

A) Description

The W2FMI-2:1-HU50 is a high-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 25 ohms. It has a constant impedance transformation ratio of 2:1 from 1MHz to 30MHz. A conservative power rating is 1KW of continuous power and 2KW 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 trifilar turns of NO. 14 H. Thermalze SF wire are wound on an Amidon FT-150-K. The center winding in Figure 1 is tapped at 5 turns from terminal 3.

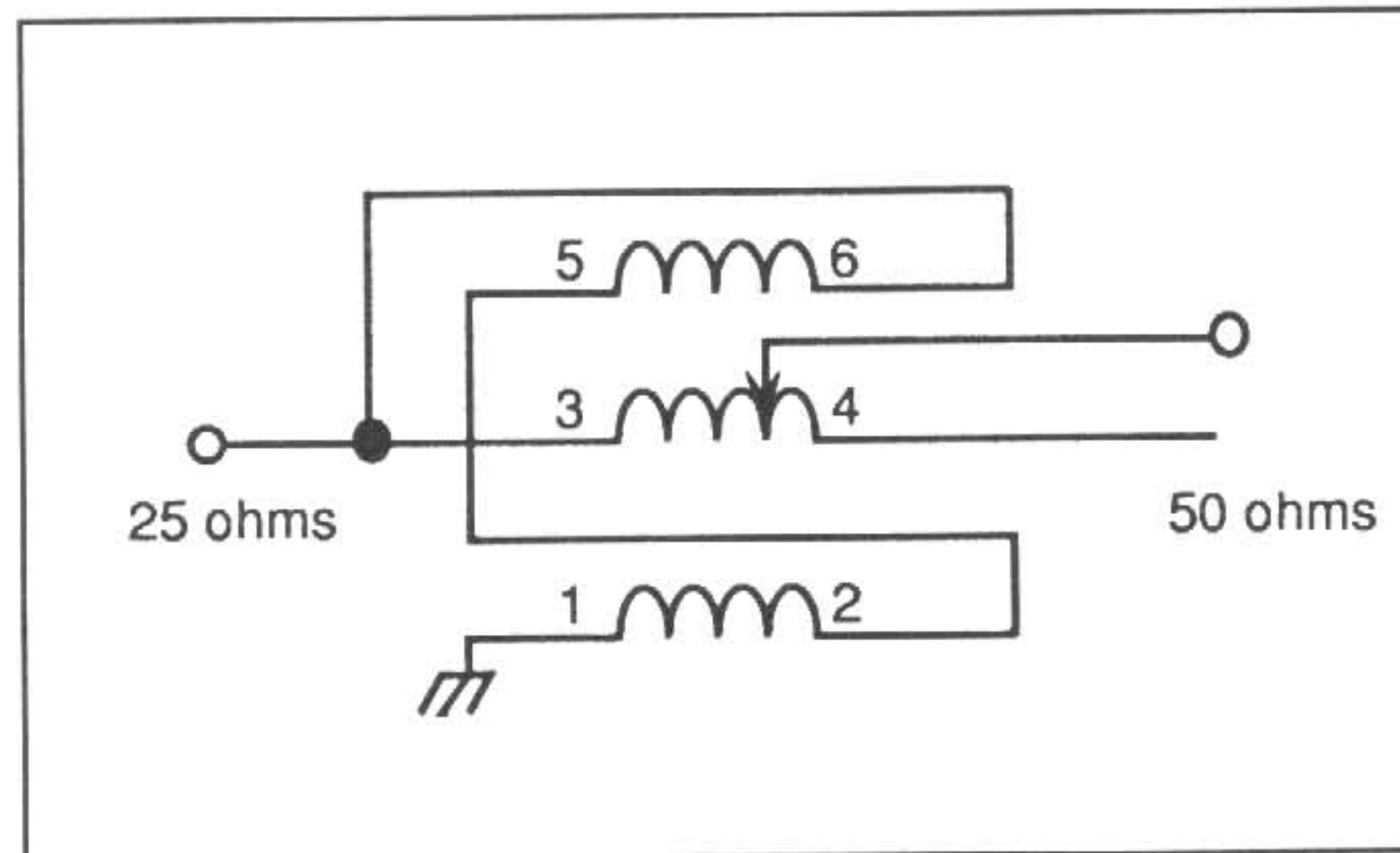


Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 50 ohms to 25 ohms

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.

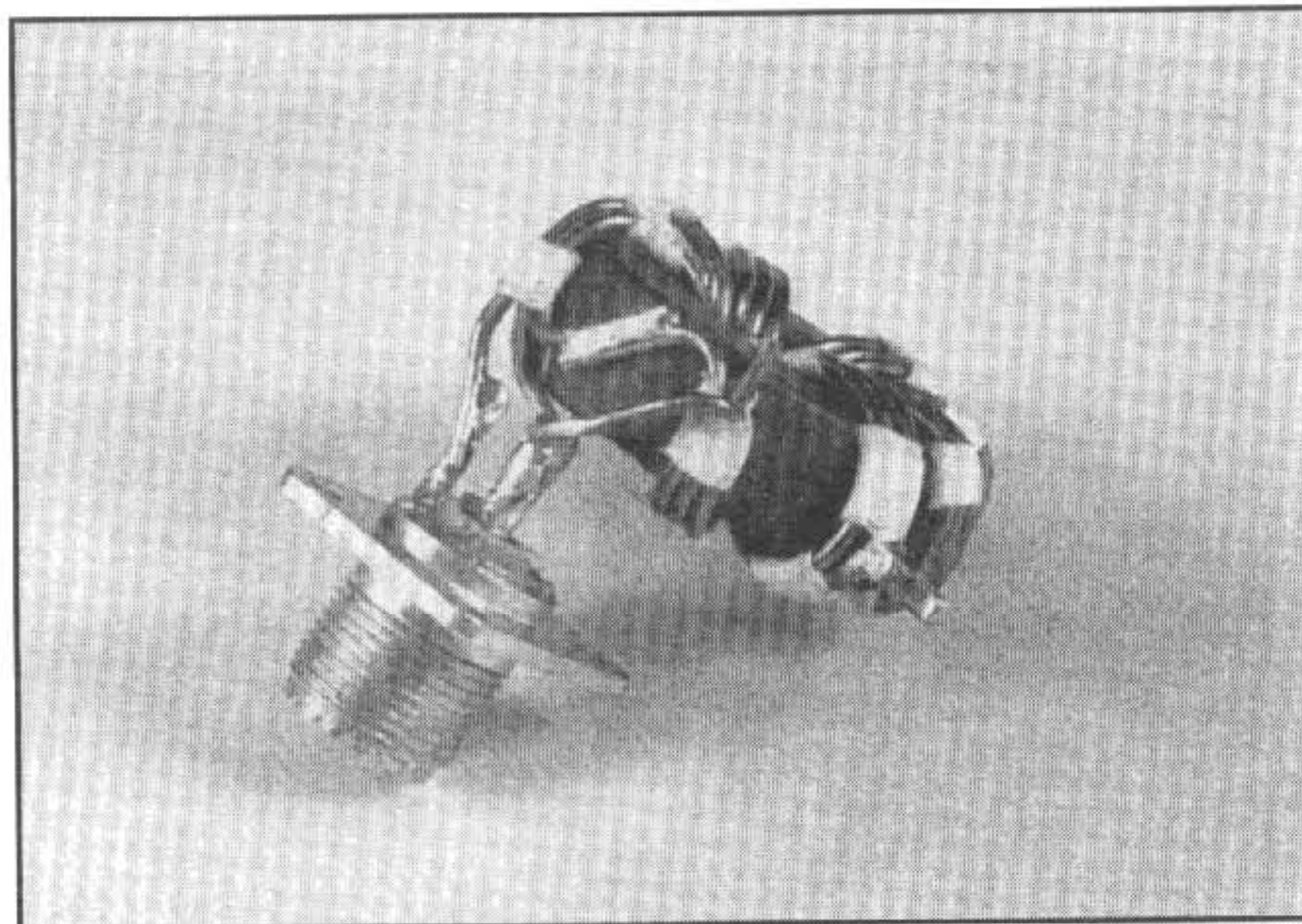


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-2:1-HU50 transformer.

A) Description

The W2FMI-1.78:1-HU50 is a high-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 28 ohms. This 1.78:1 ratio should satisfy many of the 2:1 requirements. This is especially true with antennas since their impedances vary with frequency. Only a small difference (from a 2:1 ratio) in the frequency of the best match-point (lowest VSWR) will be observed. Also, there should be very little difference in the values of the VSWRs. This very broadband transformer has a constant impedance transformation of 1.78:1 from 1MHz to 50MHz! It should find many applications. The power rating is 1KW of continuous power and 2KW 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 quadrifilar turns are wound on an Amidon PN FT-150-K. Winding 5-6 is No. 14 H. Thermaleze. The other three are No. 16 H. Thermaleze.

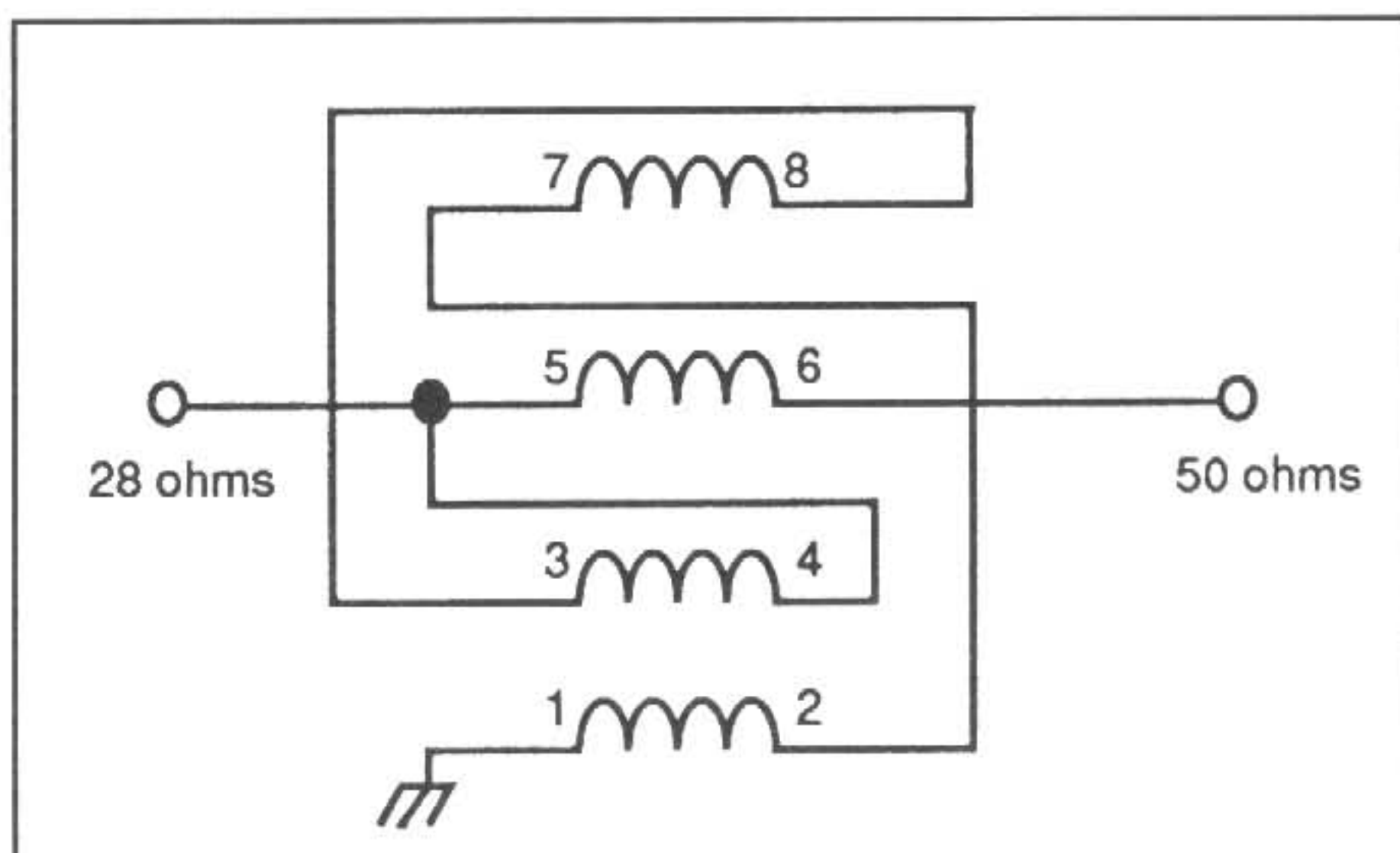


Figure 1. Schematic diagram of the quadrifilar UNUN transformer designed to match 50 ohms to 25 ohms

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.

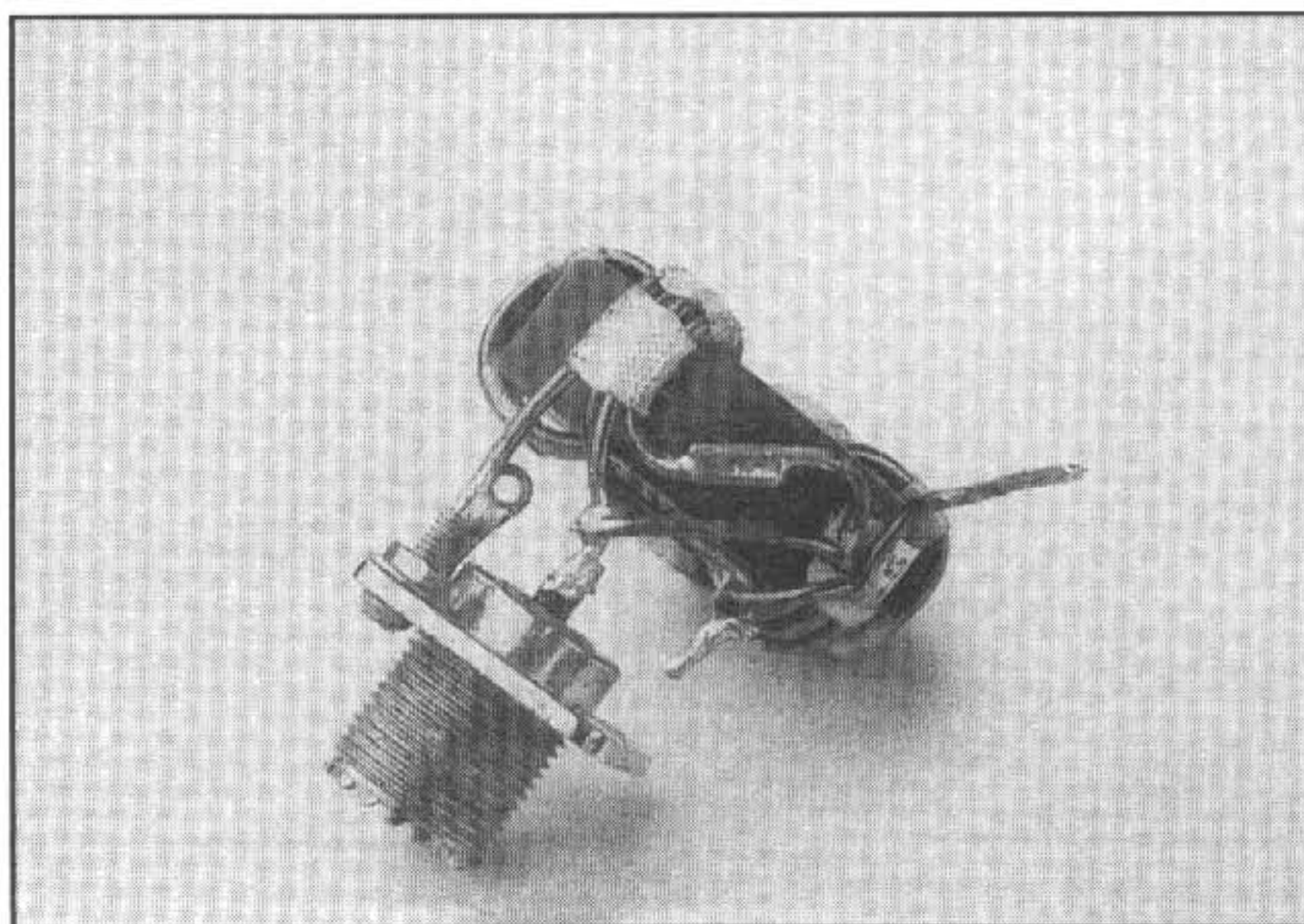


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-1.78:1-HU50 transformer.

A) Description

The W2FMI-2:1-HDU50 is a high-power, dual-output unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 22.22 ohms or 25 ohms. In matching 50 ohms to 22.22 ohms, the impedance transformation ratio is constant from 1MHz to 40MHz. In matching 50 ohms to 25 ohms, it is constant from 1MHz to 30MHz. A conservative power rating is 1KW of continuous power and 2KW 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 trifilar turns of NO. 14 H. Thermaleze wire are wound on an Amidon PN FT-150-K. The center winding in Figure 1 is tapped at 5 turns from terminal 3 yielding the 2:1 ratio (connection A). With connection B, the ratio is 2.25:1.

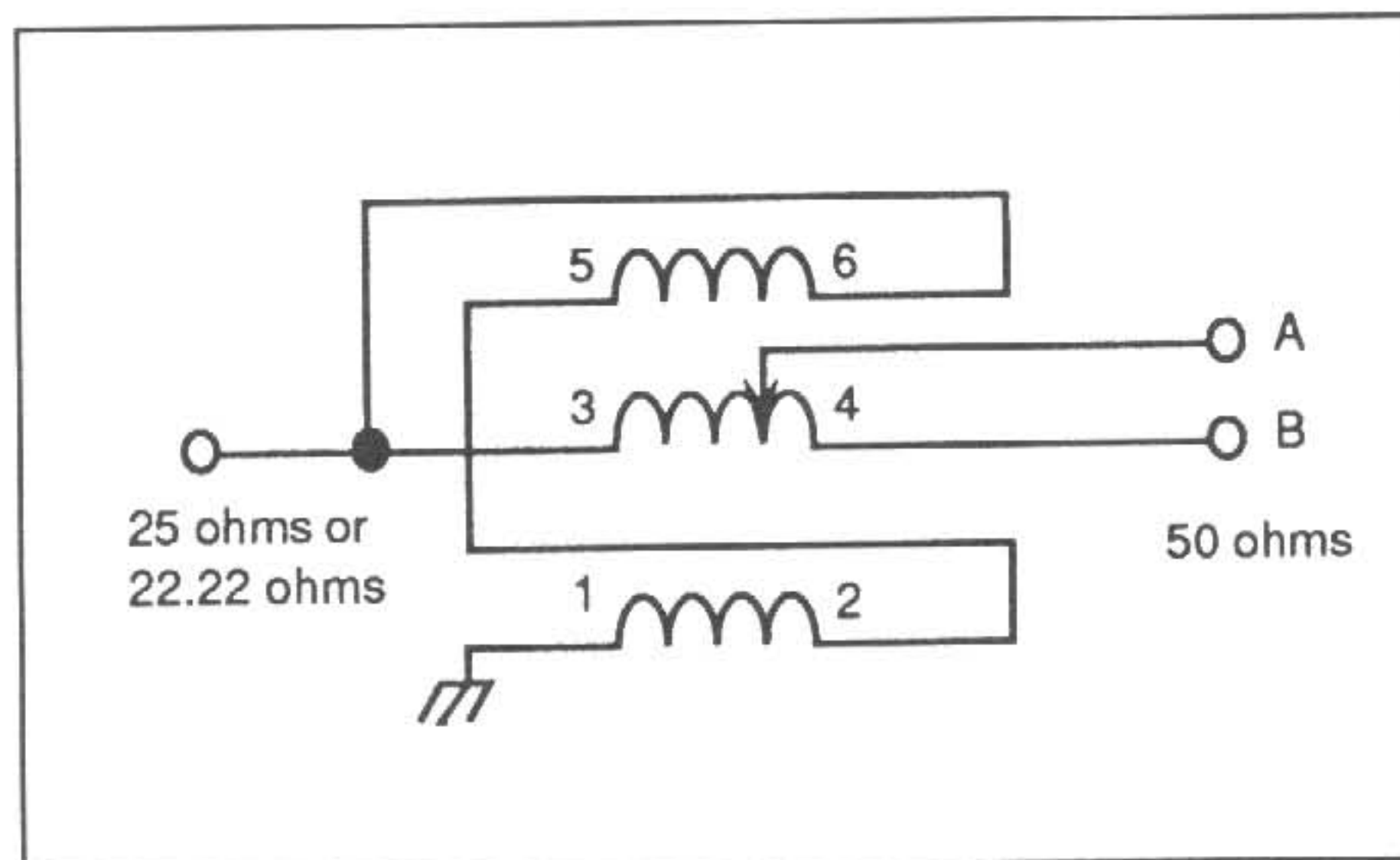


Figure 1. Schematic diagram of the trifilar dual-output UNUN transformer. A connection of 50 ohms to A yields a 2:1 ratio. A connection to B yields a 2.25:1 ratio.

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.

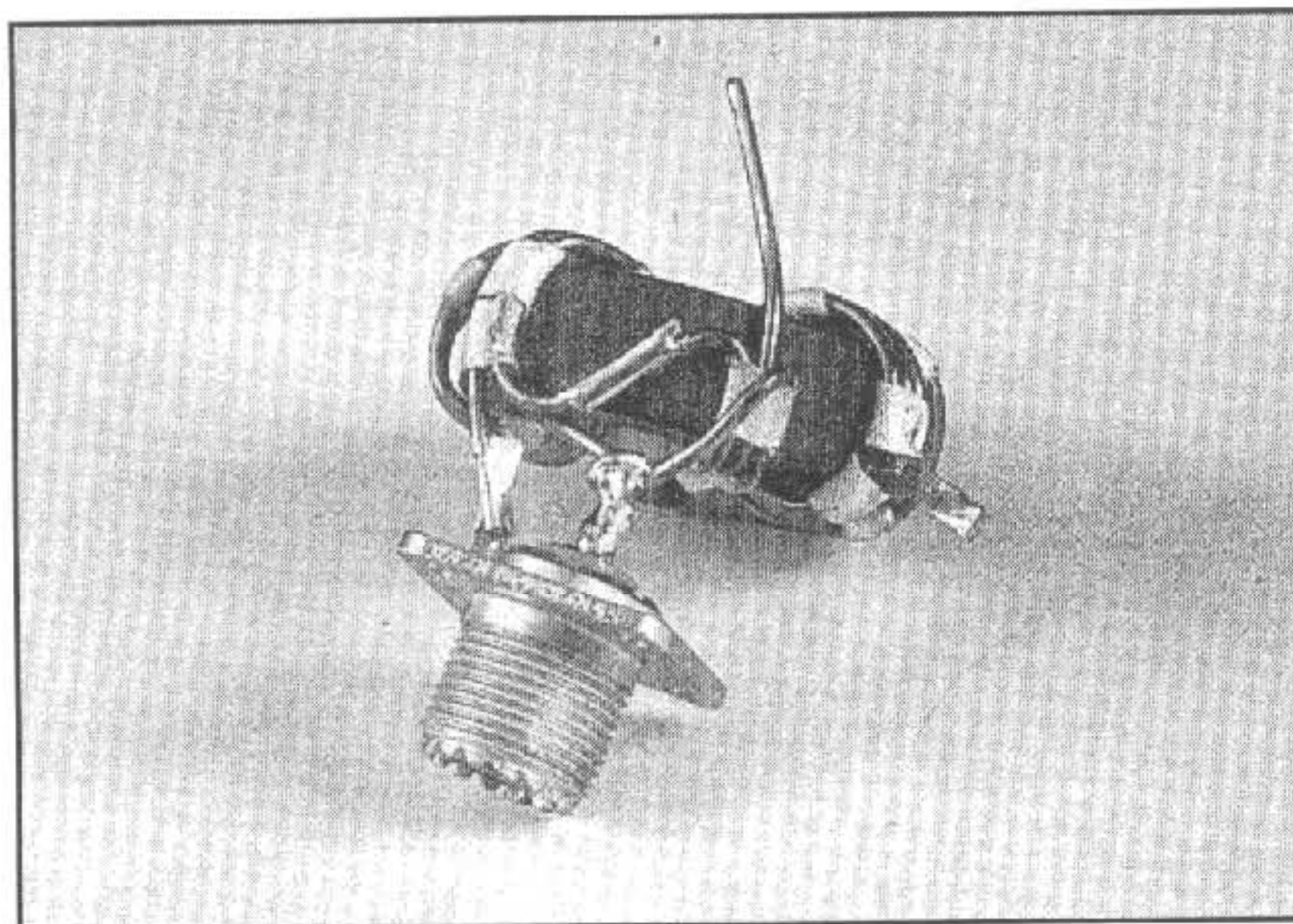


Figure 2 - Bottom-view of the highly efficient and broadband dual-output W2FMI-2:1-HDU50 transformer.

A) Description

The W2FMI-2.25:1-HU112.5 is a high-power unun (unbalanced-to-unbalanced) transformer designed to match 112.5 ohms to 50 ohms. It has a constant impedance transformation ratio of 2.25:1 from 1MHz to 40MHz. A conservative power rating is 1KW of continuous power and 2KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Seven trifilar turns are wound on an Amidon PN FT-150-K. The top winding in Figure 1 is No. 14 H. Thermaleze wire. It also has two layers of Scotch No. 92 tape. The other two windings are No. 16 H. Thermaleze wire. The thick coatings (1.6 mils) of H. Thermaleze wire, as well as the two layers of Scotch No. 92 tape on the top winding in Figure 1, are needed for optimizing the characteristic impedance of the windings. This transformer also has a very high-voltage capability.

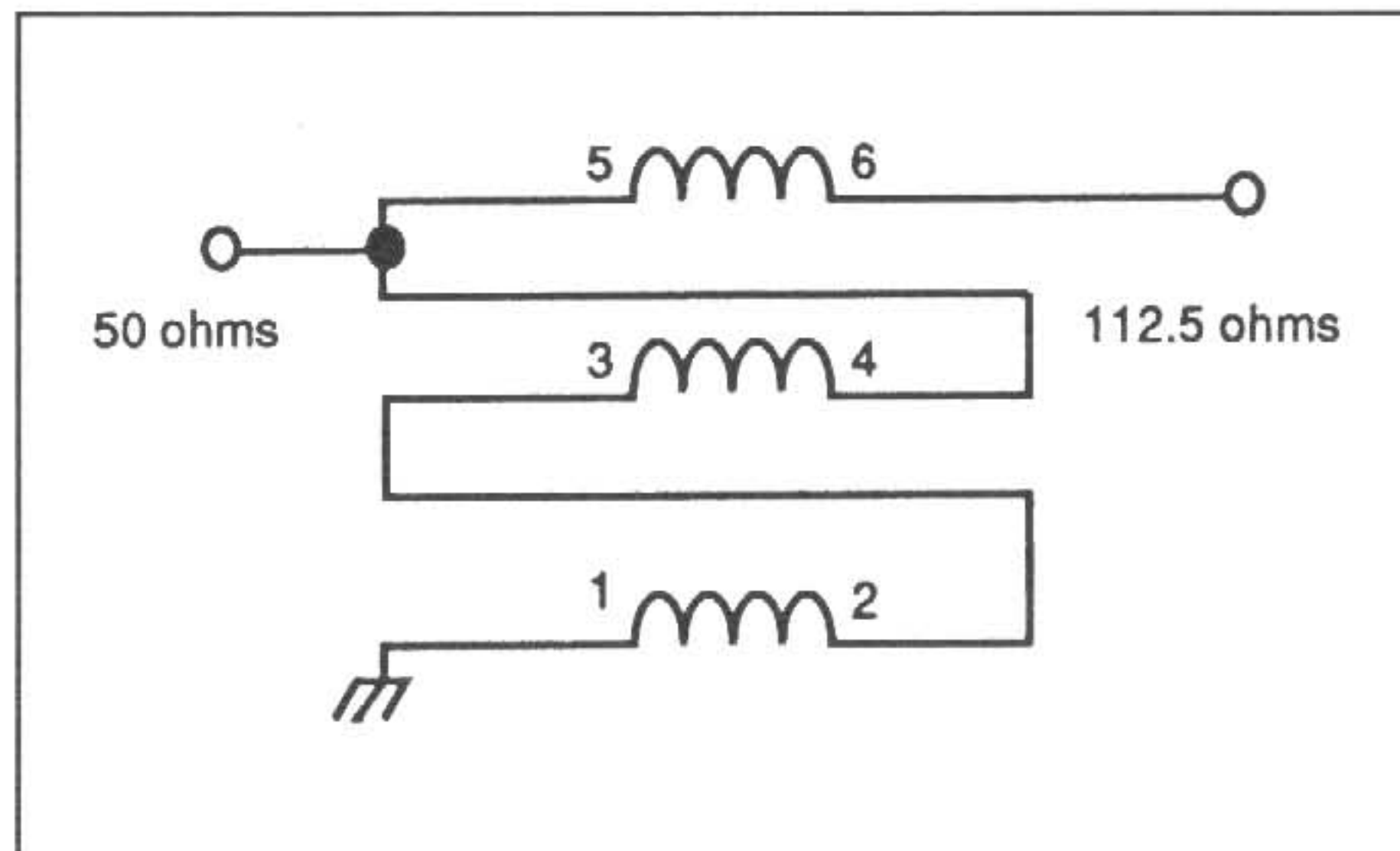


Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 112.5 ohms to 50 ohms

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.

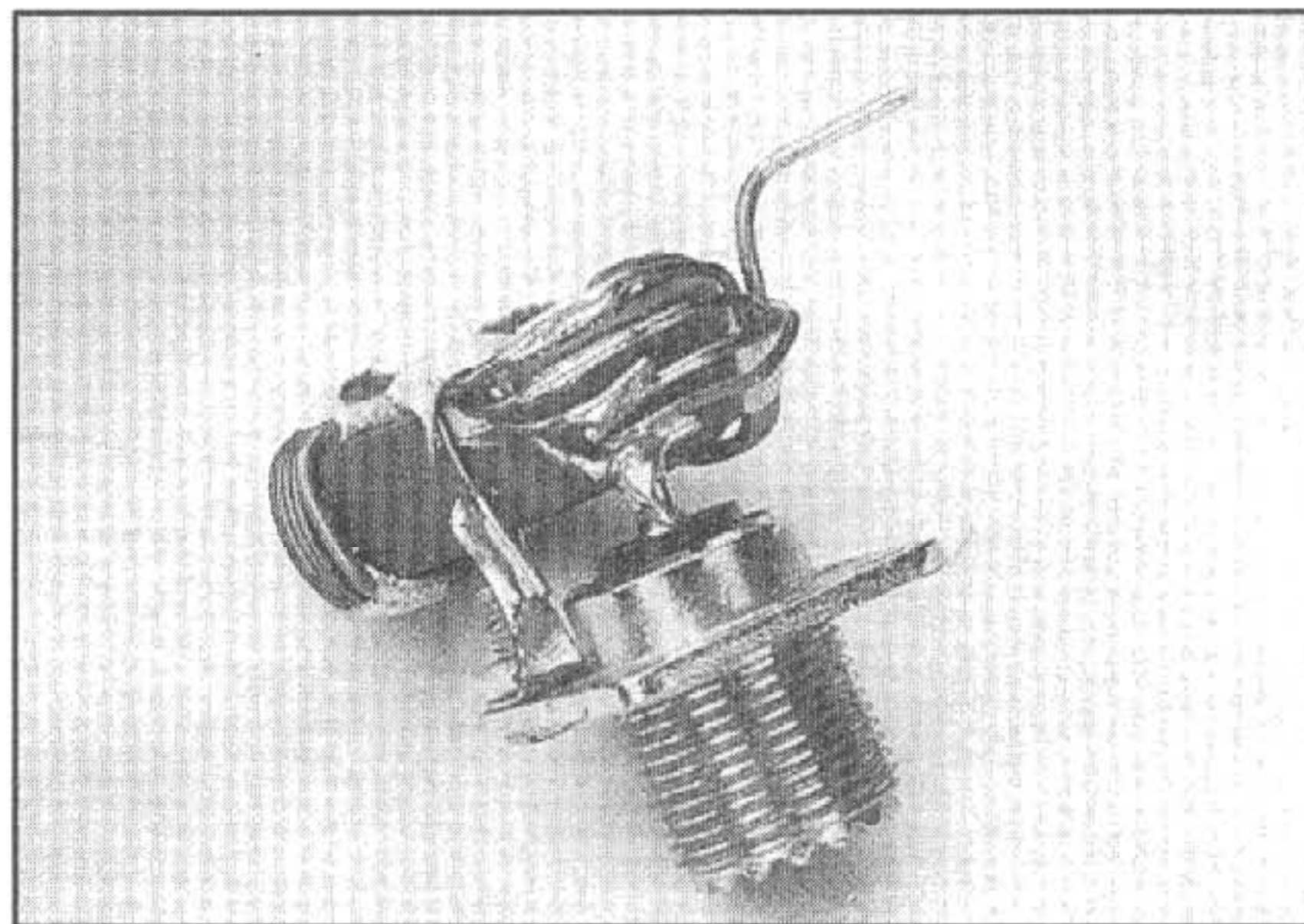


Figure 2 - Bottom view of the highly efficient and broadband W2FMI-2.25:1-HU112.5 transformer.

A) Description

The W2FMI-2:1-HU100 is a high-power unun (unbalanced-to-unbalanced) transformer designed to match 100 ohms to 50 ohms. It has a constant impedance transformation ratio of 2:1 from 1MHz to 30MHz. A conservative power rating is 1KW of continuous power and 2KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Seven trifilar turns are wound on an Amidon PN FT-150-K. The top winding in Figure 1 is No. 14 H. Thermaleze wire and it has two layers of Scotch No. 92 tape. It is also tapped at 6 turns from terminal 5 (in Figure 1) yielding the 2:1 ratio. The other two windings are No. 16 H. Thermaleze wire. The thick coatings (1.6 mils) of H. Thermaleze wire, as well as the two layers of Scotch No. 92 tape on the top winding are needed for optimizing the characteristic impedance of the windings. This transformer also has a very high-voltage capability.

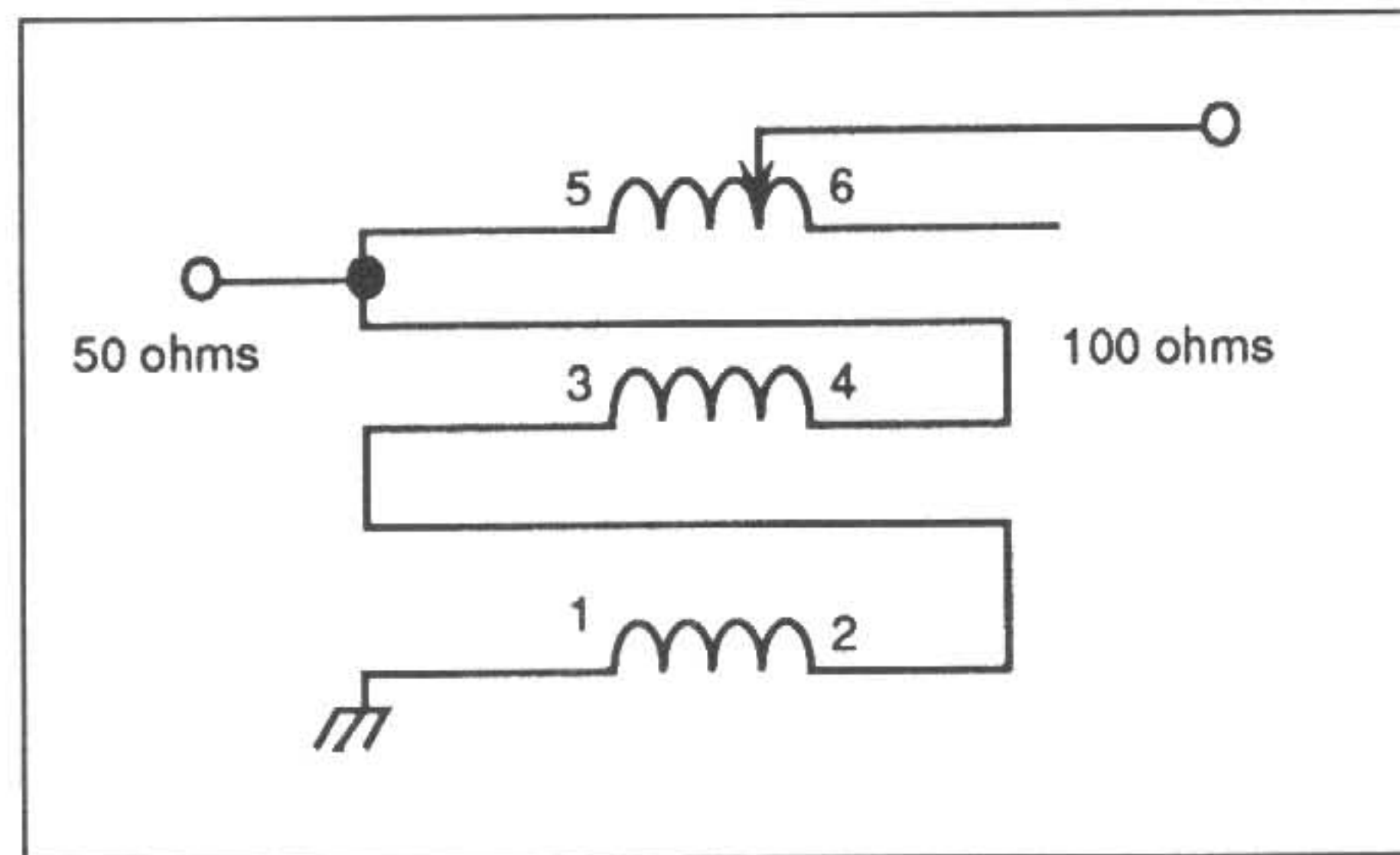


Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 100 ohms to 50 ohms

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.

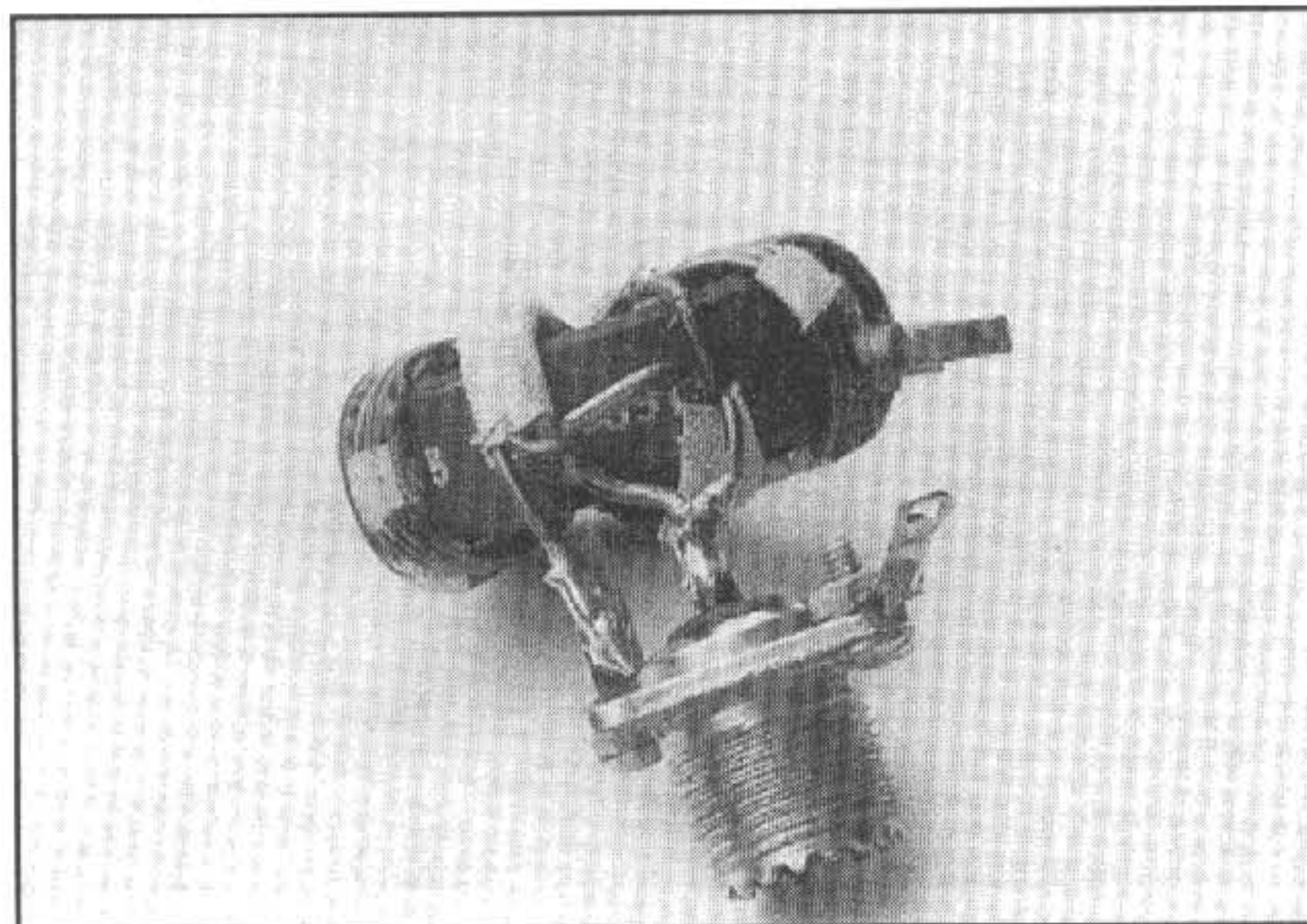


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-2:1-HU100 transformer.

A) Description

The W2FMI-2:1-HDU100 is a high-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 40MHz. In matching 100 ohms to 50 ohms, it is constant from 1 MHz to 30MHz. The power rating is 1KW of continuous power and 2KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Seven trifilar turns are wound on an Amidon PN FT-150-K. The top winding in Figure 1 is No. 14 Formvar SF wire and it has two layers of Scotch No. 92 tape. It is also tapped at 6 turns from terminal 5 yielding the 2:1 ratio (connection A). With connection B, the impedance ratio is 2.25:1. The other two windings in Figure 1 are No. 16 Formvar SF wire. The thick coatings of H. Thermaleze wire, as well as the two layers of Scotch No. 92 tape on the top winding are needed for optimizing the characteristic impedance of the windings. This transformer also has a very high-voltage breakdown.

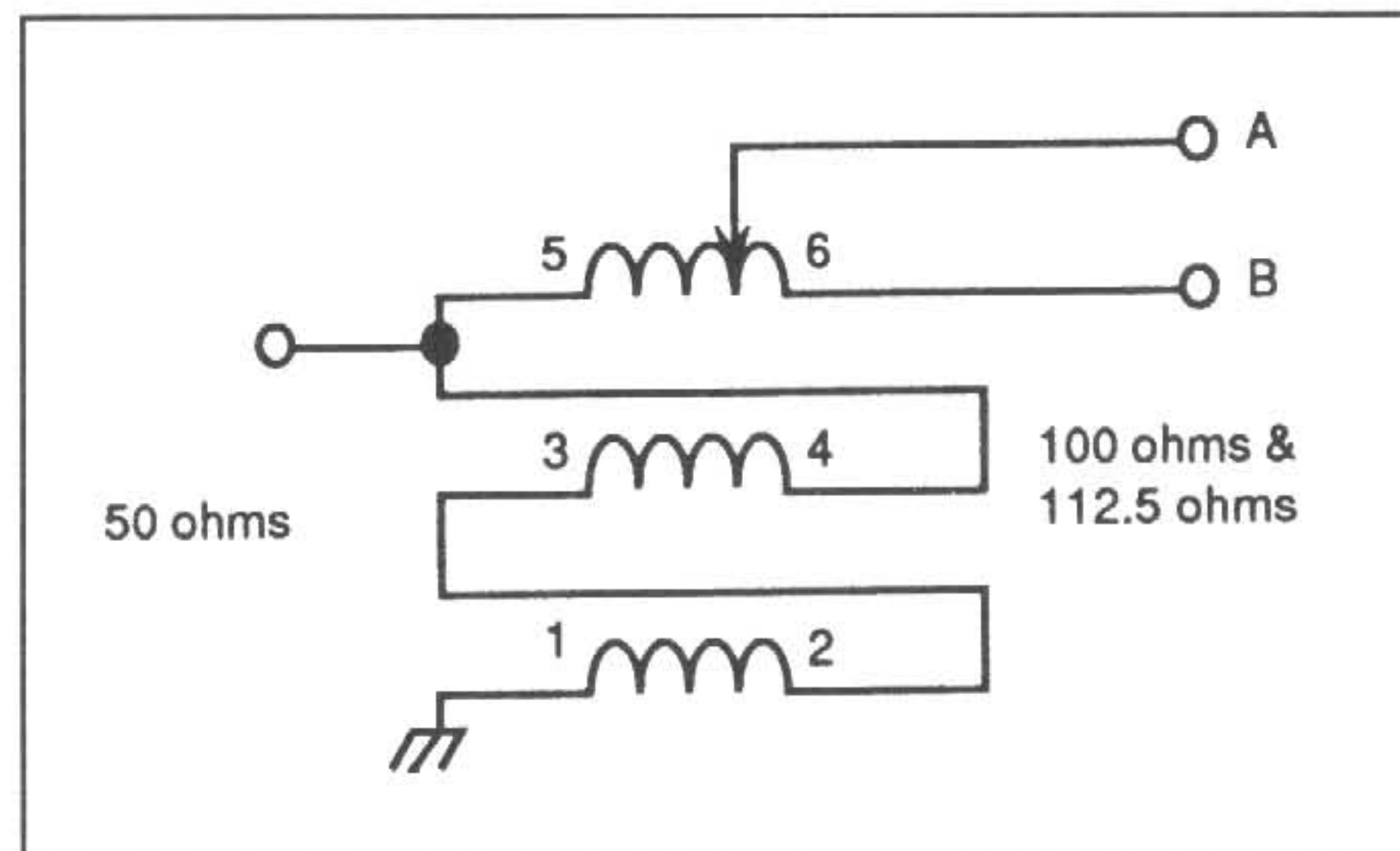


Figure 1. Schematic diagram of the trifilar dual-output UNUN transformer designed to match 112.5 ohms or 100 ohms to 50 ohms

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.

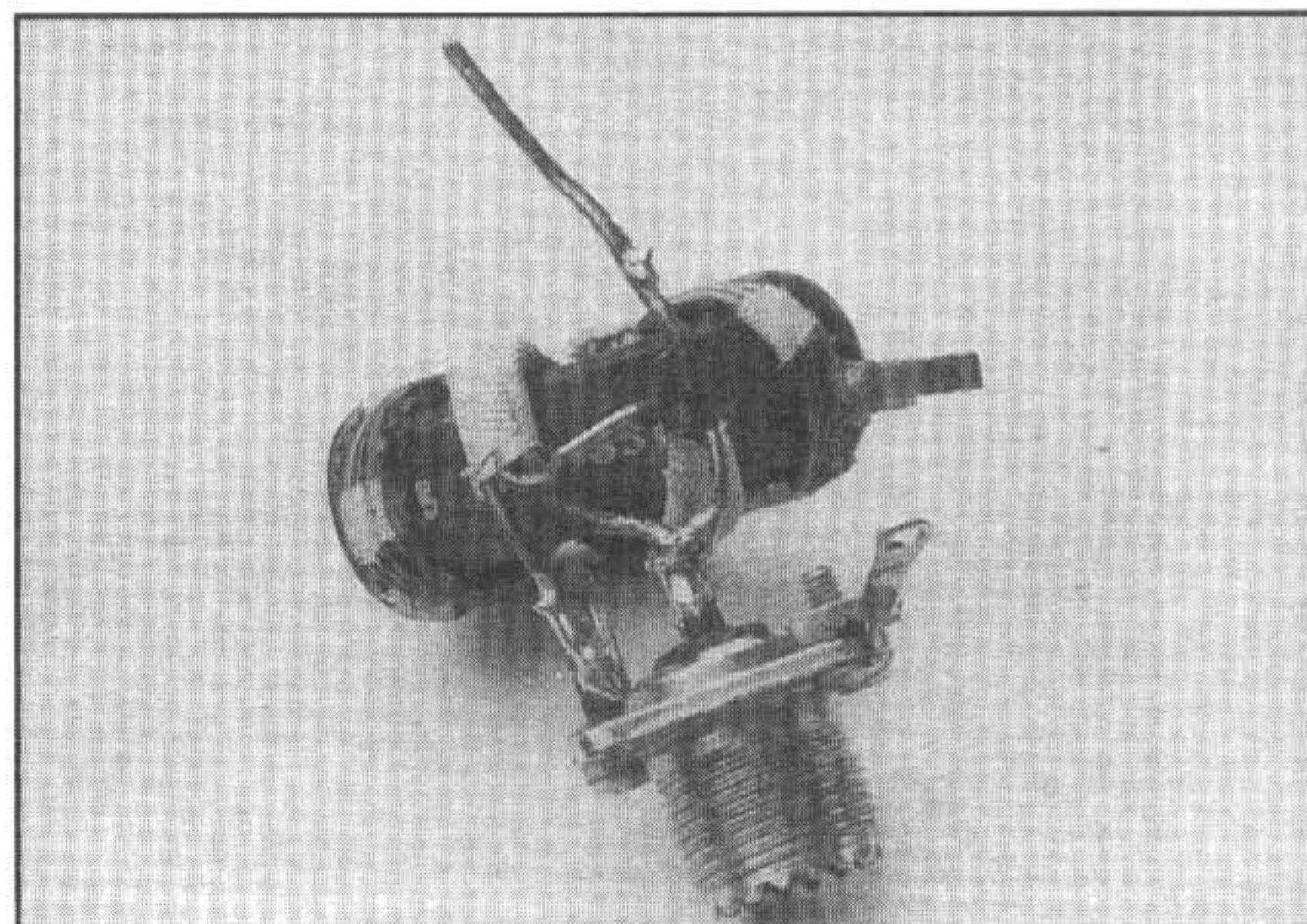


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-2:1-HDU100 transformer.

W2FMI-4:1-HRU50**A) Description**

The W2FMI-4:1-HRU50 is a high-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 a characteristic impedance of 25 ohms (which is optimum). This cannot be accomplished on a toroid! The impedance transformation ratio of 4:1 is constant from 1.5MHz to 40MHz. The power rating is 1KW of continuous power and 2KW 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 12 bifilar turns of No. 14 Formvar SF wire on an Amidon PN R61-050-400.

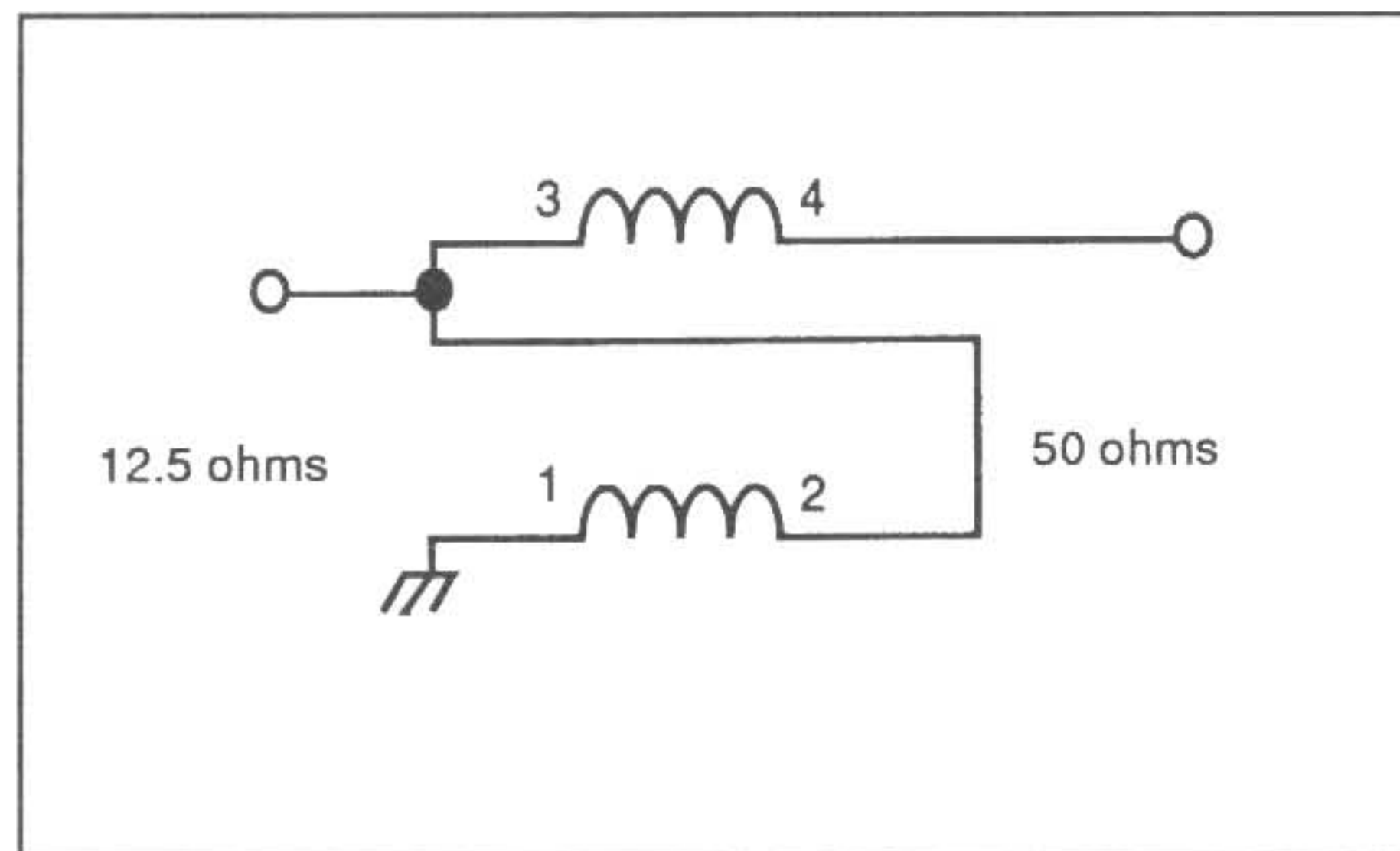


Figure 1. Schematic diagram of the Ruthroff 4:1 UNUN transformer designed to match 50 ohms to 12.5 ohms

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.

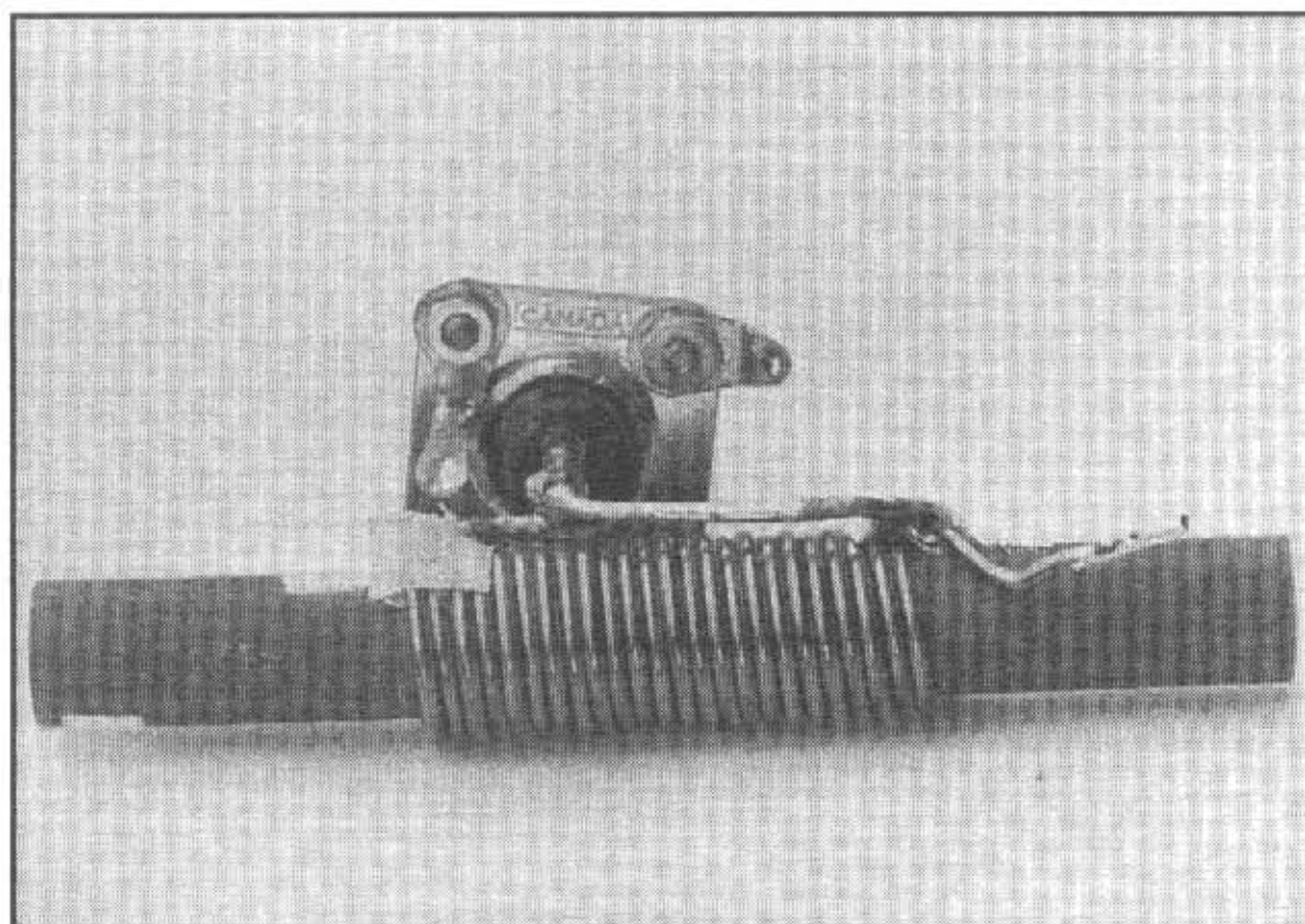


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-4:1-HRU50 transformer.

A) Description

The W2FMI-4:1-HCU50 is a very high-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 12.5 ohms. It is capable of high power levels because it uses low-impedance coaxial cable instead of wire-bifilar windings. Thus the currents are distributed more evenly about the conductors. It also has a higher frequency capability than its wire-bifilar counterpart because of less parasitic capacitance between turns. In matching 50 ohms to 12.5 ohms, this transformer has a constant impedance transformation ratio of 4:1 from 1MHz to 40MHz. Notably, the power rating is 5KW of continuous power and 10KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient, broadband and powerful transmission line transformer. There are six turns of low-impedance coaxial cable on an Amidon PN FT-150-K. The inner conductor is No. 14 H. Imideze wire and has six layers of Scotch No. 92 tape. The outer conductor, from RG122/U cable, is tightly wrapped with Scotch No. 92 tape. The characteristic impedance is 22 ohms. Experimentally, this is found to be the optimized characteristic impedance for low-impedance coaxial cable operating at this impedance level.

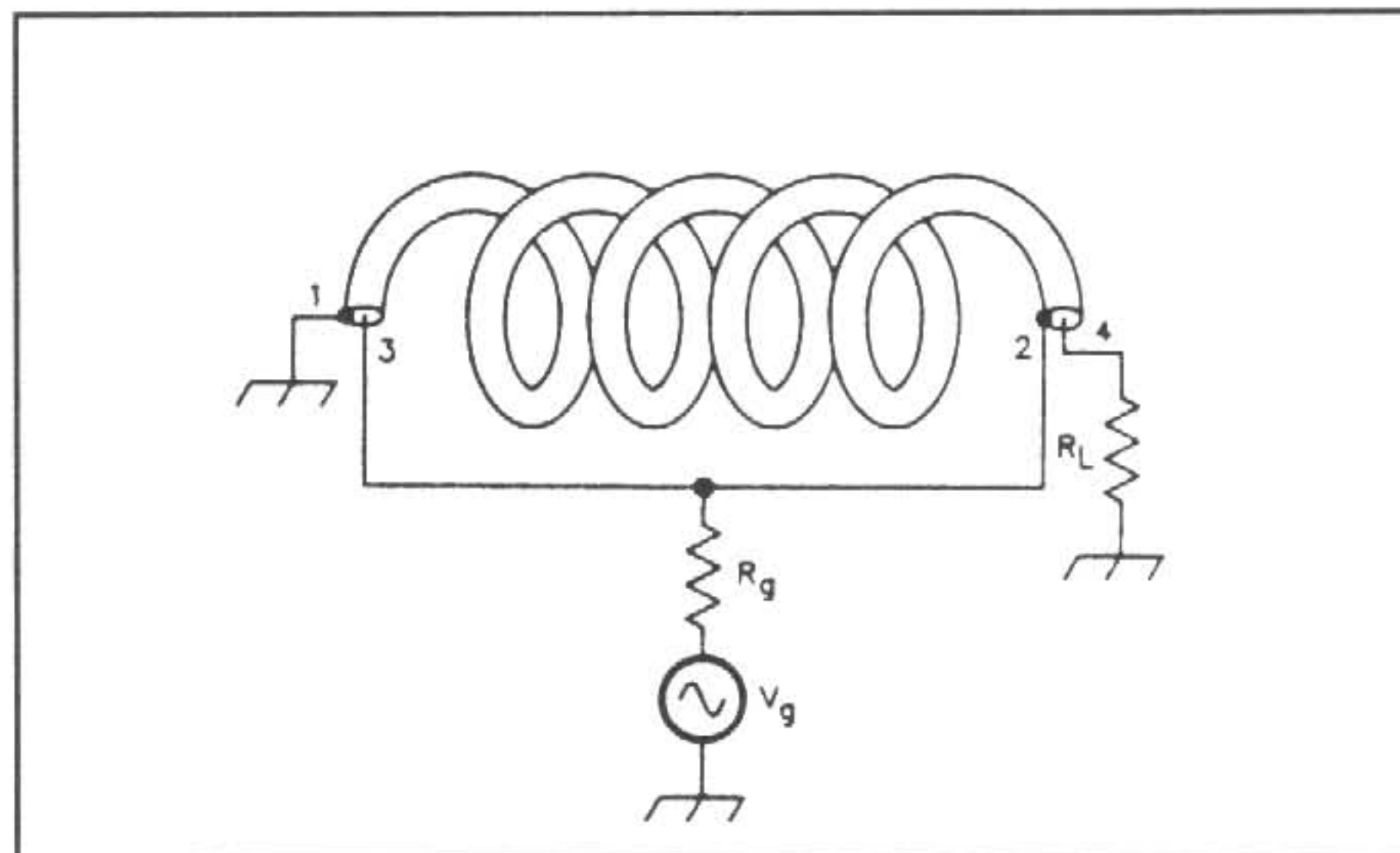


Figure 1. Schematic diagram of the coaxial cable version of the Ruthroff 4:1 UNUN transformer designed to match 50 ohms to 12.5 ohms

C) Photograph

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

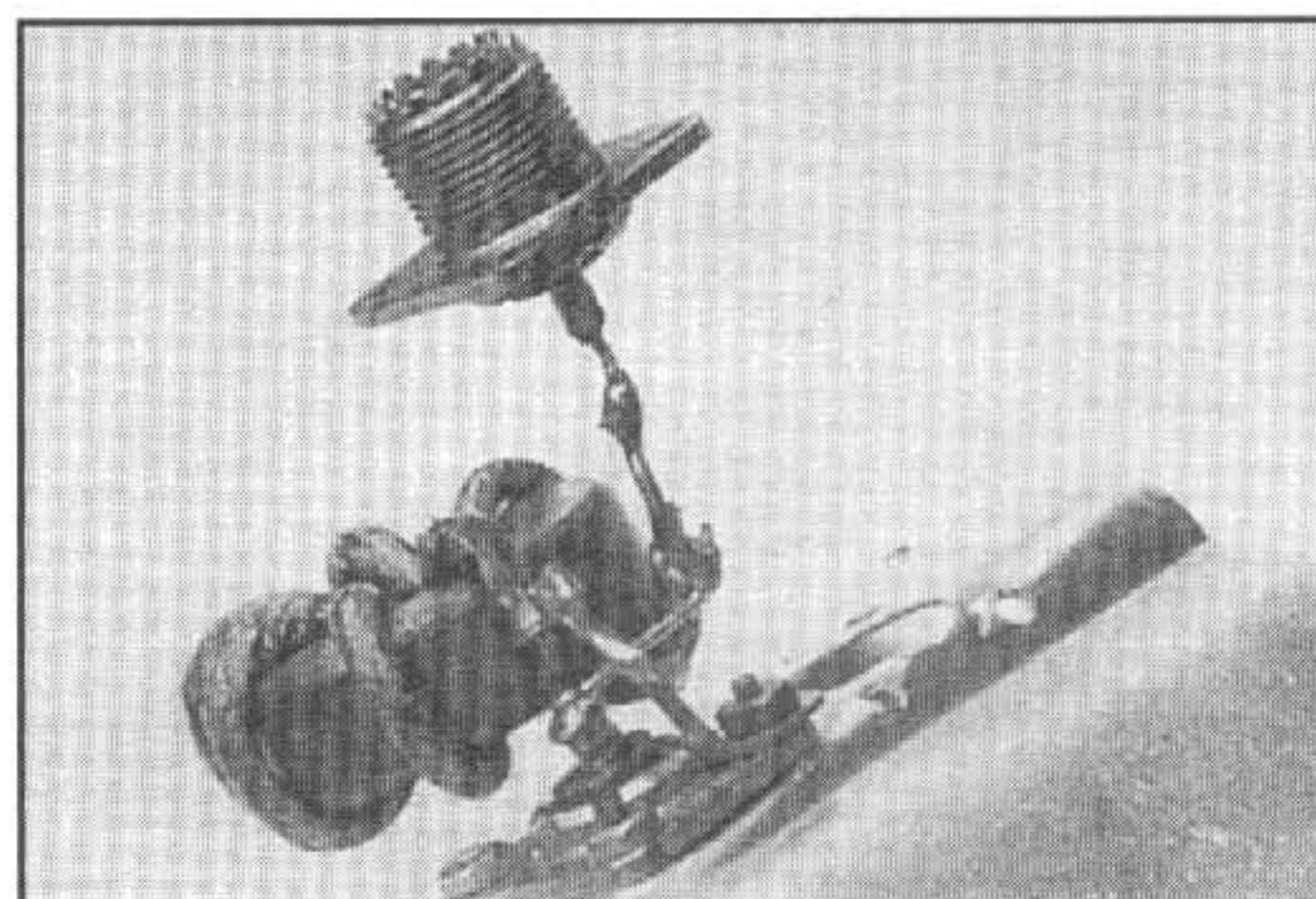


Figure 2 - Bottom-view of the highly efficient, powerful and broadband W2FMI-4:1-HCU50 transformer.

A) Description

The W2FMI-9:1-HRU50 is a high-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 5.56 ohms. It uses a rod core and a transposed winding resulting in broadband operation at the 50:5.56-ohm impedance level. At this level, the impedance transformation ratio is constant from 1MHz to 30MHz. The power rating is 1KW of continuous power and 2KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Seven trifilar turns are tightly wound on an Amidon PN R61-050-400 ferrite rod. The center winding in Figure 1 is No. 12 Formvar wire. The other two are No. 14 Formvar SF wire.

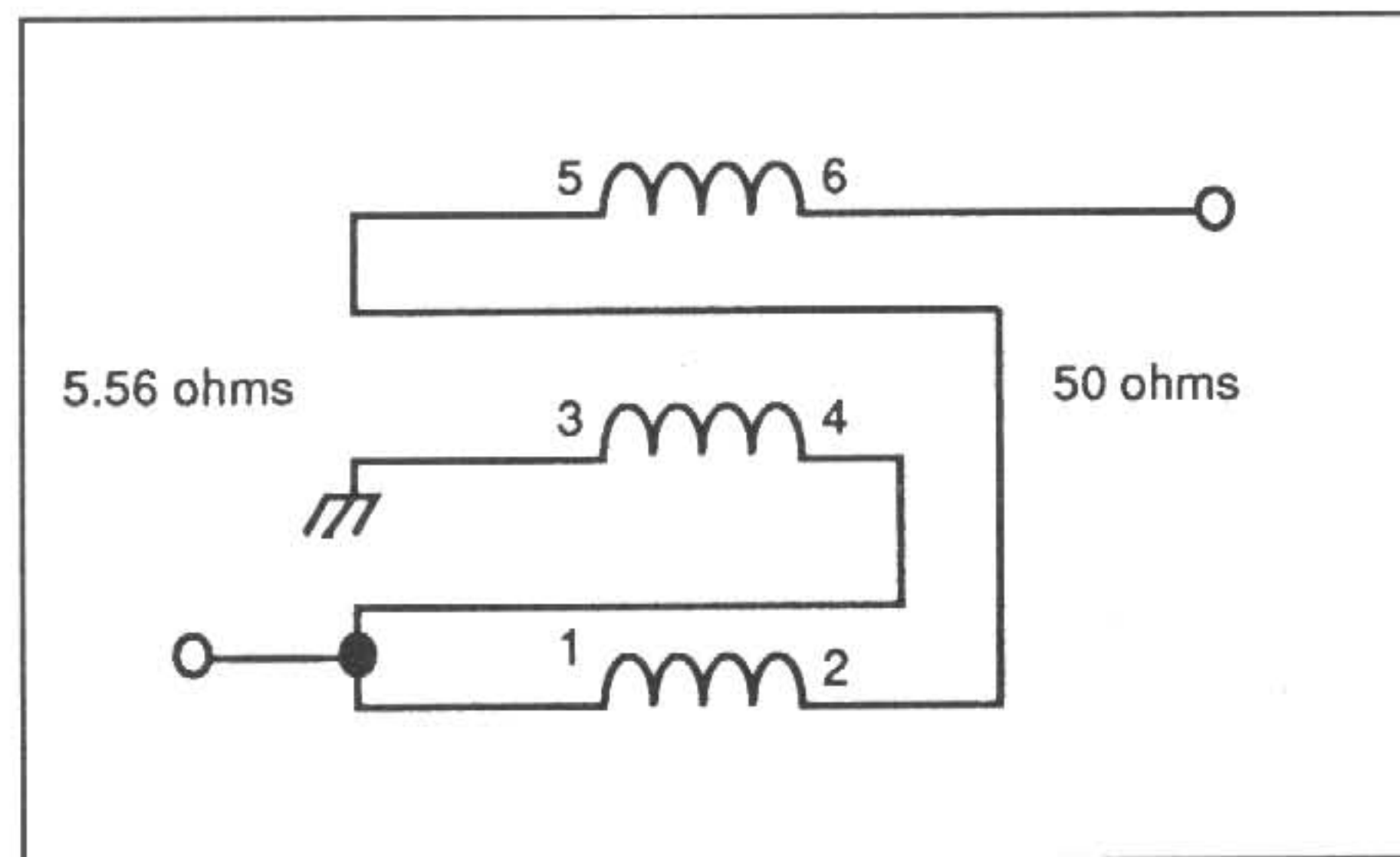


Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 50 ohms to 5.56 ohms

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.

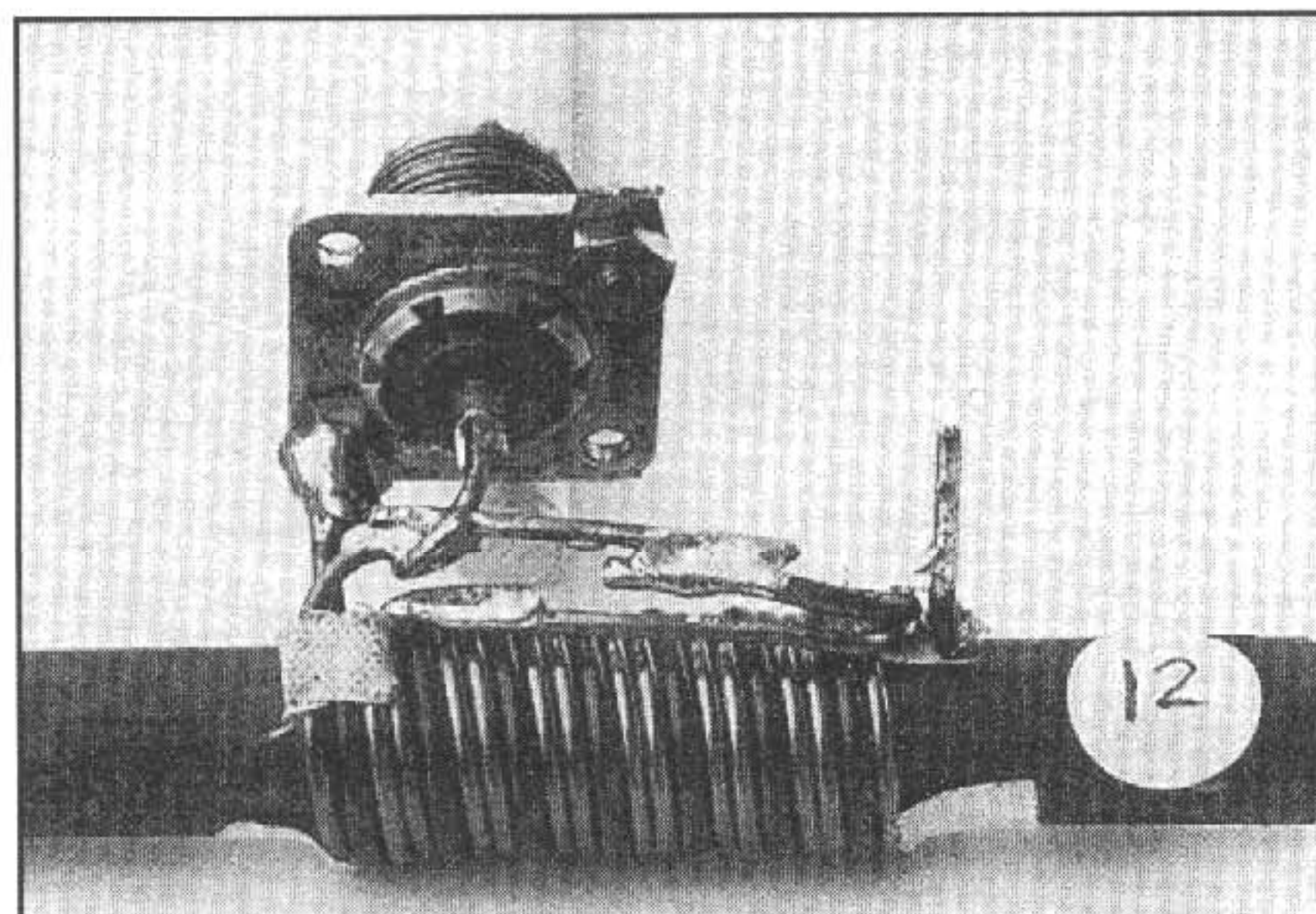


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-9:1-HRU50 transformer.

A) Description

The W2FMI-9:1-HUH50 is a very high-power unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to 5.56 ohms. It uses a toroidal core and hence requires only a few turns to satisfy the low-frequency limit. This in turn increases its power-handling capability. This transformer has a constant impedance transformation ratio from 1MHz to 30MHz. The power rating is 2KW of continuous power and 4KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of the high power, efficient and broadband transformer. There are four trifilar turns wound on an Amidon PN FT-150-K. The windings are in the "transposed" configuration which allows for better low-impedance-level operation. The center winding in Figure 1 is No. 12 Formvar. The other two are No. 14 Formvar SF wire.

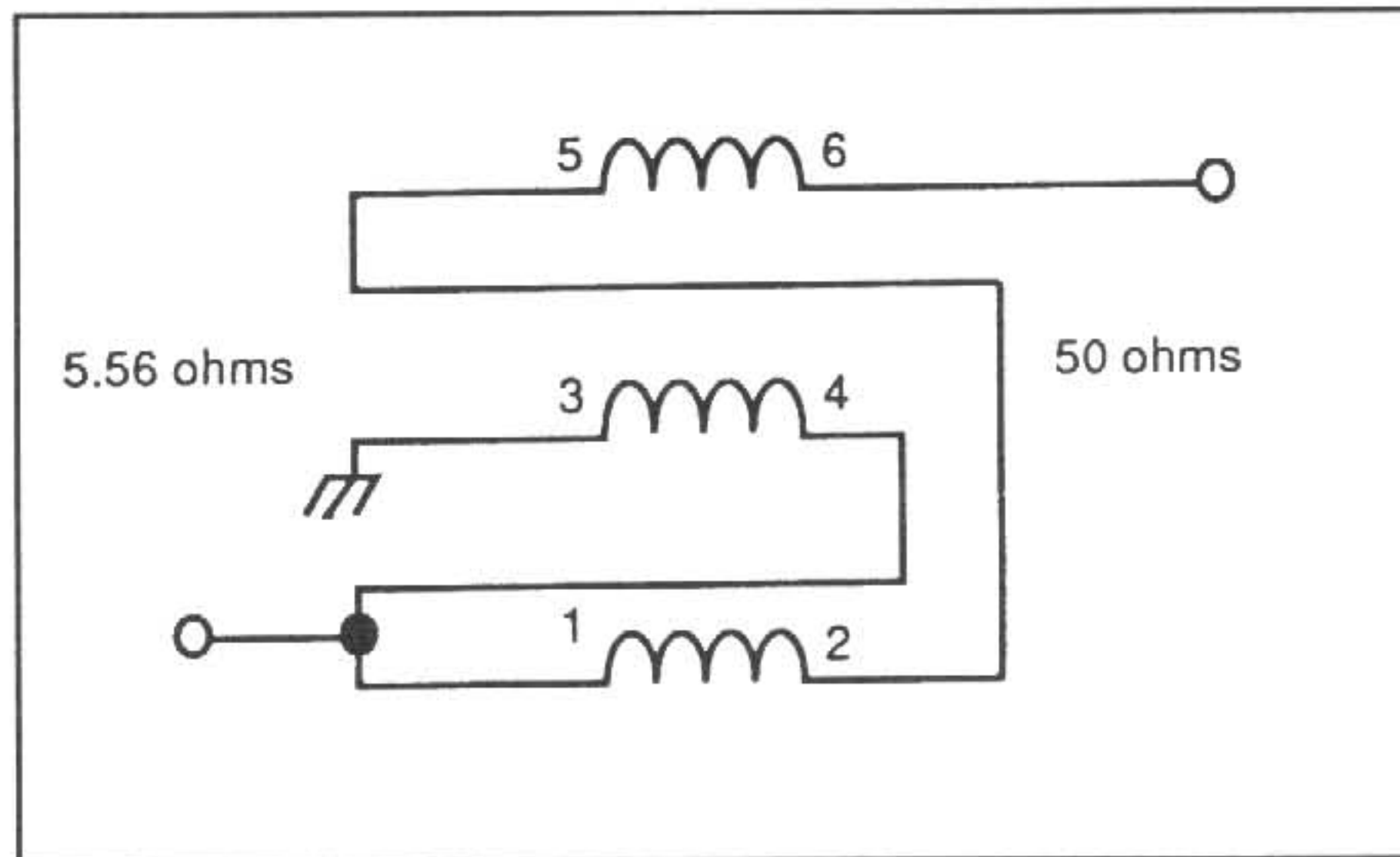


Figure 1. Schematic diagram of the trifilar UNUN transformer designed to match 50 ohms to 5.56 ohms

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.

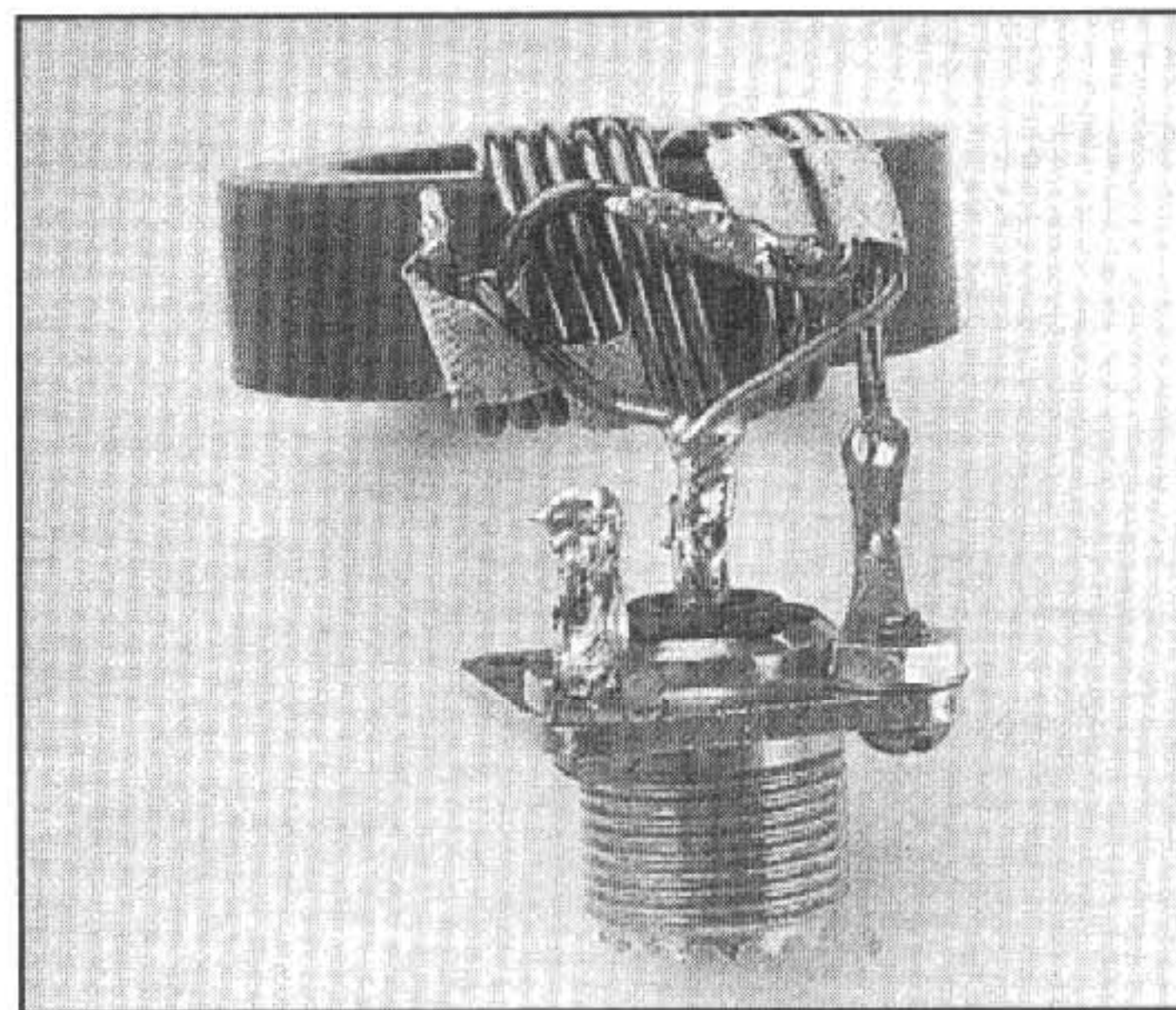


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-9:1-HUH50 transformer.

W2FMI-HMMU50

A) Description

The W2FMI-HMMU50 is a high-power, multimatch unun (unbalanced-to-unbalanced) transmission line transformer designed to match 50 ohms to five lower impedances ranging from 34.72 ohms down to 5.56 ohms. Specifically, the ratios and bandwidths (where the impedance ratio is constant) are:

- | | | | |
|----------------------------|---------------|----------------------------|-----------------|
| a) 9 : 1 (50:5.56-ohms) | 1MHz to 30MHz | d) 2.25: 1 (50:22.22-ohms) | 1MHz to 25MHz |
| b) 5.76 : 1 (50:8.68-ohms) | 1MHz to 15MHz | e) 1.44: 1 (50:34.72-ohms) | 1.7MHz to 20MHz |
| c) 4 : 1 (50:12.5-ohms) | 1MHz to 20MHz | | |

This transformer also performs as well when matching 75 ohms to the appropriate six lower impedances. The power rating is 1KW of continuous power and 2KW 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 five trifilar turns on an Amidon PN FT-150-K. The center winding in Figure 1 is No. 12 Formvar wire. The other two turns are No. 14 Formvar wire. The top winding is tapped at two turns from terminal 5. The connections to the five ratios are:

W2FMI-HMMU50

- A - L; 9:1
- B - L; 5.76:1
- C - L; 4:1
- A - H; 2.25:1
- B - H; 1.44:1

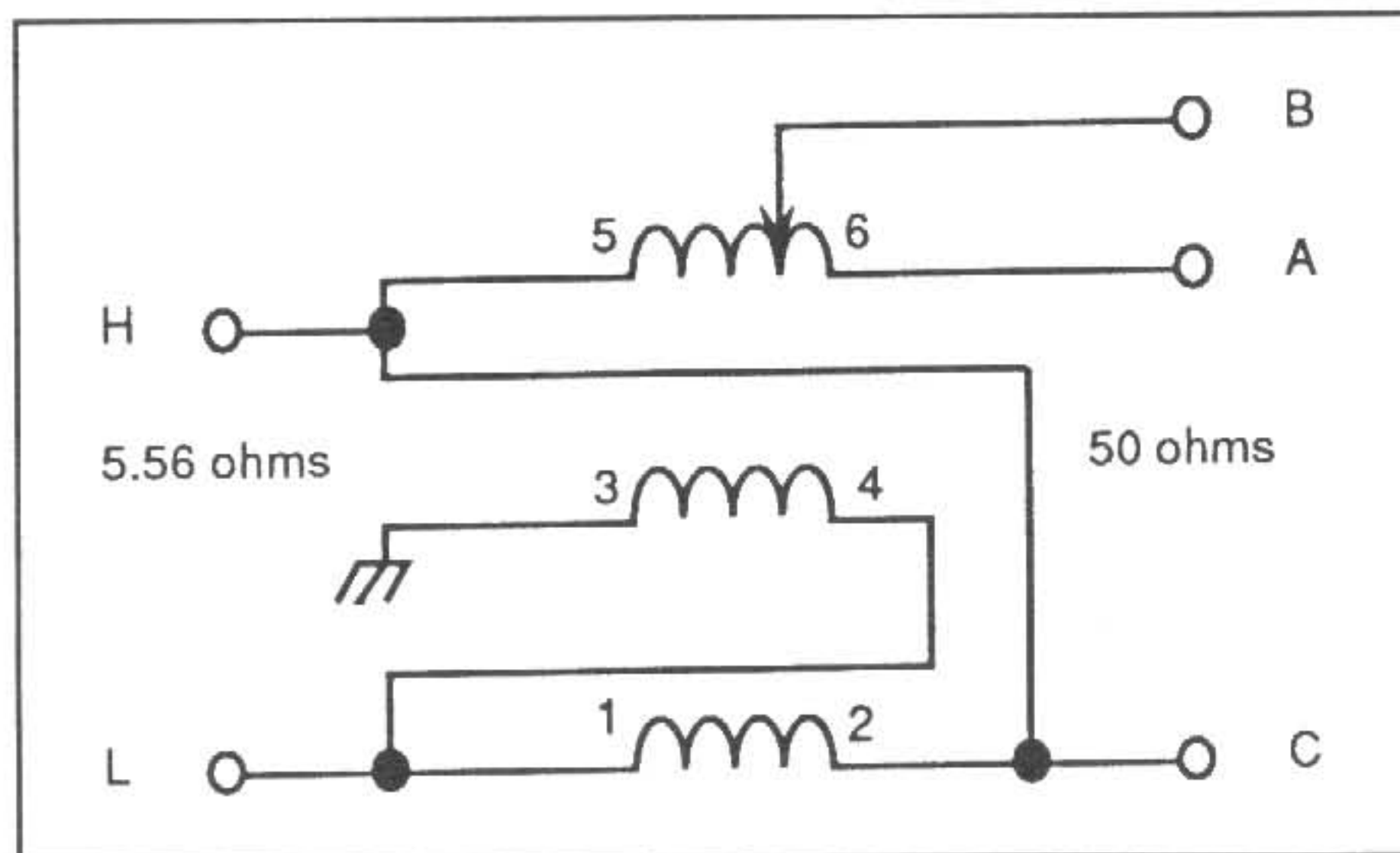


Figure 1. Schematic diagram of the trifilar multi-match transformer designed to match 50 ohms to 6 lower impedances

C) Photograph

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

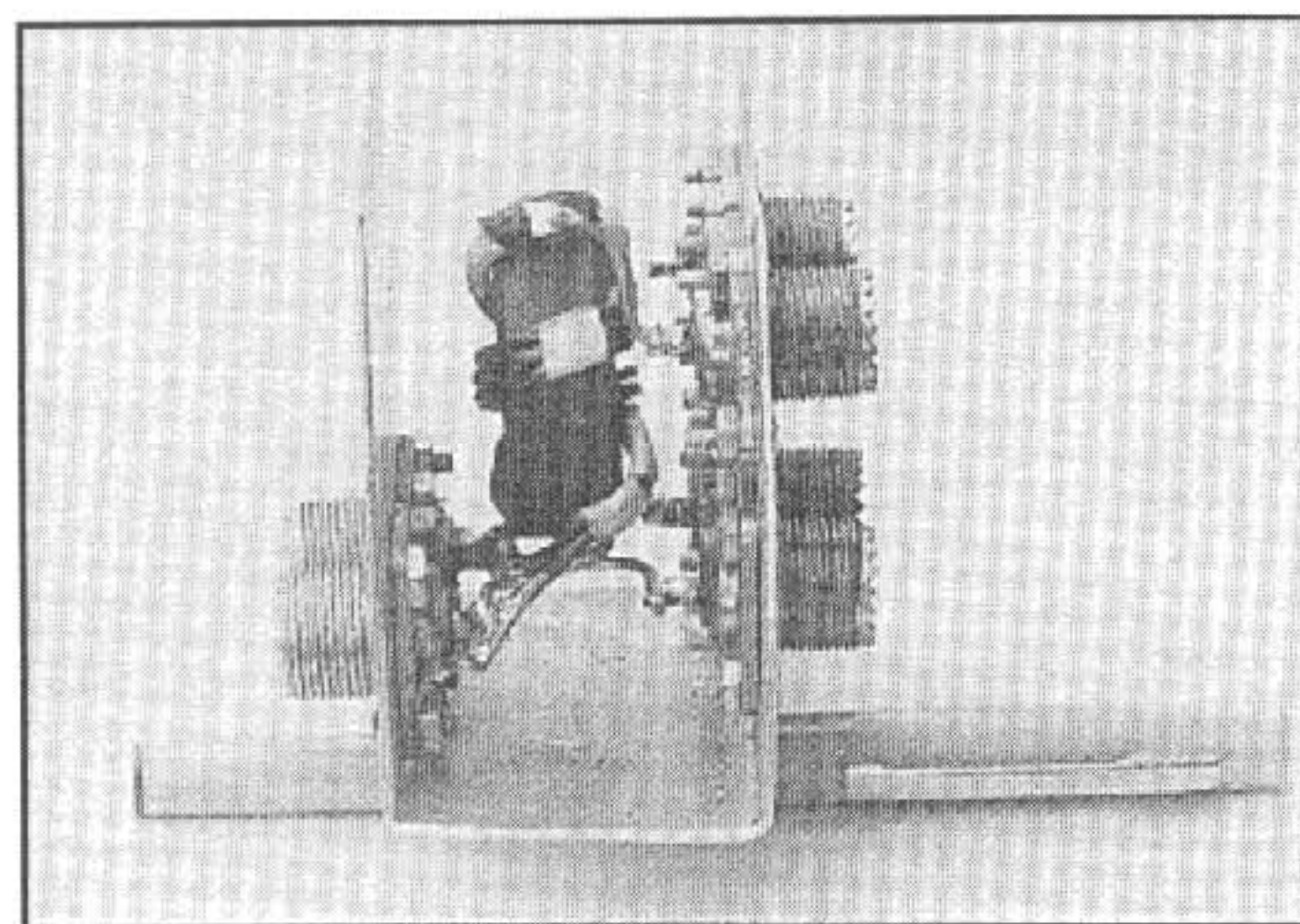


Figure 2 - A view of the highly efficient and broadband W2FMI-HMMU50 transformer.

A) Description

The W2FMI-1.78:1-HDU50 is a high-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-HDU50, 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 50MHz. In matching 50 ohms to 12.5 ohms (4:1), it is constant from 1 MHz to 40MHz. A conservative power rating is 1KW of continuous power and 2KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Four quadrifilar turns of No. 14 Formvar SF wire are wound on an Amidon FT-150-K. When connecting A to C, the ratio is 1:1.78. When connecting B to C, it is 1:4

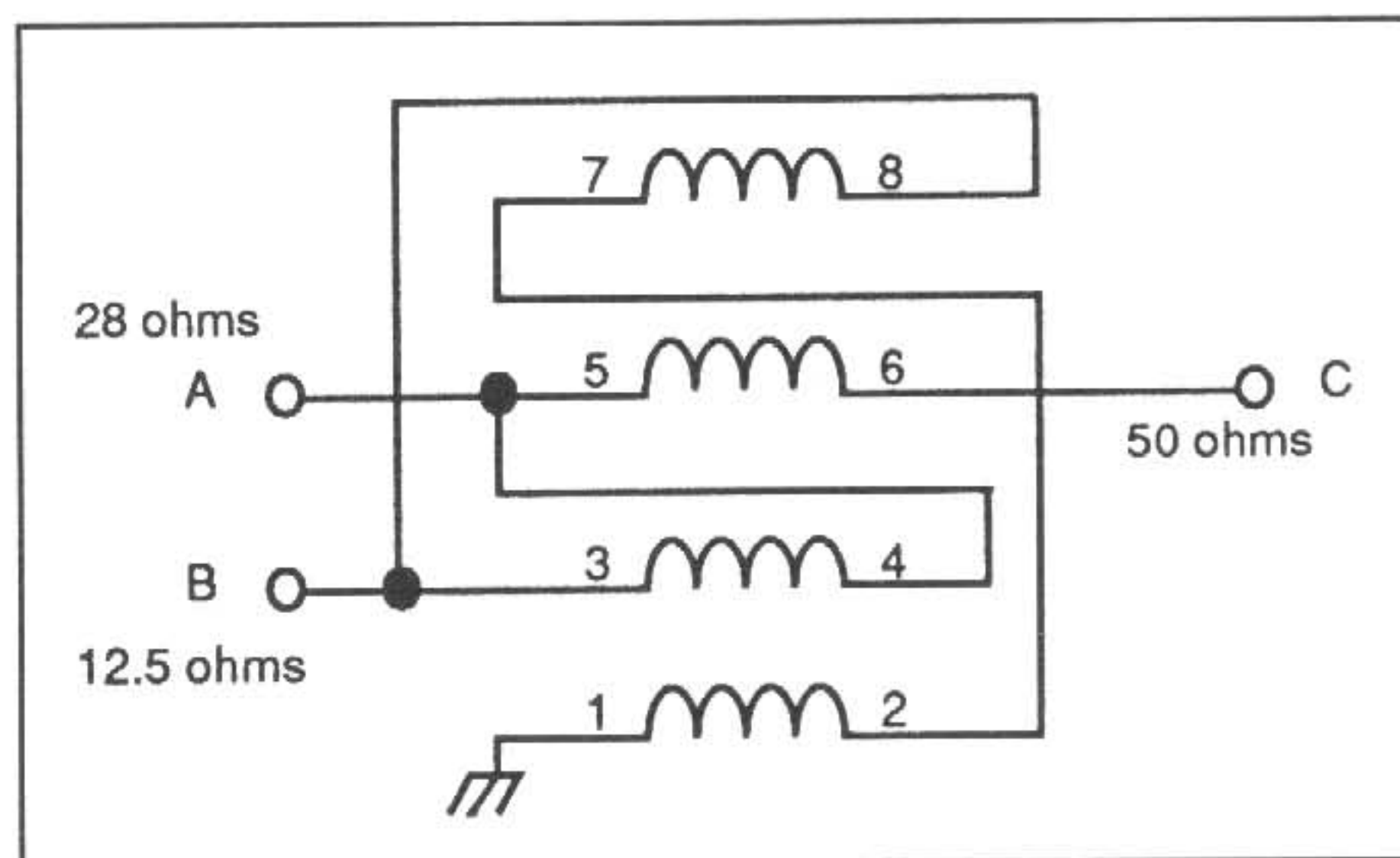


Figure 1. Schematic diagram of the dual-output transformer designed to match 50 ohms to 28 lower or 12.5 ohms

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-HDU50 transformer.

W2FMI-1.78:1-HMMU50

A) Description

The W2FMI-1.78:1-HMMU50 is a high-power, multimatch unun (unbalanced-to-unbalanced) transmission line transformer. It basically uses the schematic diagram of the W2FMI-1.78:1-HDU50 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 ratios are constant) are:

- | | | | |
|-----------------------------|---------------|------------------------------|---------------|
| a) 1.36 : 1 (50:36.76-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 25MHz |
| a) 2.25 : 1 (50:22.22-ohms) | 1MHz to 40MHz | d) 12.25 : 1 (50:4.080-ohms) | 1MHz to 20MHz |
| b) 3.06 : 1 (50:16.34-ohms) | 1MHz to 30MHz | e) 16 : 1 (50:3.125-ohms) | 1MHz to 20MHz |

A conservative power rating is 1KW of continuous power and 2KW of peak power for the five lower ratios (1.36:1 to 4:1). For the three higher ratios (9:1 to 16:1), the ratings are 500 watts of continuous power and 1KW 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. Four quadrifilar turns of No. 14 Formvar SF wire are wound on an Amidon PN FT-150-K. Winding 5-6 is tapped at two turns from terminal 5. The connections to the eight ratios are:

W2FMI-1.78:1-HMMU50

- 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

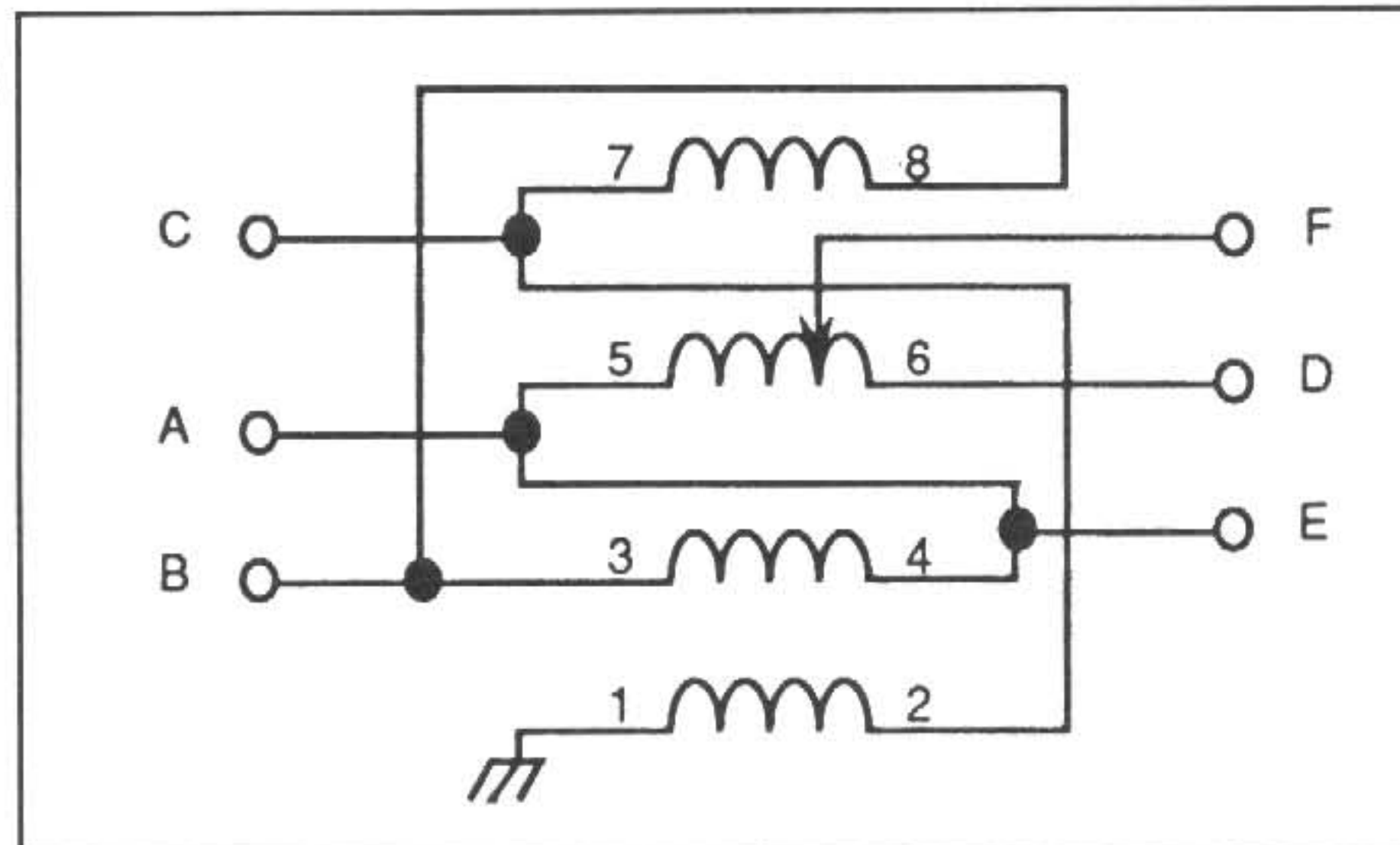


Figure 1. Schematic diagram of the quadrifilar, multi-match transformer designed to match 50 ohms to eight lower impedances

C) Photograph

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

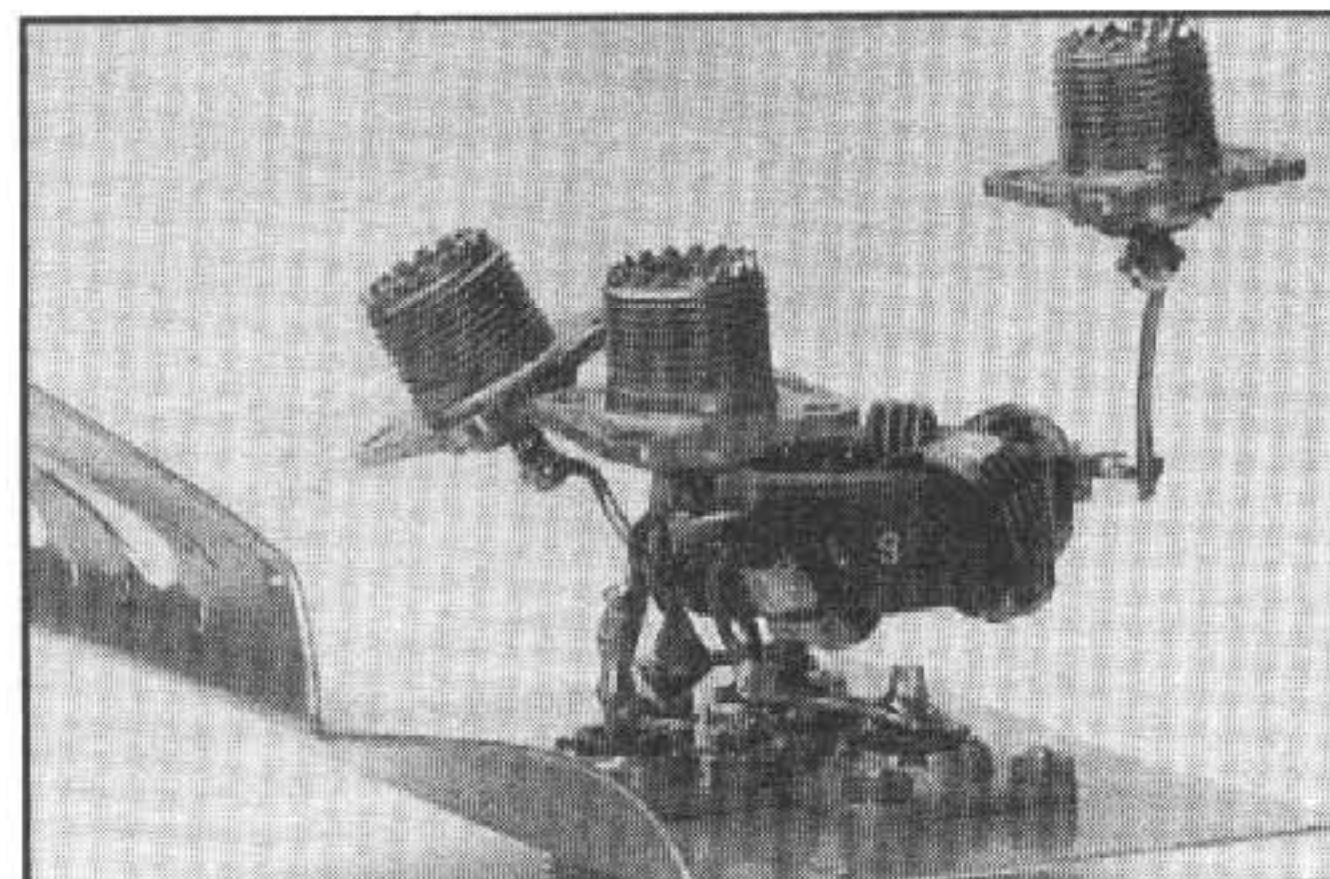


Figure 2 - An exploded view of the highly efficient and broadband W2FMI-1.78:1-HMMU 50 transformer.

A) Description

The W2FMI-1.56:1-HDU50 is a high-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-HDU50, 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 40MHz. In matching 50 ohms to 18 ohms (2.78:1), it is constant from 1 MHz to 40MHz. A conservative power rating is 1KW of continuous power and 2KW of peak power. The efficiency is 99 percent.

B) Schematic Diagram

Figure 1 shows the schematic diagram of this highly efficient and broadband transformer. Four quintufilar turns are wound on an Amidon FT-150-K. Windings 3-4 and 7-8 are No. 14 Formvar wire. The other three are No. 16 Formvar wire. When connecting A to C, the ratio is 1:1.56. When connecting B to C, it is 1:2.78

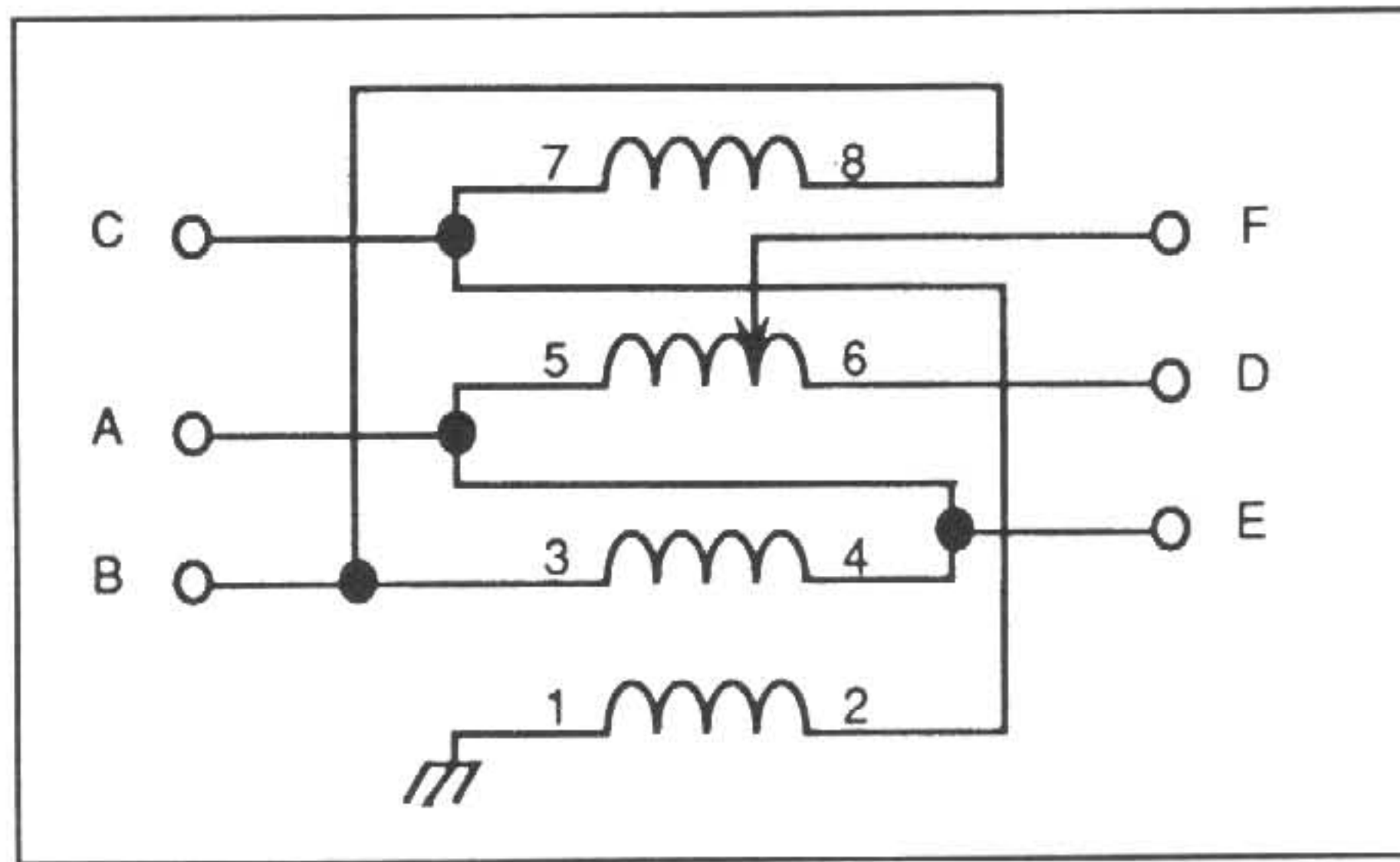


Figure 1. Schematic diagram of the dual-output transformer designed to match 50 ohms to 32 ohms or 18 ohms

C) Photograph

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

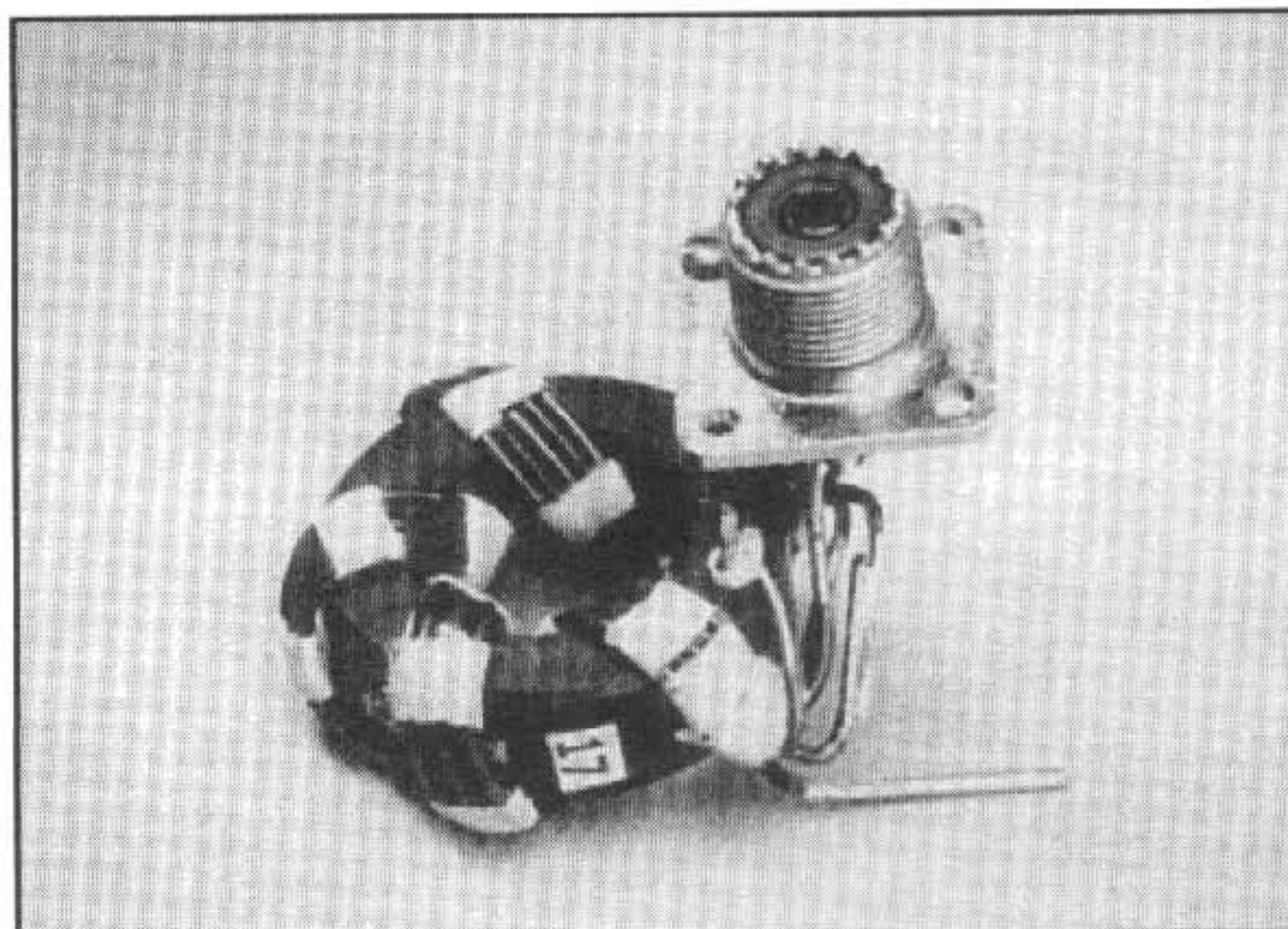


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-1.56:1-HDU50 transformer.

A) Description

The W2FMI-1:1-HBL50 is a high-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 50 ohms and significant margins in bandwidth and power-handling capability. The response is essentially flat from 1MHz to 50MHz. The conservative power rating is 2KW of continuous power and 4KW 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 Guanella 1:1 balun which uses a bifilar winding. There are ten bifilar turns of No. 14 H. Imideze wire on an Amidon PN FT-200-K. One wire is also covered with a layer of Scotch No. 92 tape.

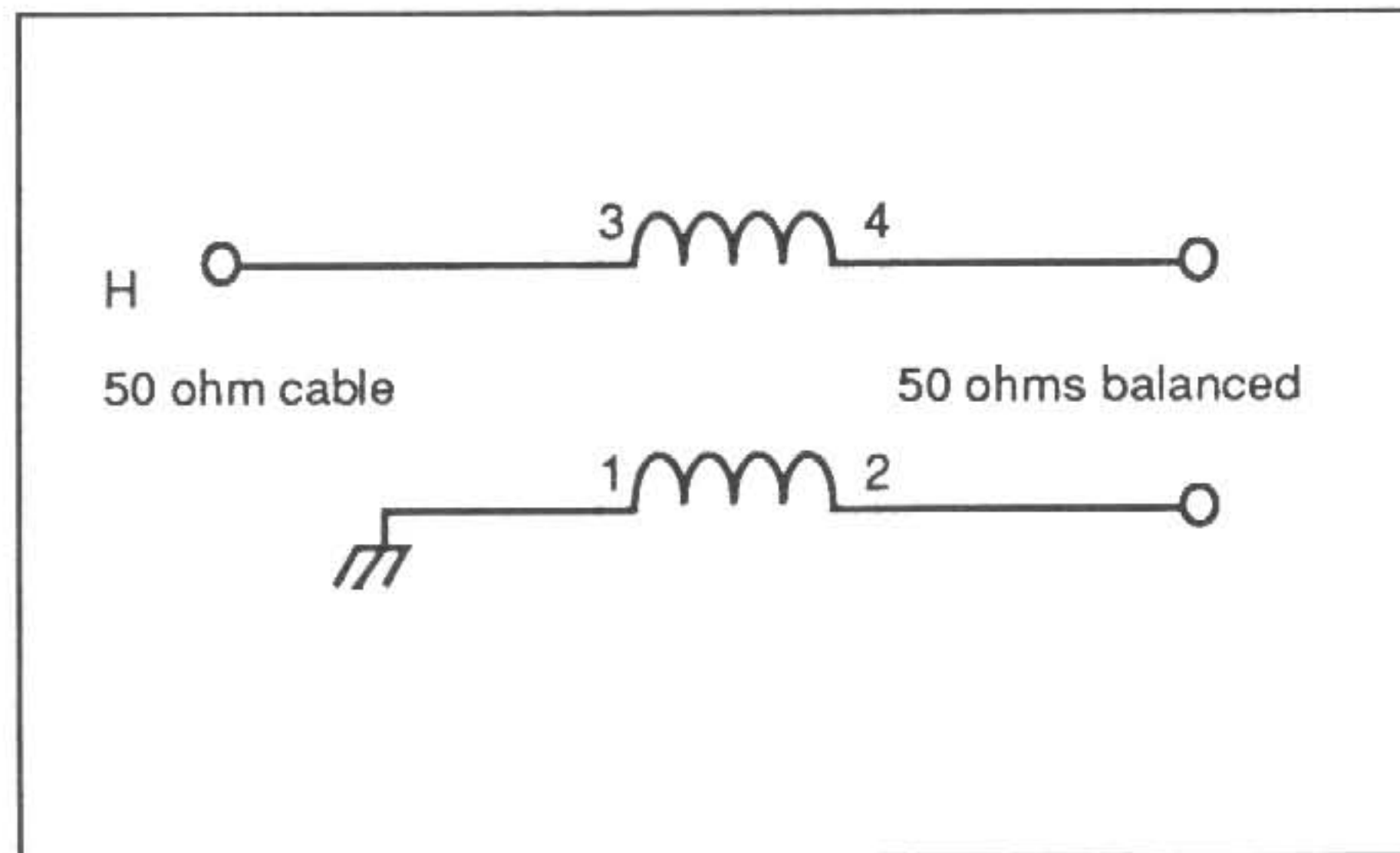


Figure 1. Schematic diagram of the Guanella 1:1 balun transformer

C) Photograph

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

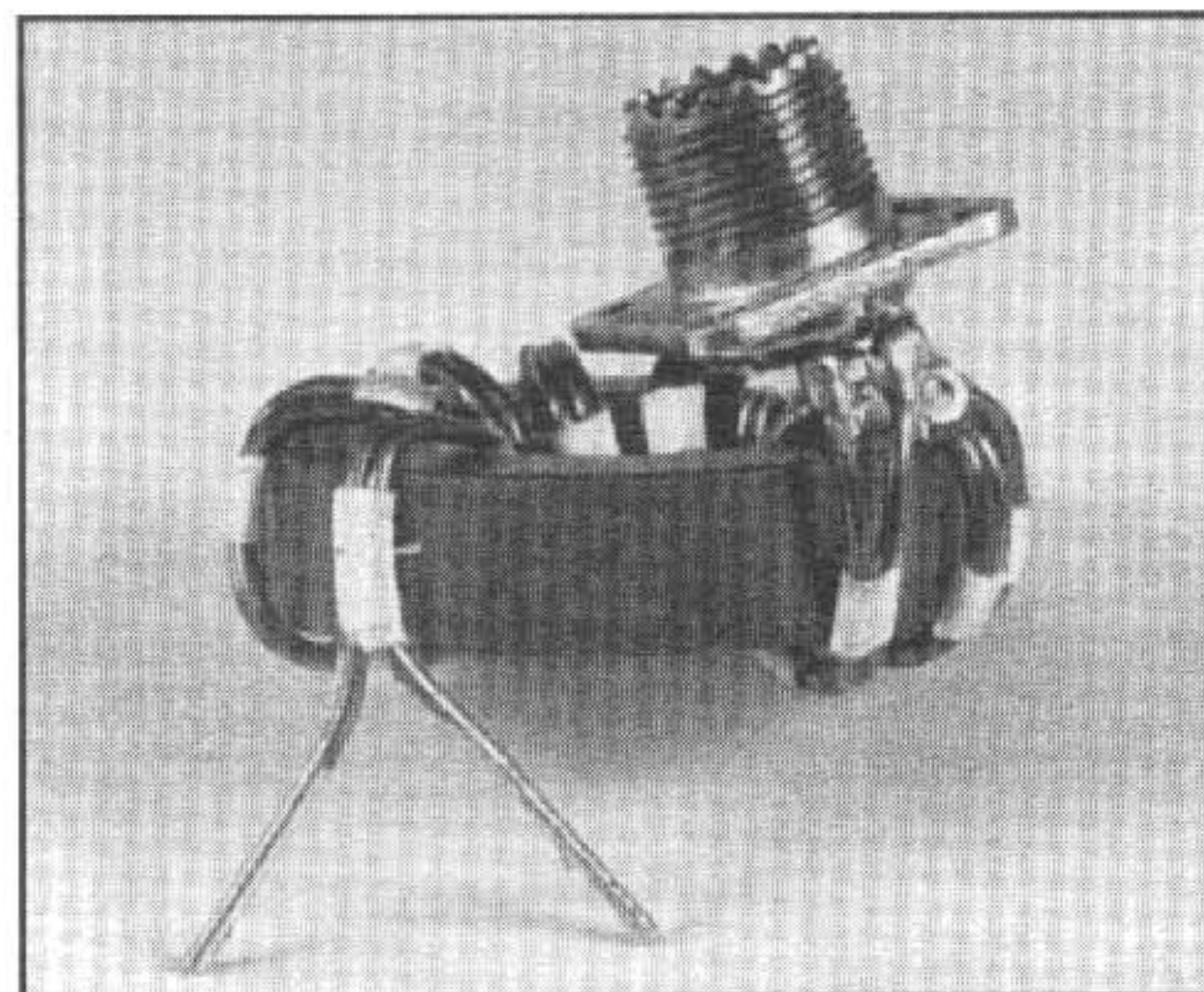


Figure 2 - Bottom-view of the highly efficient and broadband W2FMI-1:1-HBL50 transformer.