

Experimenters with Non Snap Ferrite Cylinder Bead RF Chokes

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Recently there are lots of devices that contained some RF sensitive or vice versa RF generation parts inside. It is power AC/DC converters (aka power supply), Computers, Computer Monitors, et cetera. Most common way to radiate unwanted interferences or receipt unwanted interferences is cables going apart those above mentioned parts. It is possible to kill the effect by RF- Chokes that installed on the cable.

There are two common types of RF Chokes. First, most simple is a ferrite "bead" choke, consisting of a cylinder of ferrite encircling the cable. **Figure 1** shows that RF Choke installed at the end of cable going from a Power Supply. It is fixed non demountable choke. You cannot move the choke around the cable the ferrite cylinder may be removed only by destroying that device. Second one is a snap RF Choke. **Figure 2** shows the choke. The choke may be easily moved along the cable and if it is needed may be easily removed from the cable.



Figure 1 Ferrite "Bead" Choke

However, recently the life time of those devices is limited. As usual it is limited by entering of new technology to our life. So, old, but still good electronic equipment, for example, CRT TV and monitors, video and audio tape recorders and et cetera go to scrap. Some new made devices as well go of operation and become ready for scrap. At this case it would be wise to remove all RF Chokes from the device for using them in ham radio purposes. It is very easy to remove the Snap RF Ferrite Choke from the device. I usually keep the chokes on the coaxial cable going from my transceiver IC-718 to SWR –meter (and then to the antenna). The chokes reduce electrical noise and unwanted RF current induced to the outer side of the shield of the coaxial cable. **Figure 3** shows cable going from transceiver to the SWR meter with Snap RF Chokes on it. As well the Snap RF Chokes always are behind me that means I should never lose it in my deep junk box.



Figure 2 Snap Ferrite Choke

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Well, but what can I do with old Ferrite "Bead" RF Chokes. I just cut of the chokes together with wires from scrapped devices. To remove the ferrite tube from the chokes takes time and tools. So I decided make some experimenters with the chokes without disassembly those ones.

I find in my junk box four identical Ferrite "Bead" RF Chokes. Each choke has length 36- mm with outer diameter 18- mm. Two wires cable went through the choke. The wire was marked as diameter 18- AWG and 300- V voltage. My idea was to create a kind of RF transformer with the chokes.

First experimental transformer was made according **Figure 4**. It was classical RF Transformer where one turn is primary and second turn is the secondary winding. Then transformer was tested. Primary winding was connected to MFJ- 259B. Secondary winding was loaded on to 51- Ohm resistor. **Figure 5** shows the transformer loaded to 51-Ohm resistor. **Table 1** shows data obtained for the one Ferrite RF Choke. As you can see from the table the transformer may be used for receiving purposes. I tested the transformer with my transceiver IC- 718 and receiver Hallicrafters S- 85. Transformer worked good up to 40- meter Band. Then I observed some dropping of receiving signals. However I could compensate it with adding RF- gain at transceiver and receiver where the transformer successfully worked at MW- Band.

Conclusion: The transformer may be used as Insulated Transformer for Receiver at the HF and MW.



Figure 3 Snap Ferrite Choke on the Coaxial Cable

Table 1 One Cylinder Ferrite RF Choke loaded to 51- Ohm Resistor. Data obtained with MFJ- 259B

Band	160	80	40	30	20	17	15	12	10
Z	2@j12	6@j19	17@j27	23@j28	27@31	31@j35	34@j38	39@43	41@j46
SWR	14.0	9.0	3.5	2.8	2.5	2.5	2.4	2.4	2.5

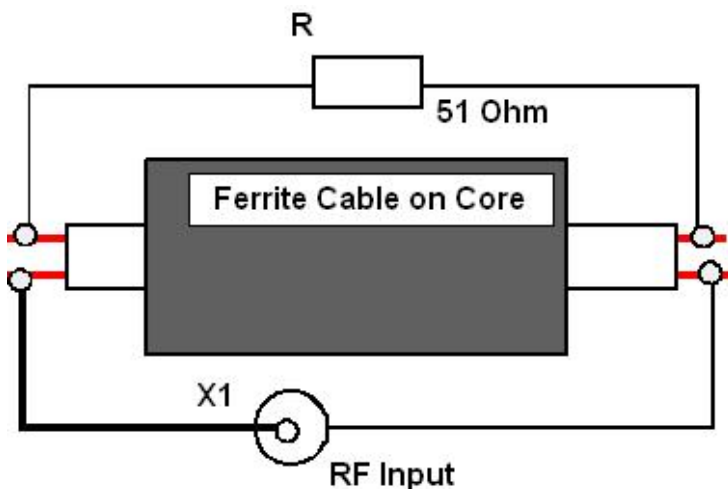


Figure 4 RF Schematic for Transformer on one Ferrite RF Choke

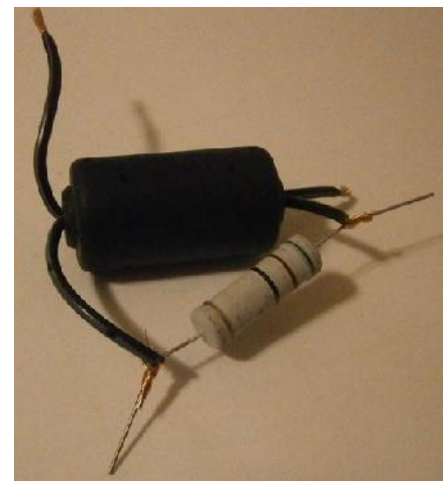


Figure 5 RF Transformer on one Ferrite RF Choke loaded to 51- Ohm Resistor

Second experimental transformer was made with two Cylinder Ferrite RF Chokes. **Figure 6** shows schematic of the transformer. It was classical RF Transformer where one turn is primary and second turn is the secondary winding. Then the transformer was tested. Primary winding was connected to MFJ- 259B. Secondary winding was loaded on to 51- Ohm resistor. **Figure 7** shows the transformer loaded to 51-Ohm resistor. **Table 2** shows data obtained for the two Ferrite RF Chokes transformer.



Figure 7 RF Transformer on Two Cylinder Ferrite RF Chokes loaded to 51- Ohm Resistor

As you can see from the table the transformer had parameters better the one cylinder transformer. Certainly the transformer may be used for receiving purposes. I tested the transformer with my transceiver IC- 718 and receiver Hallicrafters S- 85. Transformer worked good up to 80- meter Band. Then I observed some dropping of receiving signals. However I could compensate it with adding RF- gain at transceiver and receiver where the transformer successfully worked at MW-Band. Transformer was tested with IC-718 in transmitting mode, 15- wt. SWR showed by IC- 718 is close to SWR showed by MFJ- 259B.

Conclusion: The transformer may be used as Insulated Transformer for Receiver at the HF and MW. The transformer may be used for some purposes (like insulation transformer installed on antenna and then matched with coaxial cable) at transmission mode at the 40- 10 meter Bands.

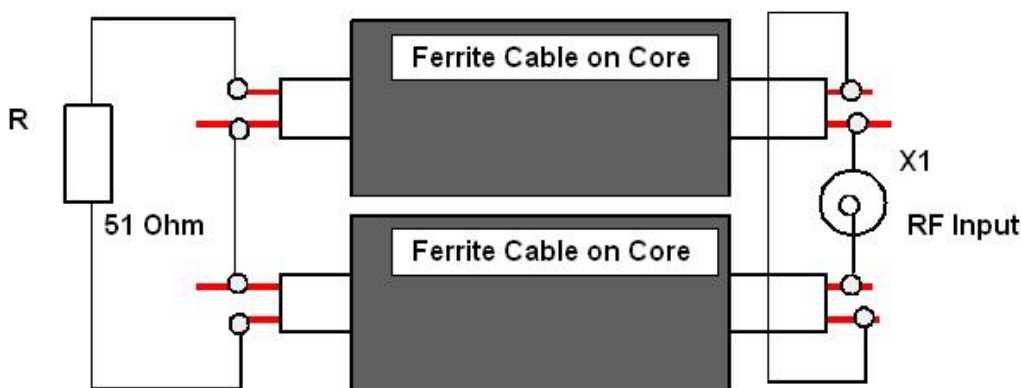


Figure 6 RF Schematic for RF Transformer Made on Two Cylinder Ferrite RF Chokes

Table 2 Two Cylinder Ferrite RF Chokes loaded to 51- Ohm Resistor. Data obtained with MFJ- 259B and IC-718

Band	160	80	40	30	20	17	15	12	10
Z by MFJ-259B	5@j18	13@j27	29@j28	33@j26	35@30	37@j33	39@j38	40@41	40@48
SWR by MFJ-259B	8.2	4.3	2.3	2.1	2.1	2.1	2.2	2.3	2.6
SWR by IC-718	-	-	2.7	2.0	2.0	1.8	2.0	2.1	2.5

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Third experimental transformer was made with three Cylinder Ferrite RF Chokes. **Figure 8** shows schematic of the transformer. It was classical RF Transformer where one turn is primary and second turn is the secondary winding. Then the transformer was tested. Primary winding was connected to MFJ- 259B. Secondary winding was loaded on to 51- Ohm resistor. **Figure 9** shows the transformer loaded to 51-Ohm resistor. **Table 3** shows data obtained for the three Ferrite RF Chokes transformer.

As you can see from the table the transformer had parameters better the one and two cylinder transformer. Certainly the transformer may be used for receiving purposes. I tested the transformer with my transceiver IC- 718 and receiver Hallicrafters S- 85. Transformer worked good up to 160- meter Band. As well the transformer performed well at MW band. Transformer was tested with IC- 718 in transmitting mode, 15- wt. SWR showed by IC- 718 is close to SWR showed by MFJ- 259B.

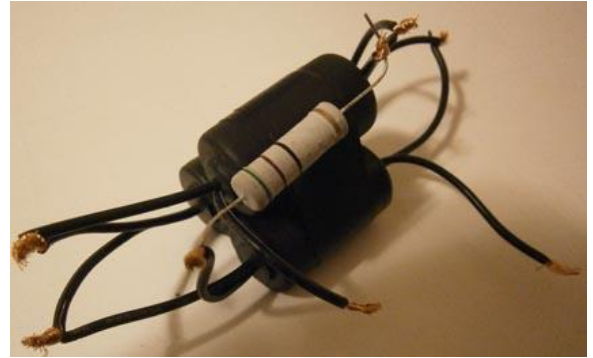


Figure 9 RF Transformer on Three Cylinder Ferrite RF Chokes loaded to 51- Ohm Resistor

Conclusion: The transformer may be used as Insulated Transformer for Receiver at the HF and MW. The transformer may be used for some purposes (like insulation transformer installed on antenna and then matched with coaxial cable) at transmission mode at the 80- 10 meter Bands.

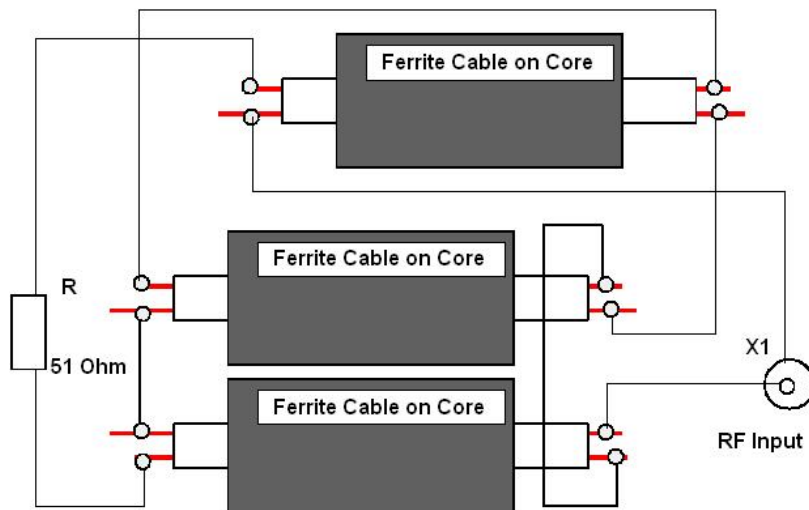


Figure 8 RF Schematic for RF Transformer Made on Three Cylinder Ferrite RF Chokes

Table 3 Three Cylinder Ferrite RF Chokes loaded to 51- Ohm Resistor. Data obtained with MFJ- 259B and IC-718

Band	160	80	40	30	20	17	15	12	10
Z by MFJ-259B	15@24	28@28	38@27	40@29	42@37	43@45	45@49	42@53	47@64
SWR by MFJ-259B	3.5	2.3	1.9	1.9	2.1	2.4	2.5	2.8	3.0
SWR by IC-718	5.0	2.2	1.8	1.7	1.9	2.3	2.4	3	3.4

Fourth experimental transformer was made with Four Cylinder Ferrite RF Chokes. **Figure 10** shows schematic of the transformer. It was classical RF Transformer where one turn is primary and second turn is the secondary winding. Then the transformer was tested. Primary winding was connected to MFJ- 259B. Secondary winding was loaded on to 51- Ohm resistor. **Figure 11** shows the transformer loaded to 51-Ohm resistor. **Table 4** shows data obtained for the Four Ferrite RF Chokes transformer.

As you can see from the table the transformer had parameters better the one, two and three cylinder transformer. Certainly the transformer may be used for receiving purposes. I tested the transformer with my transceiver IC- 718 and receiver Hallicrafters S- 85. Transformer worked good up to 160- meter Band. As well the transformer performed well at MW band. Transformer was tested with IC-718 in transmitting mode, 15- wt. SWR showed by IC- 718 is close to SWR showed by MFJ- 259B.



Figure 10 RF Transformer on Four Cylinder Ferrite RF Chokes loaded to 51- Ohm Resistor

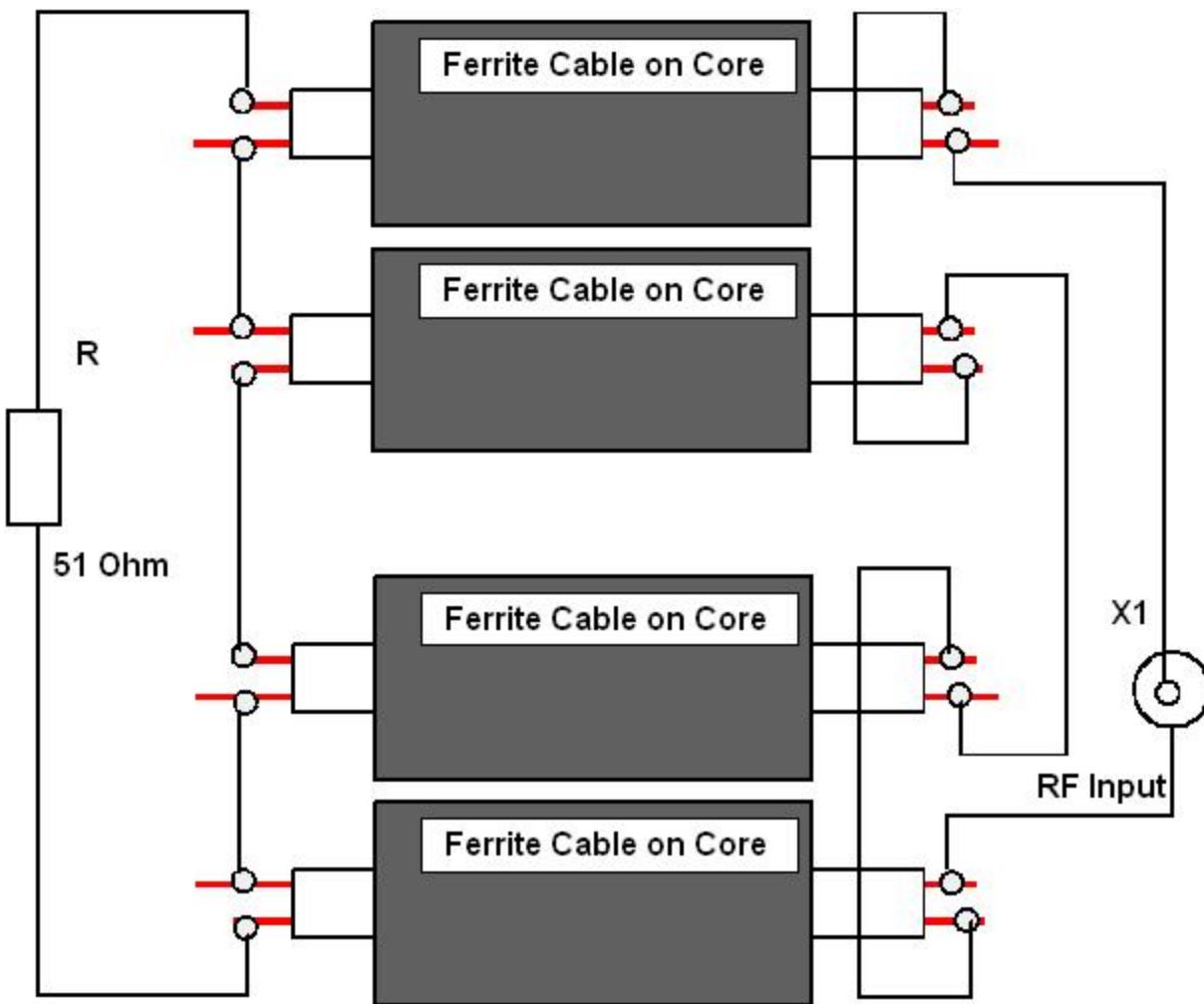


Figure 11 Schematic for RF Transformer Made on Four Cylinder Ferrite RF Chokes

Conclusion: The transformer may be used as Insulated Transformer for Receiver at the HF and MW. The transformer may be used for some purposes (like insulation transformer installed on antenna and then matched with coaxial cable) at transmission mode at the 160- 15 meter Bands.

Table 4 Four Cylinder Ferrite RF Chokes loaded to 51- Ohm Resistor. Data obtained with MFJ- 259B and IC-718

Band	160	80	40	30	20	17	15	12	10
Z by MFJ-259B	20@26	32@28	41@30	30@35	44@44	45@55	46@63	49@75	50@84
SWR by MFJ-259B	3.0	2.1	1.9	2.0	2.3	2.8	3.1	3.6	4.0
SWR by IC-718	-	2.0	2.0	2.0	2.2	2.7	2.9	3.5	-

So, the experiment shows that the Ferrite "Bead" RF Choke could be successfully used for radio amateur purposes. It is possible to make with the stuff Insulated Receiving Transformer, similar to:

Insulation RX Transformer,

http://www.antentop.org/019/insulation_transformer_019.htm

As well RF transformer made on Ferrite "Bead" RF Choke may be used with some special antennas in transmitting/receiving mode.

Ferrite "Bead" RF Choke made like a weather proof part. So transformer made on the base may be placed outside with very light weather proof prevention measures, straight away at the receiving or transmitting antenna.

73! Igor, VA3ZNW



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