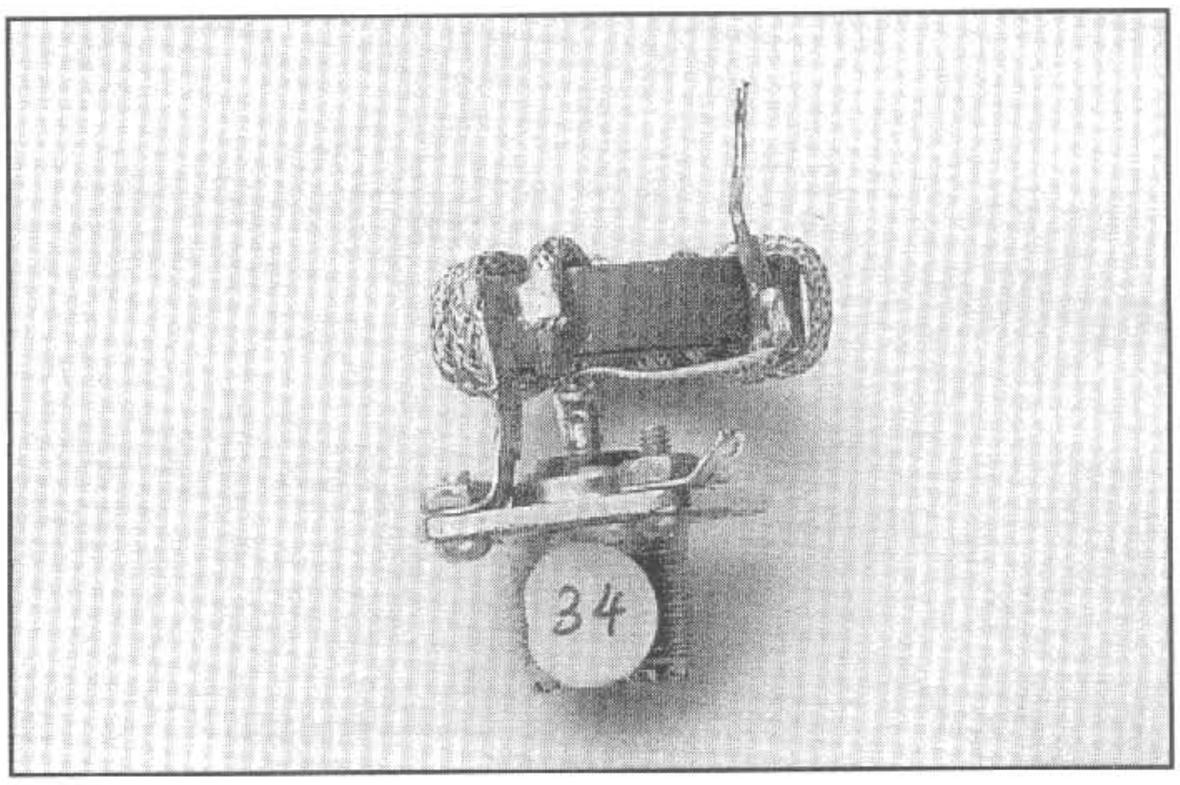

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-4:1-LCU50 transformer.

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W2FMI-9:1-LU50

A) Description

The W2FMI-9:1-LU50 is a low-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 5.56 ohms. Since the transmission lines are very short, this transformer has a remarkably wide bandwidth. When matching 50 ohms to 5.56 ohms, the impedance transformation ratio of 9:1 is constant from 1MHz to over 30MHz. Also, since it uses rather thick wires in order to achieve low characteristic impedances of the windings, it has a very high-power capability. A very conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this very broadband and highly efficient transformer. Six trifilar turns are wound on an FT-125-K. The center winding in Figure 1 is No. 14 Formvar SF wire. The other two are No. 16 Formvar SF wire.

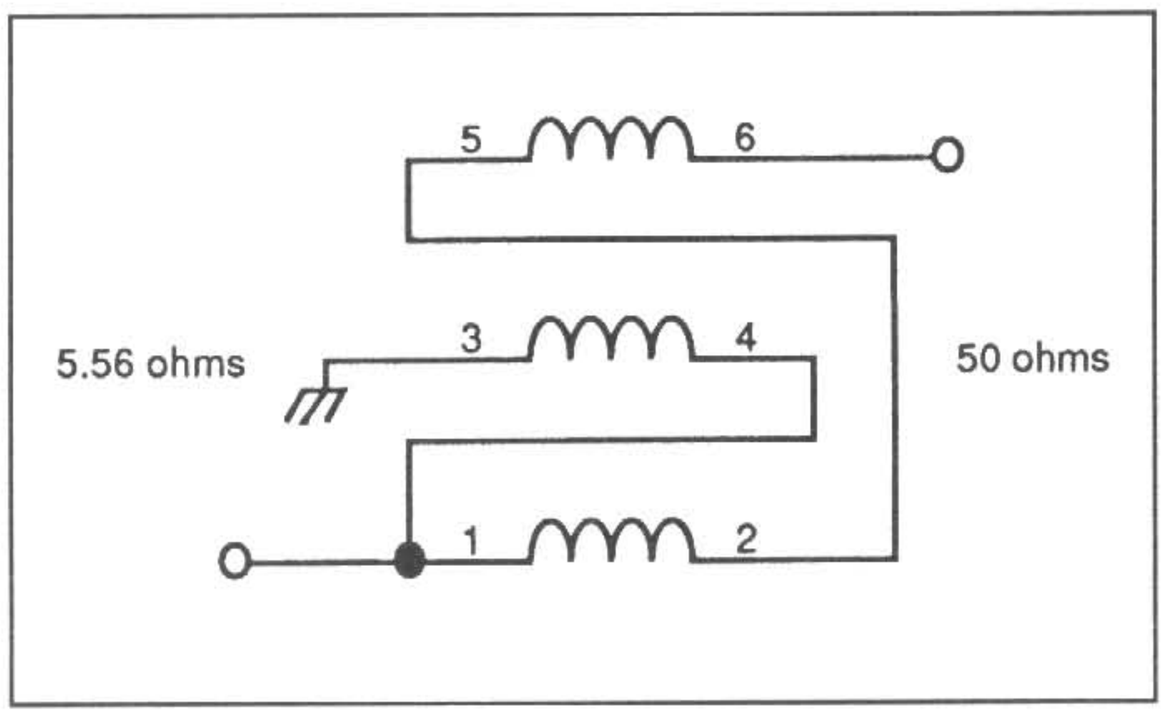

Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 50 ohms to 5.56 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

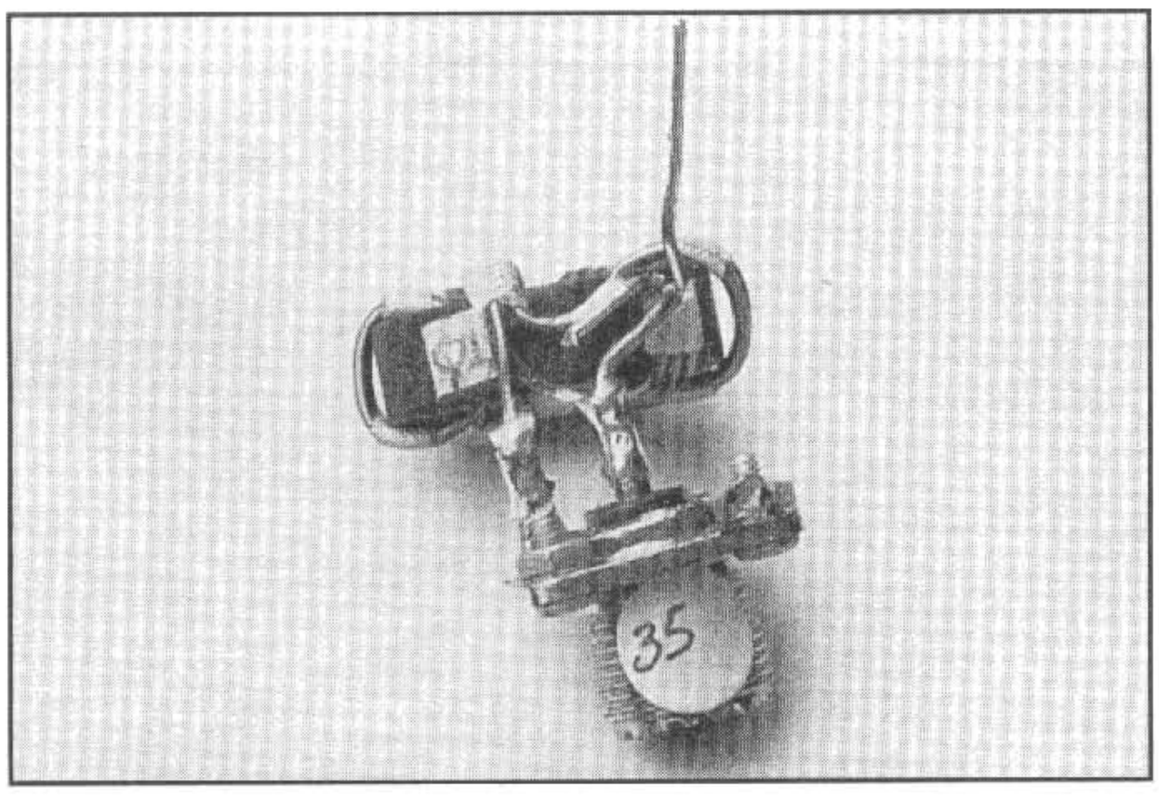

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-9:1-LU50 transformer.

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A) Description

The W2FMI-9:1-LMMU50 is a low-power, multimatch unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to five lower impedances ranging from 32 ohms to 5.56 ohms. Specifically, the ratios and bandwidths (where the impedance ratios are constant) are:

a)	9 : 1 (50:5.56-ohms)	1MHz to 30MHz	d)	2.25: 1 (50:22.22-ohms)	1MHz to 25MHz
b)	6.25 : 1 (50:8.68-ohms)	1MHz to 25MHz	e)	1.56: 1 (50:32-ohms)	1MHz to 15MHz
c)	4 : 1 (50:12.5-0hms)	1MHz to 30MHz			

This transformer also performs as well when matching 75 ohms to the appropriate lower impedances. A very conservative power rating of 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. There are eight trifilar turns on an Amidon PN FT-125-K. The center winding in Figure 1 is No. 14 Formvar SF. The other two are No. 16 Formvar SF wire. The top winding is tapped at four turns from terminal 5. The ratios are:

W2FMI-9:1-LMMU50

A - L ; 9:1
B - L ; 6.25:1
C - L ; 4:1
A - H ; 2.25:1
B - H ; 1.56:1

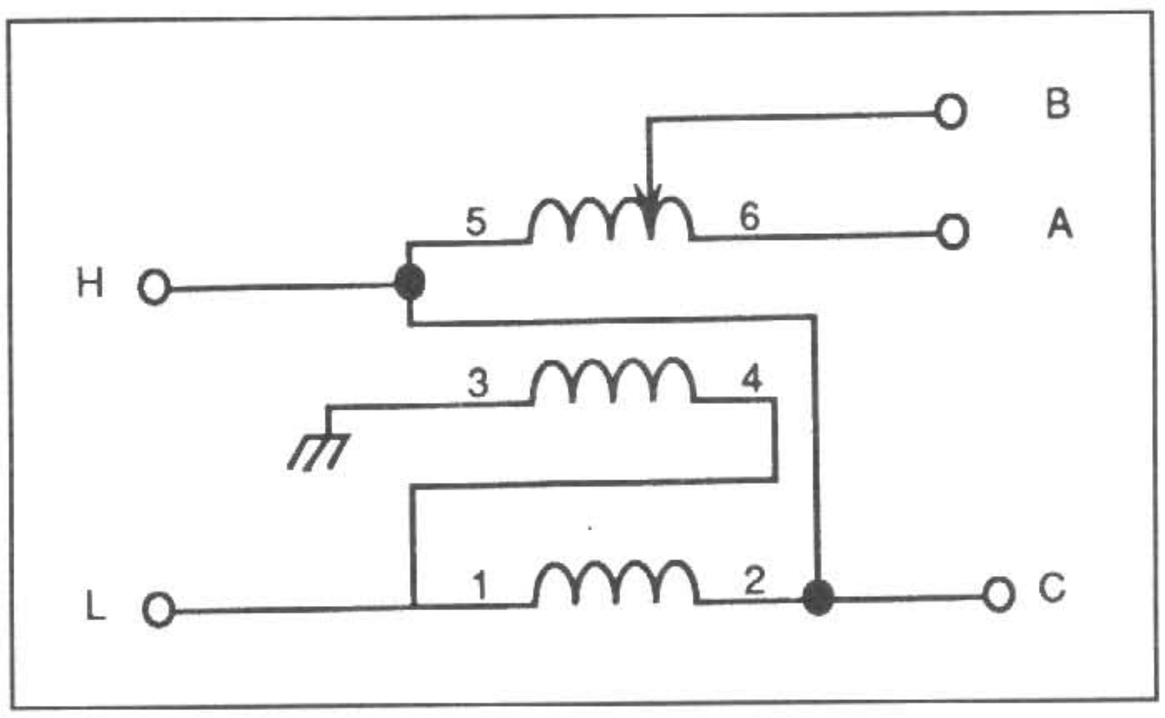

Figure 1. Schematic diagram of the multi-match UNUN transformer designed to match 50 ohms to five lower impedences

C) Photograph

A view of the transformer (cover removed) is shown in Figure 2. The photograph attempts to show the various connections.

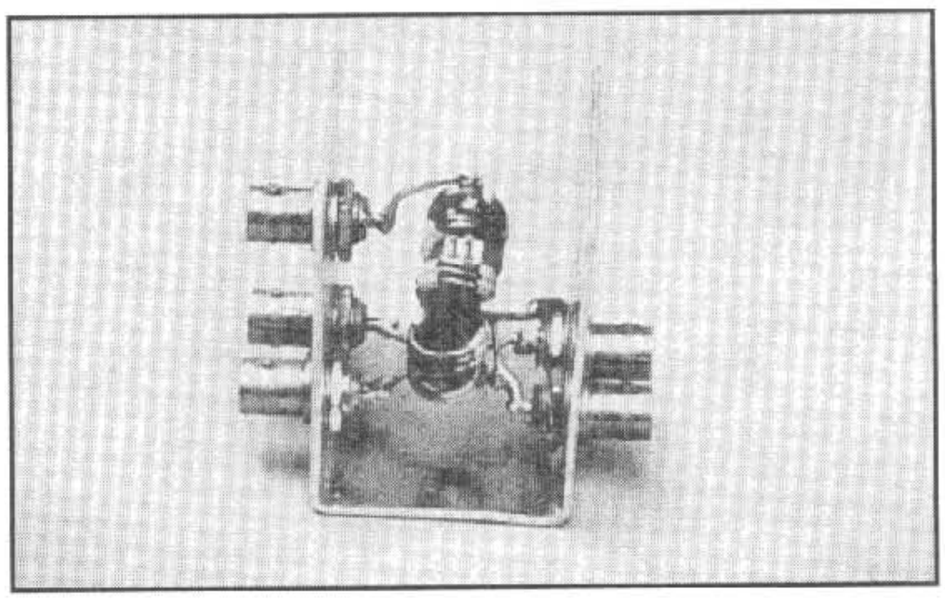

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-LMMU50 transformer.

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W2FMI-1.78:1-LDU50

A) Description

The W2FMI-1.78:1-LDU50 is a low-power, dual-output unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 28 ohms or 12.5 ohms. When connecting this transformer (in parallel on their 50 ohm sides) with W2FMI-1.56:1-LDU50, four broadband ratios of (nominally) 4:1, 3:1, 2:1 and 1.5:1 become available. In matching 50 ohms to 28 ohms (1.78:1) the impedance transformation ratio is constant from 1MHz to 45MHz. In matching 50 ohms to 12.5 ohms (4:1), it is constant from 1 MHz to 45MHz. A conservative power rating is 150 watts of continuous power and 300 watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Six quadrifilar turns of No. 16 Formvar SF wire are wound on an Amidon PN FT-125-K ferrite core. When connecting A to C, the ratio is 1:1.78. When connecting B to C, it is 1:4

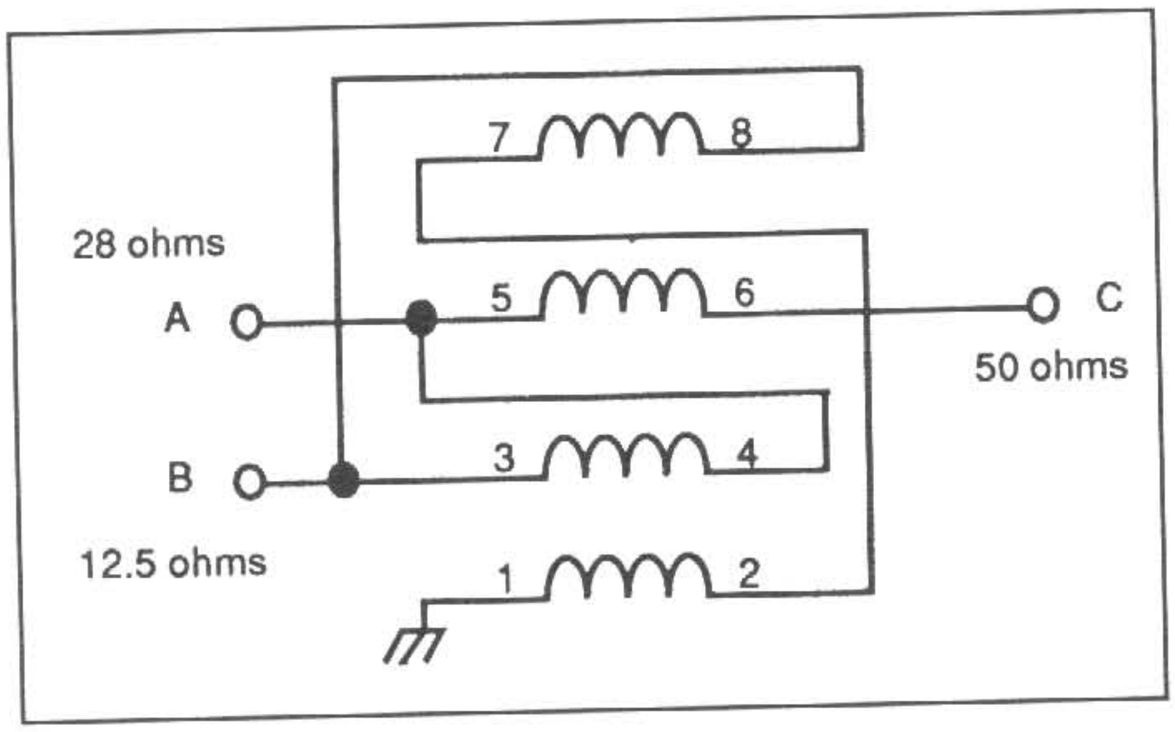

Figure 1. Schematic diagram of the dual-output transformer designed to match 50 ohms to 28 ohms or 12.5 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side.

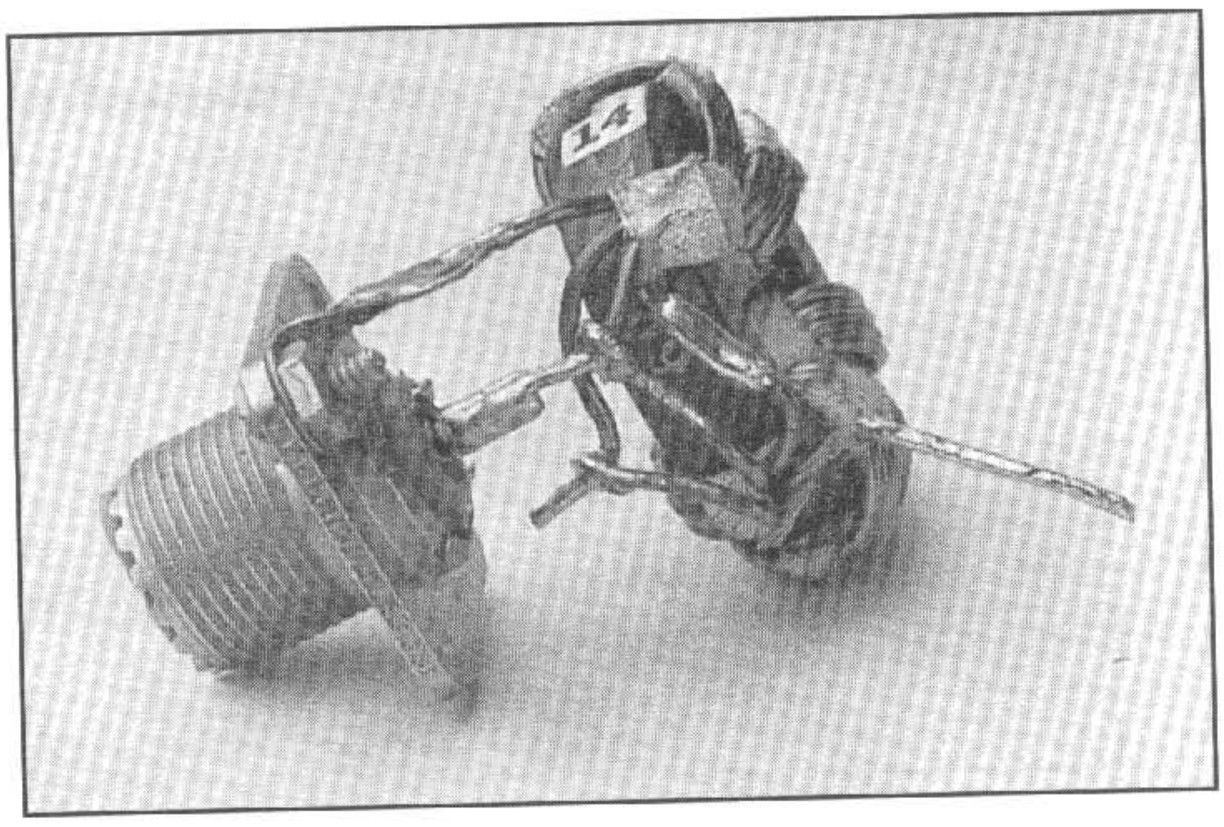

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-1.78:1-LDU50 transformer.

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W2FMI-1.78:1-LMMU50

A) Description

The W2FMI-1.78:1-LMMU50 is a low-power, multimatch unun (unbalanced-to-unbalanced) transmission line transformer. It basically uses the schematic diagram of the W2FMI-1.78:1-LDU50 transformer with more connections. It is designed to match 50 ohms to eight lower impedances ranging from 38.3 ohms down to 3.125 ohms. Specifically, the ratios and bandwidths (where the impedance ratio are constant) are:

a)	1.36 : 1	(50:36.86-ohms)	1MHz to 25MHz	d)	4 : 1	(50:12.50-ohms)	1MHz to 30MHz
b)	1.78 : 1	(50:28.13-ohms)	1MHz to 45MHz	e)	9 : 1	(50:5.560-ohms)	1MHz to 30MHz
a)	2.25 : 1	(50:22.22-ohms)	1MHz to 45MHz	d)	12.25 : 1	(50:4.080-ohms)	1MHz to 15MHz
b)	3.06 : 1	(50:16.34-ohms)	1MHz to 20MHz	e)	16 : 1	(50:3.125-ohms)	1MHz to 20MHz

A conservative power rating is 150 watts of continuous power and 300 watts of peak power. The efficiency for all ratios is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Six quadrifilar turns of No. 16 Formvar SF wire are wound on an Amidon PN FT-125-K ferrite core. Winding 5-6 is tapped at three turns from terminal 5. The connections to the eight ratios are:

W2DMI-1.78:1-LMMU50

A - D; 1 : 1.78
B - D; 1 : 4
C - D; 1 : 16
B - E; 1: 2.25
B - F; 1 :3.06
A - F; 1 : 1.36
C - E; 1: 9
C - F; 1: 12.25

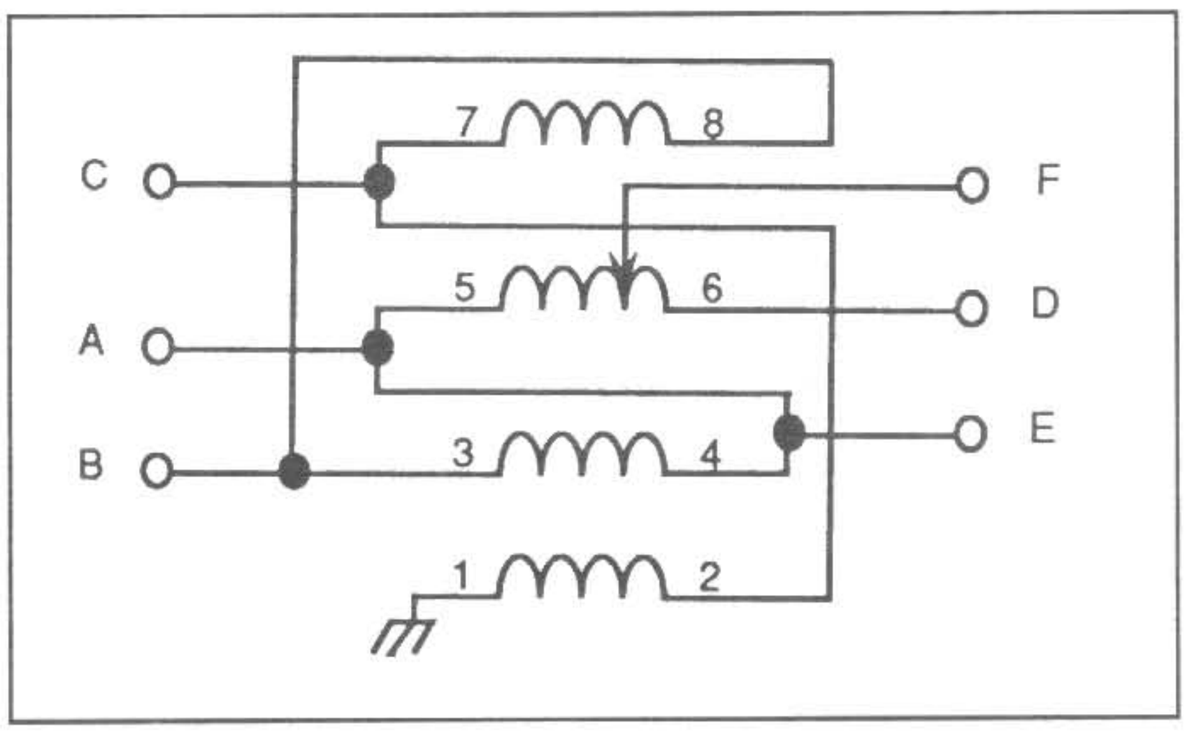

Figure 1. Schematic diagram of the multi-match UNUN transformer designed to match 50 ohms to five lowe impedences

C) Photograph

A view of the transformer (with cover removed) is shown in Figure 2. The photograph attempts to show the various connections.

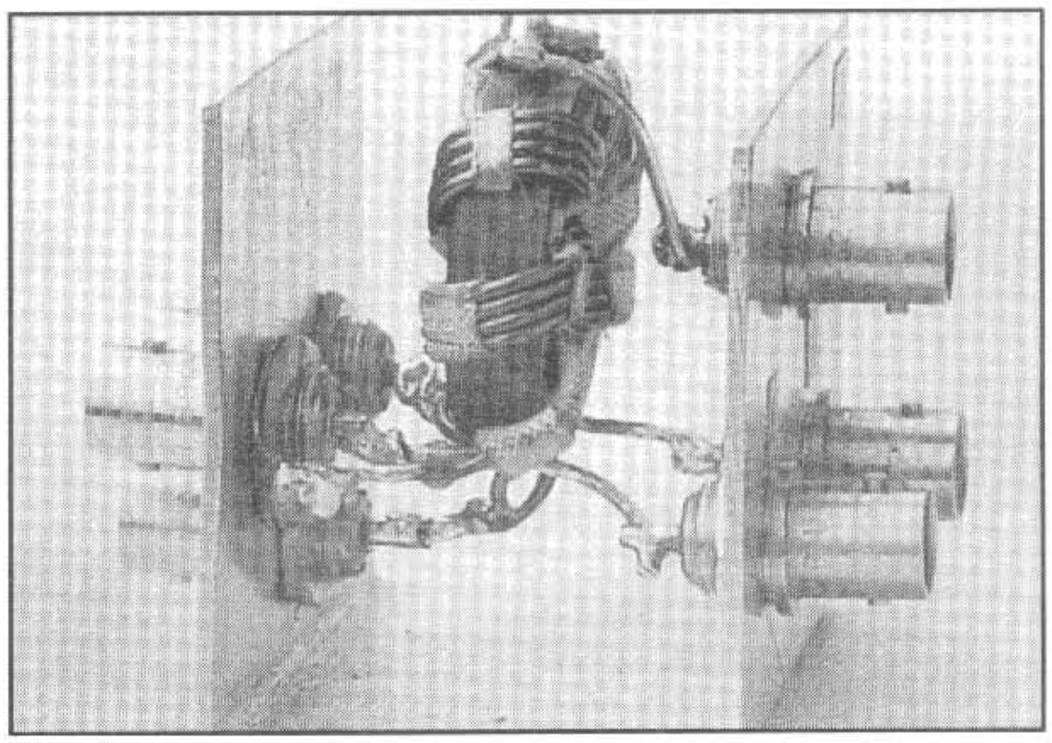

Figure 2 - A view of the highly efficient and broadband W2FMI-1.78:1-LMMU50 transformer.

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W2FMI-1.56:1-LDU50

A) Description

The W2FMI-1.56:1-LDU50 is a low-power, dual-output unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 32 ohms or 18 ohms. When connecting this transformer (in parallel on their 50 ohm sides) with W2FMI-1.78:1-LDU50, four broadband ratios of (nominally) 4:1, 3:1, 2:1 and 1.5:1 become available. In matching 50 ohms to 32 ohms (1.56:1) the impedance transformation ratio is constant from 1MHz to 45MHz. In matching 50 ohms to 18 ohms (2.78:1), it is also constant from 1 MHz to 45MHz. A conservative power rating is 150 watts of continuous power and 300 watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Five quintufilar turns are wound on an Amidon PN FT-125-K ferrite core. Windings 3-4 and 7-8 are Formvar No. 16 wire. The other three are no. 18 Formvar SF wire. When connecting A to C, the ratio is 1:1.56. When connecting B to C, it is 1:2.78

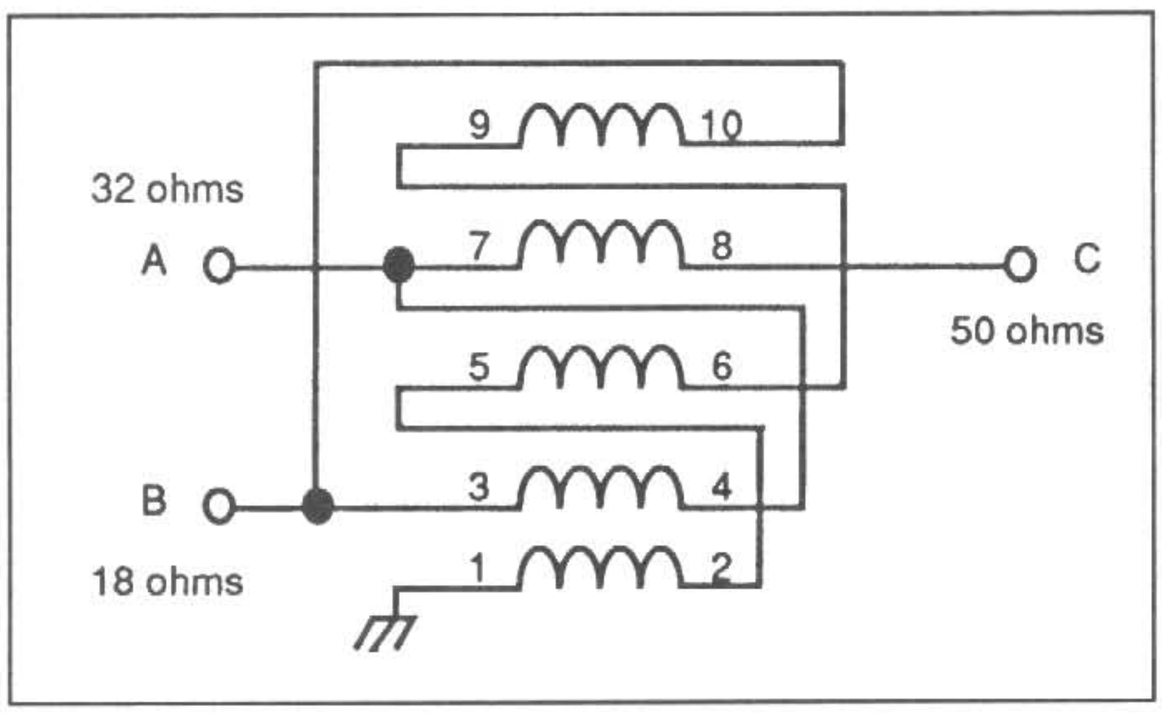

Figure 1. Schematic diagram of the dual-output transformer designed to match 50 ohms to 32 ohms or 18 ohms

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections. The connector is on the low-impedance side

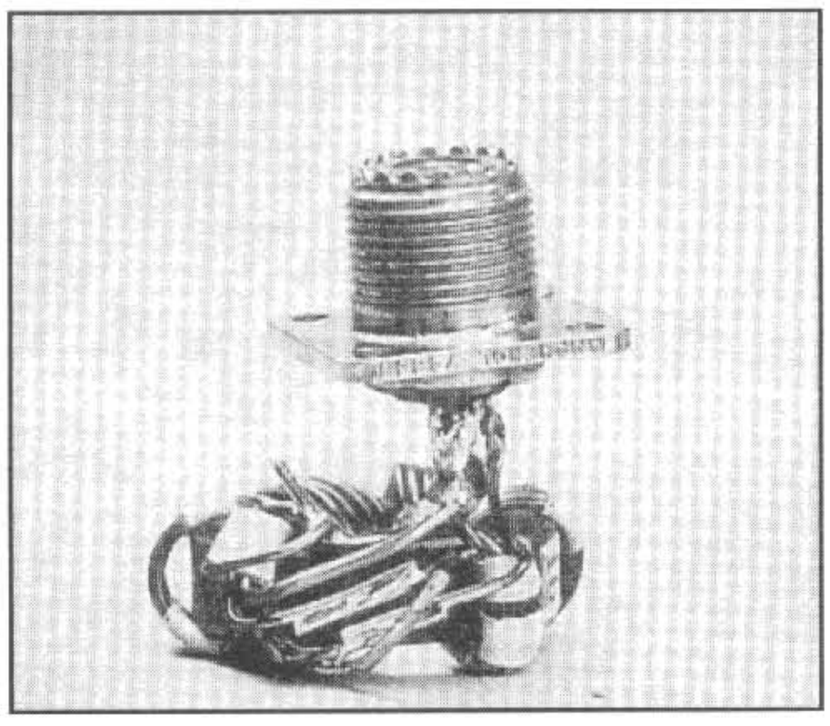

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-1.56:1-LDU50 transformer.

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W2FMI-1:1-LB50

A) Description

The W2FMI-1:1-LB50 is a low-power balun transmission line transformer designed to match 50-ohm coaxial cable to a balanced load of 50 ohms. It is especially designed to have a characteristic impedance of the most popular coaxial cables and significant margins in bandwidth and power handling capability. The response is essentially flat from 1MHz to 50MHz. The conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband balun. It is the Guanella balun which uses a bifilar winding. There are ten bifilar turns of No. 16 wire on an Amidon PN FT-125-K. One wire is H. Imideze. The other is Formvar SF with one layer of Scotch No. 92 tape. The characteristic impedance of the windings is 52 ohms.

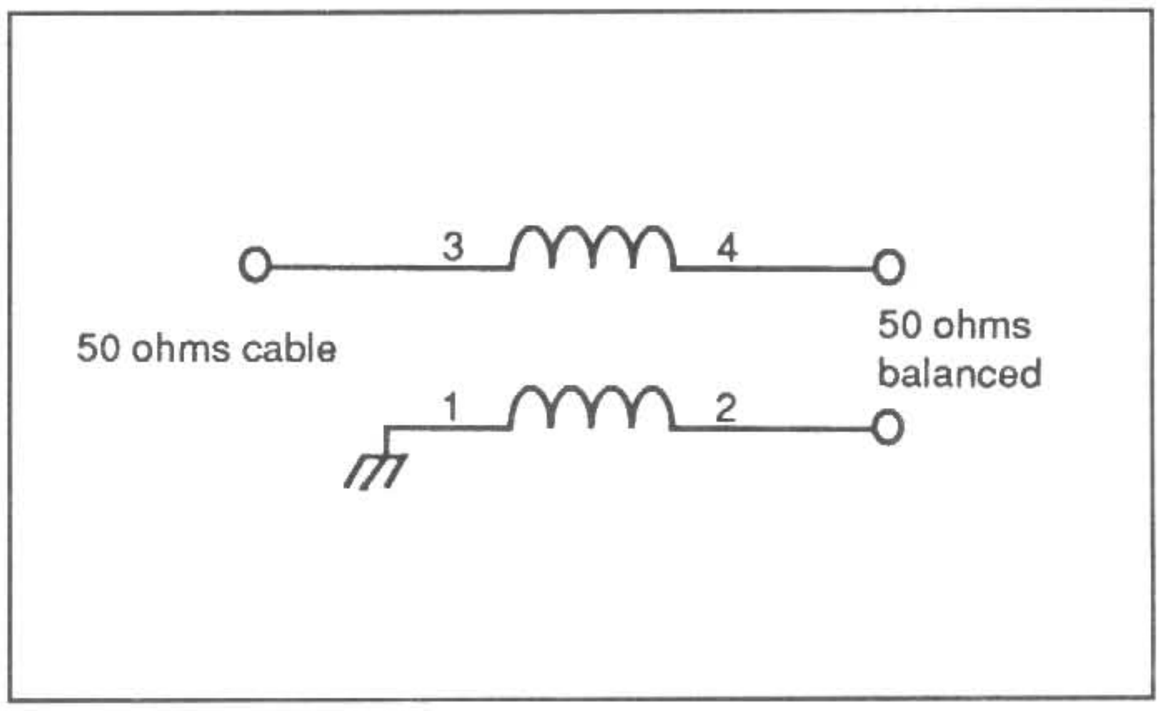

Figure 1. Schematic diagram of the Guanella 1:1 balun transformer

C) Photograph

The bottom-view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections.

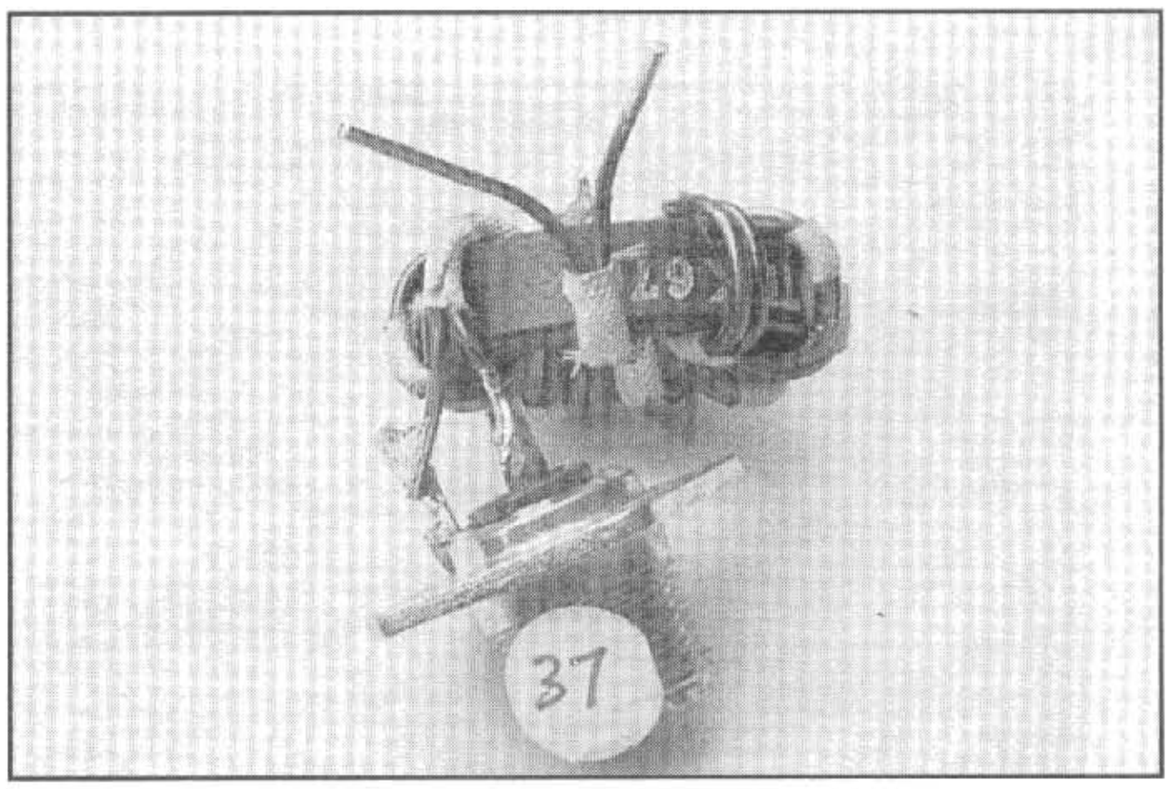

Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-1:1-LB50 transformer.

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W2FMI-4:1-LB200

A) Description

The W2FMI-4:1-LB200 is a low-power balun transmission line transformer designed to match 50-ohm coaxial cable to a balanced load of 200 ohms. The windings are especially designed to have a characteristic impedance of 100 ohms. With these optimized windings, as well as a ferrite core which allows for the best trade-off in efficiency for low-frequency response, this balun is capable of maintaining a constant impedance ratio of 4:1 from 1.7MHz to 50MHz. The conservative power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 98 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of the highly efficient and broadband balun. It is the 4:1 Guanella balun which sums the voltages of two equal delay lines. There are six bifilar turns on each transmission line. The wires are No. 18 Formvar SF and they are covered with 8-mil wall Teflon sleeving. The core is an Amidon PN FT-125-K.

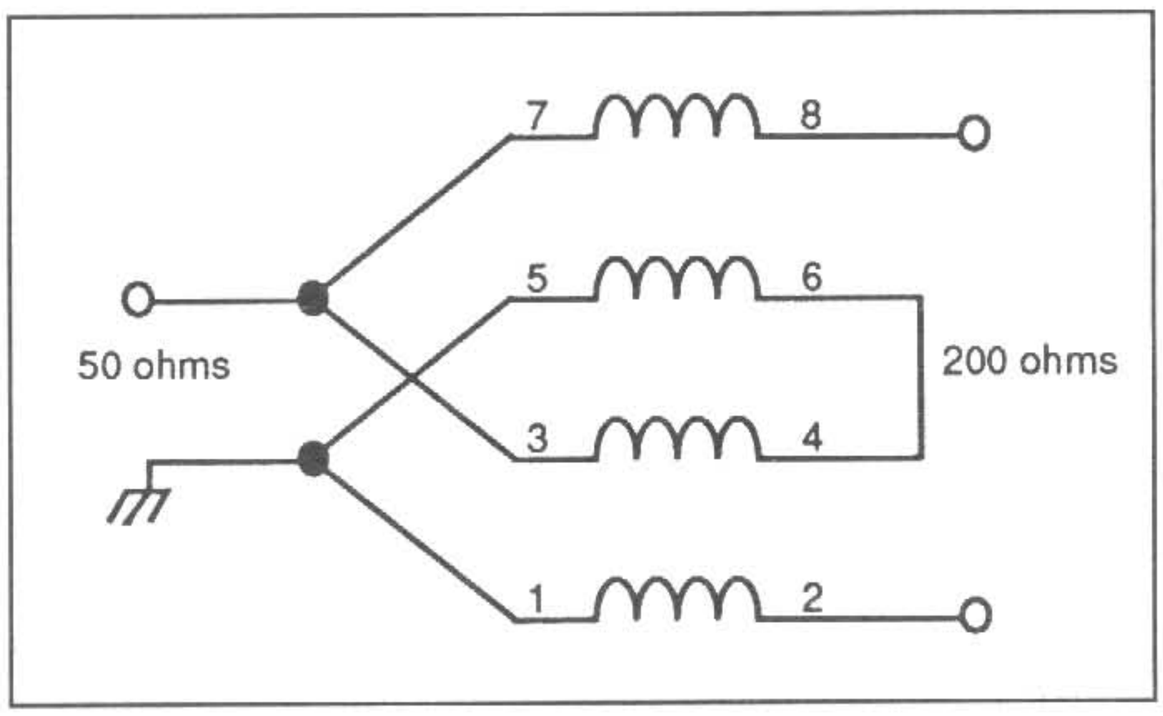

Figure 1. Schematic diagram of theGuanella balun transformer designed to match 50 ohms to 200 ohms

C) Photograph

A view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections.

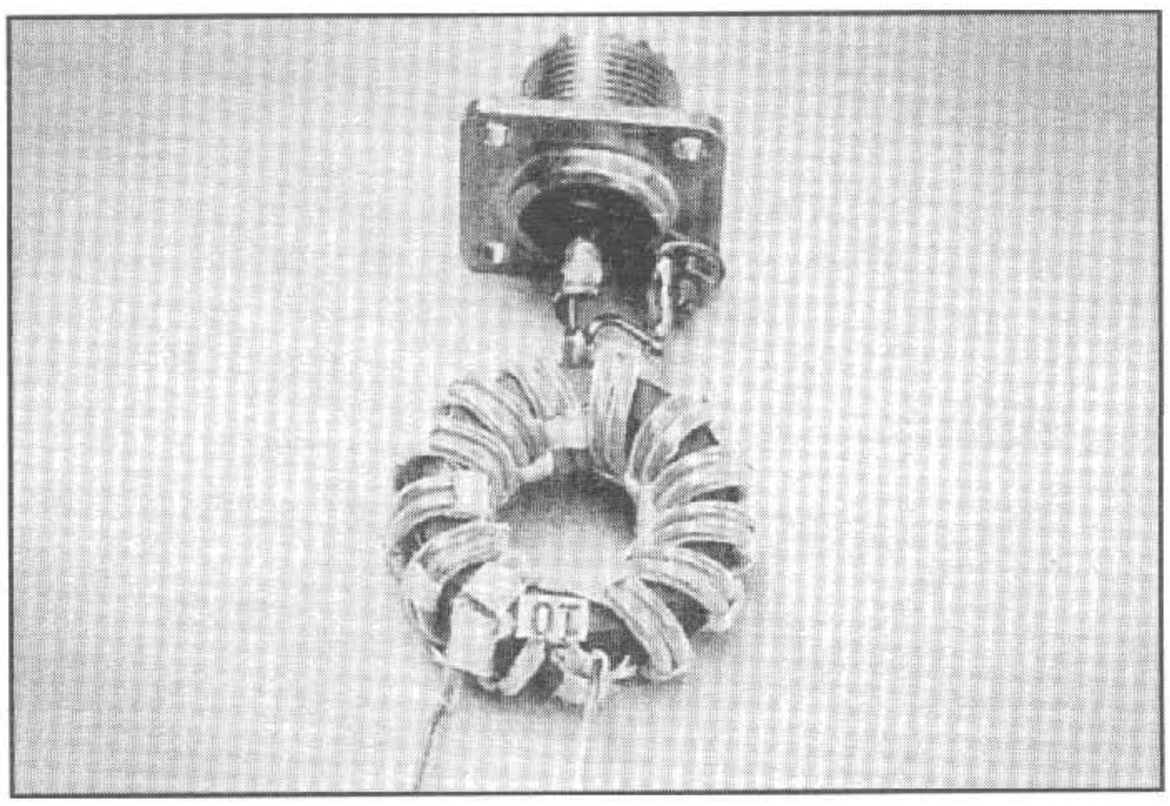

Figure 2 - A view of the high power and broadband W2FMI-4:1-LB200 transformer.

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A) Description

The W2FMI-6:1-LB300 is a low-power, compound-balun transmission line transformer designed to match 50-ohm coaxial cable to a balanced load of 300 ohms. It consists of a 1:1.5 unun (50:75-ohm) in series with a 1:4 (75:300-ohm) Guanella balun. In matching 50 ohms to 300 ohms, the impedance transformation ratio is constant from from 1.7MHz to 45MHz. The power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 97 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of the highly-efficient and broadband balun. The 1:1.5 unun on the left has six quintufilar turns on an Amidon PN FT-125-K. The top winding in Figure 1 is No. 16 Formvar SF wire. The other four are No. 18 Formvar SF wire. The 1:4 balun, on the right, has eight bifilar turns (each) on a 1.75-inch OD ferrite with a permeability in the 250 to 300 range. The wires (which are actually hook-up wires) have a 12-mil coating on No. 19 gauge wire. They are further separated by a 50-mil OD Teflon tubing. The characteristic impedance of the windings is 150 ohms.

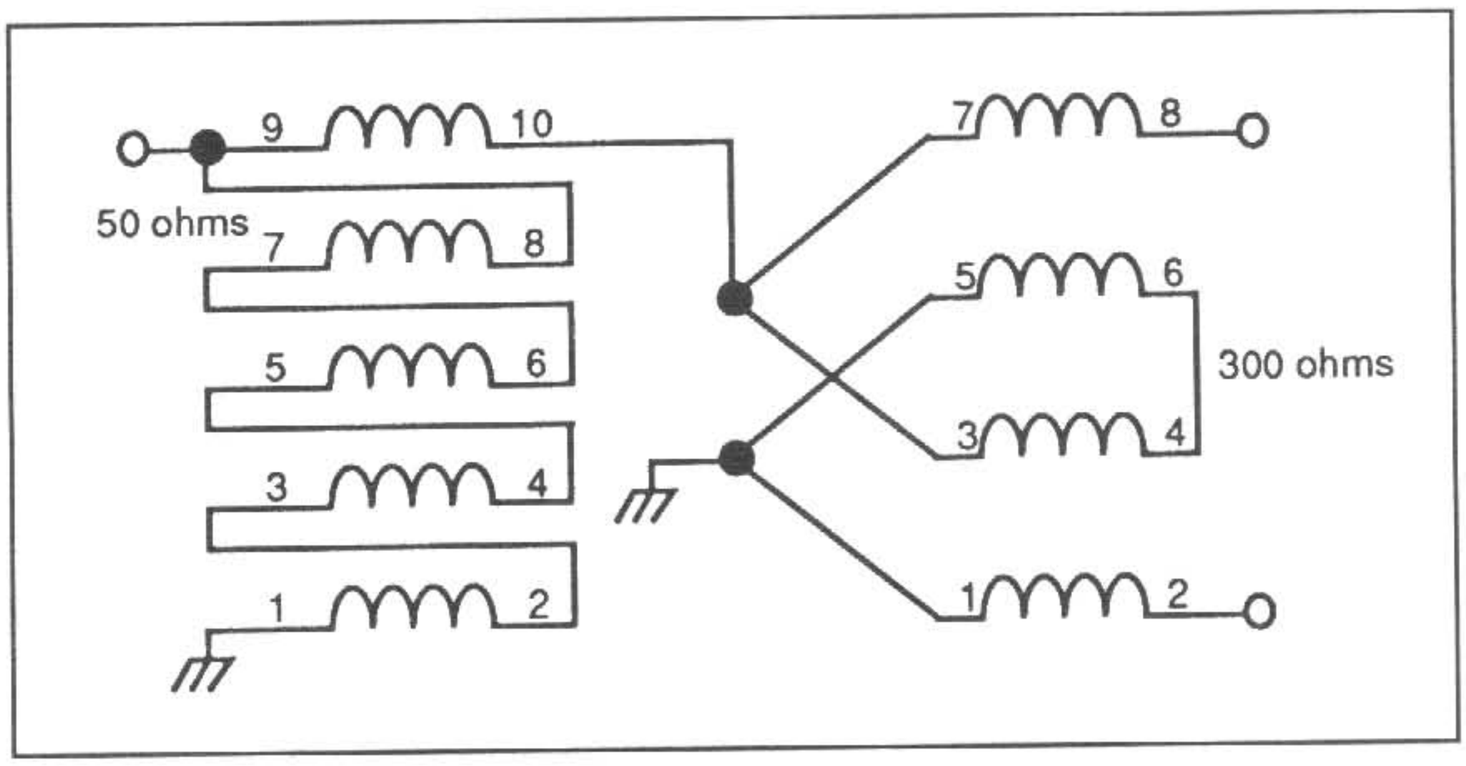

Figure 1. Schematic diagram of the compound-balun transformer with a 1:1 ratio designed to match 50 ohms to 300 ohms

C) Photograph

A view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections.

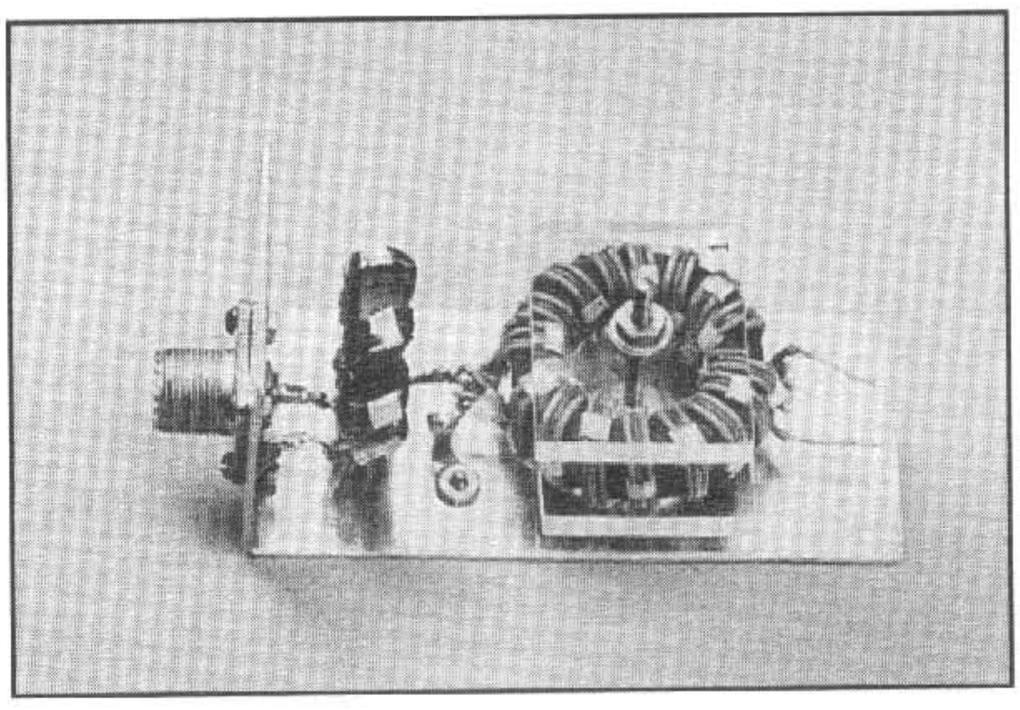

Figure 2 - A view of the low-power and broadband W2FMI-6:1-LB300 compound-balun transformer.

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W2FMI-9:1-LB450

A) Description

The W2FMI-9:1-LB450 is a low-power balun designed to match 50-ohm coaxial cable to a balanced load of 450 ohms. It uses the Guanella approach of connecting transmission line in a series-parallel arrangement such that in-phase voltages are summed at the high-impedance side. At the 50:450-ohm impedance level, the response is flat from 1.7MHz to 45MHz. The power rating is 150 Watts of continuous power and 300 Watts of peak power. The efficiency is 97 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this efficient and broadband balun. It consists of fifteen bifilar turns on each of the three 1.75-inch OD ferrites with a permeability in the 250 to 300 range. The wires (which are actually hook-up wires) have a 12-mil coating. They are further separated by a 50-mil OD Teflon tubing. The characteristic impedance of the windings is 150 ohms.

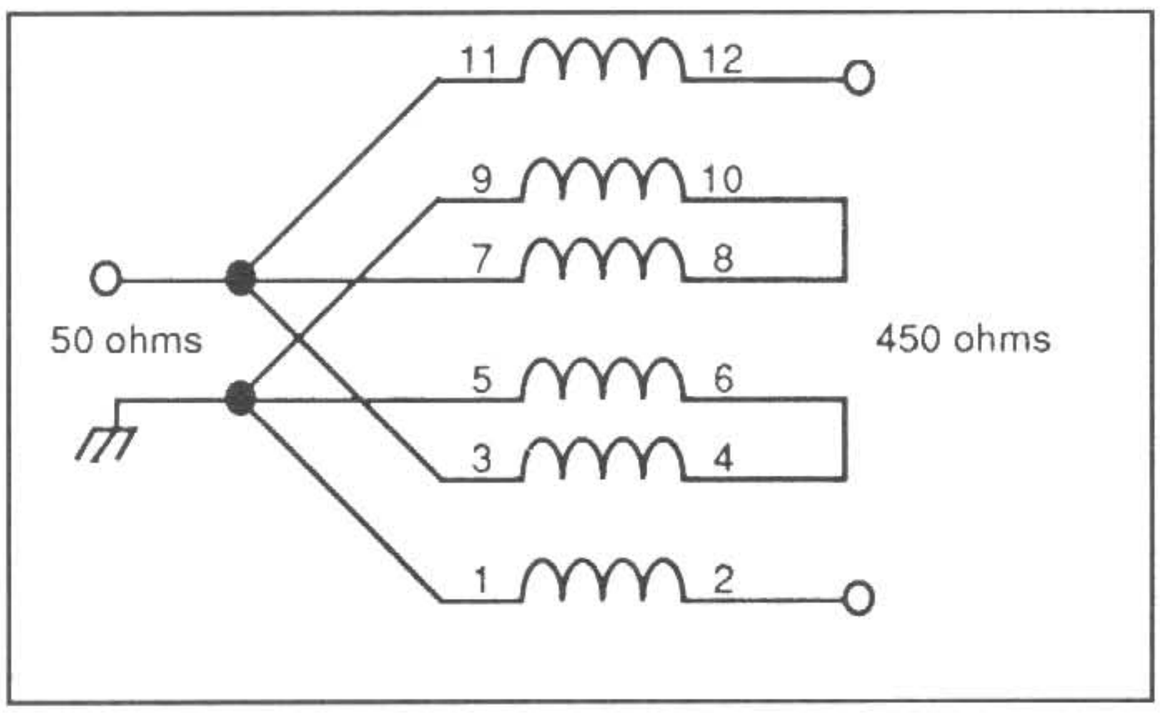

Figure 1. Schematic diagram of the Guanella balun transformer designed to match 50 ohms to 450 ohms

C) Photograph

A view of the transformer (before mounting) is shown in Figure 2. The photograph attempts to show the various connections.

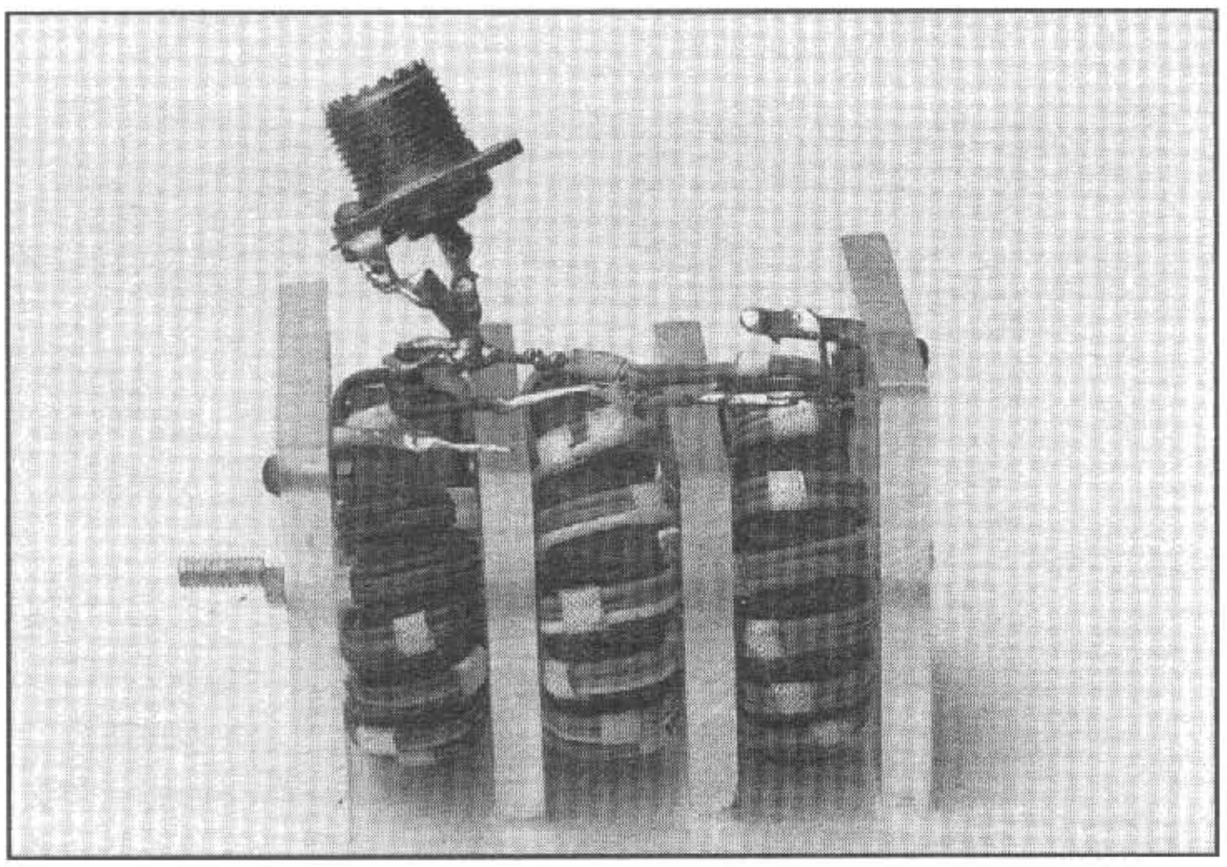

Figure 2 - A view of the high power and broadband W2FMI-9:1-LB450 balun transformer.

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