The Free Energy and Antigravity Devices of Richard Vialle

Volume 1

by

J. L. Naudin

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The free energy and antigravity devices of Richard Vialle were presented most prominently by Jean-Louis Naudin on his website, www.jnaudin.free.fr. Most of the original text is by J. L. Naudin, and is written in French. I translated the text from French to English using the Google Translate website. At various points in the book, I have inserted my own comments. These are my "editor's notes." I have also included some parts lists for building an American version of these devices if desired. Some of the parts used in the circuitry are now obsolete, however, suitable substitutes can be used. The technology is interesting, and it could be developed into a practical free energy device. One version of the technology is also an "antigravity" device, or perhaps more accurately, it is a "gravity control device."

Enjoy your adventure with the Richard Vialle technologies!

Aaron J. Klein

Editor

Introduction

Richard Vialle's Autogenerator by J.L. Naudin

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I recently discovered an excellent video report made by Pascuser on retired French physicist Richard Vialle. This physicist exposes his theory of negative mass, a new model of gravitation and mass, and its applications to antigravitation and the overunity generation of electrical energy.

"Richard Vialle conceived this theory in the early 1980s, but exceptionally, he also carried out experiments which demonstrate its validity. He obtained gravitational anomalies and created a overunity generator (free energy) which functions according to his theory, and which was tested independently and replicated as functional. Richard Vialle first explains his theory; the principles and the calculations which explain it are in a good part of the interview (several videos). Then he explains the operation of the devices he has invented, their schematics, and the means of reproducing them. Films of the functioning of the experimental devices for modifying gravity (negative mass) and overunity are included in the interview and report. This constitutes the testimony that Richard Vialle wants to bequeath to humanity: the sum of almost 30 years of work that has not been widely disseminated so far. He does not seek to make money or gain fame but to disseminate his work so that everyone can freely reproduce and use it. A man with a great ideal." (Extract from Pascuser's comments on the report).

After reading Pascuser's comments, and watching Richard Vialle's many videos, I couldn't help but jump into experiential exploration of this interesting theory. And so, I'll share with you all the results and diagrams of my experiments on this subject.

Richard Vialle's Autogenerator Principle (Simplified Explanation)

This document is based on the videos of the interview with Richard Vialle made by Pascuser. To see the full explanation of Richard Vialle's theory, I recommend you see the video Part 7 at (13' 00") and the Part 8 video as well as the complete technical document on the autogenerator.

Richard Vialle's Autogenerator principle (simplified explanation by Jean-Louis Naudin). JLN version of 05/10/2012 at 07:10:40, approved by Richard Vialle.

Richard Vialle, using his theory, makes the connection between the electrostatic attraction of an electron by the nucleus with the gravitational attraction. Thus, it defines an equivalent "electric" mass resulting from the force of attraction of the electron by the nucleus. Richard Vialle applies relativistic equations to this "electric" mass of the electron. Thus, the electron in orbit around the nucleus will be subjected to fluctuations in its speed and its orbital radius (around the value R_o, radius of the Bohr atom). These fluctuations in speed and radius will position the electron in the electron cloud. The electrostatic and gravitational potential energy of the orbital electron being constant, the trajectory of the electron will fluctuate at a pulse w_0, because each time the electron sees its orbital radius decrease, it will see its tangential speed increase and vice versa. This pulse w_0 corresponds to a calculated frequency of f_0 = 16.7 MHz. So, according to Richard Vialle, if we make the orbital electron resonate at this frequency f_0, it is possible to deform the electronic orbit and create "a cold current" in the conductive material. Richard Vialle demonstrated by calculation that if the conductor is subjected to a magnetic field, its scalar component will act on the electron orbiting around the nucleus and deform its orbital radius by creating an electrostatic field of attraction of the electron by the core. The amplification coefficient of the oscillation towards or away from the electron to the nucleus is called the "coefficient of surface area". The larger it is, the more overunity we have. The gain is maximum at the frequency f_0. The synchronous elongation at the frequency $n * f_0$ (harmonic of f_0) of the orbital electron will produce "a cold current". This "cold current" is not produced by an electron moving current in matter but simply by a synchronous oscillation of all the orbital electrons. It does not produce heating (no Joule effect) but simply a transfer of electrical energy throughout the conductive bar (like the Newton's pendulum experiment demonstrating the transfer of kinetic energy between 5 balls). At the terminals of the conductor subjected to this scalar magnetic field and in resonance, an electric field will appear which will cause a "hot current" to circulate, that is to say, a real electronic current which can be used on a resistive load in an external closed circuit (RLC + Rload circuit). The operating frequency of the autogenerator is calculated based on the length of the conductor bar. The shorter the bar, the higher the frequency. For a 1 meter long bar, the resonant frequency is 3.6 MHz (partial resonance). The frequency f_0 could not be tested yet because it would make a rung too short and difficult to implement. Usable "negative energy" is produced by the relativistic imbalance (change in mass m_0) of the electron produced by its change in orbital speed around the nucleus resulting from the change in its orbital radius. This "negative energy" is the overunity usable energy. The conducting bar is cut to prevent the conduction electrons from circulating (hot current) and to leave only the oscillations of the orbital electrons (cold current).

Chapter 1

Genesis of the project, Construction of the U-shaped Autogenerator

The construction of Richard Vialle's U-shaped autogenerator.

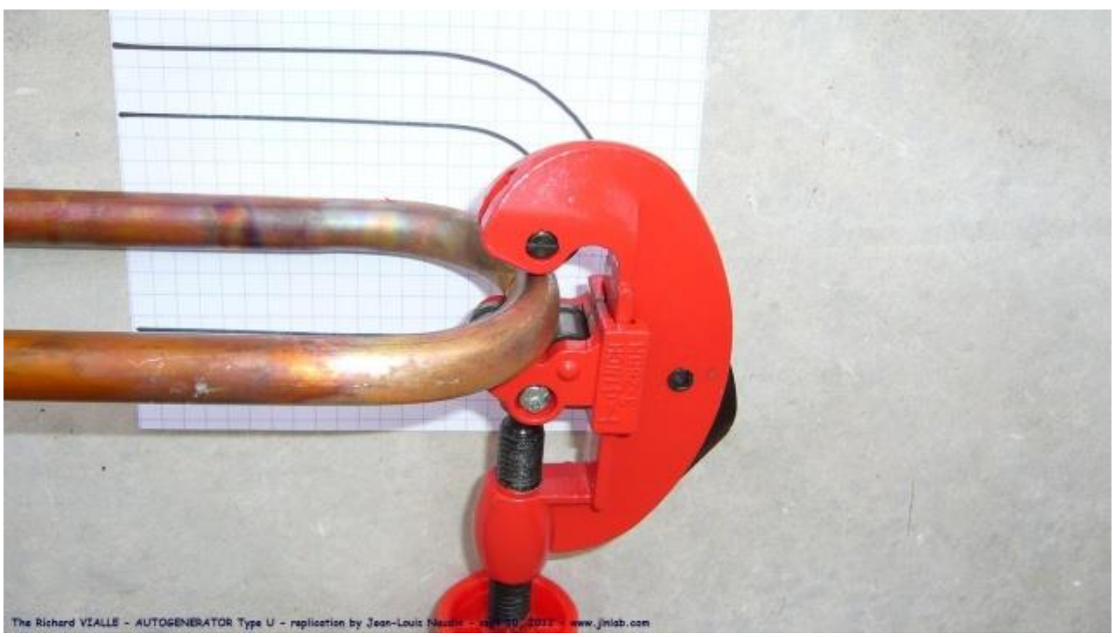
From the elements published and communicated via the internet by Pascal, I therefore decided, first of all, to reproduce the U-shaped autogenerator by Richard Vialle. To do this, I based myself on Pascal's PDF document (autogenerateur_2.pdf) detailing its construction. Below is a photo of the autogenerator built and tested by Richard Vialle himself:

Mechanical construction phase: Here are the basic elements (plumbing articles) that I put together to build the mechanics of the U-shaped auto-generator: 1 m of copper tube of 12 mm outside diameter and 10 mm inside, 1 plumber's bender for 12 mm diameter tube, 1 tube cutter for 12 mm tube, and 8/10 mm enameled wire. *Editor's Note: This would be a 0.47 inch outer diameter and 0.394 inch inner diameter copper tube. The wall thickness is therefore 0.038 inches. One standard size for this tube is 0.5 inch O.D. x 0.43 inch I.D., with 0.035 inch wall thickness. The length of the tube is 39.375 inches. The wire is equivalent to 20 AWG. The small plastic part that holds the two copper tube halves together is explained later and is a plastic rod or tube. The O.D. of this rod is a bit less than 0.43 inches. A 0.375 inch diameter fiberglass rod can be used. The gap between the two copper tube halves is about 0.125 inches.*

The first thing to do is to bend the tube at 180° so as to form a U. It is necessary to heat it red with a torch and then spray the part to be bent with cold water three times in a row (recommended). Remember to protect your hand with a thermal protection glove.

Then just use the folder to get the U shape:

Cut the U-shaped tube in the middle with the tube cutter:



Insert an insulating piece to separate the junction of the two half-Us. I used a fiberglass rod.

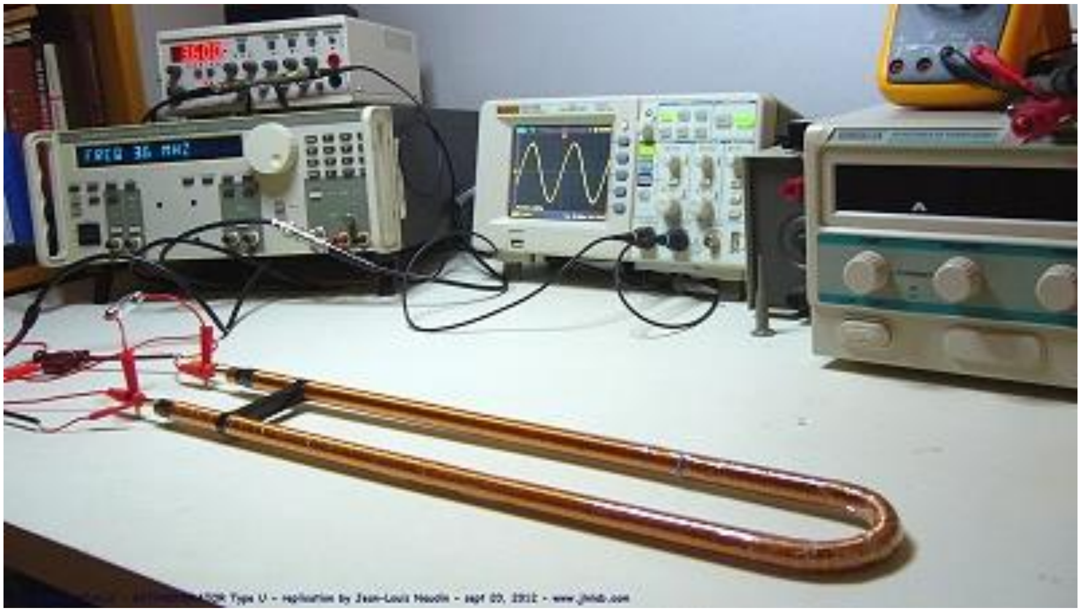
I glued this rod securely with two-component quick glue.

The junction is covered with electrical tape (or Teflon), and the rest of the tube with thin double-sided tape (carpet adhesive), to insulate it and also hold the enameled wire when winding.

Then, all you have to do is wind on the 8/10mm wire in a continuous coil (if possible) over the entire length of the U-tube.

It's a long and tedious phase, but the result is up to the job.

I soldered two female 4mm PK sockets to the ends of the U-tube to connect the charging lamp. I also glued, with a glue gun, a bar of hard wood to firmly maintain the spacing of the U-tube. The yellow and red connectors connect the coil that is intended for the production of the excitation magnetic field, and are 3.5 mm PK connectors which will be connected to the function generator or pilot oscillator. It is very important to check with the ohmmeter that the two branches of the U-shaped tube are well insulated and that the enameled wire is not in contact with one of the two branches of the tube. If this was the case, it would have to be unwound and the short-circuit point found (it happened to me). And there you have it, Richard Vialle's U-shaped generator is finished. Let's move on to experimentation and testing.



Parts List

0.5 inch O.D. x 0.43 inch I.D. x 39.375 inches Long copper tube (0.035 inch wall thickness).

0.375 inch diameter fiberglass rod or 0.125 inch nominal diameter PVC tube, 1 inch long.

1 pound roll of 20 AWG enameled magnet wire.

0.5 inch O.D. wood dowel rod.

Banana jacks, quantity: 4

Banana plugs, quantity: 4

1 roll of 20 AWG PVC hookup wire.

1 roll of double stick tape.

1 roll of electrical tape.

1 package of clear epoxy glue

1 pipe bender

1 plumbing torch

1 thermal protection glove

1 bottle of water

1 pipe cutter with at least a 0.5 inch diameter capacity

Chapter 2

The First Tests and Measurements of the U-shaped Autogenerator

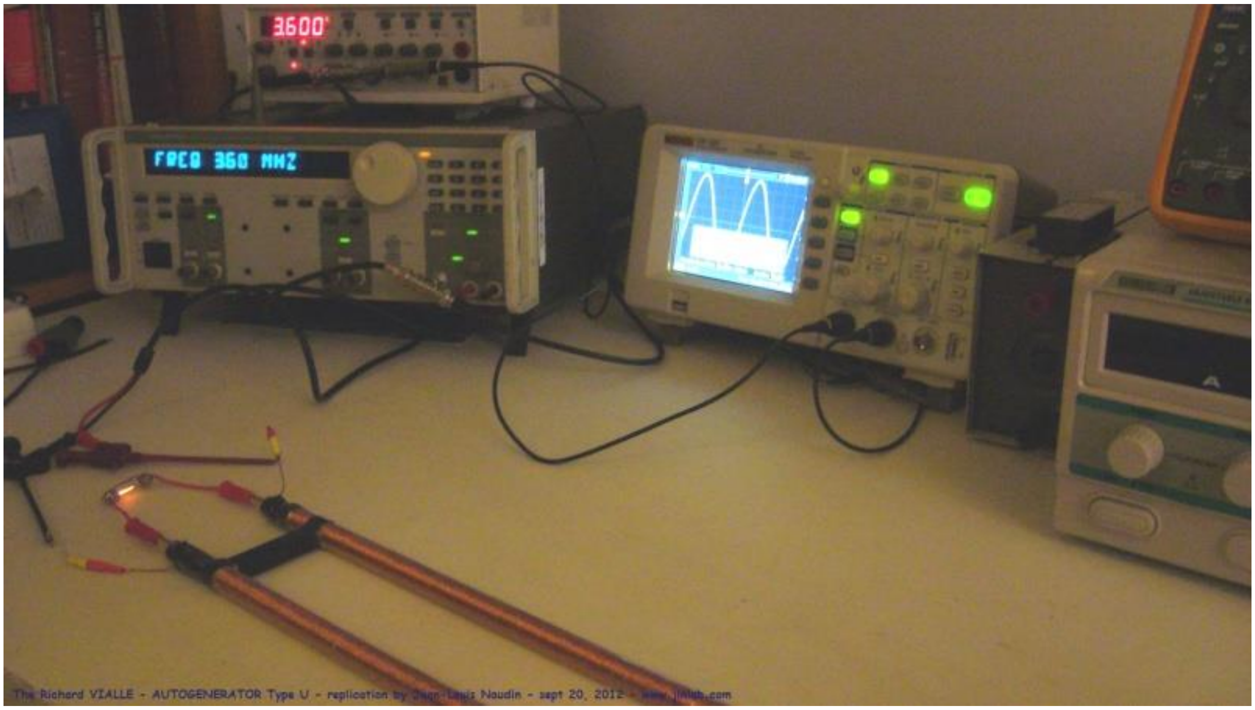
Now that the U-shaped generator is built, the first tests will begin. First, I checked that the generator operating frequency was indeed 3.6 MHz as Richard Vialle's calculation shows. Below is the formula for calculating the operating frequency of the U-shaped autogenerator as shaped by Pascuser. *Editor's Note: the formula was available through a link to another website. More research would need to be done to locate the formula. As stated, the frequency used for a one meter length of tube is 3.6 MHz.*

A NE PAS MODIFIER		Constantes physiques		
Constante de structure fine	α	7,29735307964E-03	Données de physique	
Charge de l'électron	e (C)	1,60217733000E-19		
Vitesse de la lumière dans le vide	c (m/s)	2,99792458000E+08		
Masse de l'électron	m0 (kg)	9,10938970000E-31		
Rayon de Bohr	R0 (m)	5,29177249000E-11		
Epsilon 0	ε0 (As/Vm)	8,85418781762E-12		
Nombre d'Avogadro	Na	6,02213670000E+23		
Paramètres à modifier: BARREAU		Modifier ce qui est en **rouge gras**		
Angle θ entre les électrons et l'axe du barreau	cos²(θ)	0,450	**Modèle Richard VIALLE (ne pas changer inconsidérément)**	mesure expérimentale
Fréquence de résonance des électrons liés sur orbitale	f0	1,670E+07		mesure expérimentale
Masse volumique du matériau du barreau	Mv (kg/m3)	**8954,00**	**Type de métal du barreau**	cuivre=8954
Masse molaire du matériau du barreau	Mm (g/mol)	**63,546**		cuivre=63.546
Nombre d' électrons liés par atome de matériau du barreau	n	**28**		cuivre=28
Résistivité du matériau du barreau	ρ (Ω.m)	**1,673E-08**		cuivre=1.673*10^(-8)
Susceptibilité magnétique du matériau du barreau	χm	**-1,000E-05**		cuivre=-10^(-5)
Longueur du barreau	L (m)	**1,000**	**Géométrie et dimensions du barreau: cas général**	
Aire de la section du barreau (calcul automatique si section ronde)	S (mm²)	**34,5575**		
Périmètre intérieur+extérieur de la section du barreau (auto si rond)	P (mm)	**69,115**		
Si barreau de section ronde (vide ou plein):				
Diamètre extérieur du barreau si tube ou tige	Dext(mm)	**12,000**	**Dans le cas d'un barreau de section ronde (vide si tube ou plein si tige)**	
Diamètre intérieur du barreau si tube	Dint(mm)	**10,000**		
Aire de la boucle définie par le barreau plié (si applicable)	Sboucle (cm²)	**450,000**		
Périmètre de la boucle définie par le barreau plié (si applicable)	Pboucle (cm)	**100,000**		
----- Résultats des calculs des paramètres précédents à la suite ici -----				
A NE PAS MODIFIER		Eléments calculés: BARREAU		
Fréquence de résonance du barreau	f (hz)	3,5946E+06	Caractéristiques électriques correct si le barreau est une tige ronde pleine	
Résistance effective totale (avec effet de peau) du barreau	R0 (Ω)	0,00705		
Inductance de fuite du barreau si droit (formule usuelle)	L0 (nH)	1131,0532		
Inductance de fuite du barreau si droit (formule plus précise)	L0 (nH)	1127,777		
Inductance de fuite du barreau si plié (formule usuelle)	**L0(nH) si boucle**	**591,604**	**Correct si barreau plié**	
Densité volumique d'atomes de matériau du barreau	N (atomes/m3)	8,486E+28		
Perméabilité magnétique relative du matériau du barreau	µr	0,999990		
Capacité virtuelle	C0 (F)	3,8374E-06		
Résistance en continu du barreau	Rc (Ω)	0,00048		
Épaisseur de peau à la fréquence f	e (µm)	34,335		
Diamètre équivalent si c'était un tube rond plein	d (mm)	6,633		
Paramètres à modifier: FIL de court-circuit		Modifier ce qui est en **rouge gras**		
Résistivité du métal du fil	ρ (Ω.m)	**1,673E-08**	**Type de métal du fil**	cuivre=1.673*10^(-8)
Susceptibilité magnétique du métal du fil	χm	**-1,000E-05**		cuivre=-10^(-5)
Longueur du fil	L (m)	**1,000**	**Dimensions du fil**	
Diamètre du fil	d (mm)	**1,0000**		
----- Résultats des calculs des paramètres précédents à la suite ici -----				
A NE PAS MODIFIER		Eléments calculés: FIL		
Résistance effective totale (avec effet de peau) du fil	R0 (Ω)	0,16061	Caractéristiques électriques	
Inductance de fuite du fil (formule usuelle)	L0 (nH)	1508,9094		
Inductance de fuite du fil (formule plus précise)	L0 (nH)	1505,628		
Perméabilité magnétique relative du métal du fil	µr	0,999990		
Résistance en continu du fil	Rc (Ω)	0,02130		
Épaisseur de peau à la fréquence f	e (µm)	34,335		

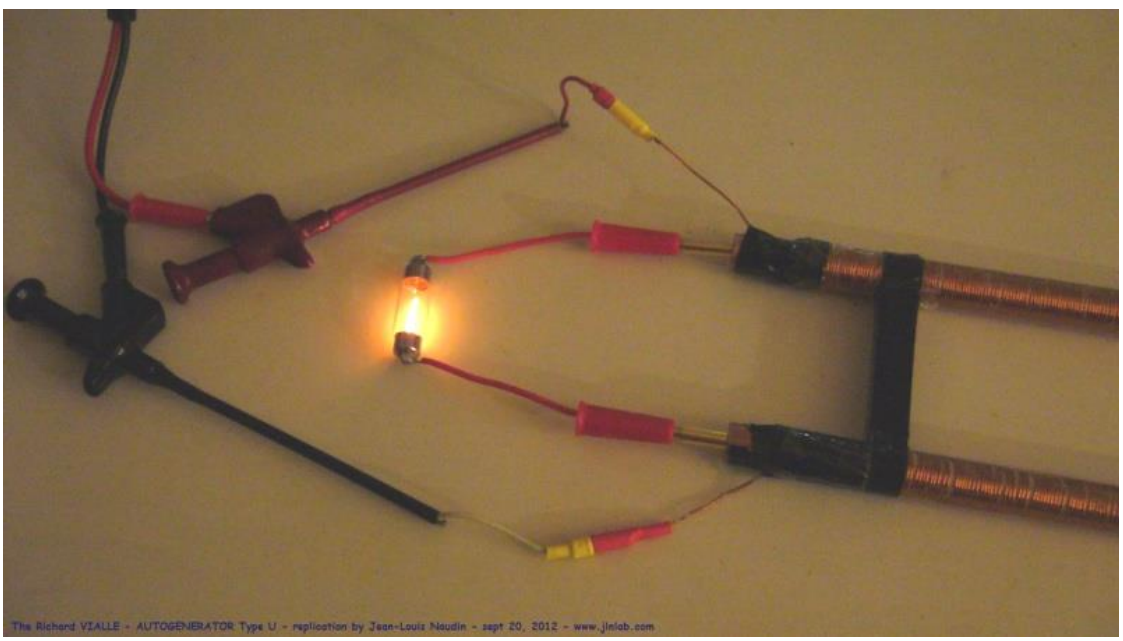
Spec du Tube en U

3.6 Mhz

So I connected a Wavetek 288 function generator to the U-shaped autogenerator coil terminals and a 12V at 5W charging lamp to the copper half-U terminals.

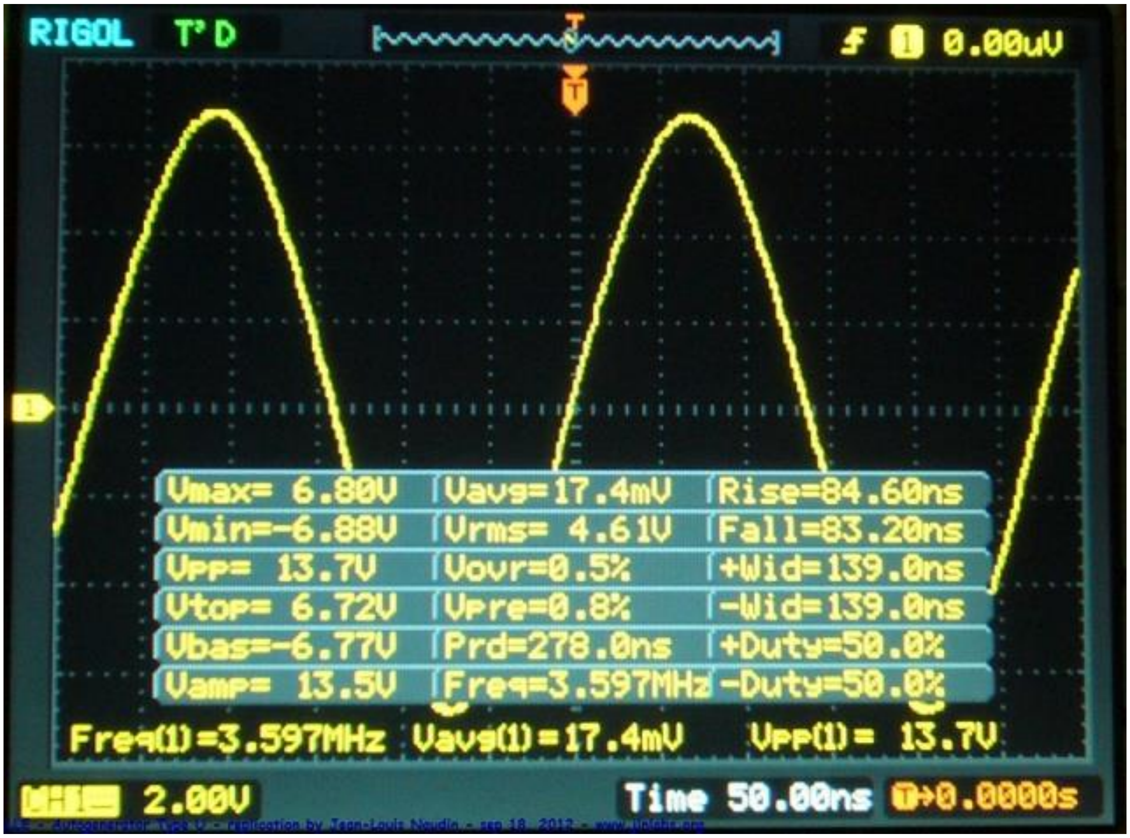


At the frequency of 3.6 MHz, the lamp ignited as in the calculation from the theory by Richard Vialle. Wow!

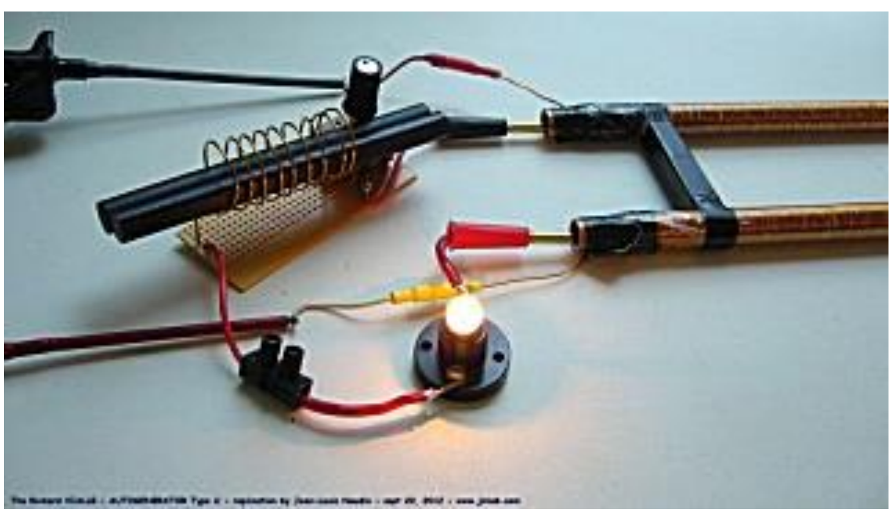


The charging lamp did not come on strongly because of the low power injected by my function generator, but it's still very good news because the experience confirms the theory.

The operating frequency of the U-shaped autogenerator was verified with an external frequency meter and digital oscilloscope.



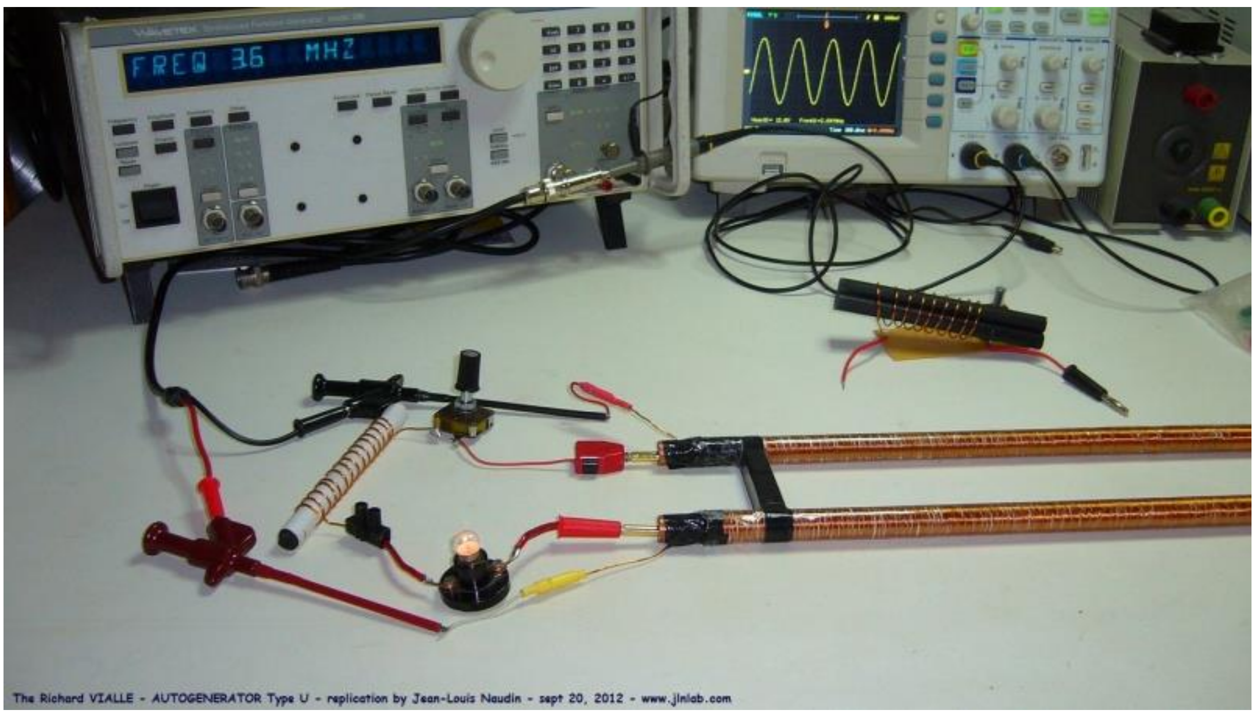
After these encouraging first tests, I tried to optimize Richard Vialle's U-shaped generator.

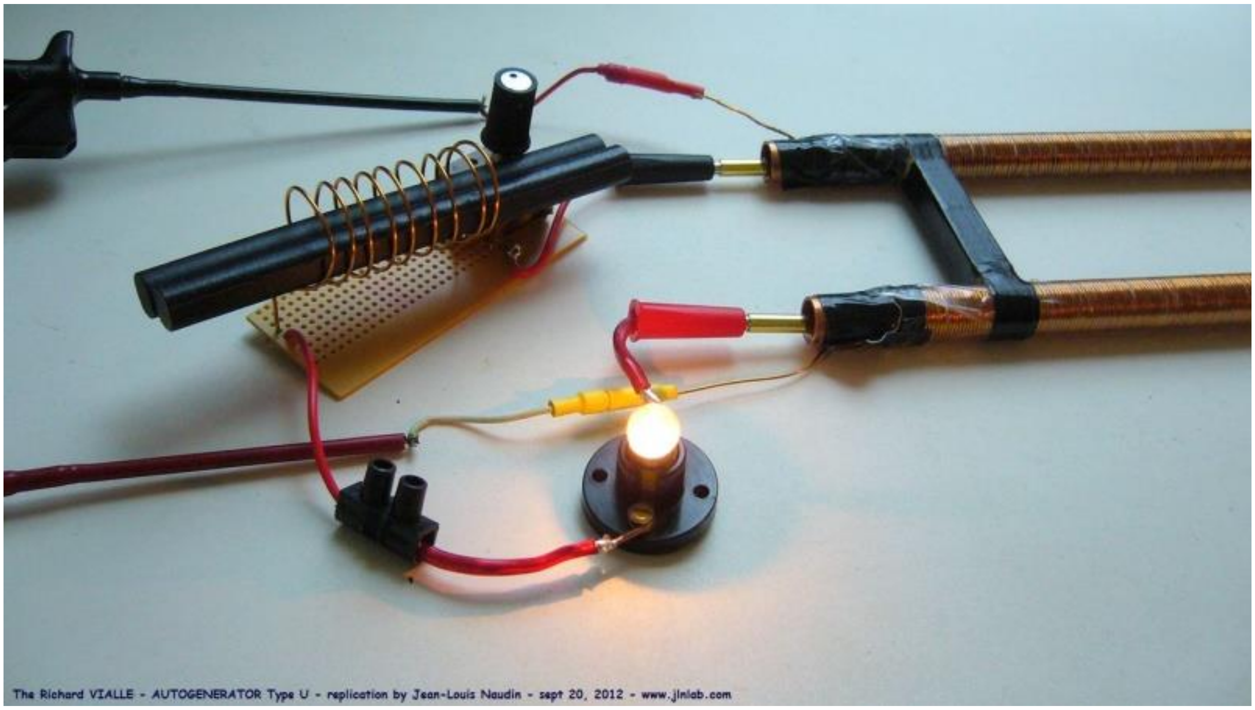


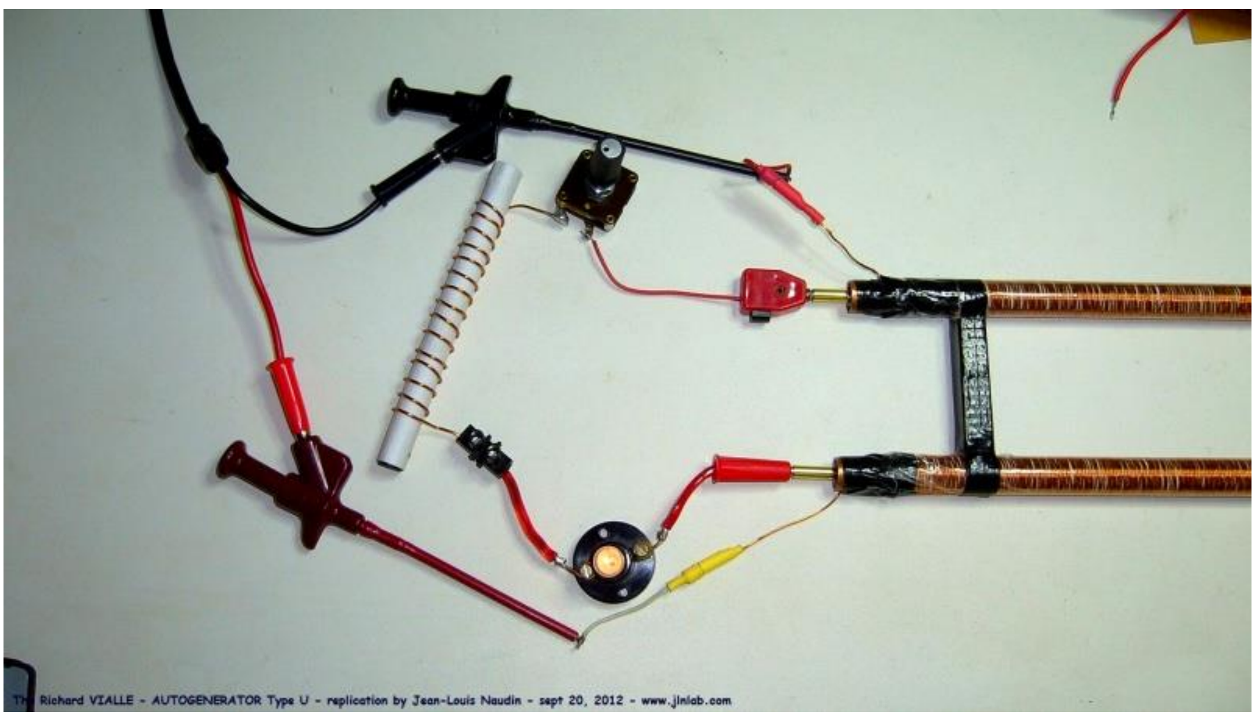
Chapter 3

Optimization of the Resonance of the U-shaped Autogenerator

In order to optimize Richard Vialle's U-shaped generator, I tested different LC circuits connected to the U-tube (output of the autogenerator). A 6V at 100mA lamp has been connected as a load. The frequency of the function generator is fixed at 3.6 MHz.

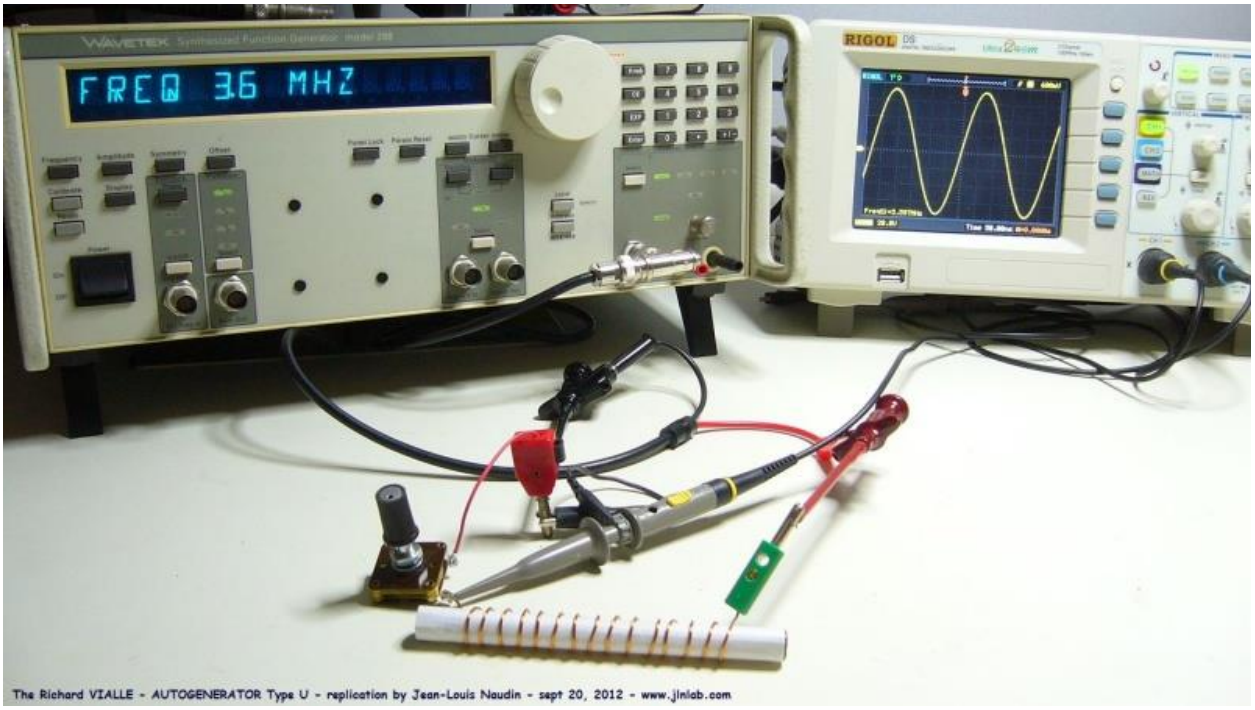


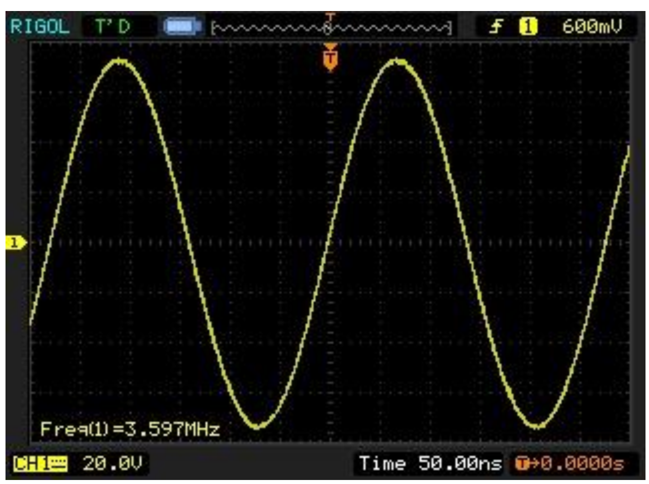




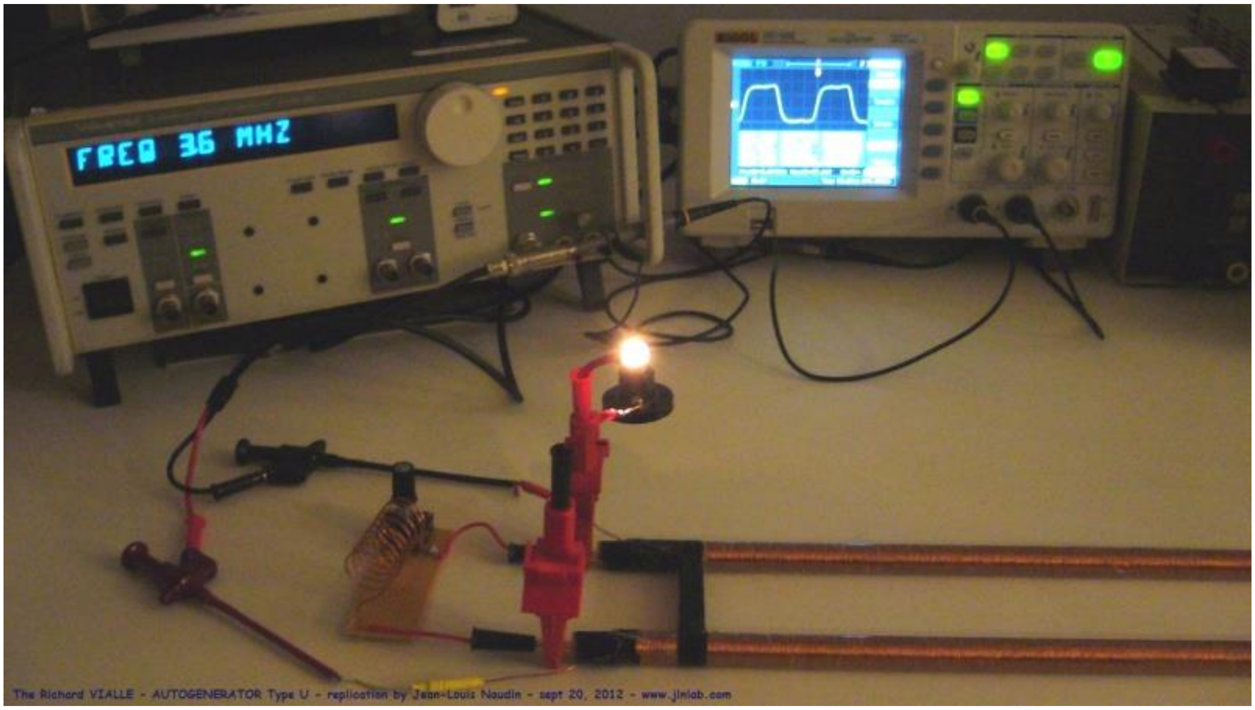
To date, the optimal configuration is the use of a coil of 15 turns of 10/10 mm enameled wire wound on a ferrite rod 10 mm in diameter and 120 mm long with a variable capacitor of 500pF.

I then checked with the oscilloscope that the resonant frequency of the LC circuit was indeed 3.6 MHz.





I found that the charging lamp lights up brighter with a 3.6 MHz square wave than with a pure sine wave. Richard Vialle also noted this fact.



This last interesting observation led me to think that we could therefore design a simple oscillator circuit at 3.6 MHz that produces a symmetrical square wave of high power. This is perfectly possible with fast switching MOSFET transistors and a Royer oscillator. This would allow a simple assembly that is inexpensive and easy to reproduce by all.

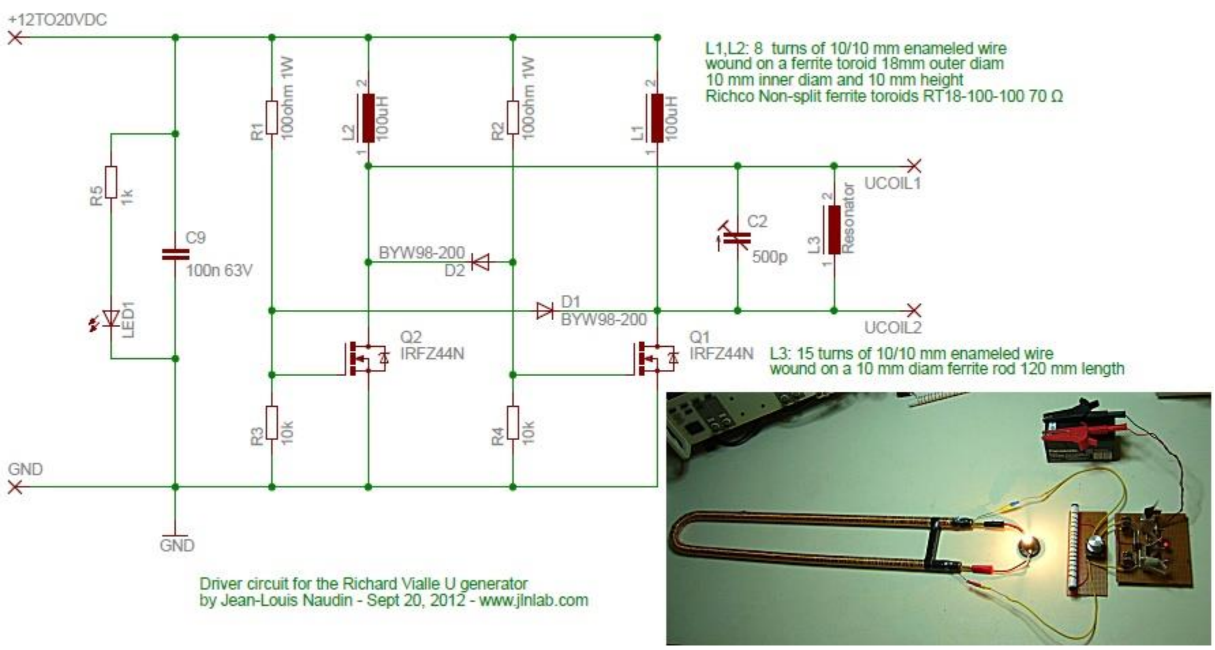
Chapter 4

Realization of the Richard Vialle U-shaped Autogenerator

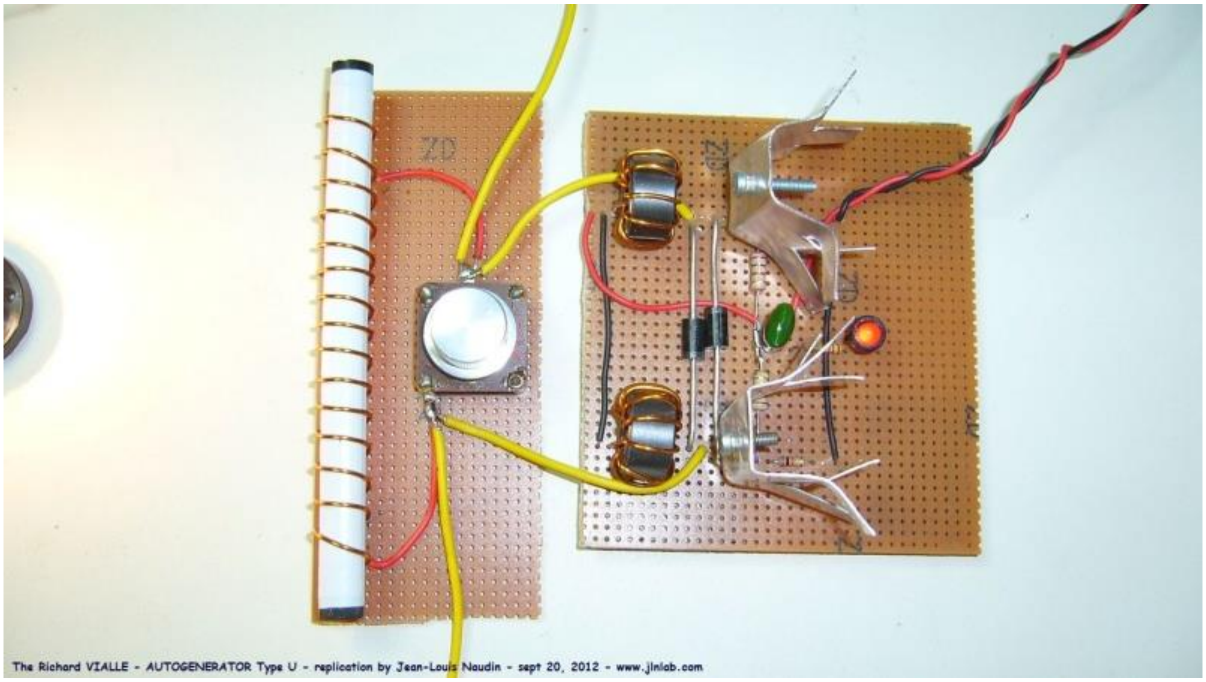
It is Simple and Reproducible by All!

As a result of the last tests and experimental observations carried out on Richard Vialle's U-shaped autogenerator, I therefore designed and produced an oscillator circuit (Royer type) to drive the U-shaped autogenerator. The LC circuit that was previously optimized for the optimum frequency and operating mode was used as the pilot oscillator. This oscillator, which drives the U-shaped autogenerator, uses 2 fast IRFZ44N MOSFET transistors and 2 fast switching BYW98-200 diodes. The circuit can be supplied with a direct voltage of 12V (a battery for example) to 20V. A variable capacitor is used to finely adjust the operating frequency of the autogenerator.

Here is the schematic of the pilot oscillator of Richard Vialle's U-shaped autogenerator:



Here is the prototype electronic board of the pilot oscillator v1.0:

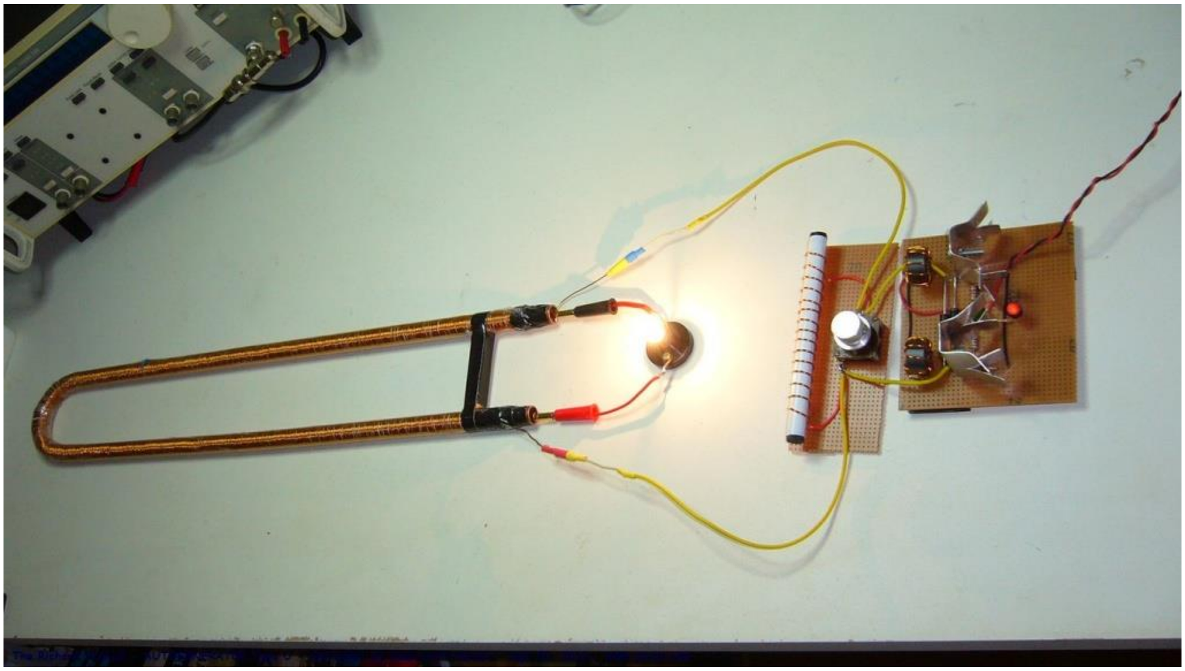


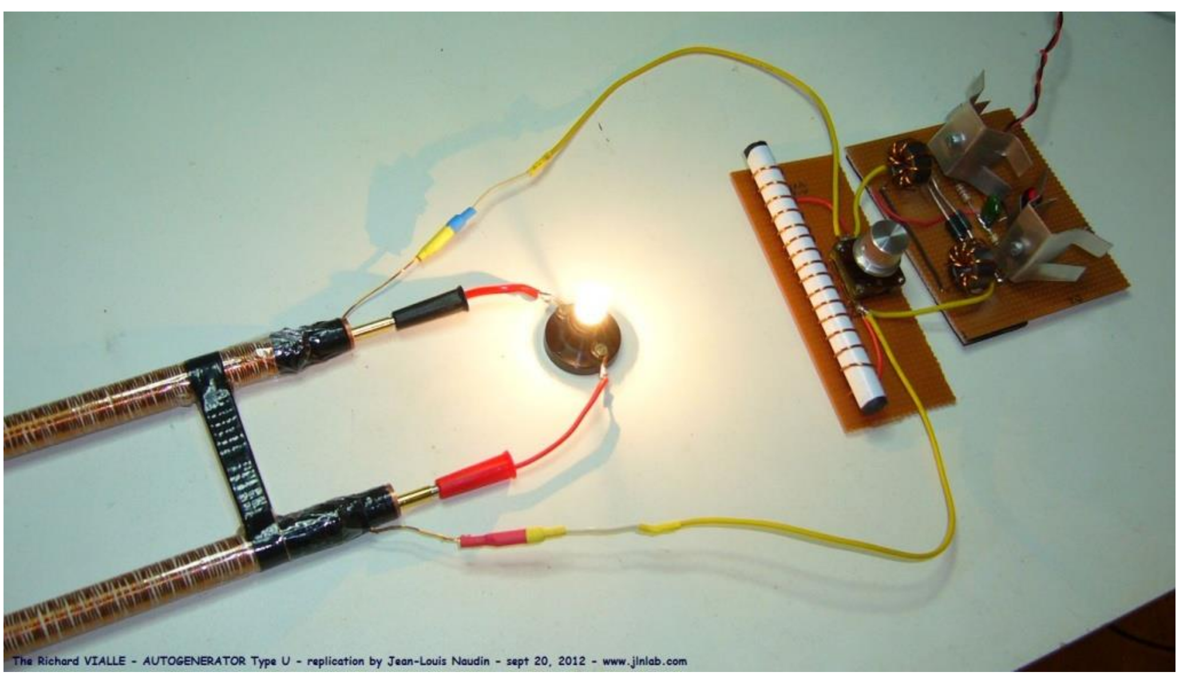
And here is a detailed view of the adjustable capacitor and coil.

I recommend using an isolated knob on the axis of the variable capacitor so as not to disturb the adjustment when approaching with the hands.

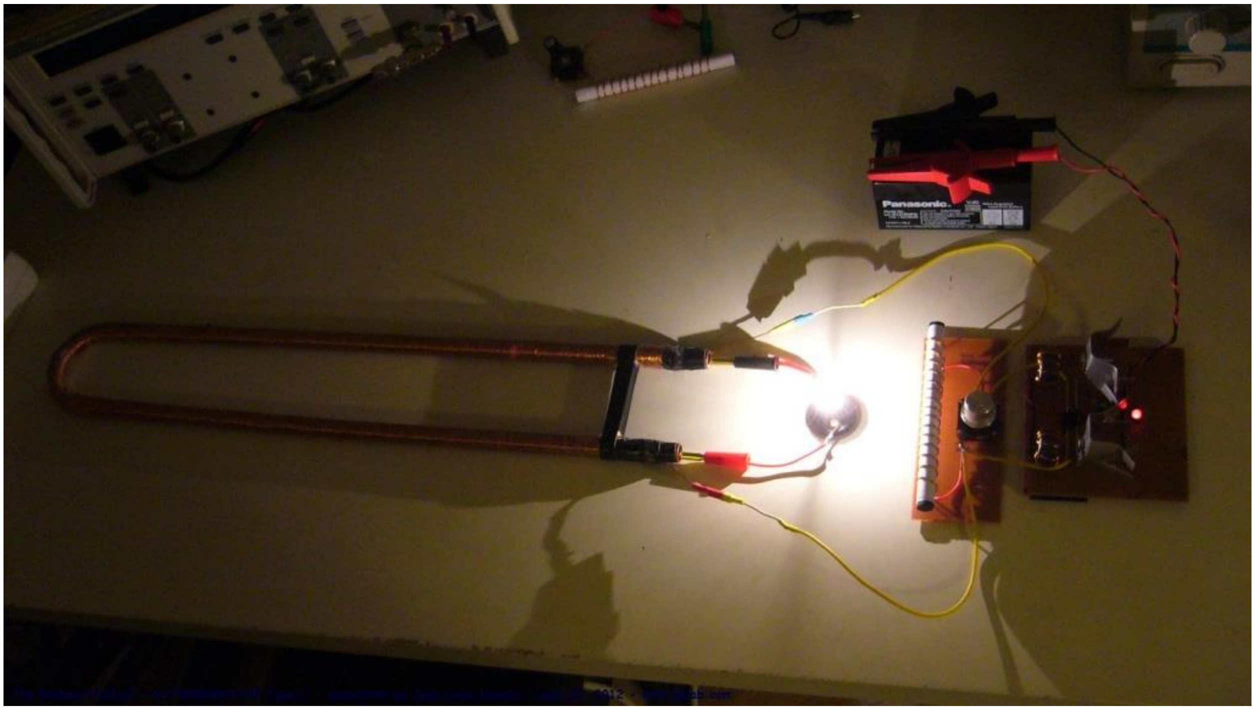
As soon as the pilot oscillator is energized, the 6V at 100mA lamp connected to the terminals of the U-shaped copper tube lights up instantly.

I recommend starting with a supply voltage of 12 Volts.





Richard Vialle's U-shaped autogenerator also works with a simple 12-volt battery.



These first tests showed that Richard Vialle's U-shaped autogenerator works as his theoretical calculation has shown. There is still a lot to dig into and many other experiments and measurements to be carried out. These tests are not finished and are just beginning, stay tuned.

I wish you good construction and good experiences with this U-shaped autogenerator.

Additional technical documents:

- Advanced Power MOSFET IRFZ44 datasheet
- BYW98-200 - High efficiency fast recovery rectifier diode datasheet
- Richco Non-Split ferrite toroids RT18-100-100 datasheet

Parts List

1 x 10mm diameter and 120mm long (0.394 inch diameter and 5 inches long) ferrite rod

18 AWG enameled copper magnet wire

500pF variable capacitor

Plastic knob for variable capacitor

1 x 1k ½ watt resistor

2 x 100 ohm 1 watt resistor

2 x 10K ½ watt resistor

1 x 100nF 63V ceramic capacitor

1 x LED

2 x BYW98-200 diode or equivalent diode

2 x IRFZ44N MOSFET transistor

2 x TO-220 Heat sink

2 x TO-220 Heat sink thermal pad

1 x perforated circuit board

18mm O.D. x 10mm I.D. x 10mm Thick toroid for up to 10Mhz or more in frequency

6V at 100mA incandescent lamp

12 Volt DC power supply

10 MHz or higher function generator

Oscilloscope

20 AWG hookup wire

Chapter 5

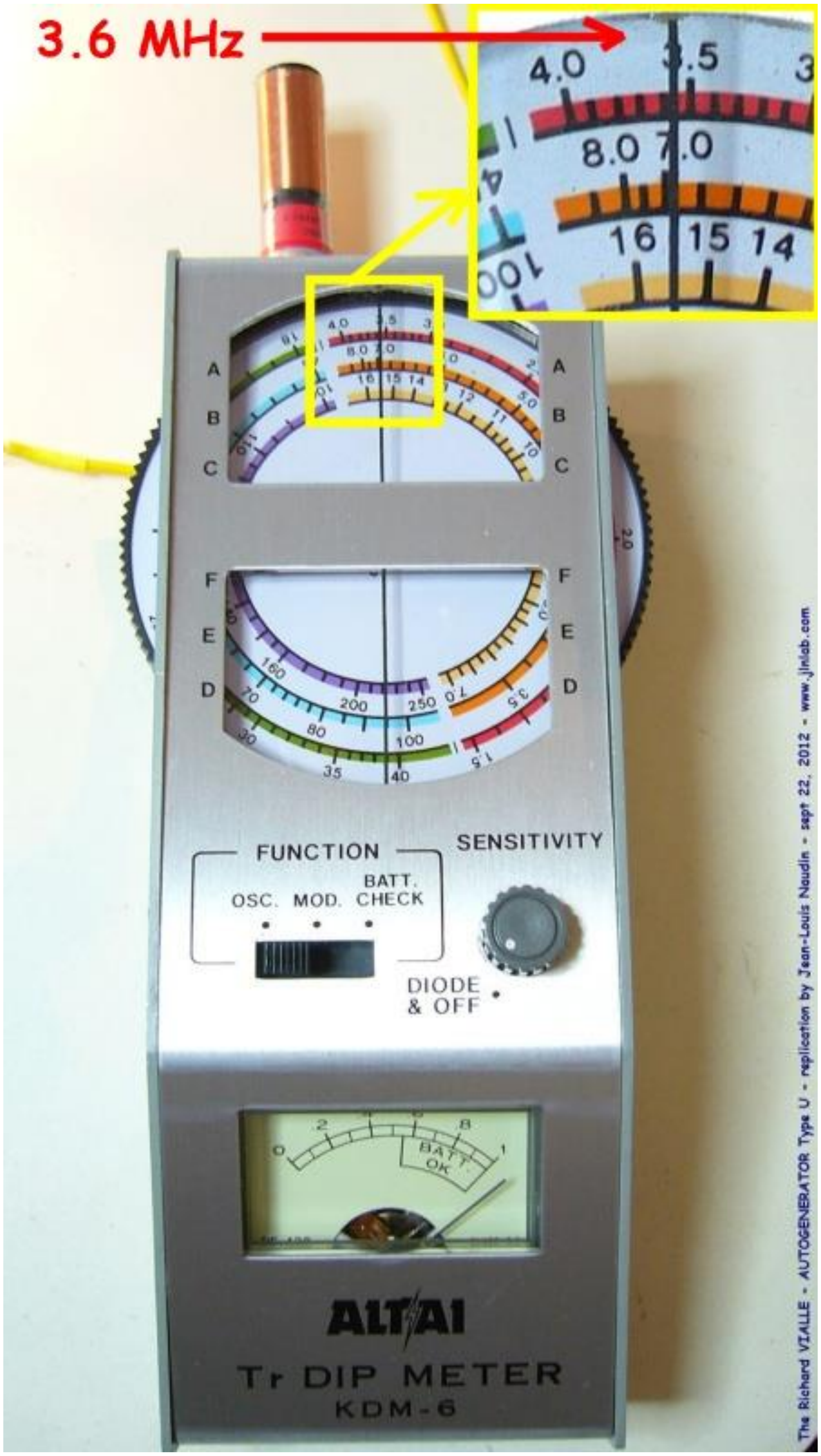
Fine-tuning the LC Circuit of the U-shaped Autogenerator Pilot Oscillator

With an Absorption Wavemeter

In order to optimize the LC circuit at the frequency of the oscillator which drives the U-shaped autogenerator, I used an absorption wavemeter. This device makes it possible to perform a remote measurement (by electromagnetic coupling and therefore without an electrical connection) of the operating frequency of an oscillator. Thus, I was able to make a more precise adjustment of the LC circuit of the pilot oscillator taking into account the losses in the wires and in the printed circuit. For this I used an Altai KD6M dipmeter / wavemeter.

This method allows fine adjustment of the LC circuit by taking into account the losses in the wires and in the printed circuit of the prototype assembly.

In order to optimize the adjustment range of the variable capacitor of 500pF, I reduced the number of turns in the coil to 8 turns of 10/10mm wire on the ferrite bar of 10 x 120mm.



3.6 MHz
FUNCTION
SENSITIVITY
OSC. MOD. BATT. CHECK
DIODE & OFF
ALTAI
Tr DIP METER
KDM-6
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - sept 22, 2012 - www.jlnlab.com

The frequency of the pilot oscillator is indeed 3.6 MHz.

Good construction and good experiences with this U-shaped autogenerator by Richard Vialle.

Additional technical documents:

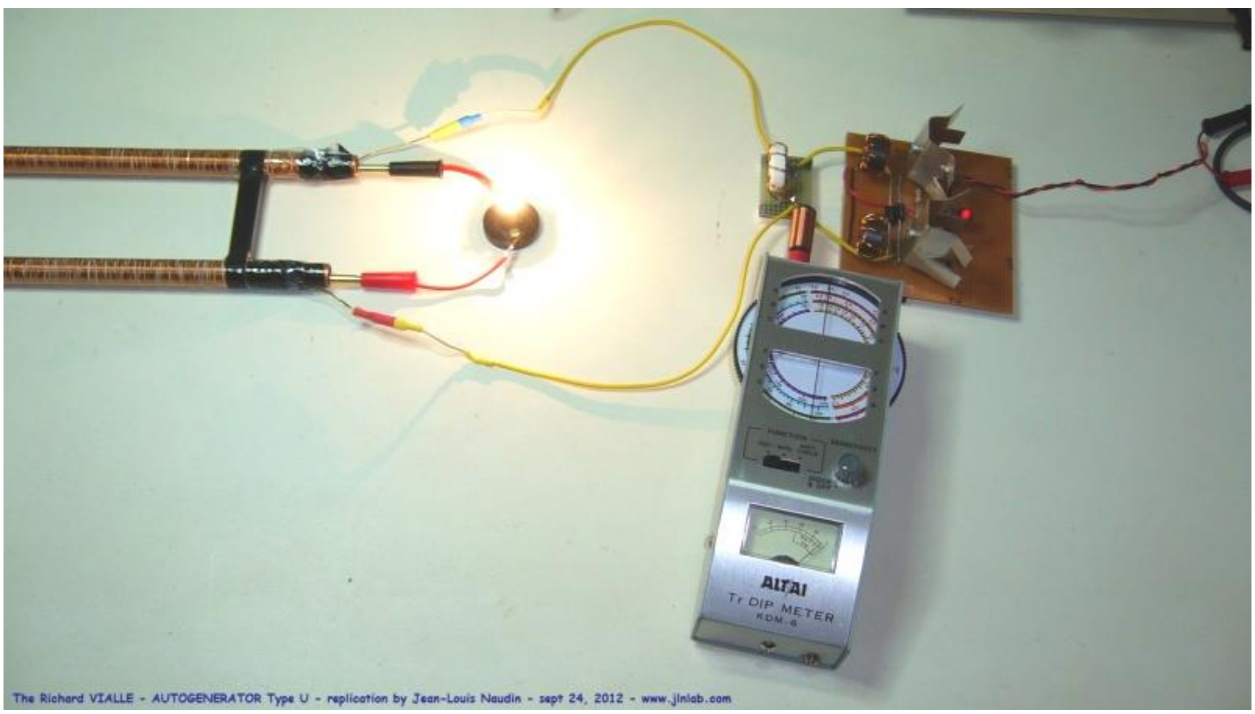
Altai Dip meter KD6M user manual

Editor's Note: the Dip meter is also called a "Grid Dip meter."

Chapter 6

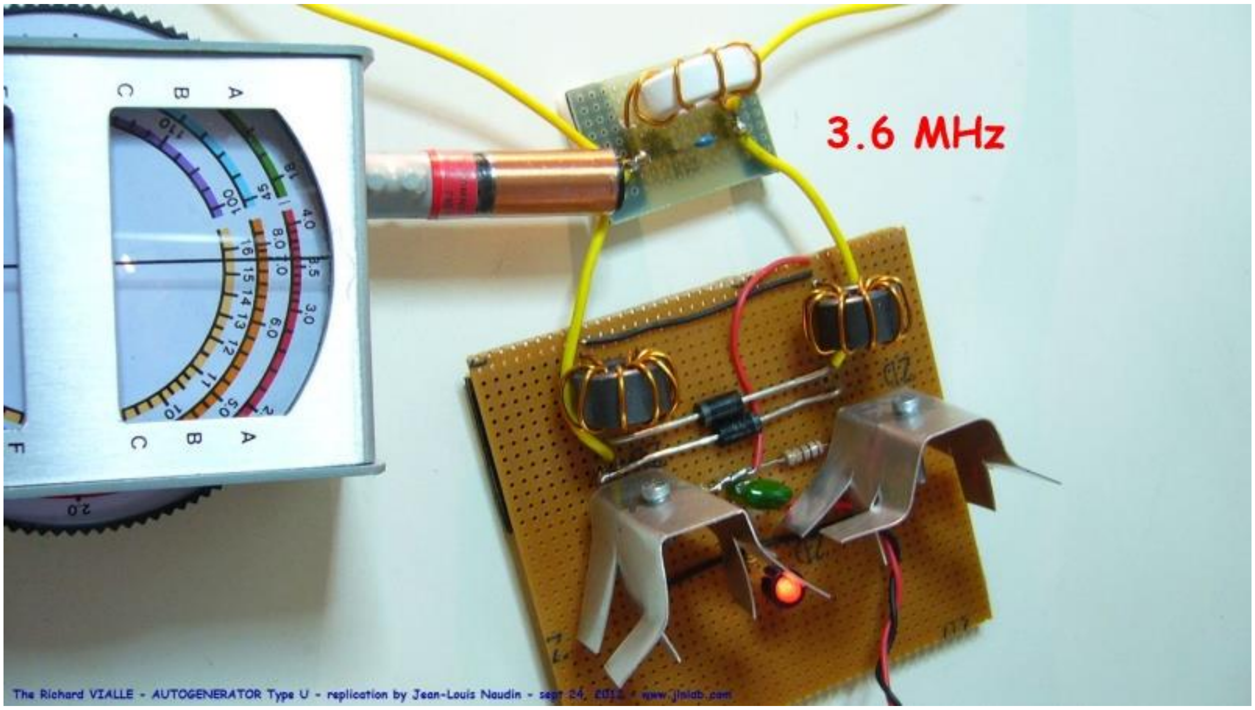
New Optimized Pilot Oscillator v1.1 Schematic for U-Shaped Autogenerator

We have previously measured that the optimal operating frequency (load lamp lit at maximum) of Richard Vialle's U-shaped generator is 3.6 MHz in perfect accordance with his theoretical calculation. So I designed an LC circuit with fixed components tuned to this frequency so there is no adjustment to be made and the circuit worked the first time. In order to reduce parasitic electromagnetic radiation from the LC circuit, I've wound the inductance on a ferrite toroid core.

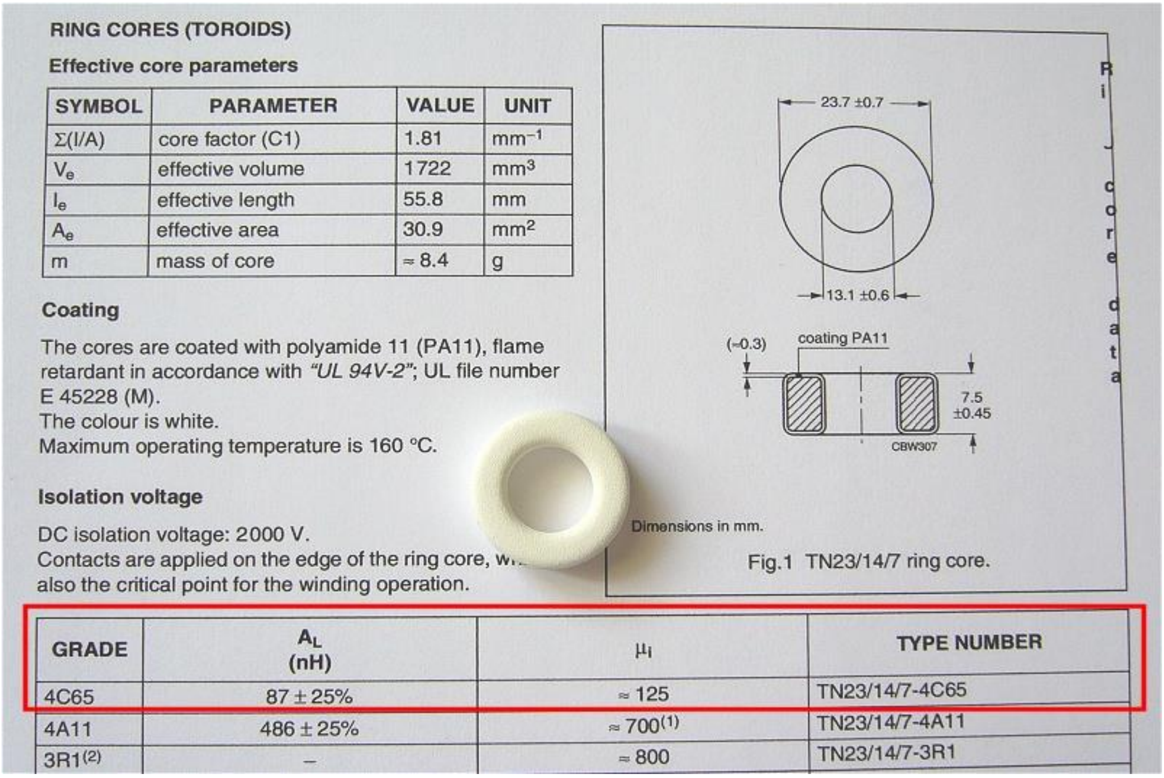


The tuning of the circuit has been verified with an absorption wavemeter which confirms the resonant frequency of the pilot circuit at 3.6 MHz.

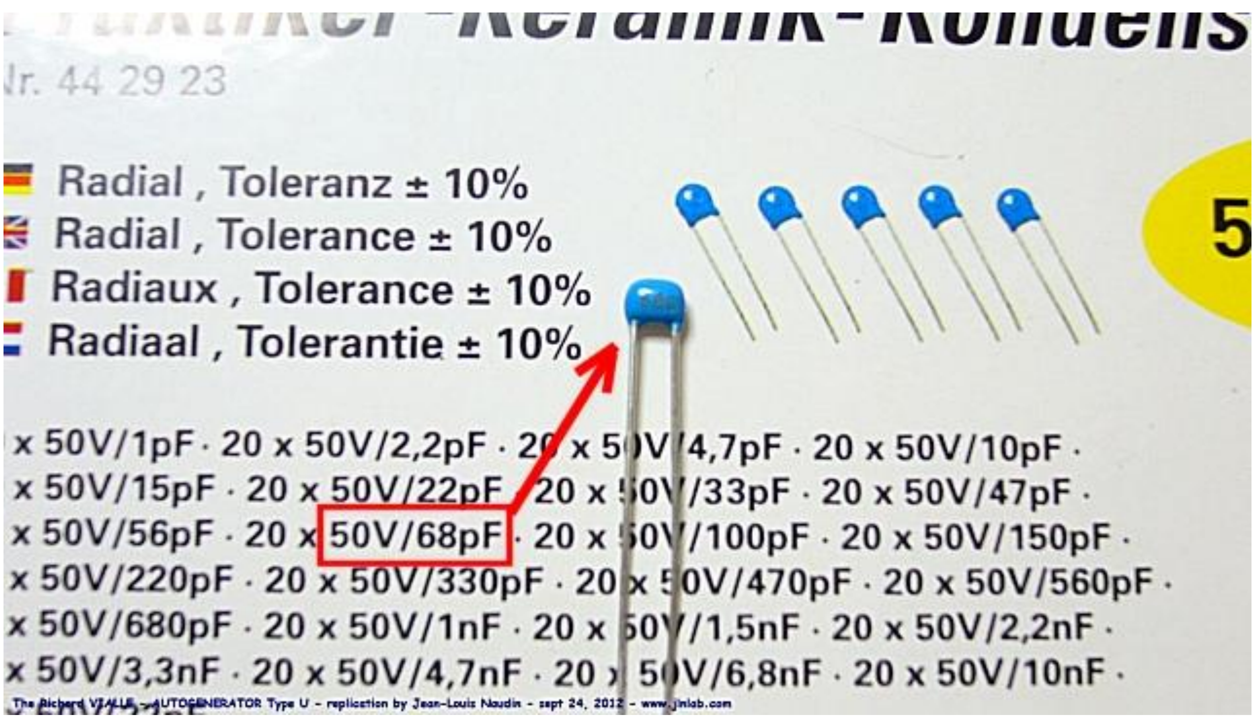
For this I used an Altai KD6M dipmeter / wavemeter.

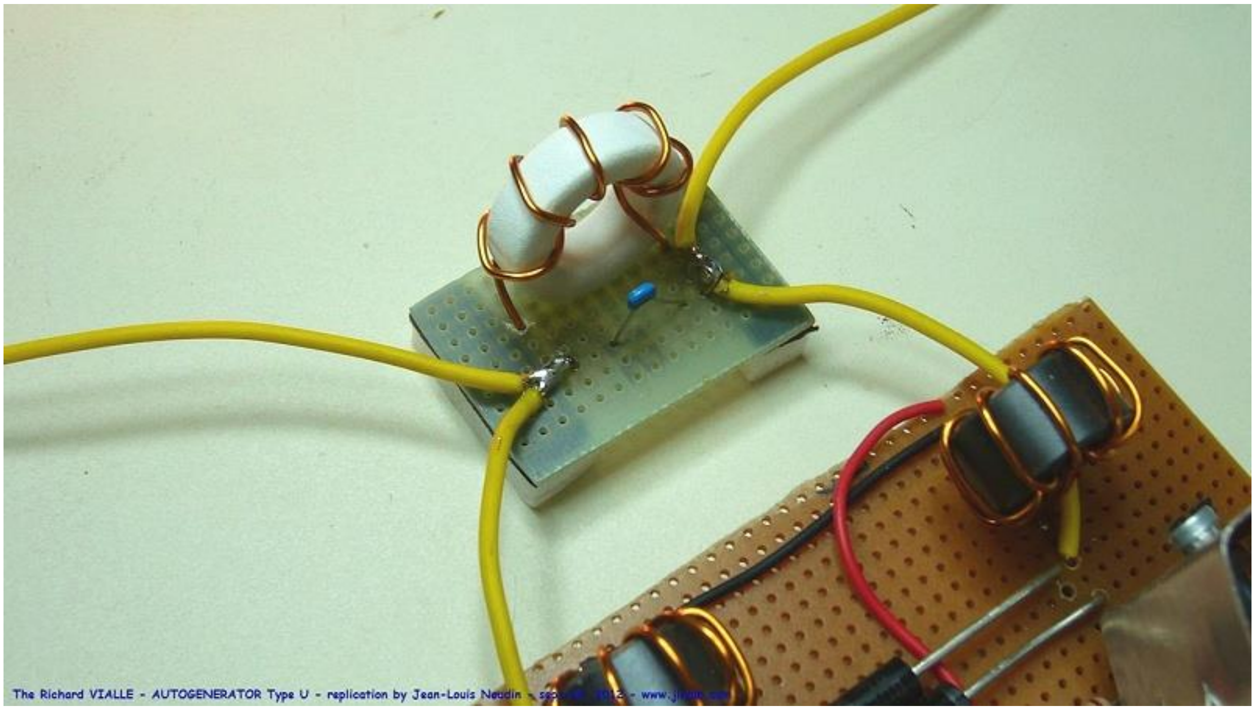


The LC circuit with fixed components is composed of a ferrite toroid of Ferroxcube brand and reference TN23/47 of grade 4C65 and µi = 125. There are 5 turns of 10/10 mm enameled wire on the toroid.

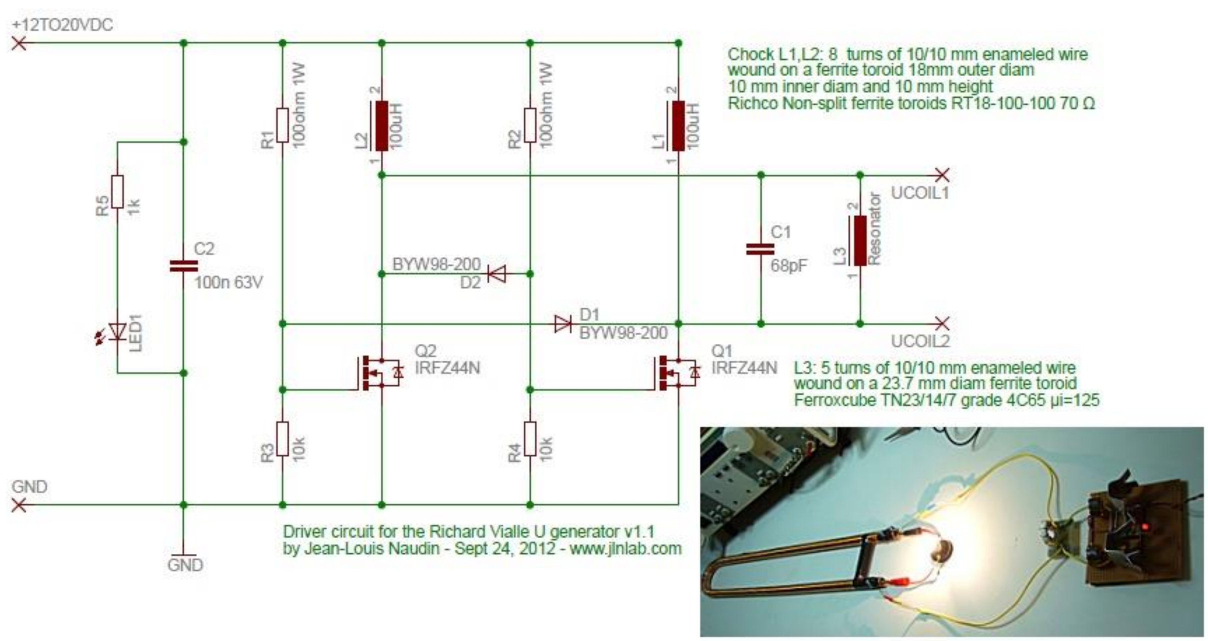


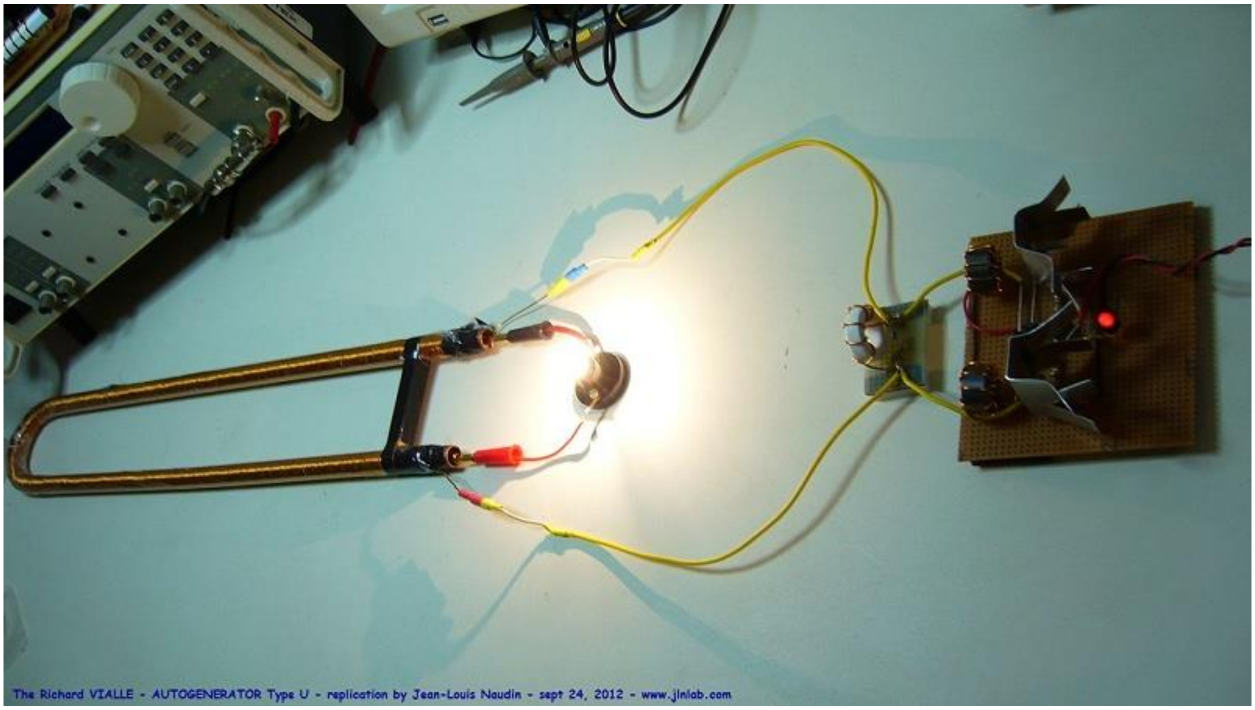
The capacitor is a 68 pF ceramic capacitor.





Here is the schematic of pilot oscillator v1.1.





Good construction and good experiences with this U-shaped autogenerator by Richard Vialle.

Additional technical documents:

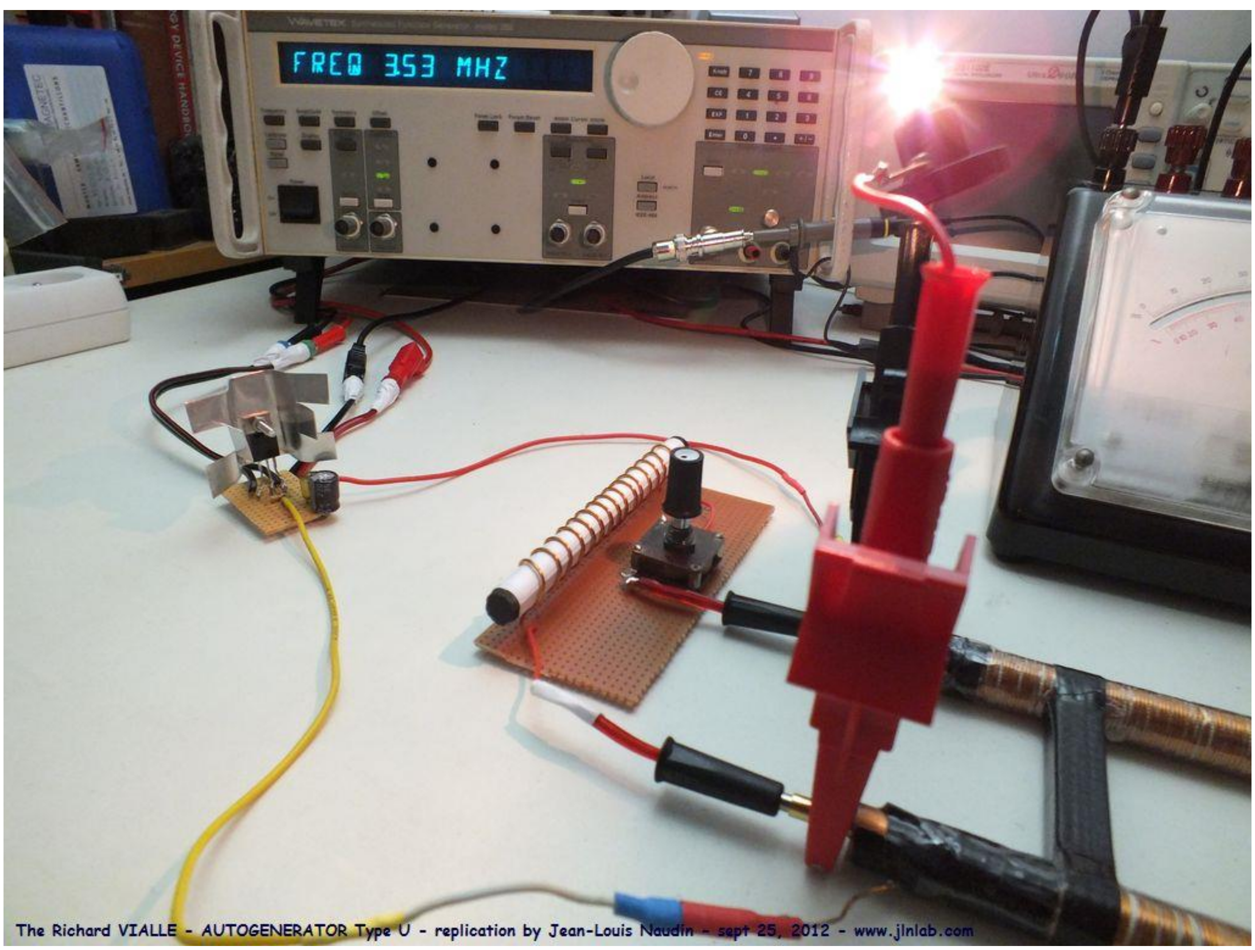
- Ferroxcube ferrite toroïd 4C65 datasheet
- Altai Dip meter KD6M user manual

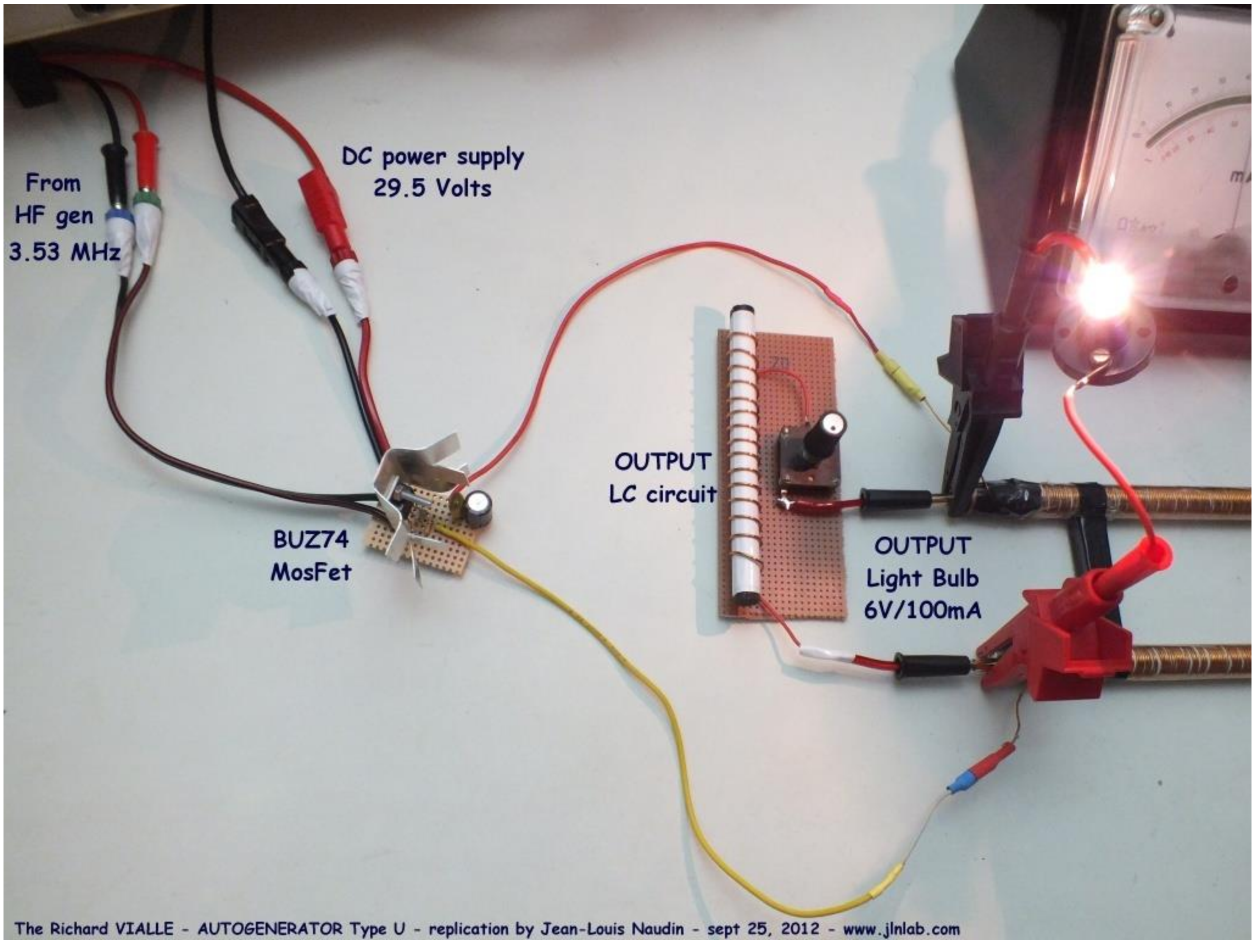
Chapter 7

On-load and Off-load Tests and Measurements

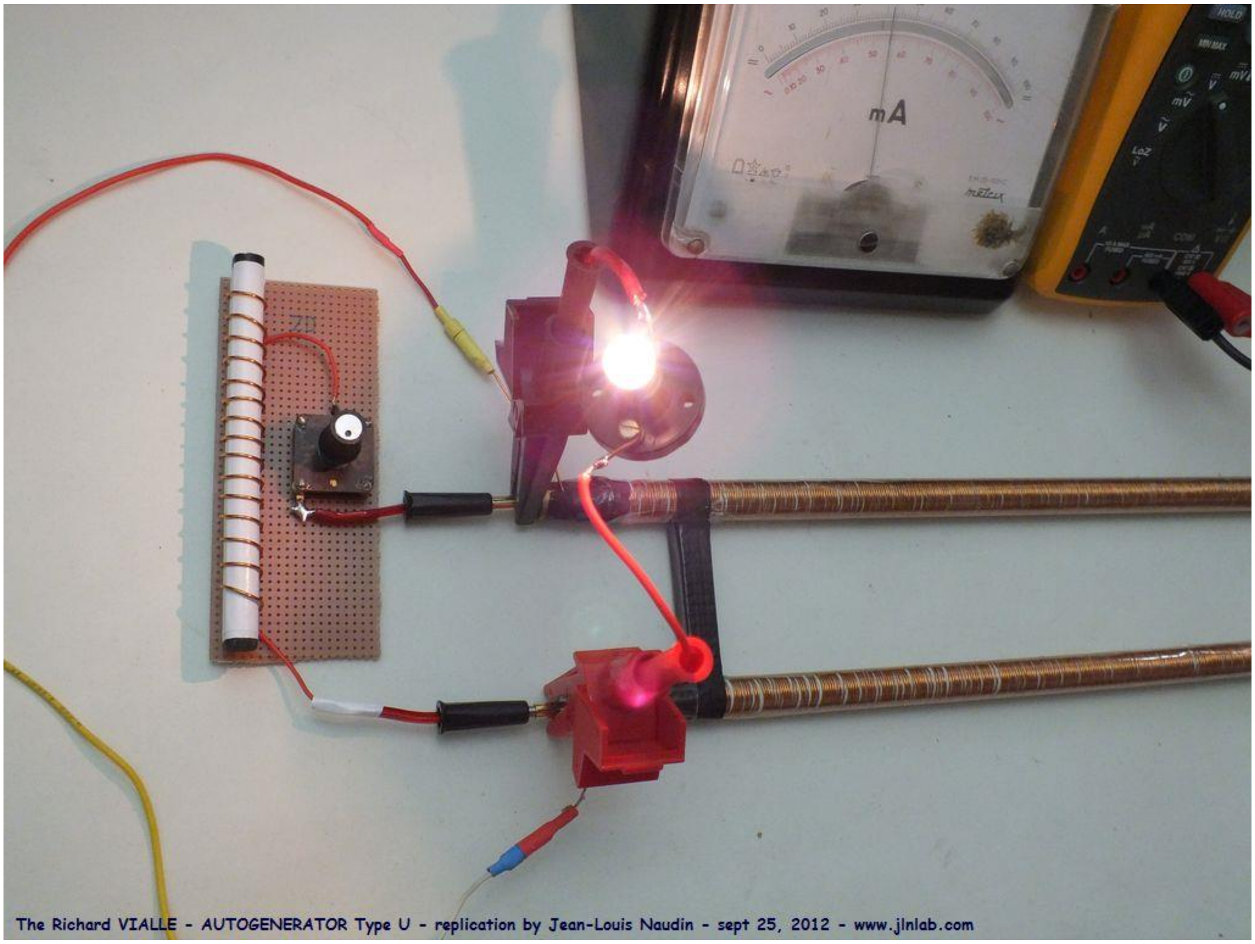
At the Optimum Operating Point of the U-shaped Autogenerator

In order to study the behavior of the supply current at the operating point of Richard Vialle's U-shaped autogenerator, I reconnected my Wavetek 288 function generator interfaced by a small power circuit using a MOSFET BUZ74 transistor. This configuration allows me to control and measure very precisely the optimum operating frequency of the U-shaped autogenerator. The power circuit is supplied by a stabilized power supply delivering a continuous voltage of 30V. The direct supply current is measured with an analog Metrix milliamperemeter and the voltage with a digital voltmeter. I chose to use a needle milliamperemeter because it allows fine tuning that is much more intuitive and visual than a digital device.



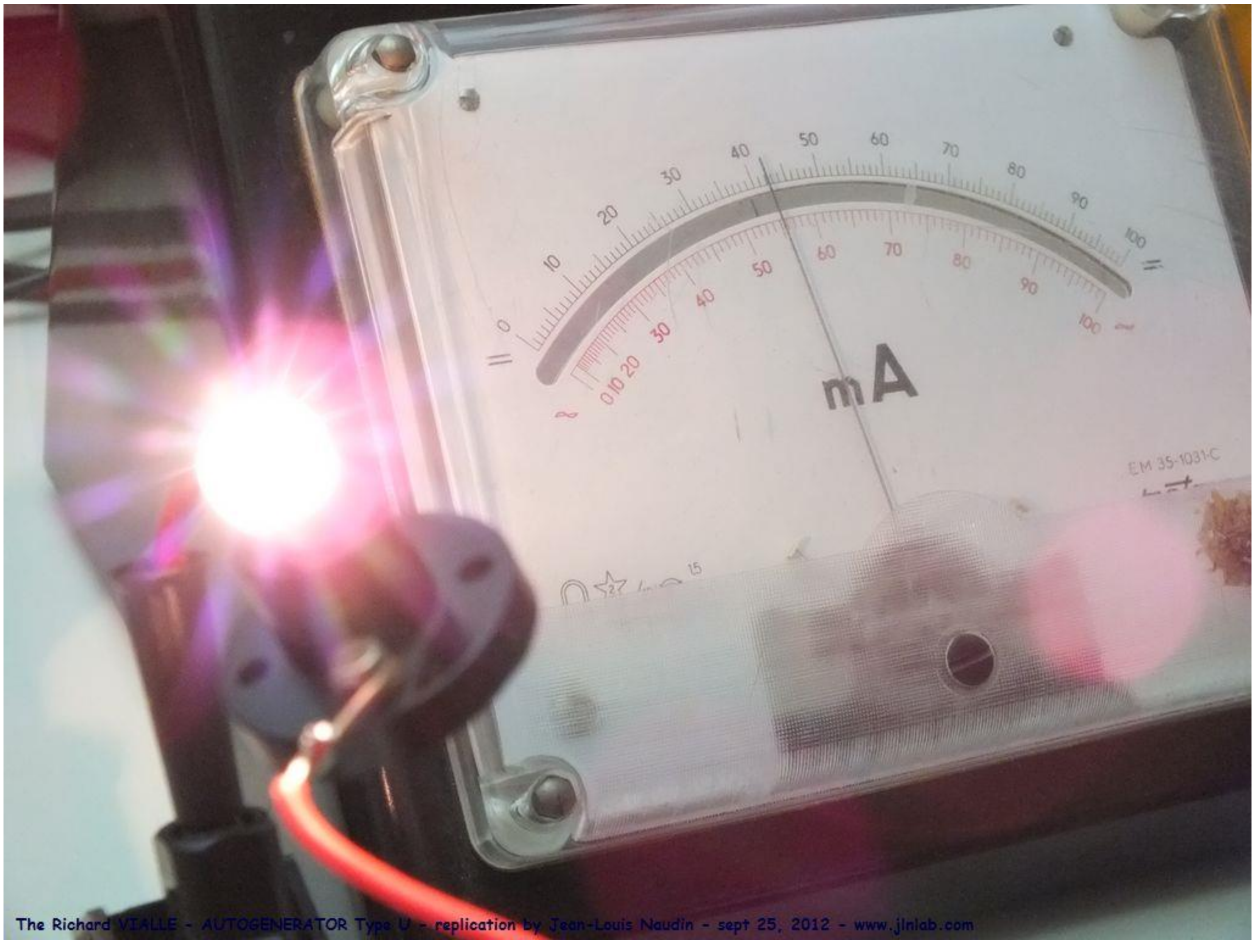


A tuned LC circuit is connected in parallel with the charging lamp (6V at 100mA) and on the 2 U-shaped half-tubes.

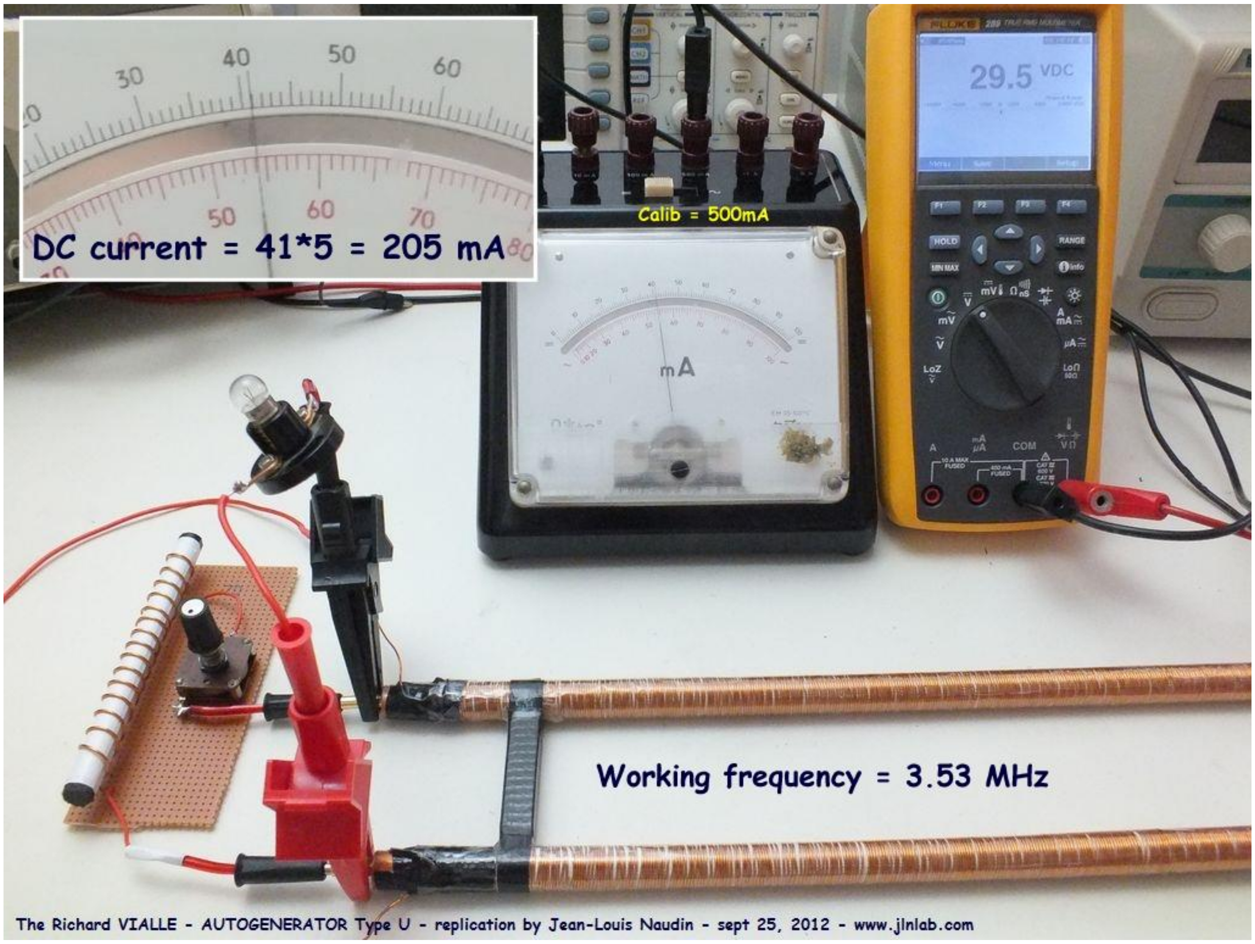


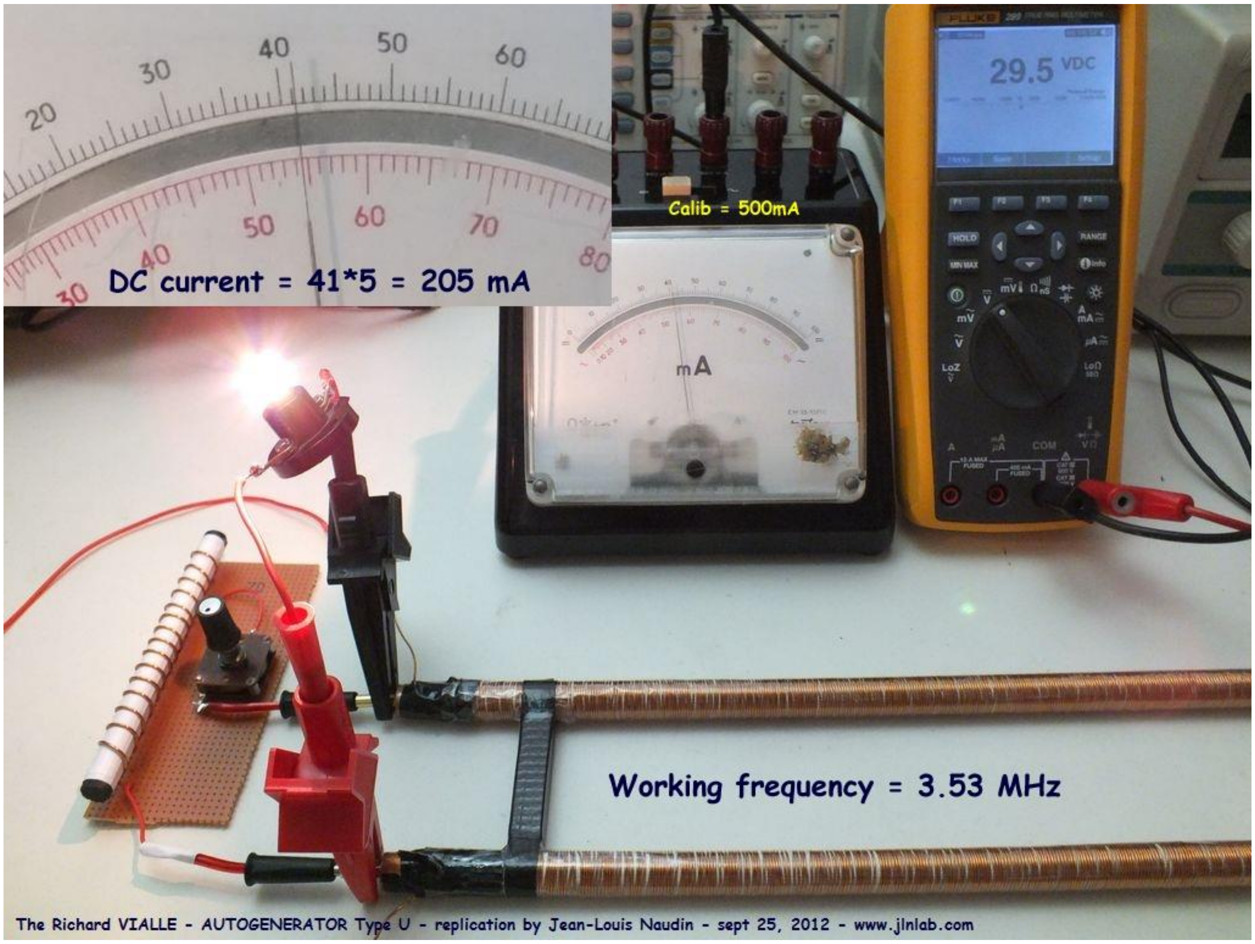
The operating point is delicate and sharp to adjust, and it requires a little skill. The frequency of this tested circuit is 3.53 MHz.

Optimal brightness must be obtained, but also the invariance (or at best the reduction) of the consumption of the continuous power at the input.



When the optimum operating point of the autogenerator is found (here measured at 3.53MHz), we see the invariance or drop in power at the input when the load lamp is on or off. *Editor's Note: In other words, the input power required either does not vary or drops when the output load is connected. This is a very remarkable effect.*


DC current = 41*5 = 205 mA
Calib = 500mA
29.5 VDC
mA
Working frequency = 3.53 MHz
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - sept 25, 2012 - www.jlnlab.com



Here is a video of the U-shaped autogenerator in action:

https://youtu.be/UnR2hydBk30

This experience tends to confirm again the theory and experience of Richard Vialle.

Chapter 8

Drop in Input Power Measured

When the U-shaped Autogenerator is Under Load

Following the tests of the U-shaped autogenerator that I carried out previously and which demonstrated the invariance of the input power in load or in no load, I therefore continued the optimization of the assembly by approaching Richard Vialle's experience as well as possible.

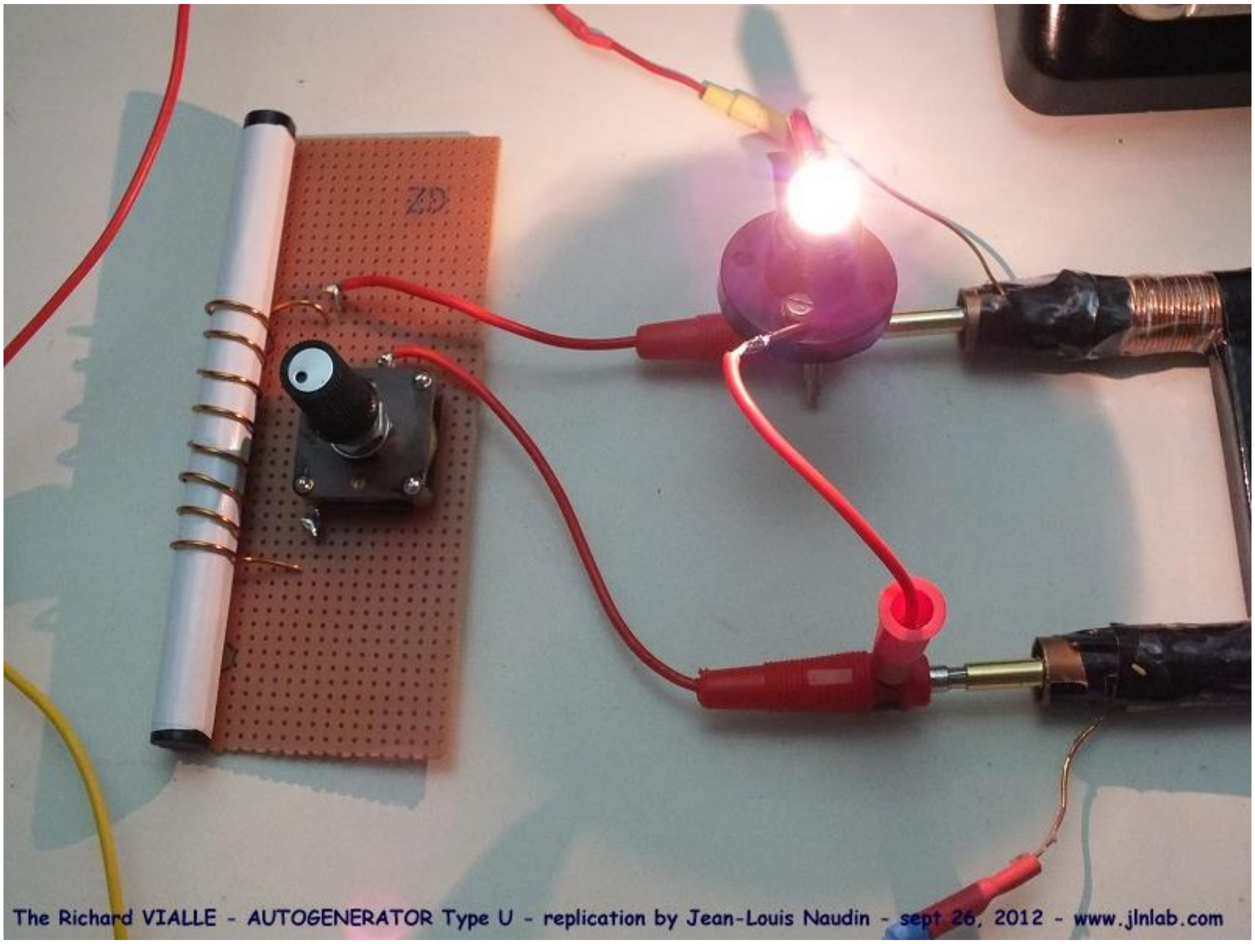
Richard Vialle's theory shows by the calculation below, that the operating frequency to obtain the optimal effect is 3.6 MHz.

A NE PAS MODIFIER	Constantes physiques			
Constante de structure fine	α	7,29735307964E-03	Données de physique	
Charge de l'électron	e (C)	1,60217733000E-19		
Vitesse de la lumière dans le vide	c (m/s)	2,99792458000E+08		
Masse de l'électron	m0 (kg)	9,10938970000E-31		
Rayon de Bohr	R0 (m)	5,29177249000E-11		
Epsilon 0	ε0 (As/Vm)	8,85418781762E-12		
Nombre d'Avogadro	Na	6,02213670000E+23		
Paramètres à modifier: BARREAU	Modifier ce qui est en rouge gras			
Angle θ entre les électrons et l'axe du barreau	cos²(θ)	0,450	Modèle Richard VIALLE (ne pas changer inconsidérément)	mesure expérimentale
Fréquence de résonance des électrons liés sur orbitale	f0	1,670E+07		mesure expérimentale
Masse volumique du matériau du barreau	Mv (kg/m3)	**8954,00**	Type de métal du barreau	cuivre=8954
Masse molaire du matériau du barreau	Mm (g/mol)	**63,546**		cuivre=63.546
Nombre d' électrons liés par atome de matériau du barreau	n	**28**		cuivre=28
Résistivité du matériau du barreau	ρ (Ω.m)	**1,673E-08**		cuivre=1.673*10^(-8)
Susceptibilité magnétique du matériau du barreau	χm	**-1,000E-05**		cuivre=-10^(-5)
Longueur du barreau	L (m)	**1,000**	Géométrie et dimensions du barreau: cas général	
Aire de la section du barreau (calcul automatique si section ronde)	S (mm²)	**34,5575**		
Périmètre intérieur+extérieur de la section du barreau (auto si rond)	P (mm)	**69,115**		
Si barreau de section ronde (vide ou plein):				
Diamètre extérieur du barreau si tube ou tige	Dext(mm)	**12,000**	Dans le cas d'un barreau de section ronde (vide si tube ou plein si tige)	
Diamètre intérieur du barreau si tube	Dint(mm)	**10,000**		
Aire de la boucle définie par le barreau plié (si applicable)	Sboucle (cm²)	**450,000**		
Périmètre de la boucle définie par le barreau plié (si applicable)	Pboucle (cm)	**100,000**		
----- **Résultats des calculs des paramètres précédents à la suite ici** -----				
A NE PAS MODIFIER	Eléments calculés: BARREAU			
Fréquence de résonance du barreau	f (hz)	3,5946E+06	Caractéristiques électriques correct si le barreau est une tige ronde pleine	
Résistance effective totale (avec effet de peau) du barreau	R0 (Ω)	0,00705		
Inductance de fuite du barreau si droit (formule usuelle)	L0 (nH)	1131,0532		
Inductance de fuite du barreau si droit (formule plus précise)	L0 (nH)	1127,777		
Inductance de fuite du barreau si plié (formule usuelle)	**L0(nH) si boucle**	**591,604**	**Correct si barreau plié**	
Densité volumique d'atomes de matériau du barreau	N (atomes/m3)	8,486E+28		
Perméabilité magnétique relative du matériau du barreau	μr	0,999990		
Capacité virtuelle	C0 (F)	3,8374E-06		
Résistance en continu du barreau	Rc (Ω)	0,00048		
Épaisseur de peau à la fréquence f	e (μm)	34,335		
Diamètre équivalent si c'était un tube rond plein	d (mm)	6,633		
Paramètres à modifier: FIL de court-circuit	Modifier ce qui est en rouge gras			
Résistivité du métal du fil	ρ (Ω.m)	**1,673E-08**	Type de métal du fil	cuivre=1.673*10^(-8)
Susceptibilité magnétique du métal du fil	χm	**-1,000E-05**		cuivre=-10^(-5)
Longueur du fil	L (m)	**1,000**	Dimensions du fil	
Diamètre du fil	d (mm)	**1,0000**		
----- **Résultats des calculs des paramètres précédents à la suite ici** -----				
A NE PAS MODIFIER	Eléments calculés: FIL			
Résistance effective totale (avec effet de peau) du fil	R0 (Ω)	0,16061	Caractéristiques électriques	
Inductance de fuite du fil (formule usuelle)	L0 (nH)	1508,9094		
Inductance de fuite du fil (formule plus précise)	L0 (nH)	1505,628		
Perméabilité magnétique relative du métal du fil	μr	0,999990		
Résistance en continu du fil	Rc (Ω)	0,02130		
Épaisseur de peau à la fréquence f	e (μm)	34,335		

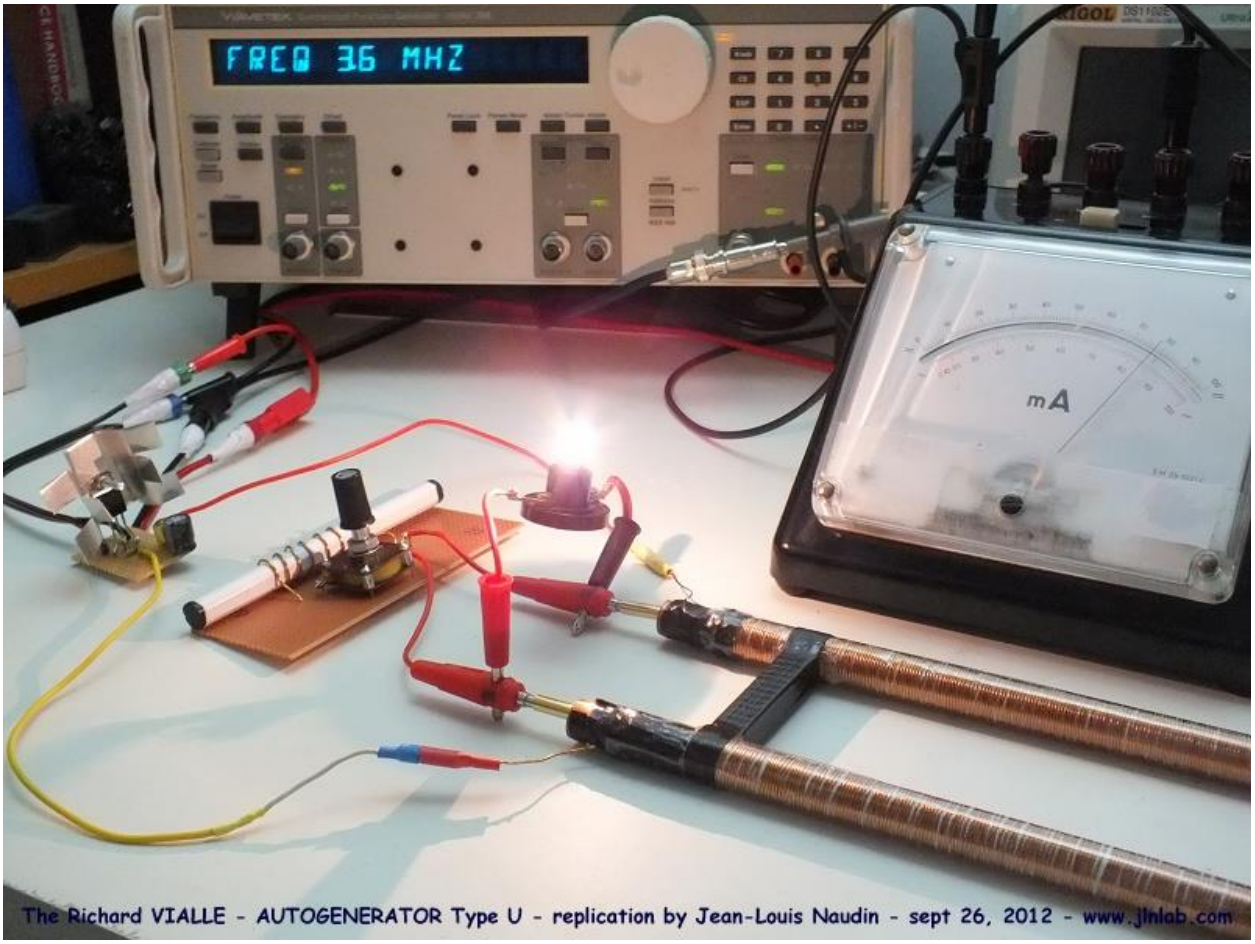
Spec du Tube en U

3.6 Mhz

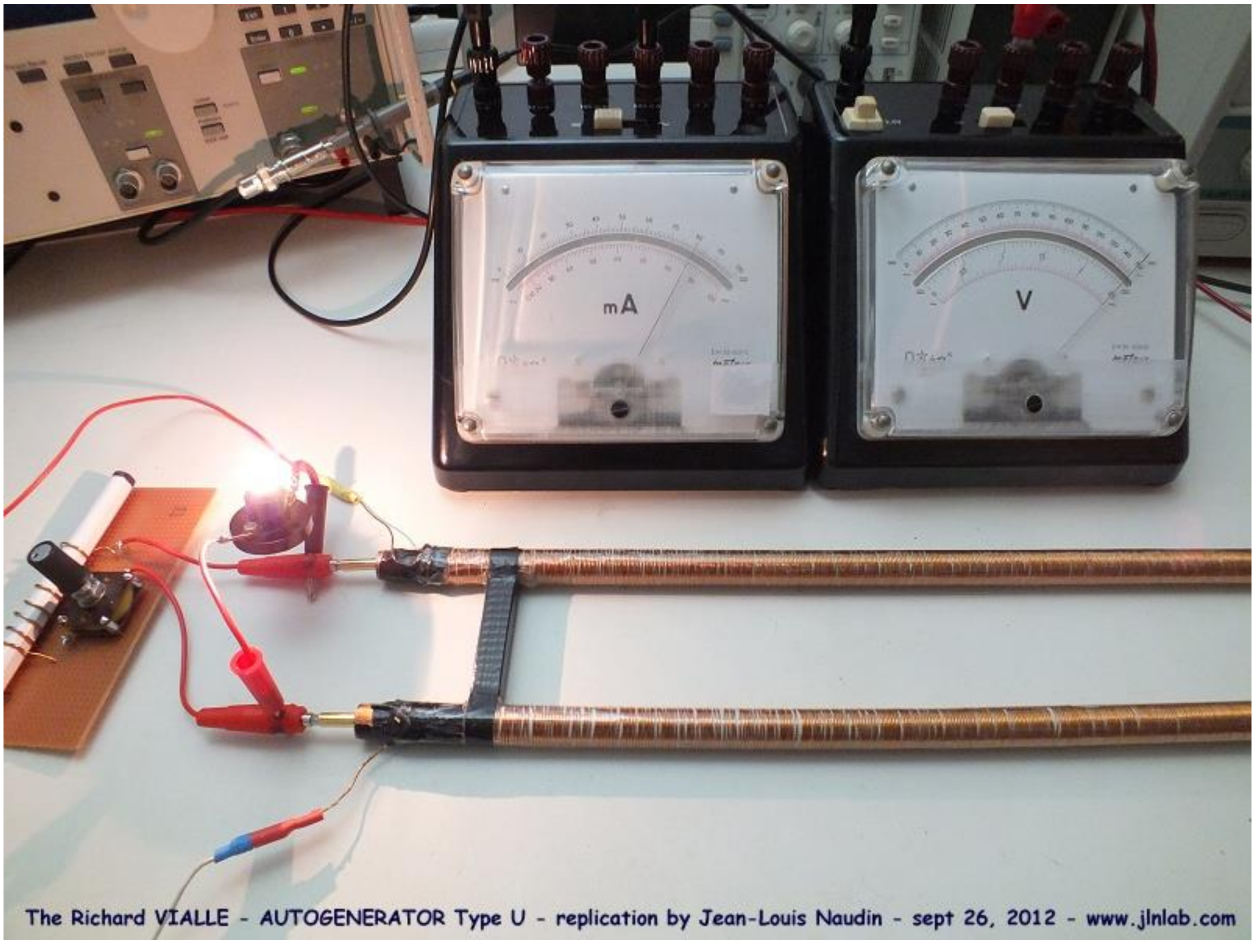
So, I took again the LC circuit previously tuned to 3.6 MHz (with the absorption wavemeter) that I had used for the pilot oscillator. The tuned LC circuit is connected in parallel with the load lamp (6V at 100mA) and on the 2 U-shaped half-tubes. The inductance is made with 8 turns of 10/10 mm enameled wire wound on a rod of ferrite (ferroxcube) 10 mm in diameter and 120 mm long. The capacitor is a 500 pF variable capacitor.



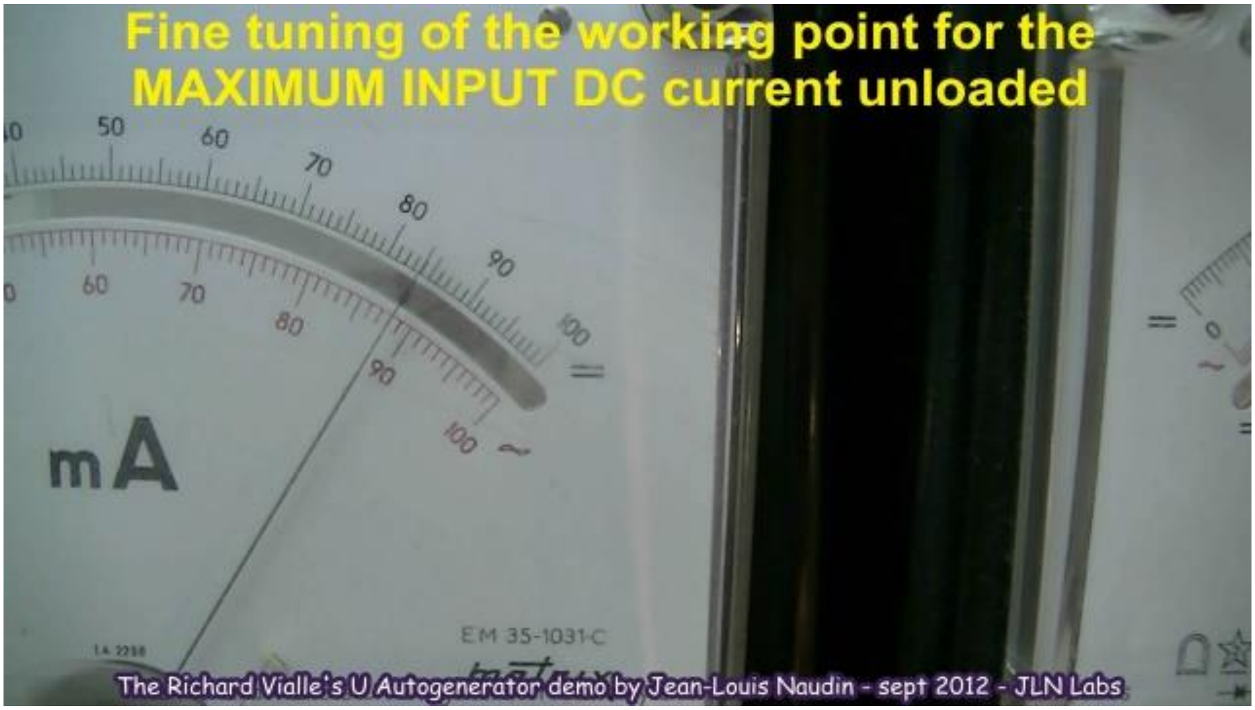
The Wavetek 288 function generator has been programmed on 3.6 MHz (in square wave mode), corresponding to the theoretical frequency calculated by the Richard Vialle formula.

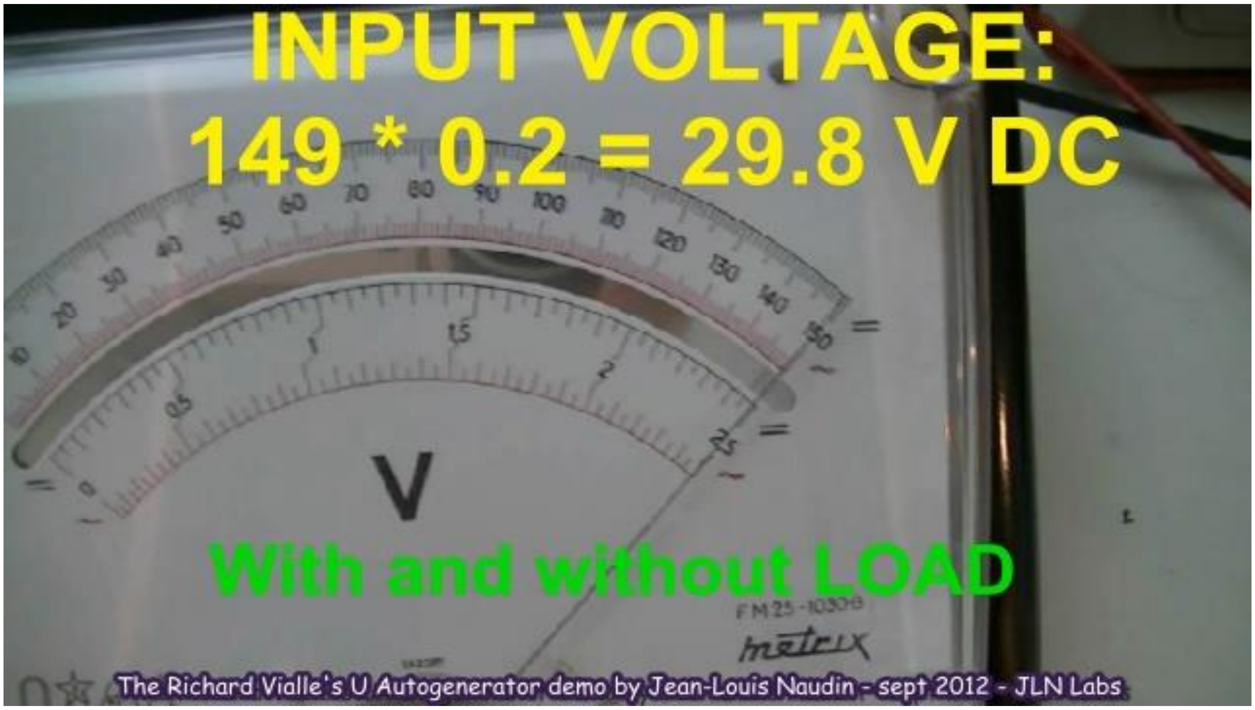


For the measurement of the direct current supplying the amplifier of the U-shaped autogenerator, I used a Metrix analog milliammeter (500mA calibration); this allows a very visual fine adjustment of the operating point of the autogenerator. To measure the DC voltage supplying the U-shaped autogenerator amplifier, I used a Metrix analog voltmeter (on 30V calibration).



The operating point is adjusted without the lamp connected, so as to obtain the maximum direct current supplying the amplifier of the autogenerator. The measured no-load current is around 420 mA; see the test video below. The supply voltage measured with no load or under load is 29.8 Volts.

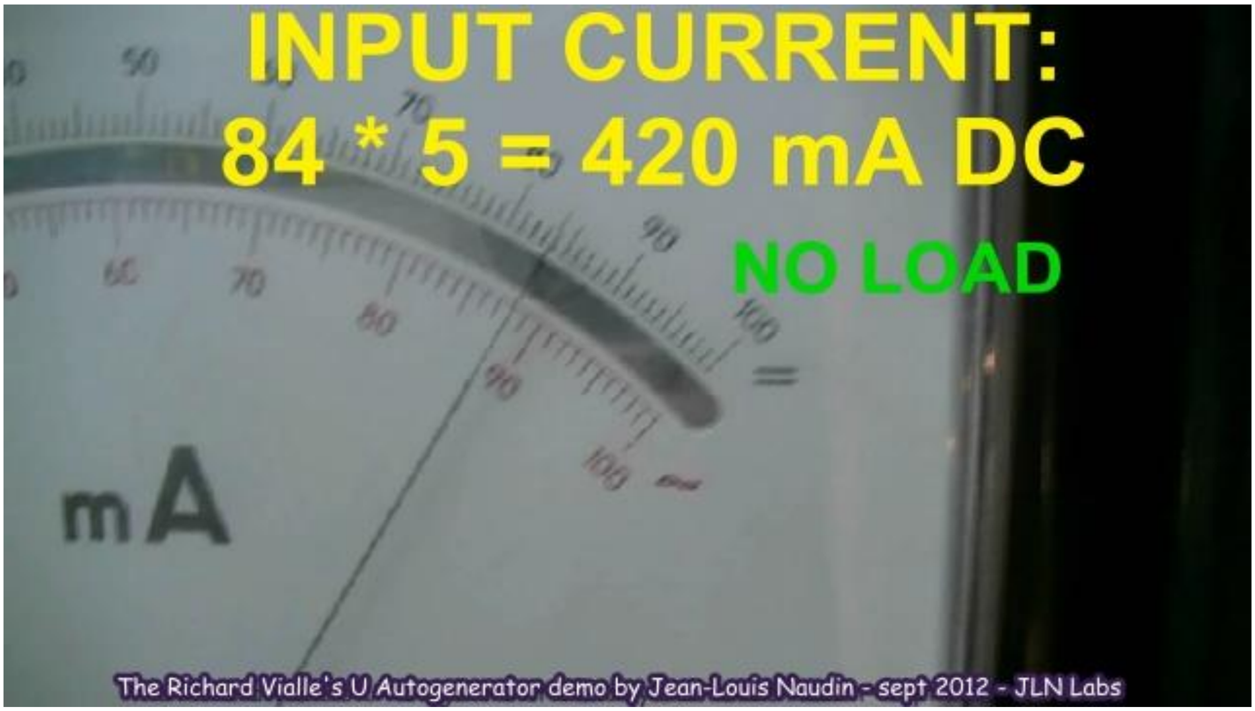




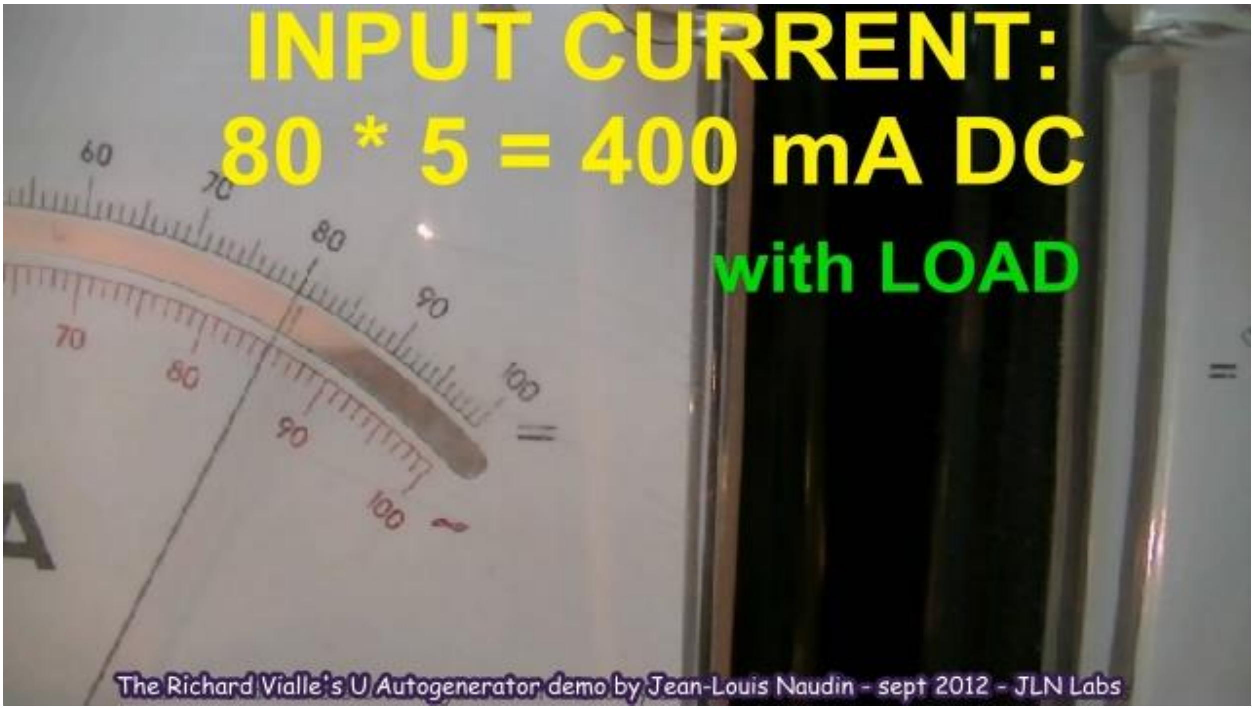
Here is the video of Richard Vialle's U-shaped autogenerator v2.1 test:

https://youtu.be/y3tQPKYK9xI

When the U-shaped autogenerator operates on 3.6MHz and at the optimum operating point, I notice a drop in the power consumed of 596mW by the U-shaped autogenerator when the latter is loaded by a 6V at 100mA lamp.



No-load power consumption = 29.8 V * 0.42 A = 12.52 W



Power consumed under load = 29.8 V * 0.40 A = 11.92 W

DeltaP = Load power - No load power = 11.92 - 12.52 which equals approximately -0.60W.

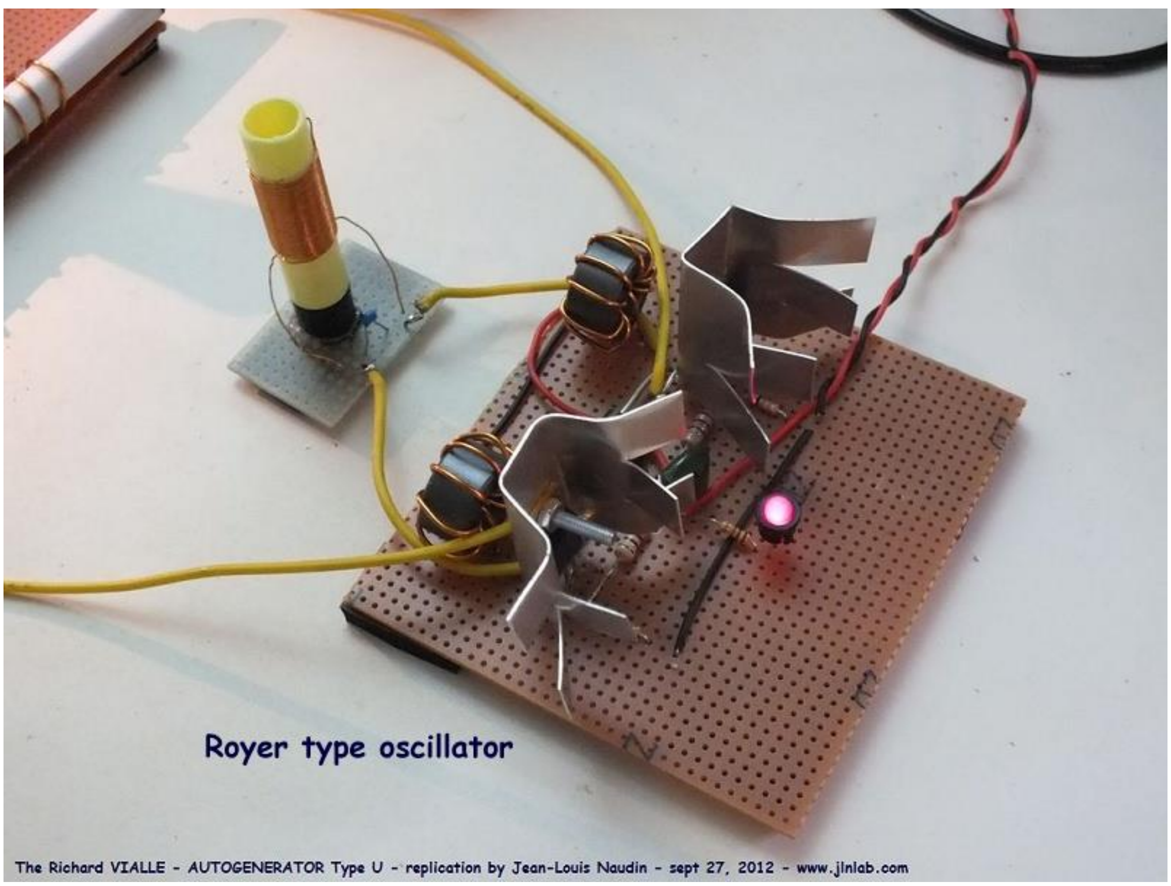
This experience tends to confirm once again the theory and experience of Richard Vialle.

Chapter 9

Significant Drop in Input Power Under Load

With Oscillator v2.2 on the U-shaped Autogenerator

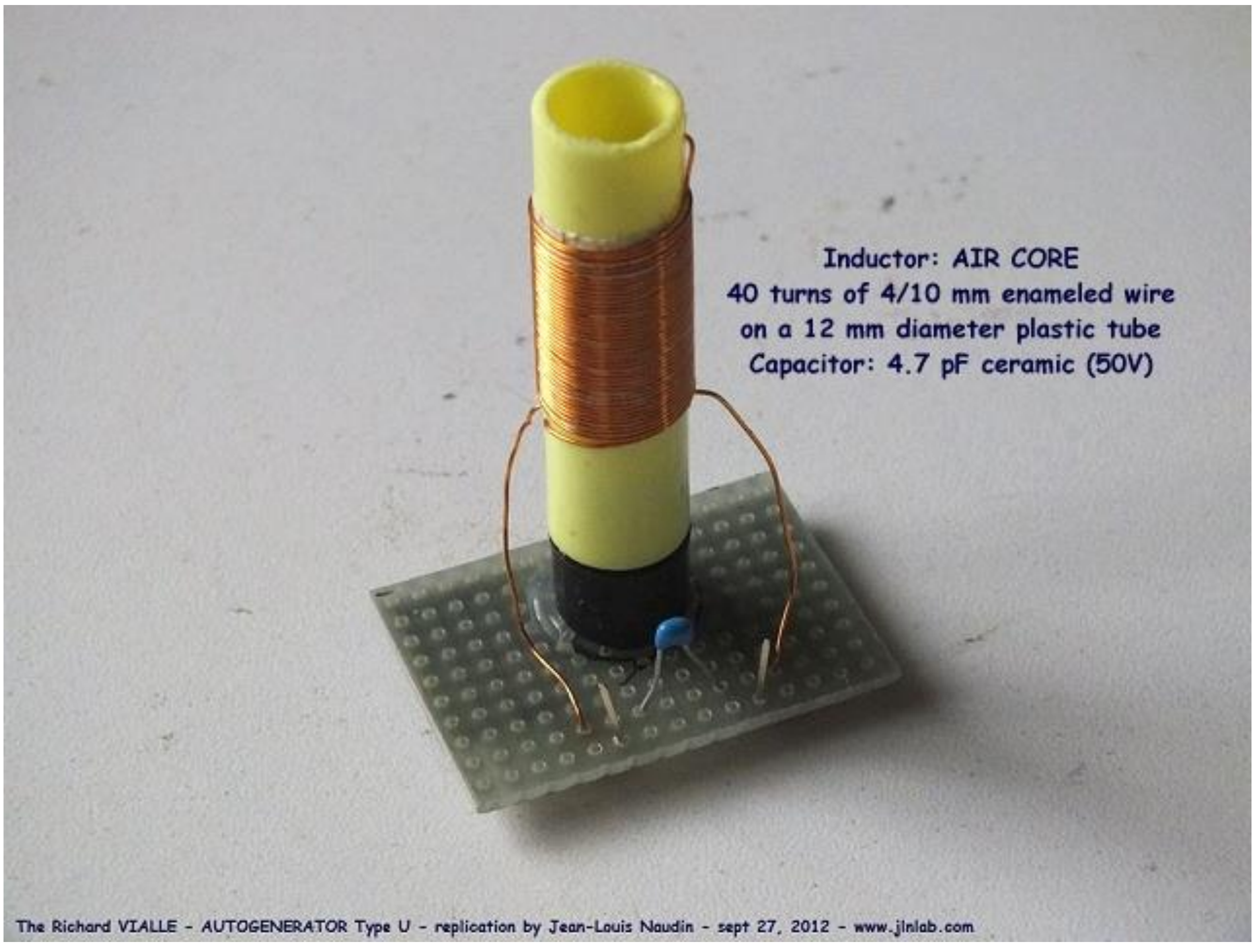
Following previous tests which enabled me to refine Richard Vialle's U-shaped Autogenerator adjustment method, I transposed my experience to the pilot oscillator (Royer type) tested previously. At first, I was not able to demonstrate a drop in power under load with version 1.1 of the pilot oscillator which uses the ferrite core. In order to find the right parameters to obtain this effect of lowering power under load, I had to make a new coil and build a new tuned circuit. I used the same Royer oscillator circuit previously used (with the MOSFET IRFZ44N), I only changed its LC circuit.

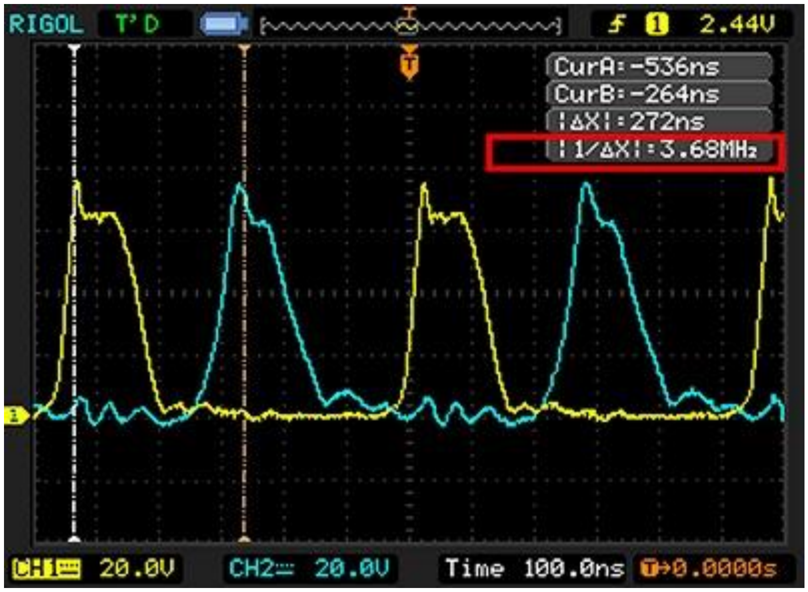


I used an air core coil in order to reduce the HF losses.

The coil is made on a plastic tube (piece of highlighter pen), 12 mm in diameter and 50 mm long.

The inductor has 40 turns of 4/10 mm enameled copper wire. The capacitor in parallel is 4.7pF.

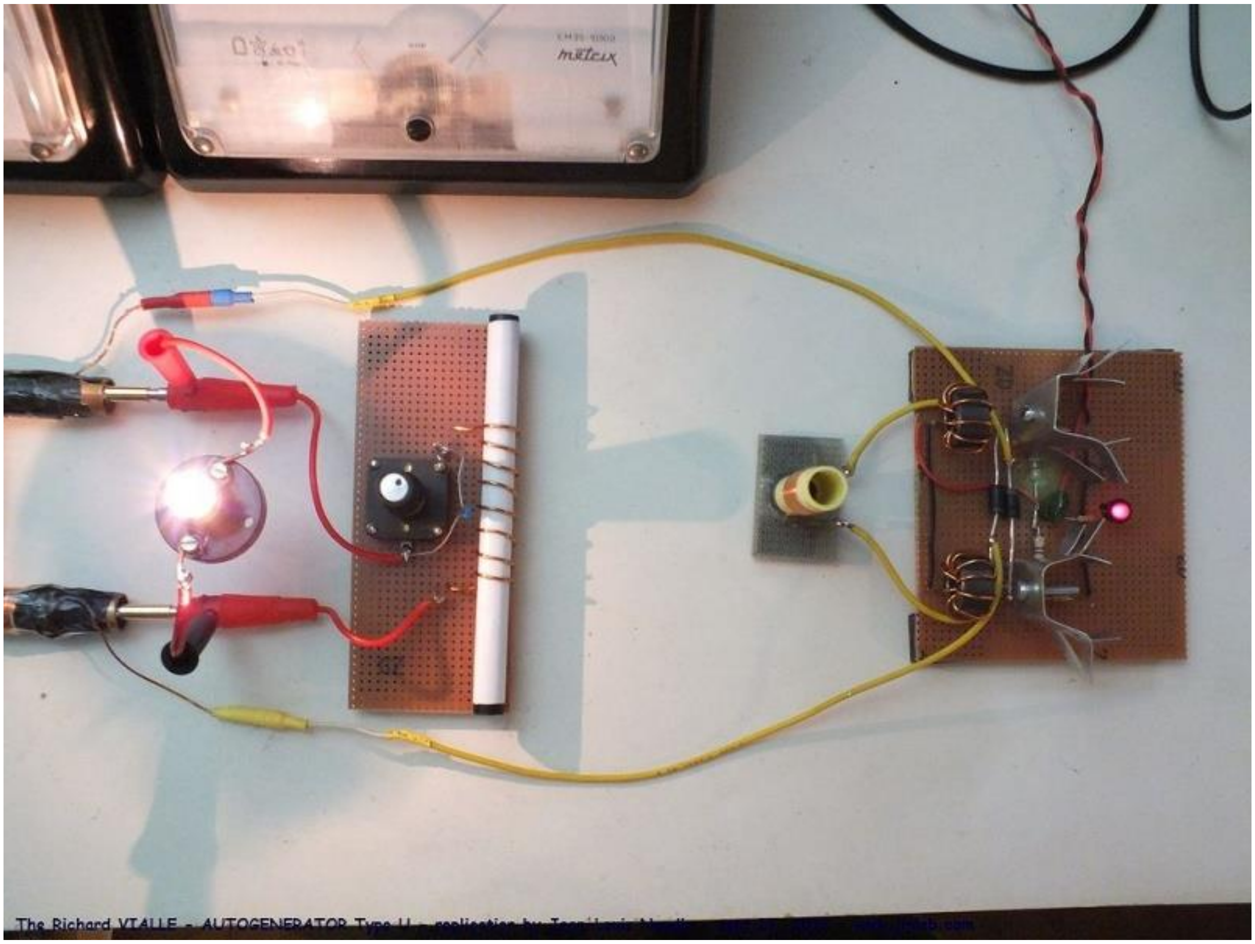




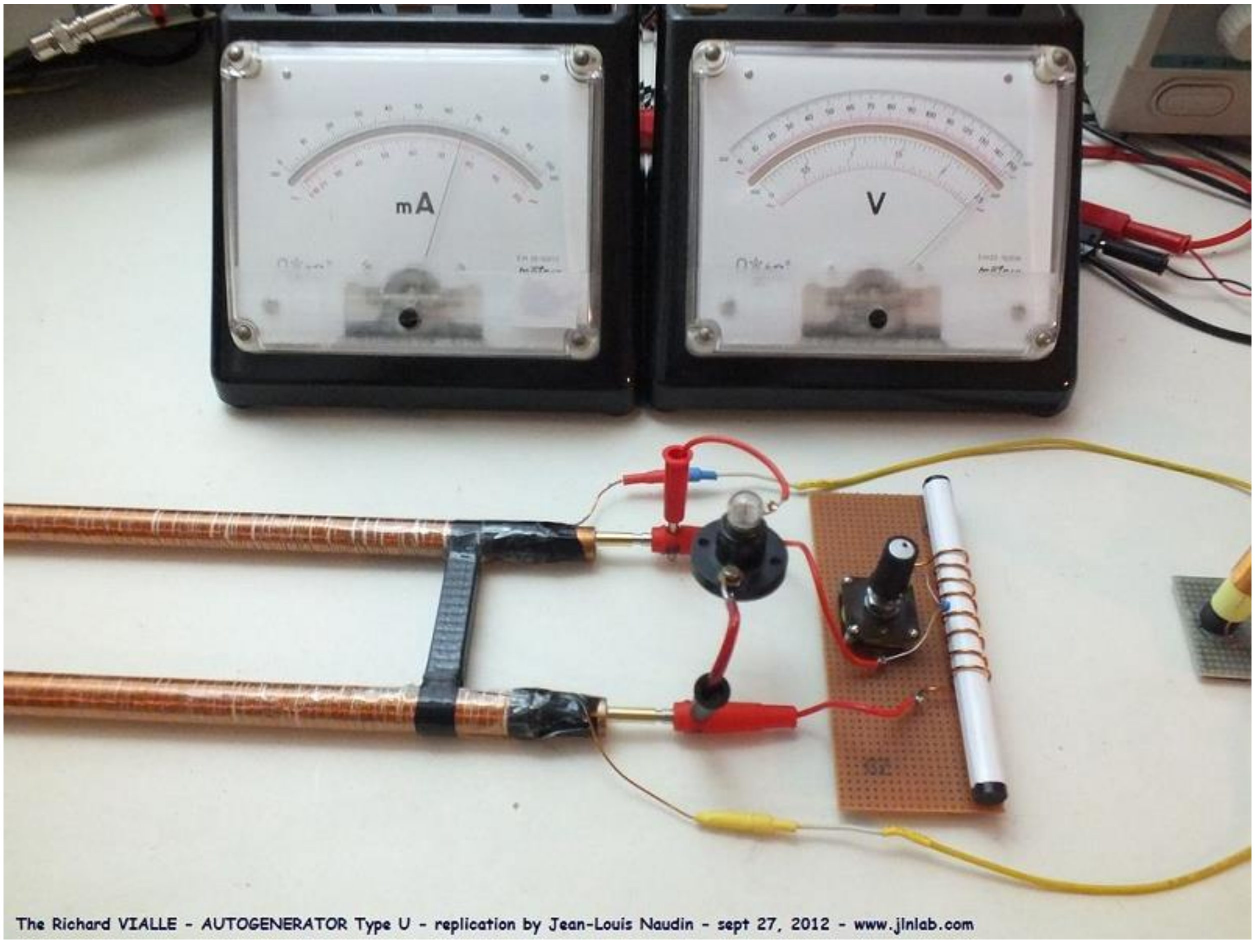
The frequency of the pilot oscillator when measured at the terminals of the above LC circuit (with respect to ground) is 3.68 MHz.

On the output circuit connected in parallel with the load, I increased the capacitance of the variable capacitor of 500pF by putting a 150pF capacitor in parallel to it.

The inductance remains unchanged (8 turns of 10/10 mm on a ferrite rod (ferroxcube), 10 mm in diameter and 120 mm long).

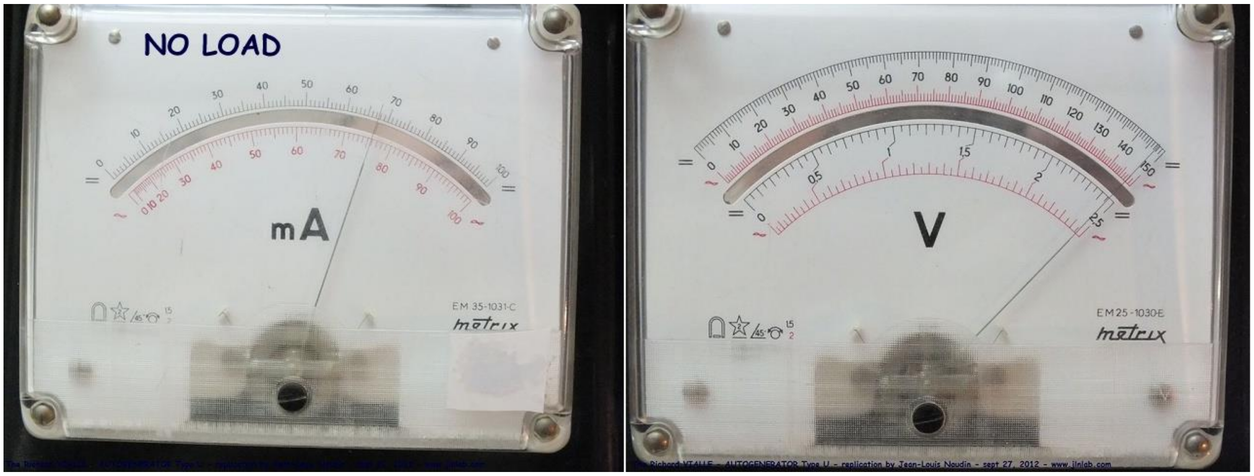


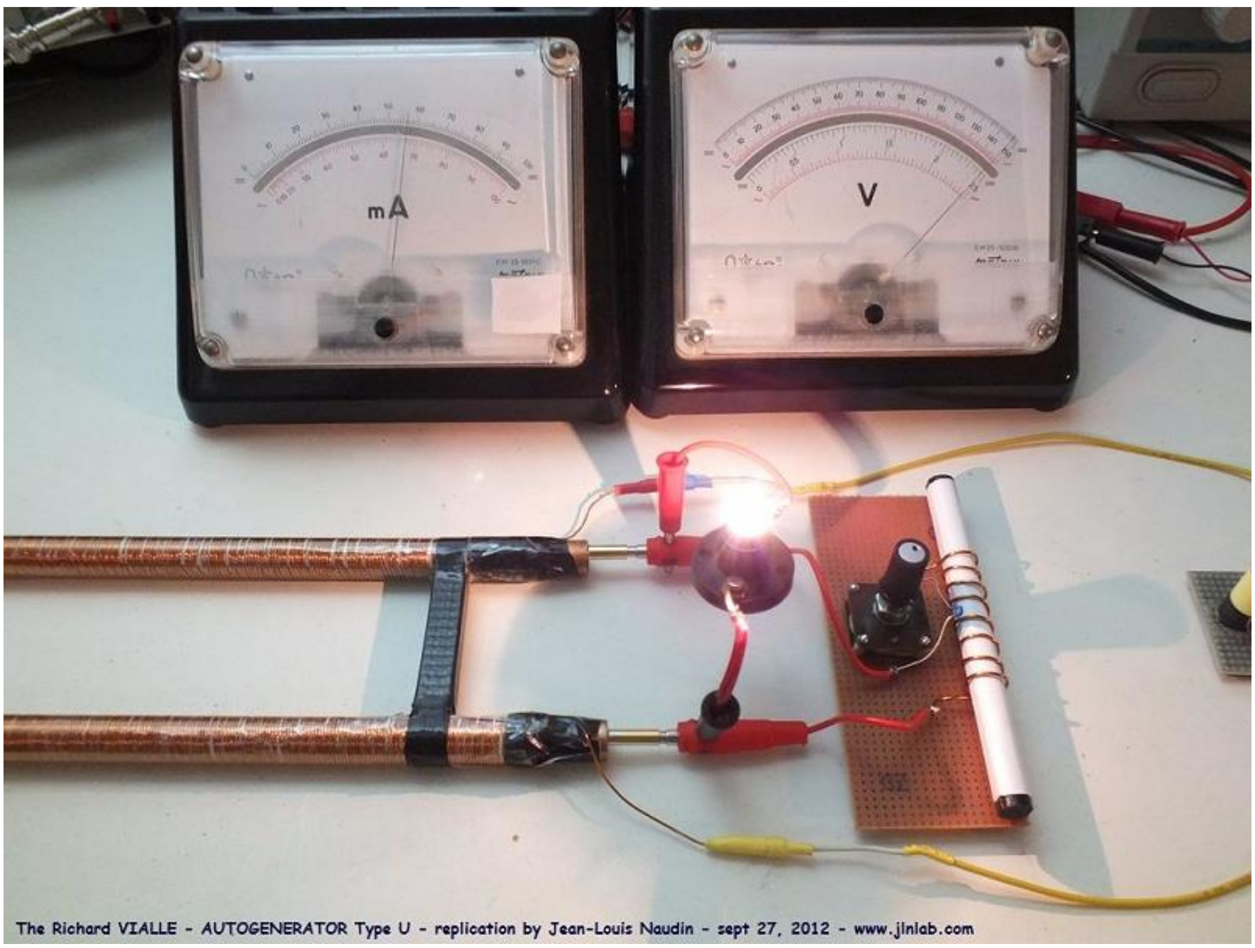
The load is a 6V at 100mA lamp, or an approximately 0.6 Watt lamp.



When “empty” (without the charging lamp connected), the measured direct current is 0.68A and the direct voltage is 14.8V.

The power consumed by the no-load circuit is therefore: 14.8V x 0.68 A = 10.06 watts (see below).





When charging (with the charging lamp connected), the measured DC current is 0.56 A and the DC voltage is 14.8 V.

The power consumed by the circuit with load is therefore: 14.8V x 0.56A = 8.29 watts (see below).

When the 0.6W charging lamp is connected, a drop in the deltaP power of the U-shaped autogenerator power supply is observed by:

DeltaP = Load power - No load power = 8.29 - 10.06 = -1.77W

Here is a video of the experience:

https://youtu.be/8Hfof-NyE3w

This experience tends to confirm once again the theory and experience of Richard Vialle.

Parts List

0.5 inch by 2 inch long plastic tube

26 AWG enameled magnet wire

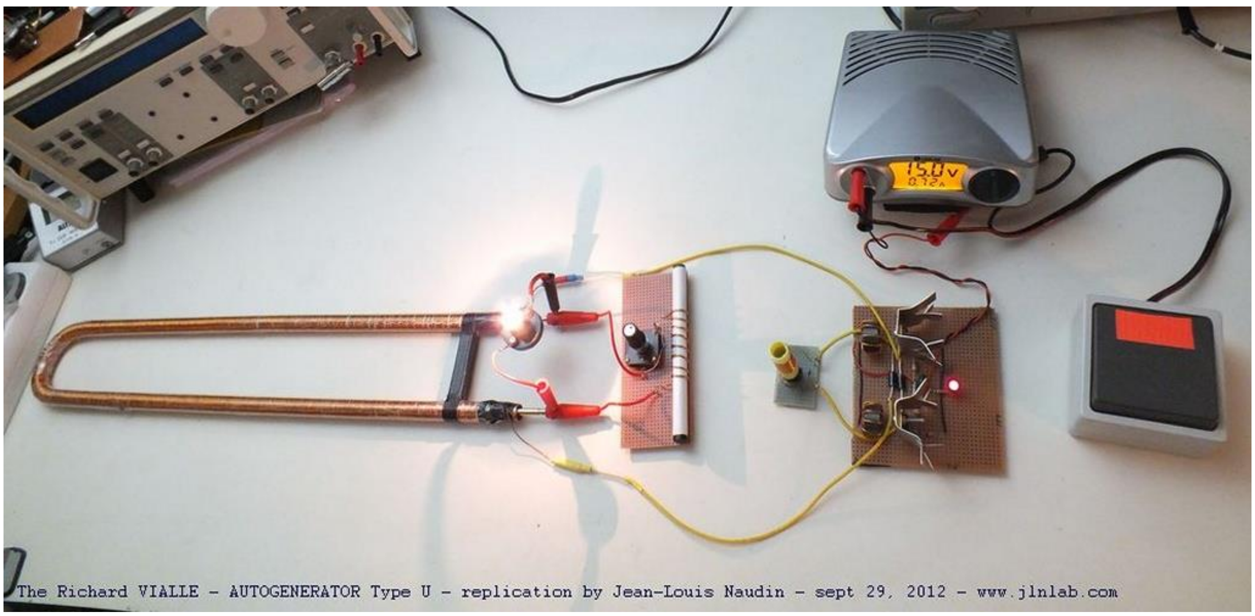
4.7pF 50V ceramic capacitor

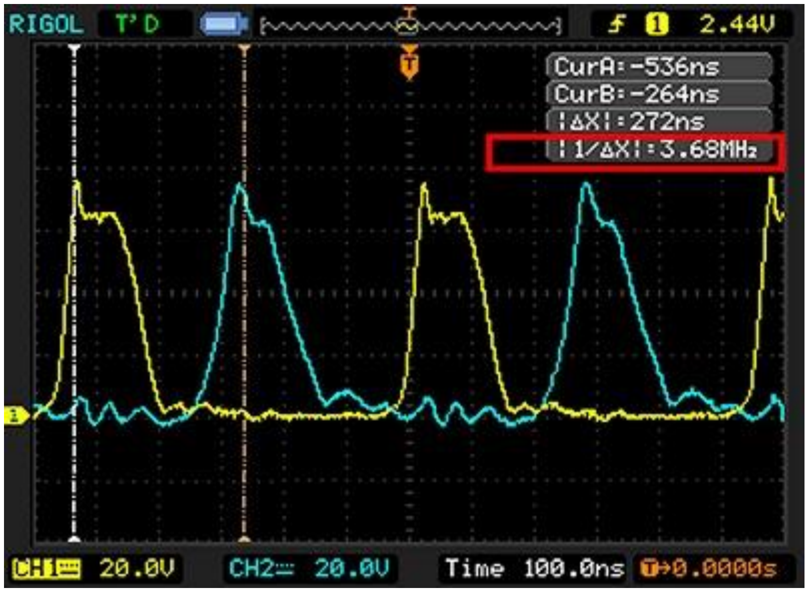
150pF 50V ceramic capacitor

Chapter 10

Input Power Drop of the U-shaped Autogenerator Powered with a Digital Power Supply

Here is a simple test with the same configuration of Richard Vialle's U-shaped generator and its pilot oscillator v2.2 (Royer type), but powered this time with a small DC power supply with digital display.





The frequency of the pilot oscillator which when measured at the terminals of the above LC circuit (with respect to ground) is 3.68 MHz.

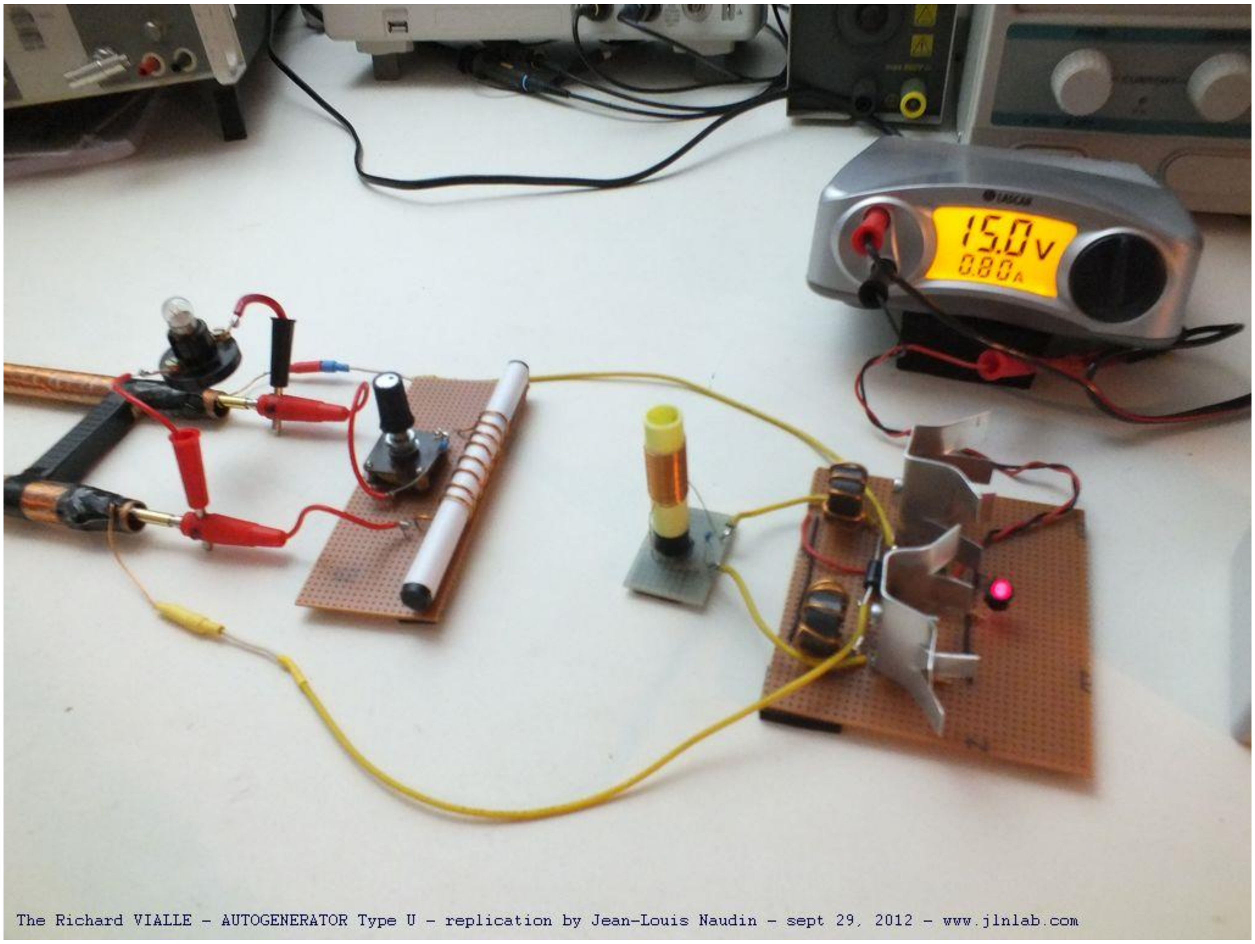
The operating frequency should be adjusted and controlled experimentally with an absorption wavemeter and an oscilloscope.

The values of the components of the LC circuit may differ from the theoretical values calculated due to the parasitic capacitances and inductances produced in the prototyping circuit.

The load is a 6V at 100mA lamp or approximately 0.6 Watt.

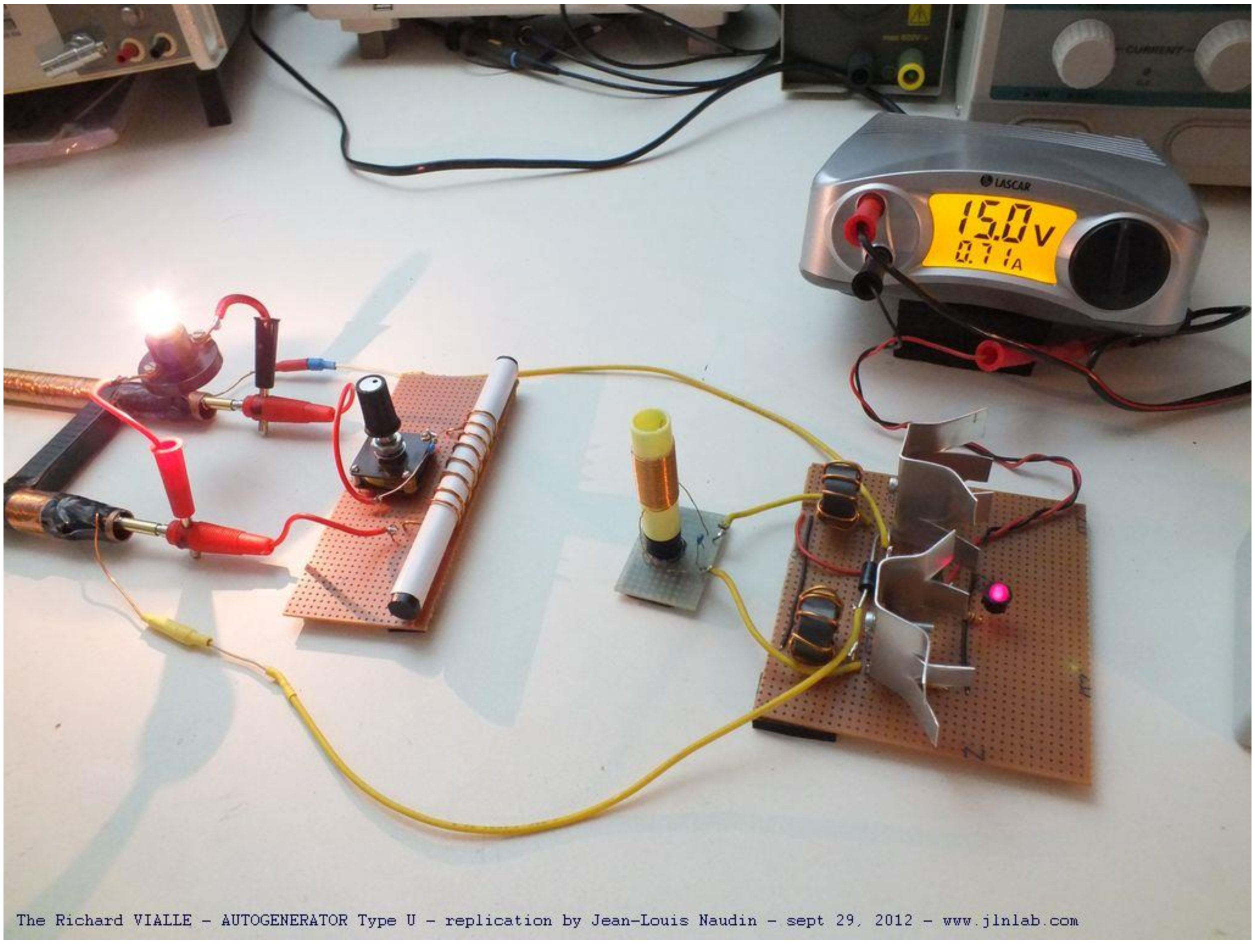
When empty (without the charging lamp connected), the measured direct current is 0.80A and the direct voltage is 15V.

The power consumed by the no-load circuit is therefore: 15V x 0.8A = 12 watts (see below).



When charging (with the charging lamp connected), the measured direct current is 0.71A and the direct voltage is 15V.

The power consumed by the circuit with load is therefore: 15V x 0.71A = 10.65 Watts (see below).



When the 0.6W charging lamp is connected, a drop in the deltaP power of the U-shaped autogenerator power supply is observed by:

DeltaP = Load power - No load power = 10.65 - 12.00 = -1.35W

Here is a video of the experience:

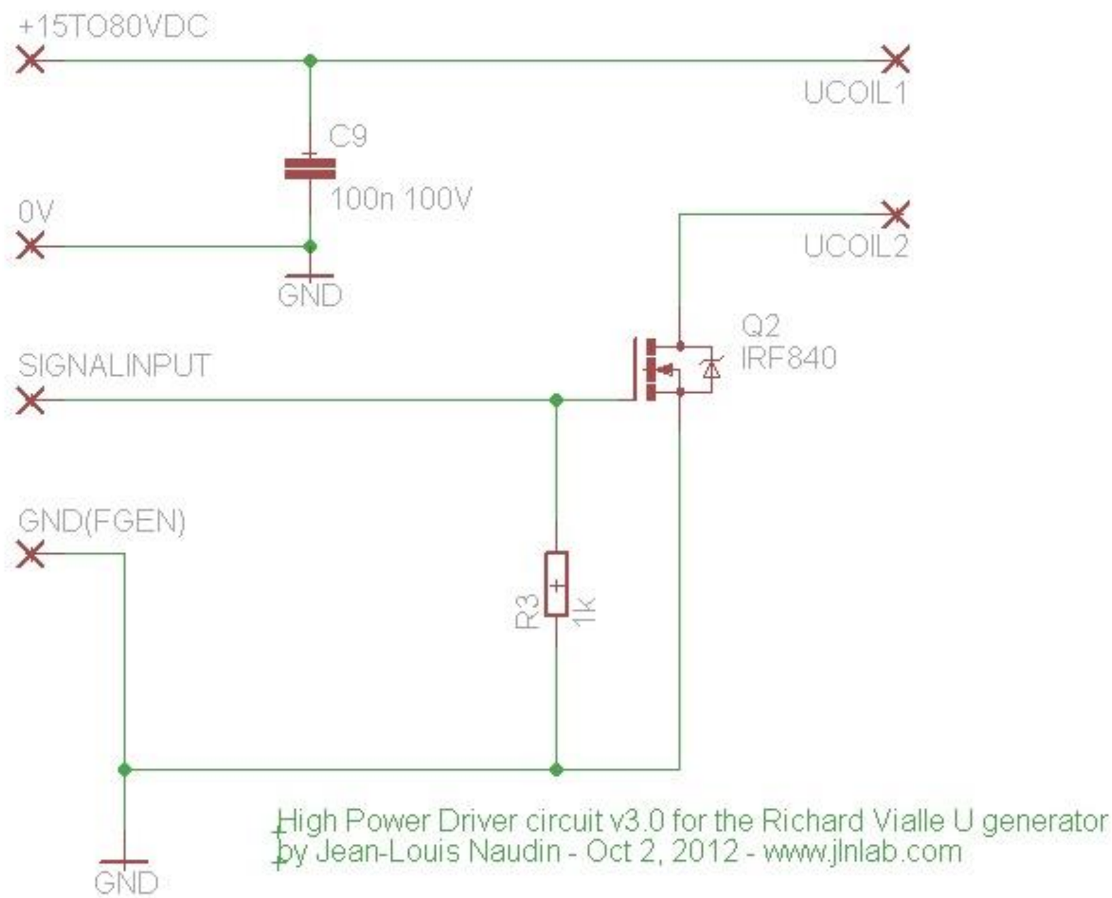
https://youtu.be/_jCHWYAD9Ns

This experience tends to confirm once again the theory and experience of Richard Vialle.

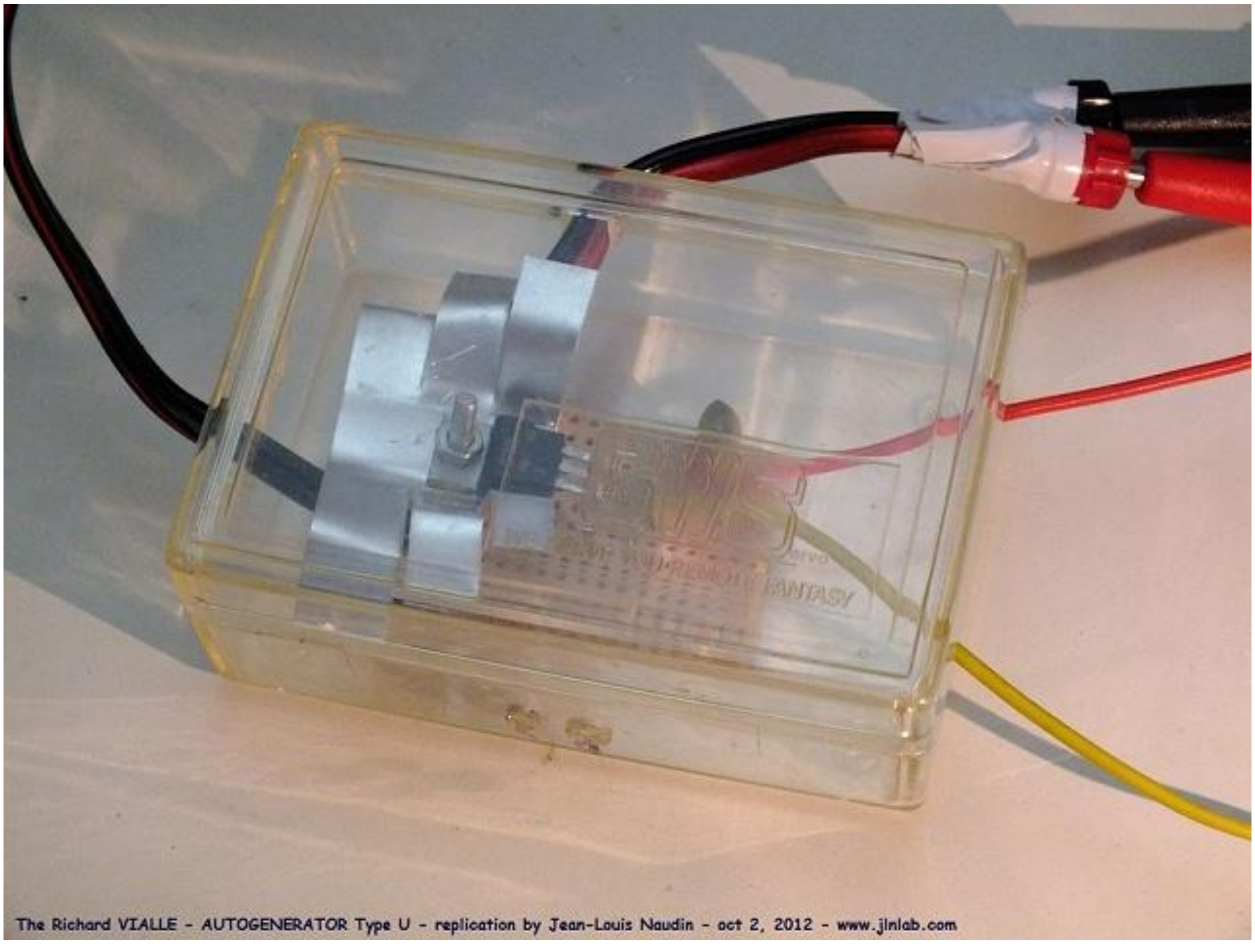
Chapter 11

More Power (10W) at the Output and -4 W of Negative Power at the Input of the U-shaped Autogenerator

I continue to explore the interesting features of Richard Vialle's U-shaped Autogenerator. My Wavetek 288 function generator cannot deliver more than 15 V, which therefore limits the power available at the output. Until now with this function generator, I could only light a 6V at 100 mA lamp. In order to extract more power from the Autogenerator output, I built a simple HF amplifier connected to the output of my function generator. This simple HF generator uses an IRF840 MOSFET N-Channel transistor capable of withstanding a Drain-Source voltage of up to 500 Volts and a current of 8 A with an RDS (ON) of 0.850 Ohm (so little ohmic loss), and a very fast switching time (enough to hold the 3.6 MHz). Here is the diagram of my simple HF amplifier which drives the U-shaped autogenerator.



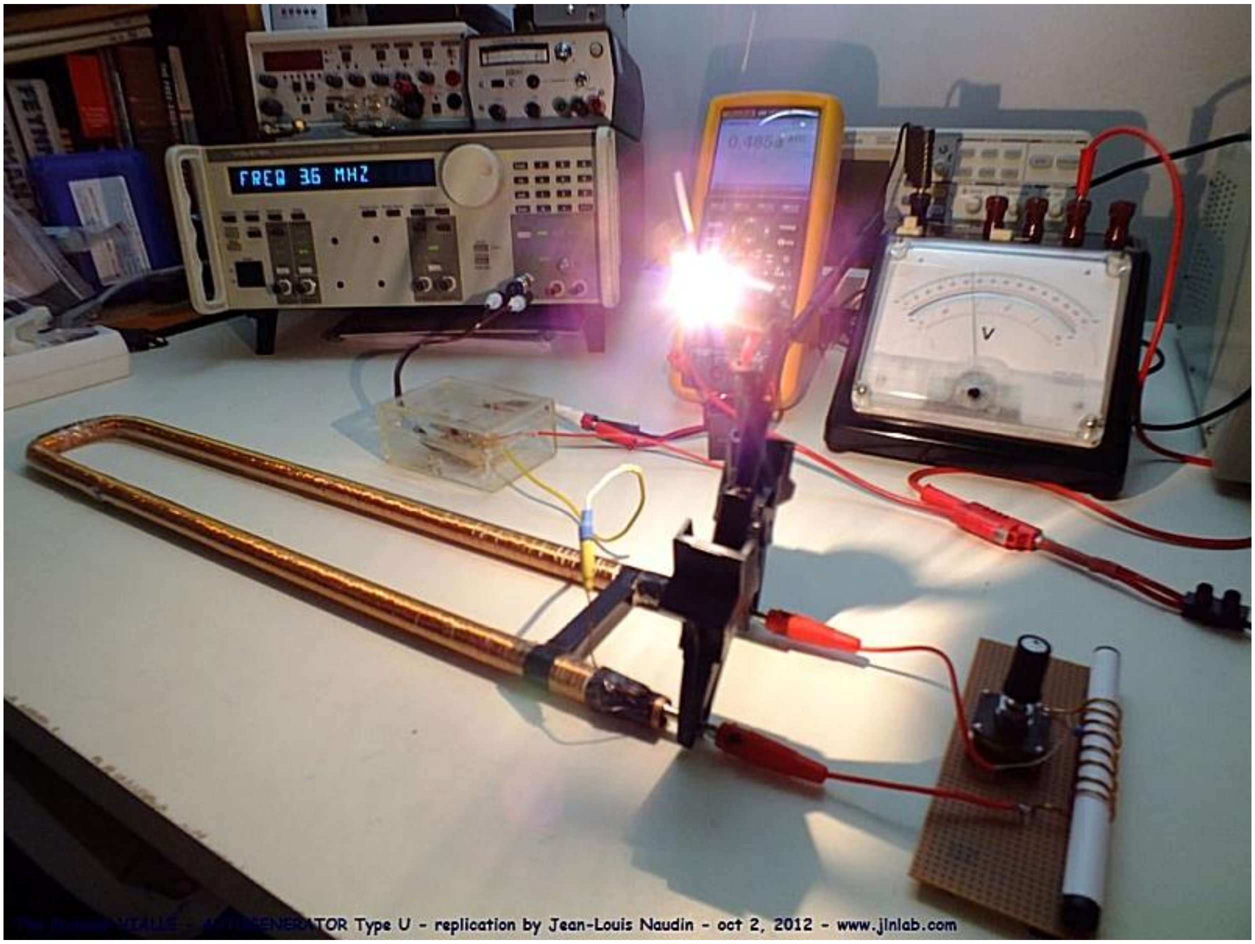
The amplifier is integrated in a plastic box. I recommend putting a heat sink on the MOSFET.



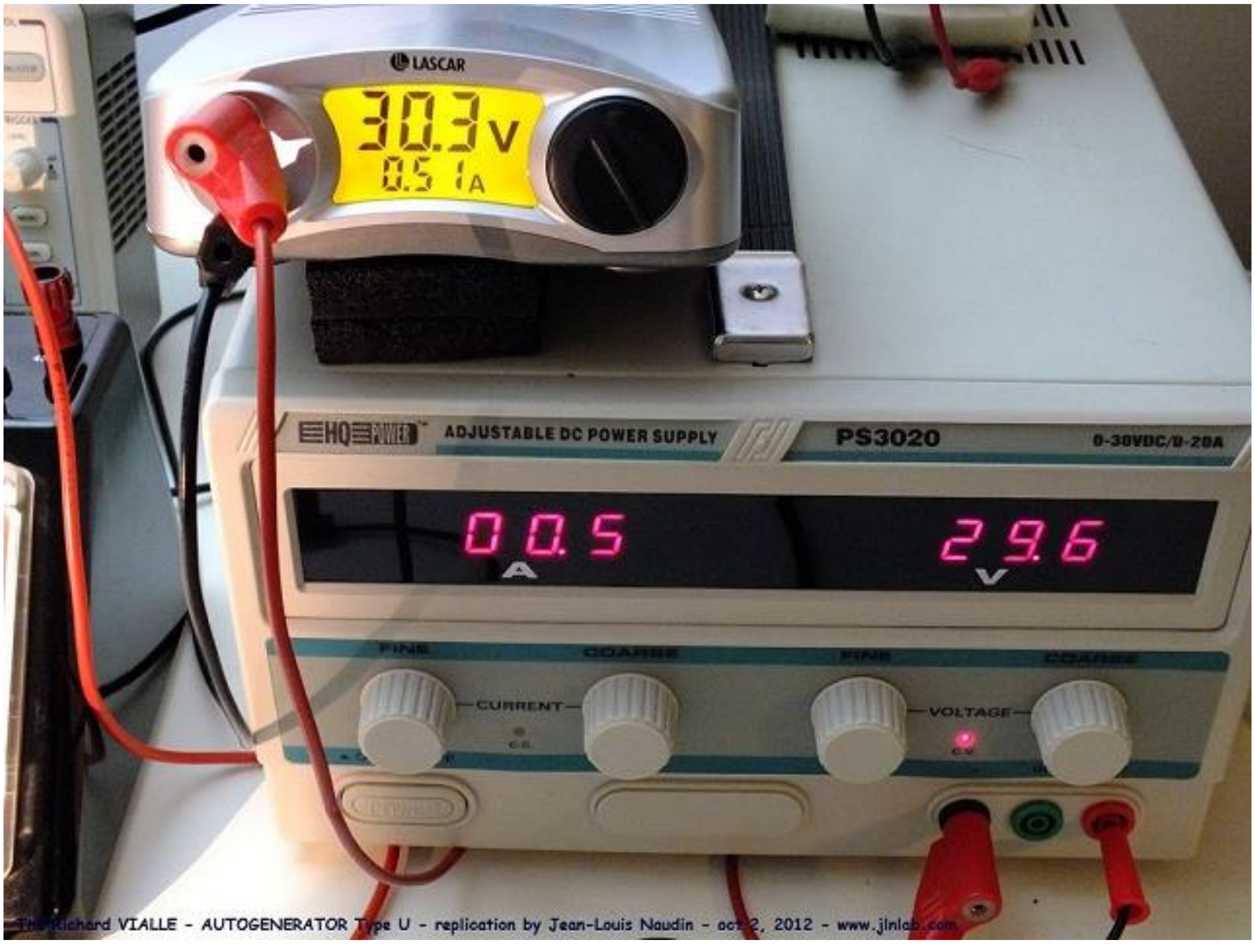
The frequency of the Wavetek 288 function generator is precisely adjusted to the frequency calculated by Richard Vialle's theory, i.e., 3.6 MHz.

The load is a 12 Volt 10 Watt lamp.

When the output tuning circuit is properly tuned, the 10 watt lamp lights up at full power.

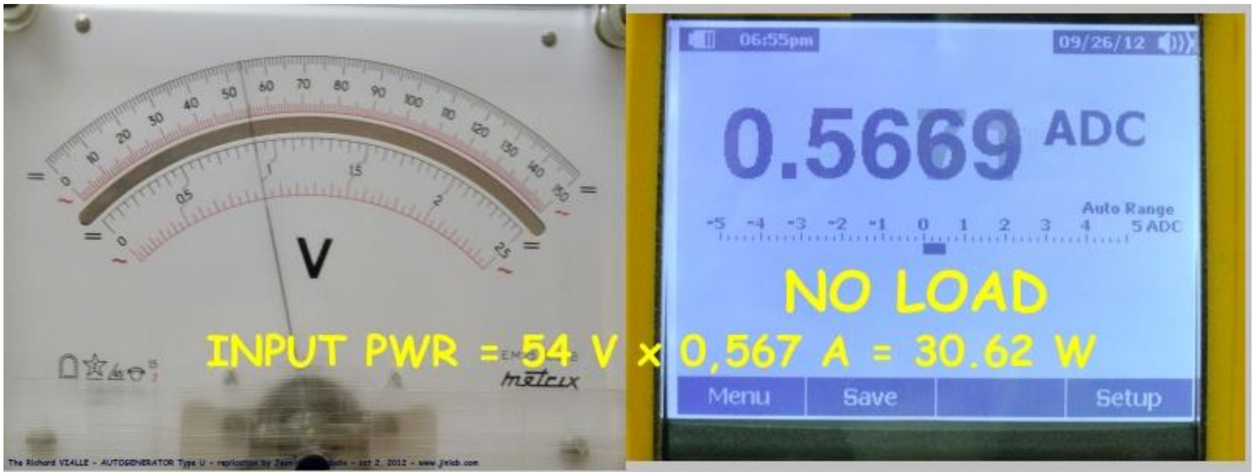


My power supply being limited to 30 V DC, I connected a second power supply in series to have more power.



When empty (without the charging lamp connected), the measured direct current is 0.567 A and the direct voltage is 54 V.

The power consumed by the no-load circuit is therefore: 54V x 0.567 A = 30.6 watts (see below).



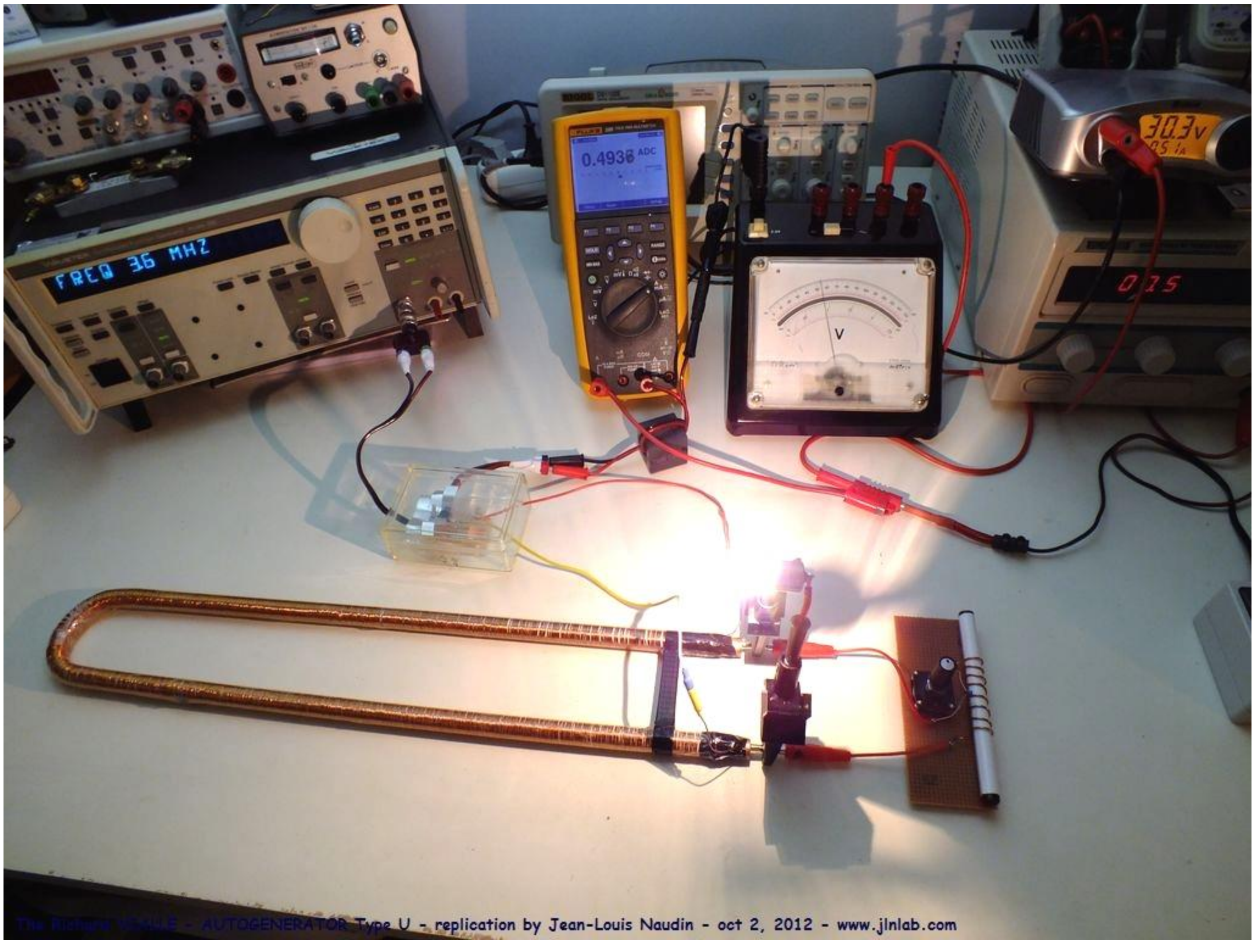
When charging (with the 10W charging lamp connected), the measured DC current is 0.491A and the DC voltage is 54V.

The power consumed by the load circuit is therefore: 54V x 0.491A = 26.5 watts (see below).

When the 10W charging lamp is connected and at full power, there is a drop in the deltaP power of the U-shaped autogenerator supply of:

DeltaP = Load power - No load power = 26.5 - 30.6 = -4.1W

The output power of the U-shaped autogenerator is there, it is undeniable; the 10 W lamp illuminates to the maximum.



Here is a video of the experience:

https://youtu.be/7BNvOkuRz5o

This experience tends to confirm once again the theory and experience of Richard Vialle.

Chapter 12

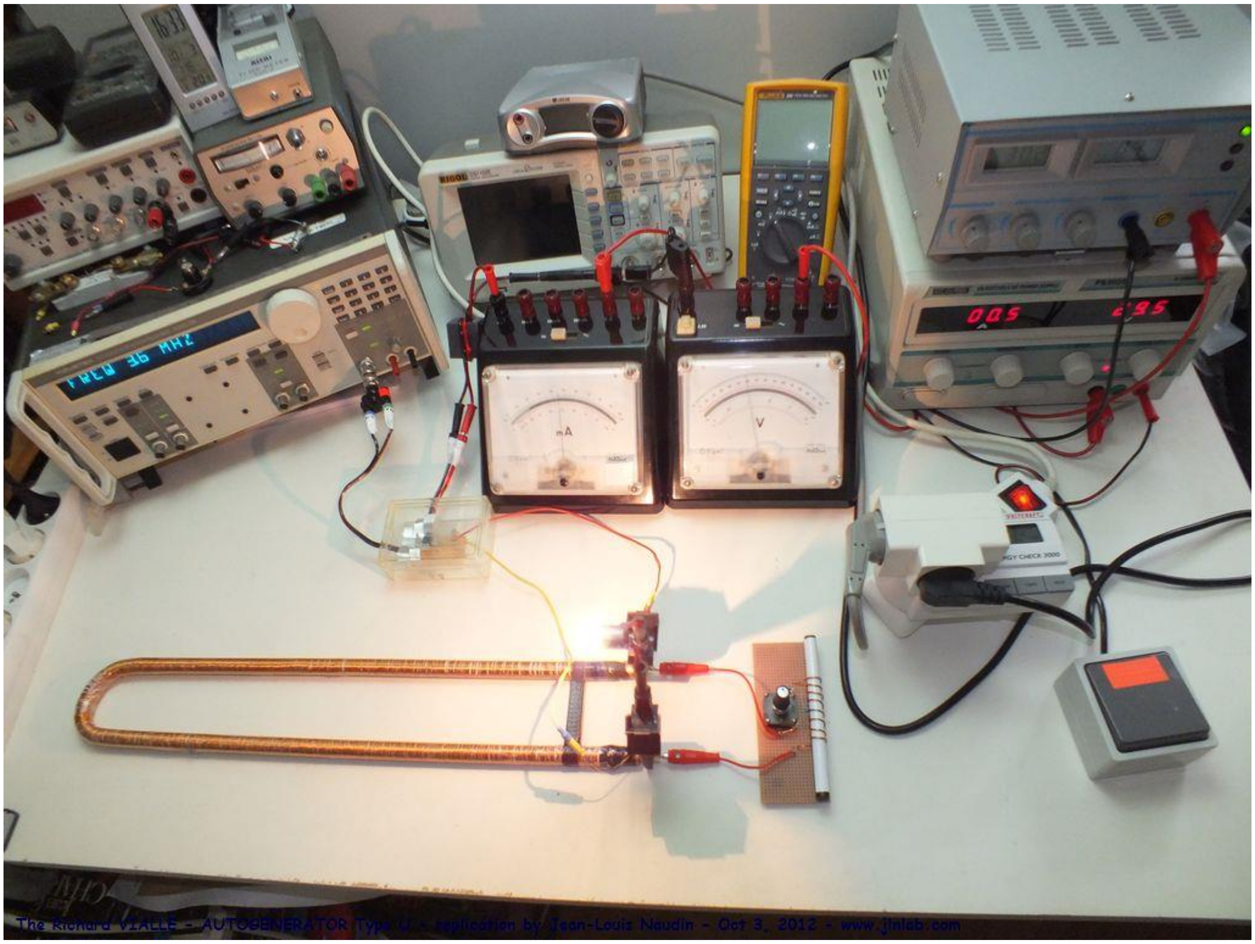
Input Power Measurement with a Mains ENERGIE-METER

With and Without the 10W Charging Lamp

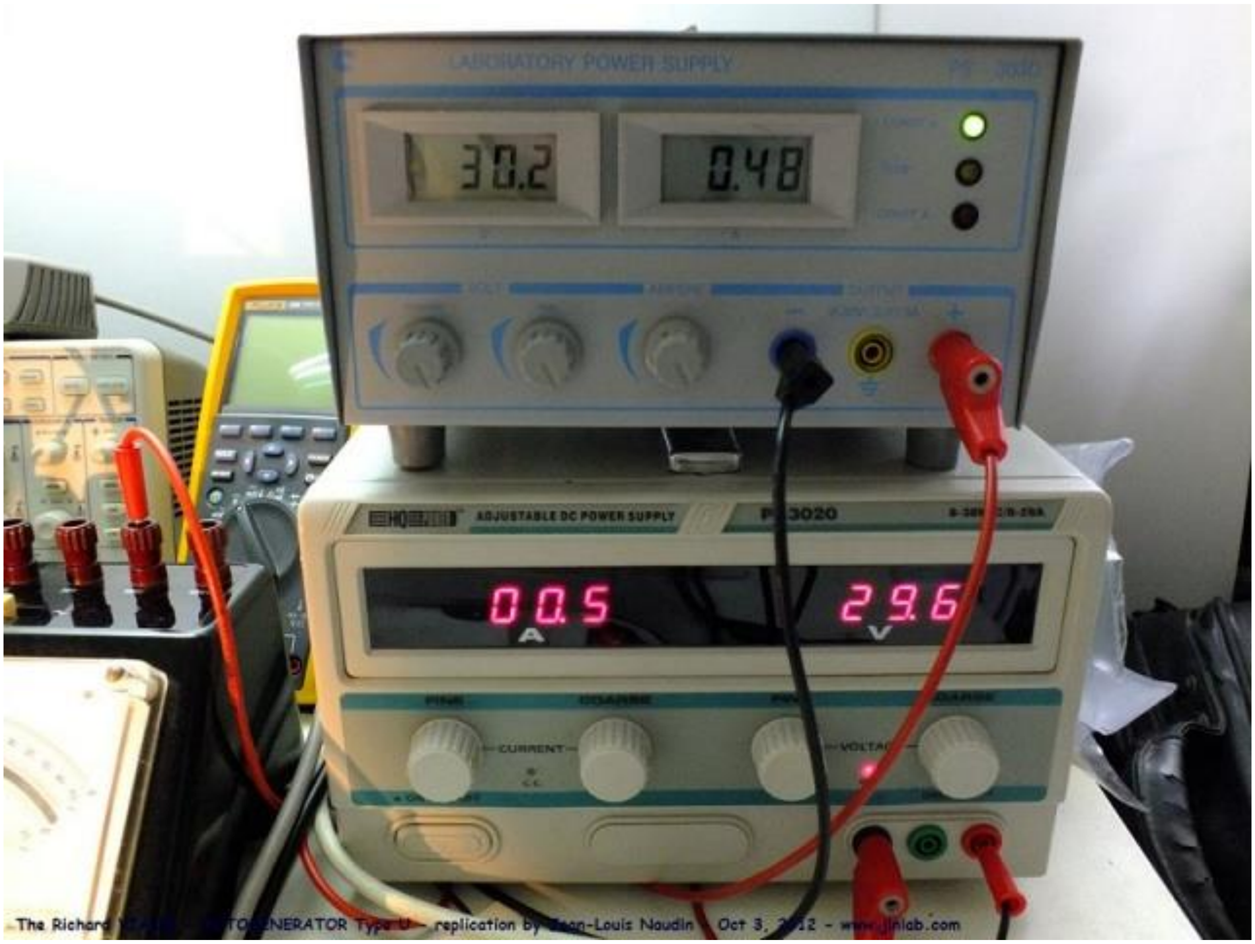
In order to check that the power drop observed with the 10 W load lamp connected to the output of Richard Vialle's U-shaped Autogenerator is real, I connected the two Autogenerator supplies to an ENERGIE-METER unit. I used a Voltcraft ENERGY CHECK 3000 ENERGIE-METER for this. The U-shaped Autogenerator is supplied with the HF V3 amplifier used previously and the operating frequency is 3.6 MHz.

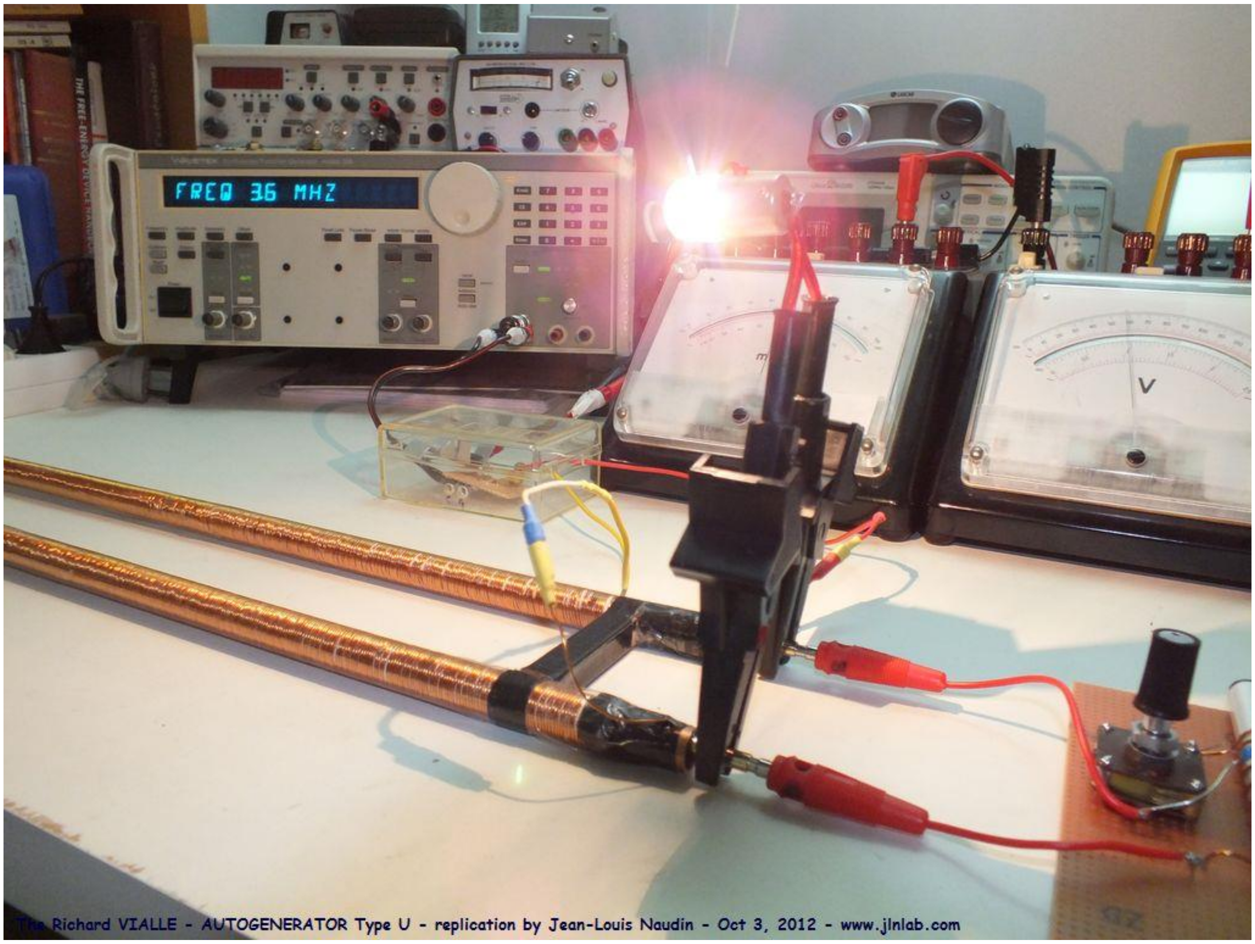
The load is a 10 Watt 12 Volt lamp.

When the output tuning circuit is properly tuned, the 10 watt lamp lights up at full power.



The autogenerator is supplied with two power supplies (with floating ground) connected in series to have more power.

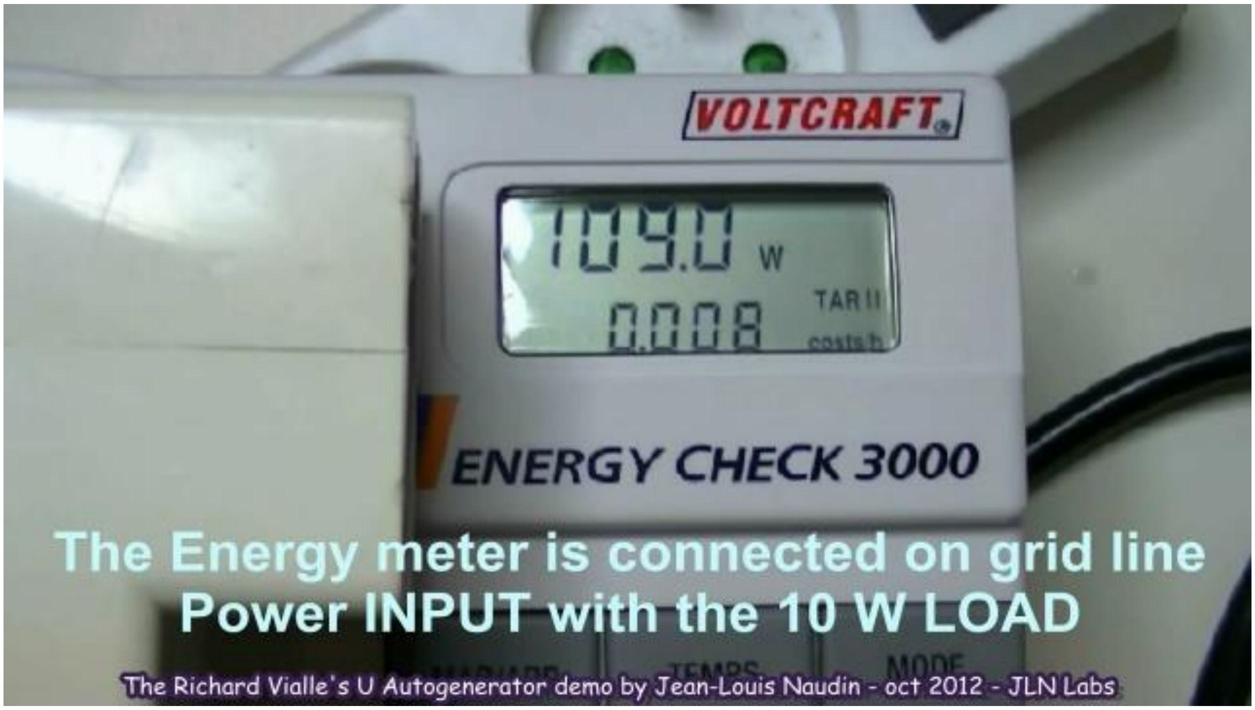

LABORATORY POWER SUPPLY
30.2
0.48
ADJUSTABLE DC POWER SUPPLY
00.5
A
29.6
V
CURRENT
COARSE



The power consumed by the two power supplies alone, i.e., with the U-shaped Autogenerator completely disconnected, is: 64.6 W.

With the U-shaped Autogenerator supplied but WITHOUT the load lamp connected, the power consumed from the mains is 120.1 watts (see below).

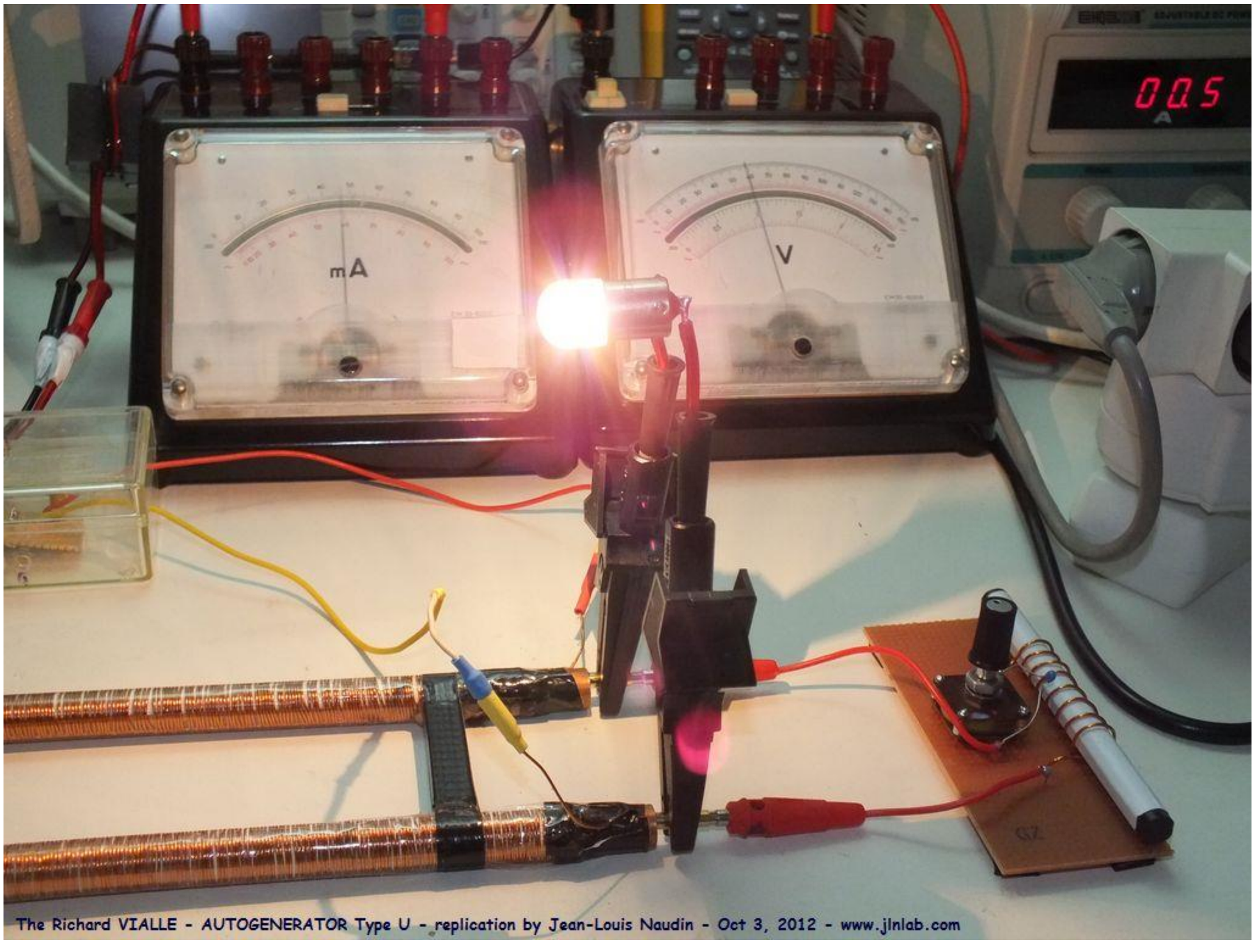
With the U-shaped Autogenerator powered and WITH the 10 W charging lamp connected, the power consumed from the mains is 109.0 watts (see below).



When the 10 W charging lamp is connected and at full power, we observe on the ENERGY METER at the mains a drop in the deltaP power of the U-shaped autogenerator power supply of:

DeltaP = Load power - No load power = 109.0 - 120.1 = -11.1W

The output power of the U-shaped autogenerator is there, it is undeniable; the 10 W lamp illuminates to the maximum.



Here is a video of the experience:

https://youtu.be/709bmda0tRs

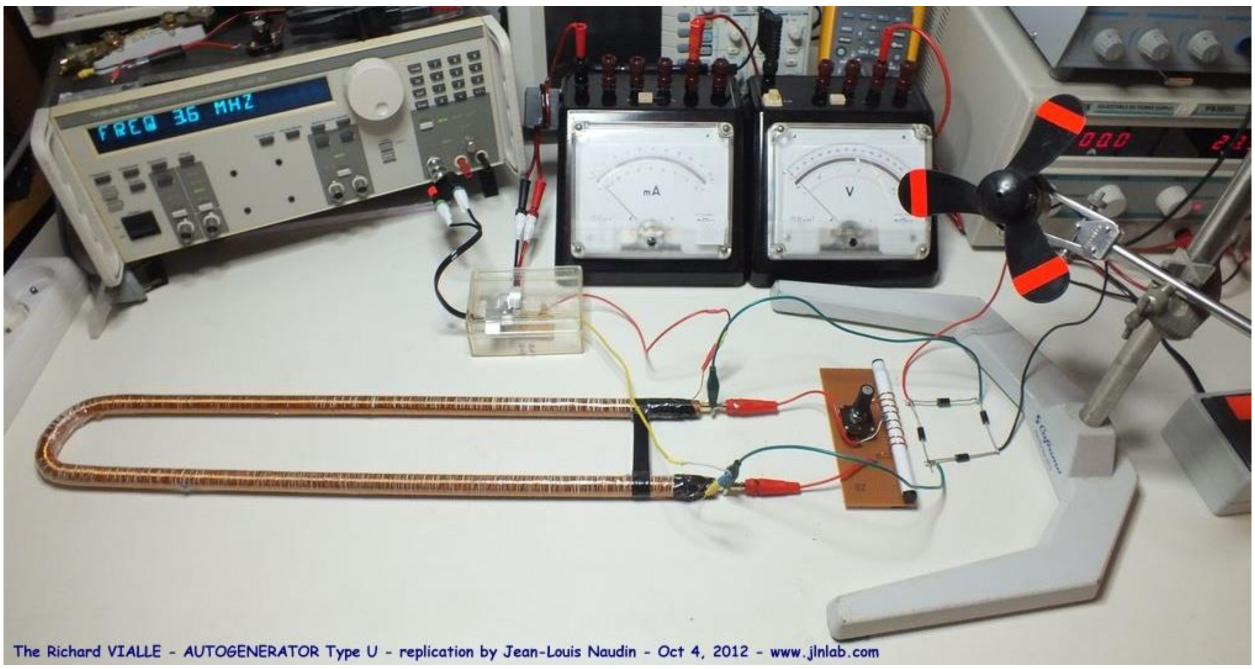
Additional technical documents:

See the technical specifications and user's manual of the ENERGY CHECK 3000 energy meter.

Chapter 13

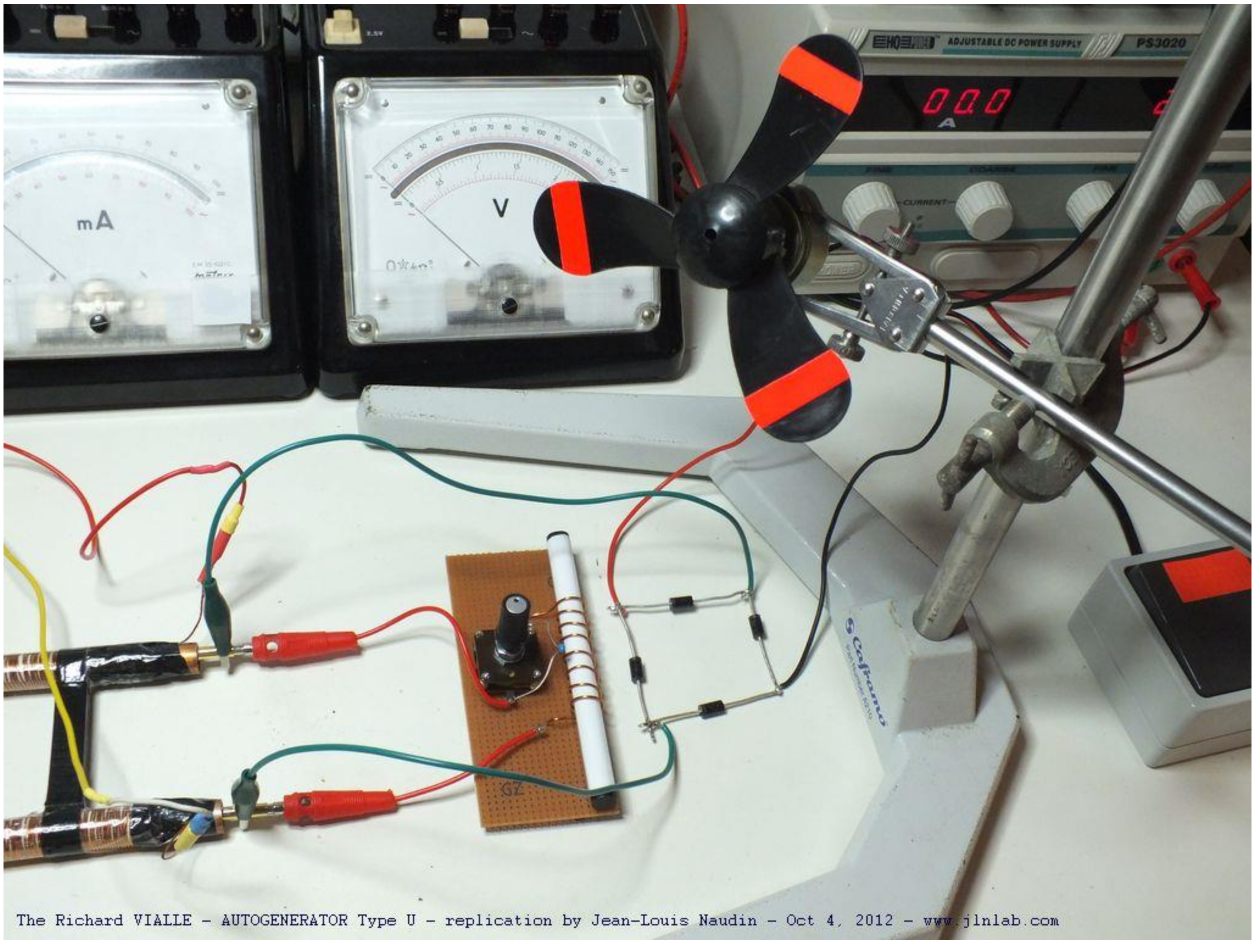
Testing the U-shaped Autogenerator with a DC Fan Connected as the Load

Here is a new test of Richard Vialle's U-shaped Autogenerator with a DC Fan connected as OUTPUT LOAD. The U-shaped Autogenerator is supplied with the HF amplifier v3 used previously and the operating frequency is 3.6 MHz.



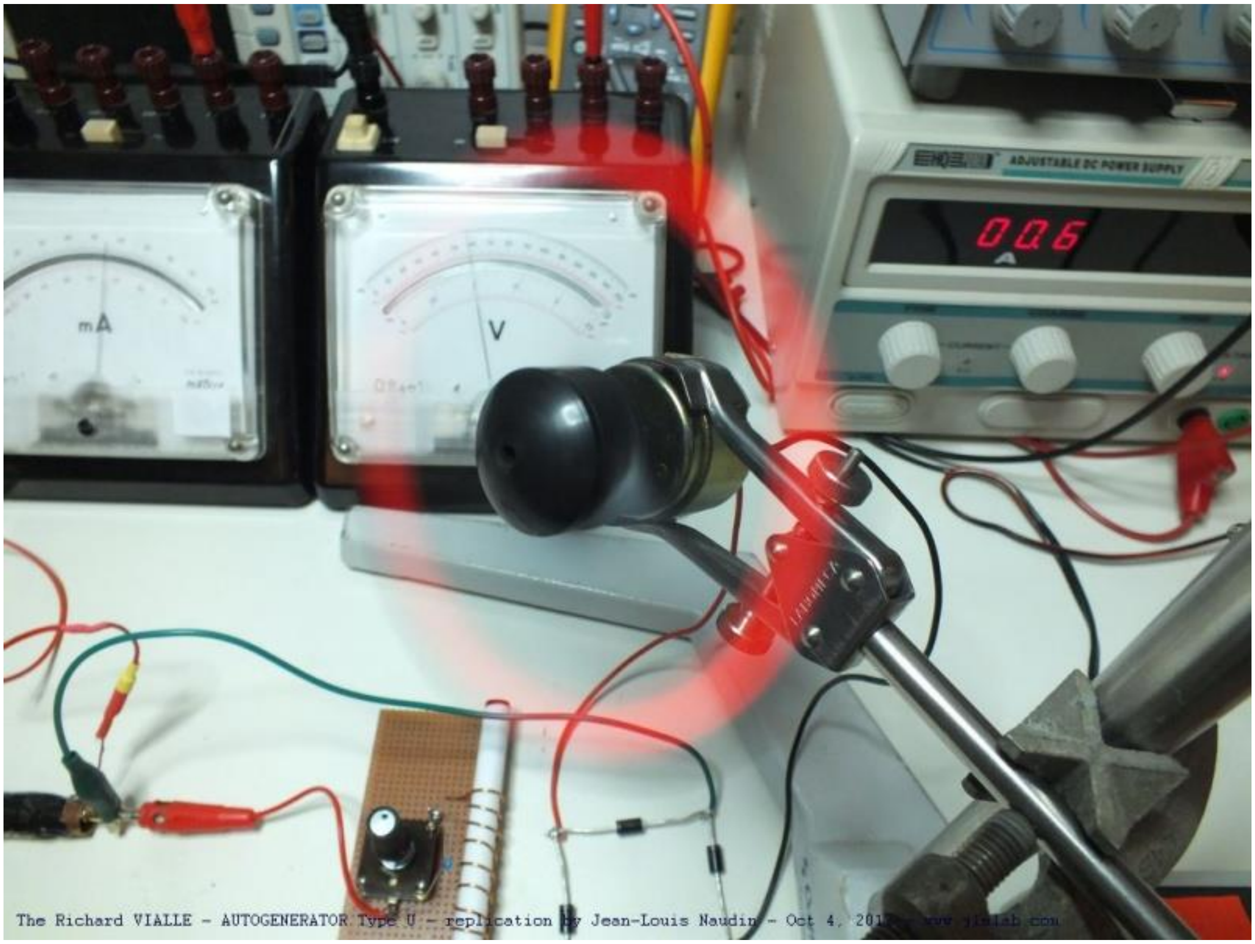
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 4, 2012 - www.jlnlab.com

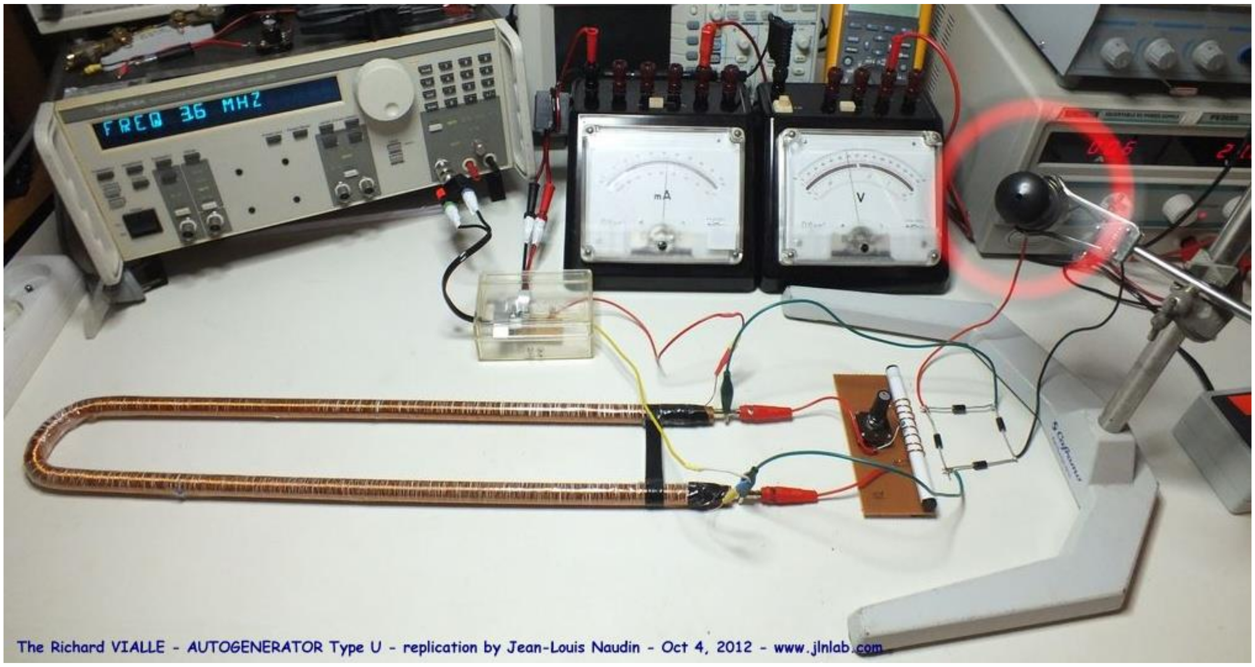
I used for this a simple car fan operating at 12V DC.



In order to obtain a DC output voltage, I built an HF rectifier made up of 4 BYW98/200 fast diodes and a 0.47µF 100V filter capacitor.

When the autogenerator is powered with the fan connected, it instantly starts and runs at full power.





The variation in the power from the DC supply is almost invariable, and even slightly decreases at the input of the autogenerator when the fan is connected.

Here is a video of the experience:

https://youtu.be/WxJW6_VHwQM

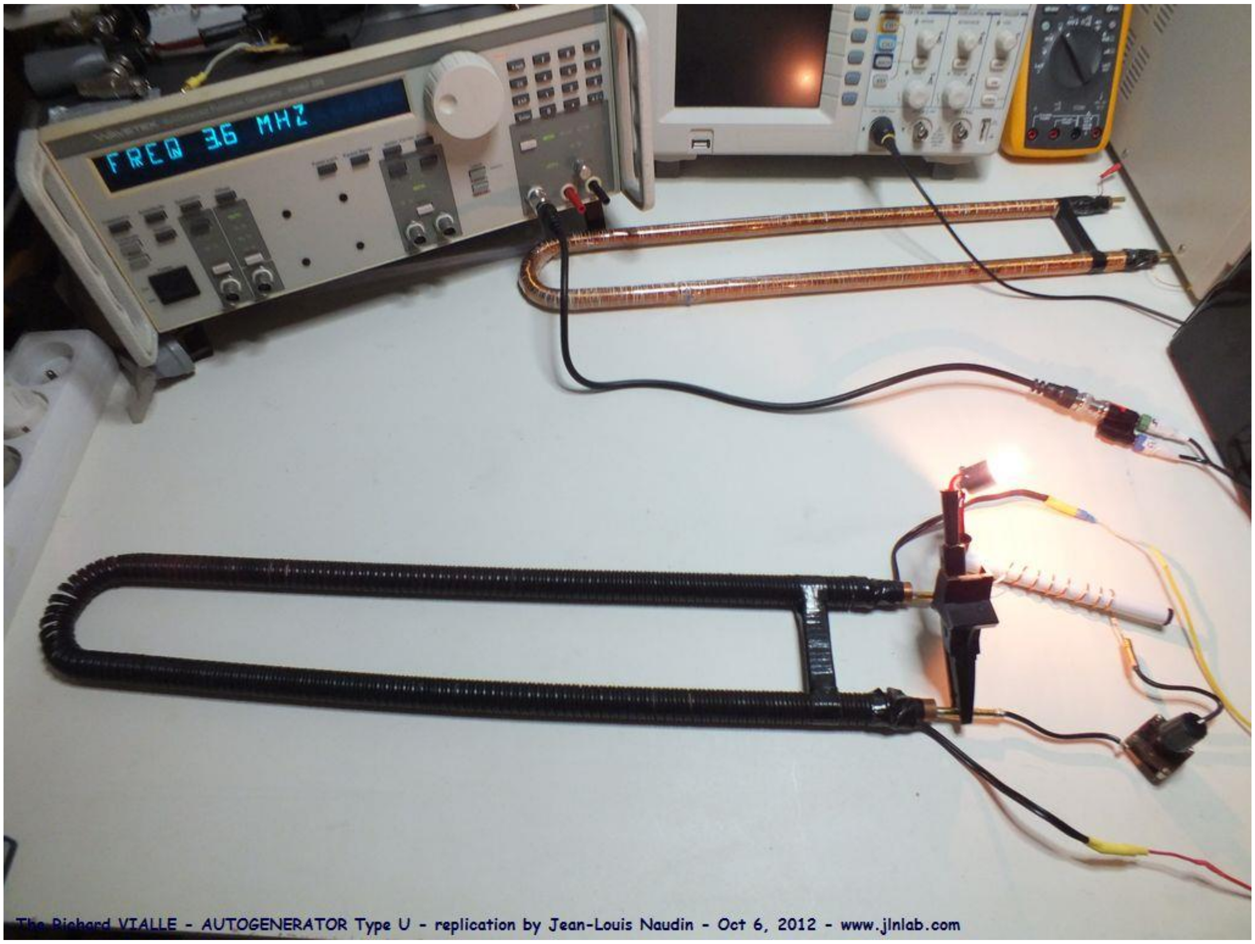
Chapter 14

Tests of the New Version 3.1 of the U-shaped Autogenerator by Richard Vialle

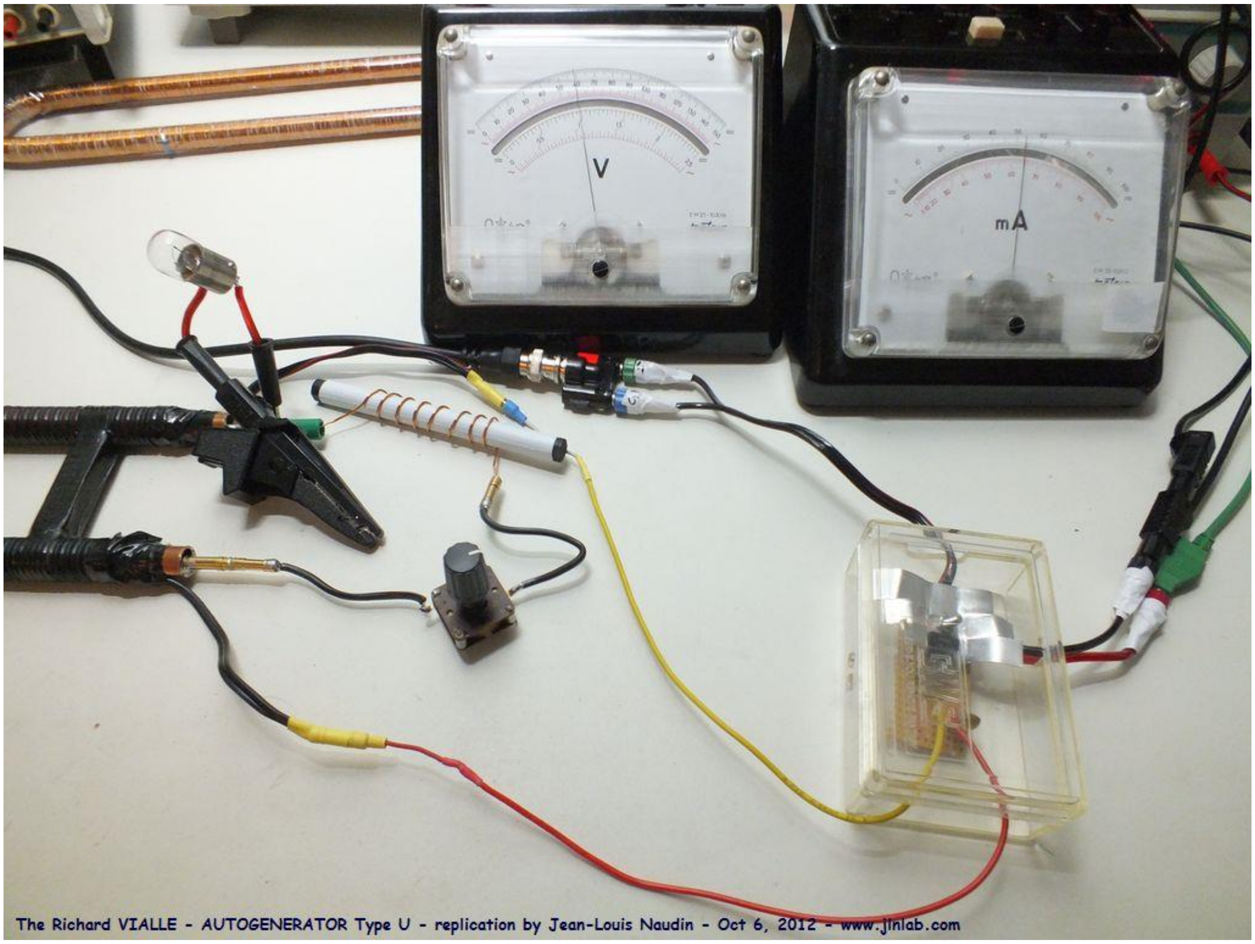
In order to try to reduce the skin effects and the HF losses of Richard Vialle's U-shaped autogenerator, I built a second U-shaped autogenerator. The mechanical part is the same as the previous version, i.e., a copper tube 12 mm outside diameter and 1 m long, bent in a U and cut in the middle (spacing of about 5 mm). For the winding on the other hand, I used 9.80 meters of double insulated multi-stranded wire used for speaker wiring, the two cables (+ and -) are wound together on the U-tube, then connected to each other (connected in parallel at each extremity). I used thin double-sided tape (for carpet) to glue this cable to the tube when winding.

The U-bent copper tube is cut in the middle and the spacing between copper tubes is of the order of 5 mm.

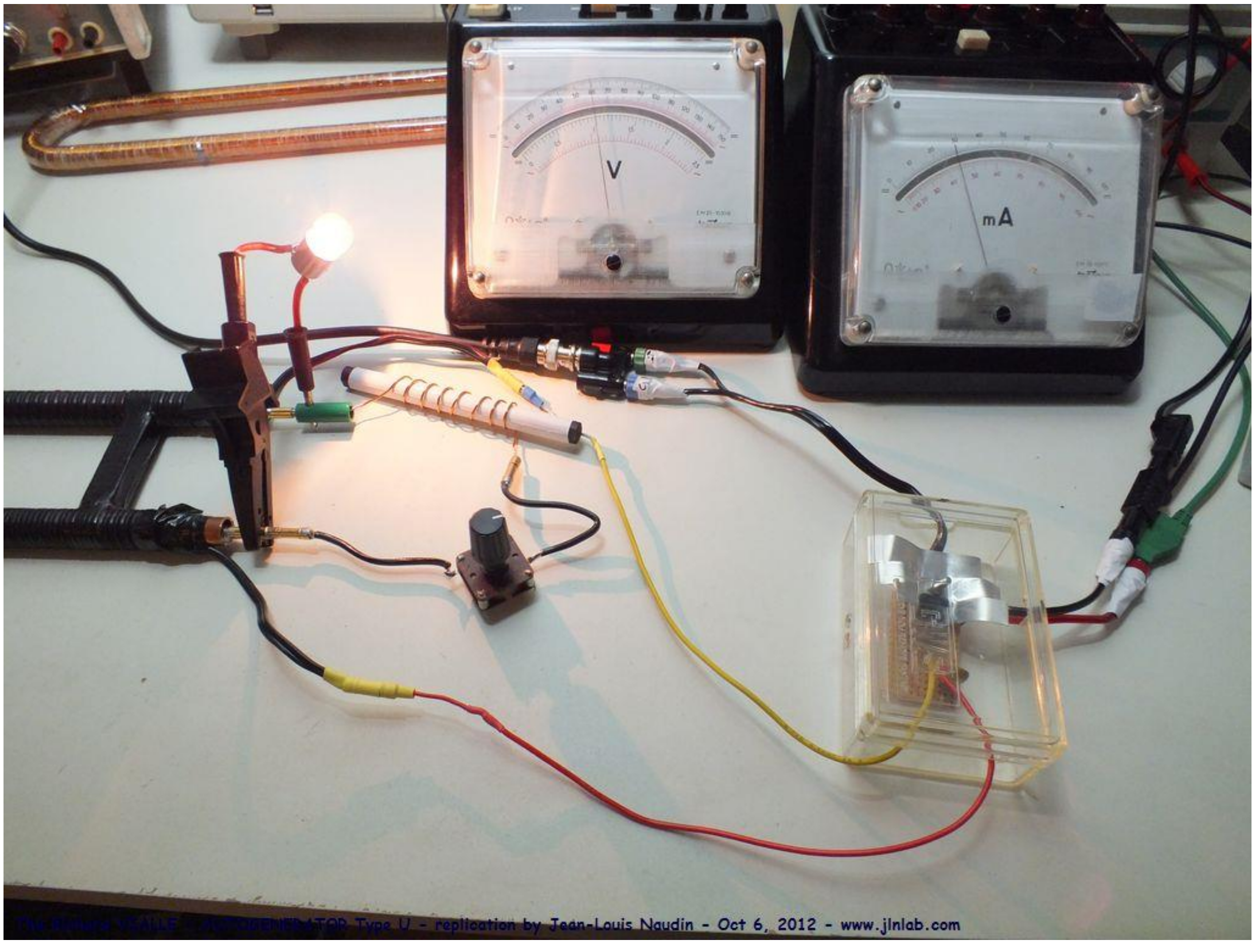
There is a fiberglass rod glued with two-component glue to hold the two half-U parts.



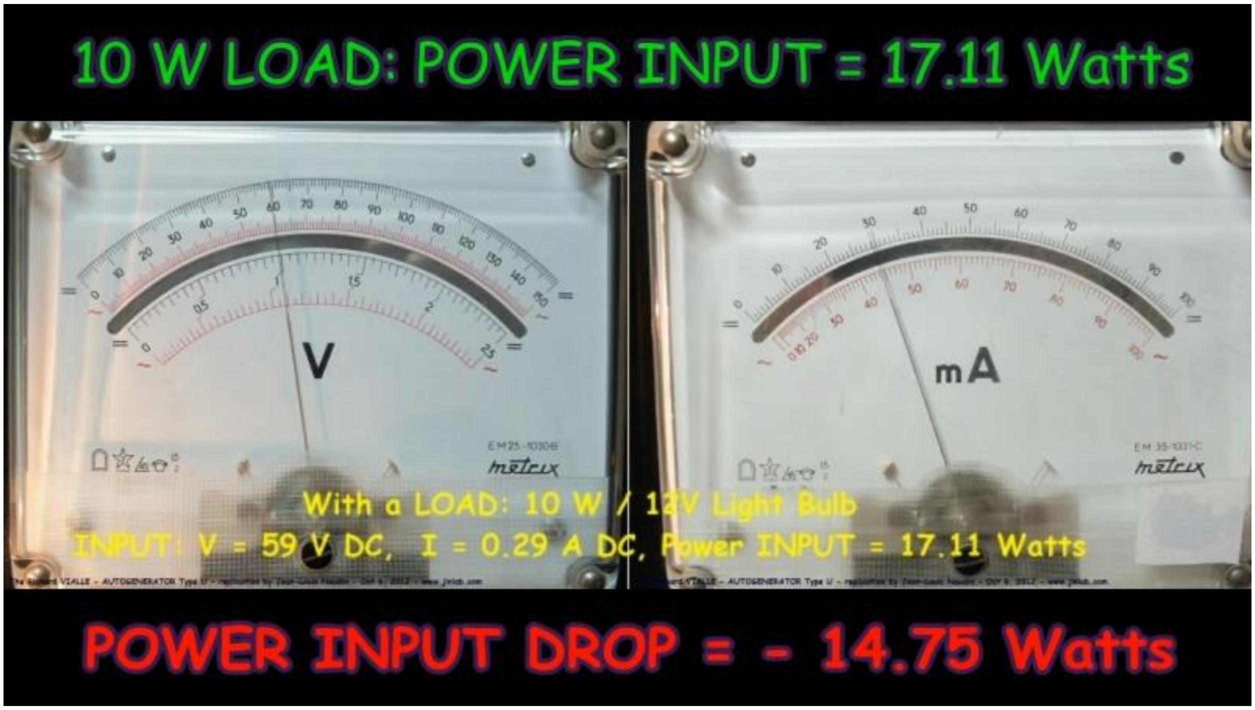
The coil of the U-shaped autogenerator V3.1 is connected to the Wavetek 288 function generator via the HF amplifier V3 (with a MOSFET IRF840 transistor) used previously. The load connected to the ends of the U-tube is a 12 V 10 W lamp. The output series LC circuit is composed of an inductor with 8 turns of 10/10 mm wire on a ferrite rod (Ferroxcube 10 mm in diameter and 120 mm long), and a variable capacitor of 500 pF. The setting of the operating point of the U-shaped autogenerator V3.1 is delicate and precise and must be carried out carefully.



When the U-shaped autogenerator v3.1 is supplied with HF at 3.6 MHz (frequency calculated by the theory of Richard Vialle), the direct voltage is 59 V and the direct current is 0.54 A measured at the input of the power supply, i.e., a power of 31.86 Watts.



When the 10W charging lamp is connected to the U-shaped autogenerator V3.1, the direct voltage is 59 V and the direct current is 0.29 A measured at the input of the power supply, i.e., a power of 17.11 Watts.



So when the 10W charging lamp is connected to the U-shaped autogenerator v3.1, I observe a drop in input power of - 14.75 Watts.

Here is a video of the experience:

https://youtu.be/2Jz94RWt87c

Parts List

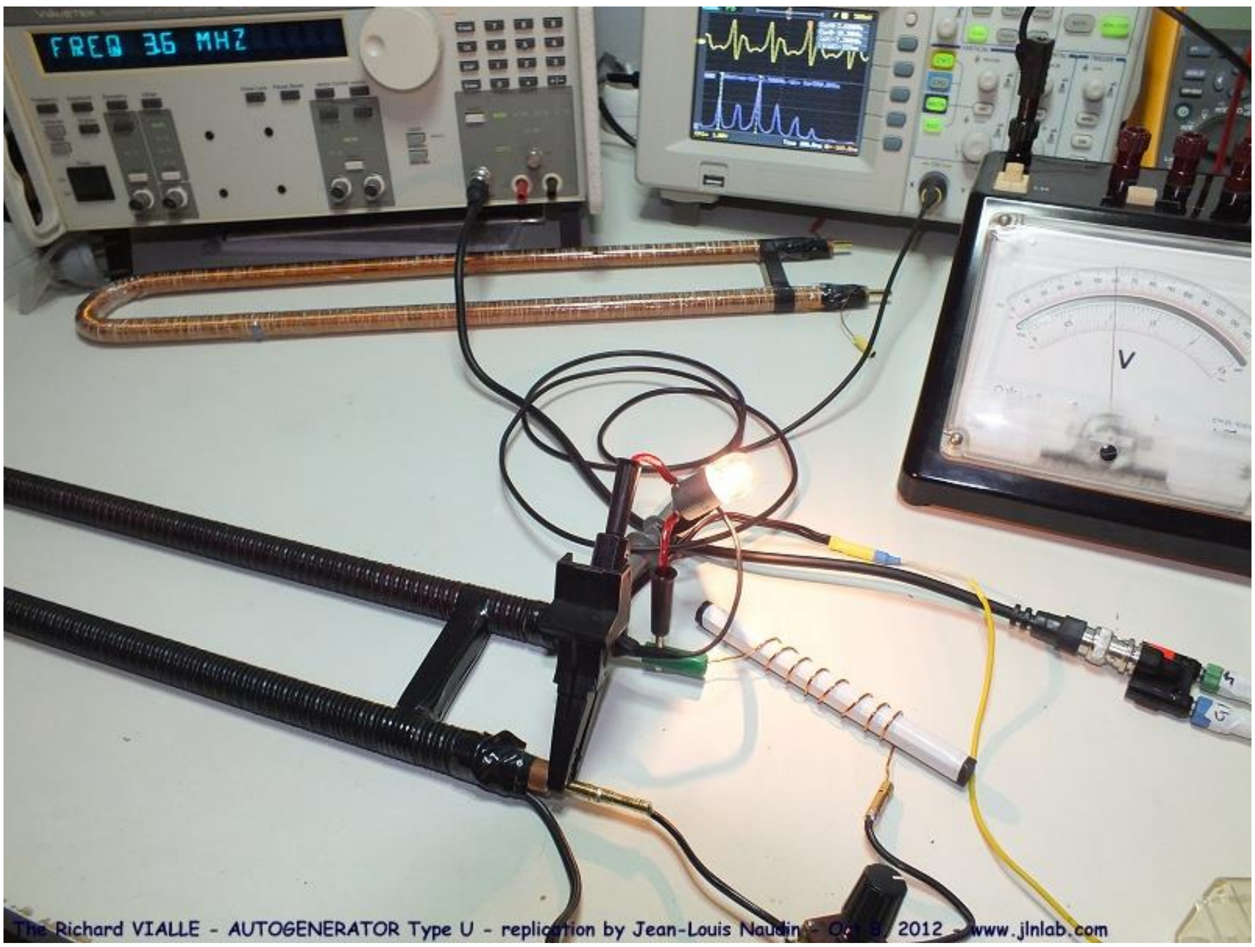
100 feet of 18 AWG twin conductor speaker cable

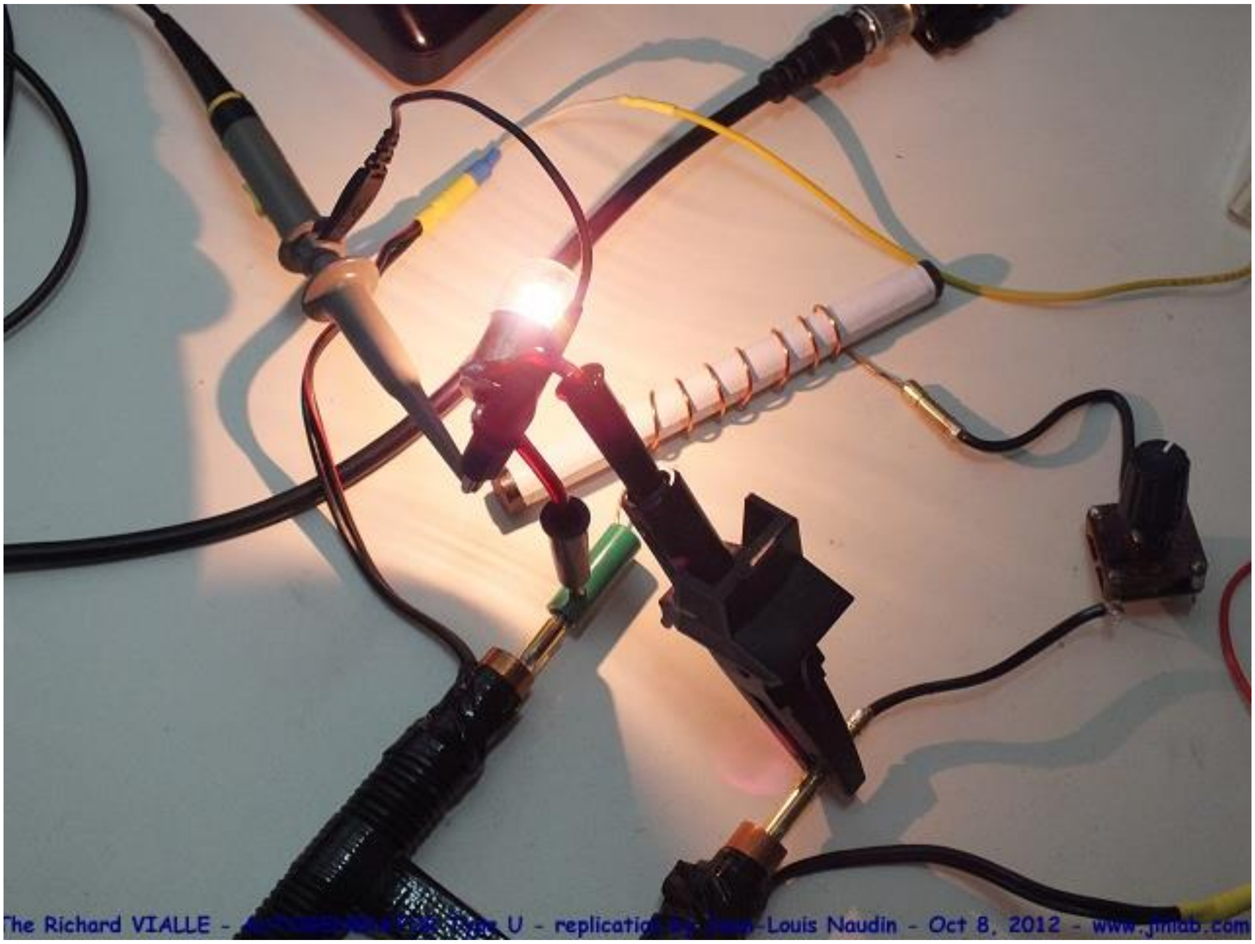
Chapter 15

Analysis of the Frequency Spectrum

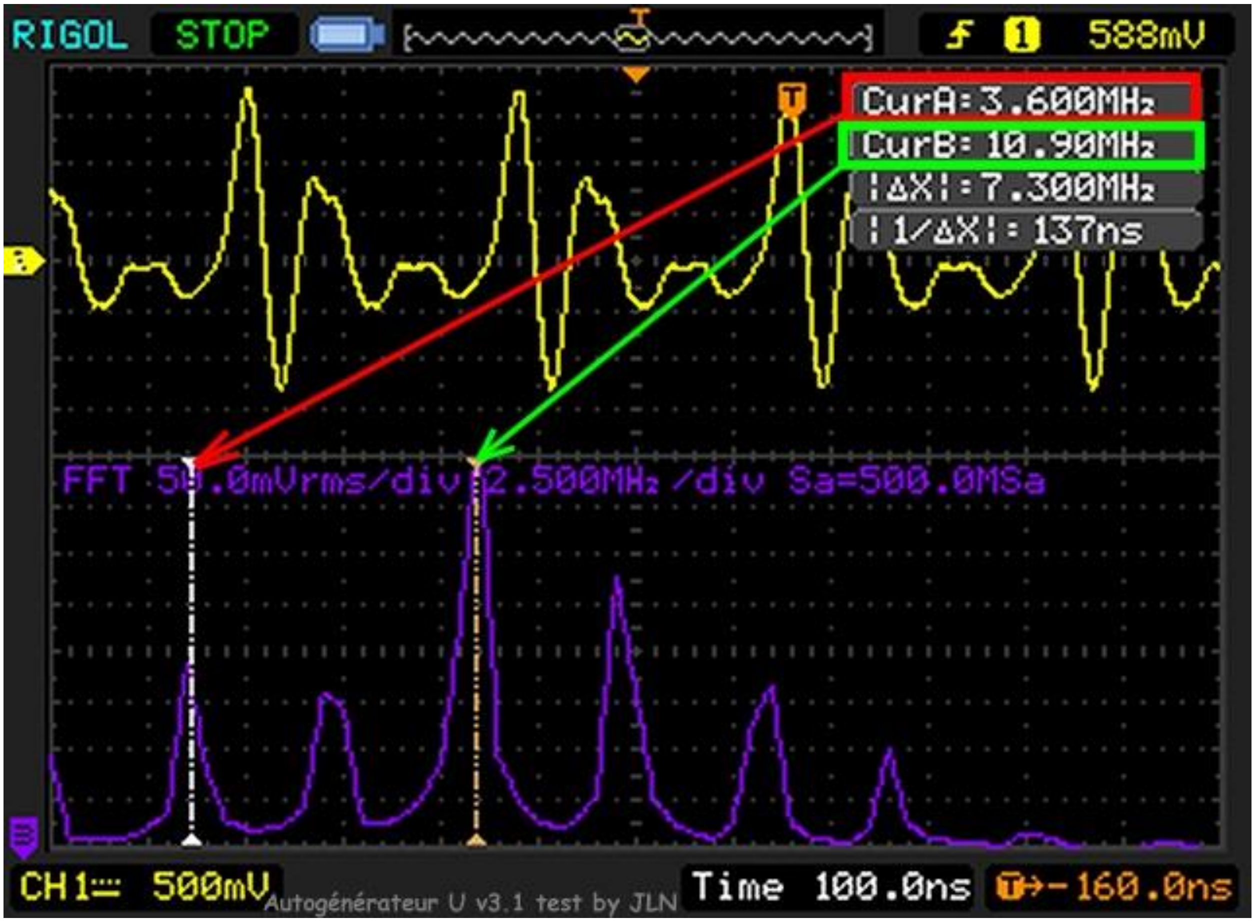
Produced at the Output of Richard Vialle's U-shaped Autogenerator

Here is the frequency spectrum produced on the load current loop at the output of Richard Vialle's U-shaped autogenerator. The oscilloscope probe is simply used with its ground loop to pick up EM radiation emitted by the current loop feeding the 10 W load lamp connected to the U-tube outputs of the autogenerator.

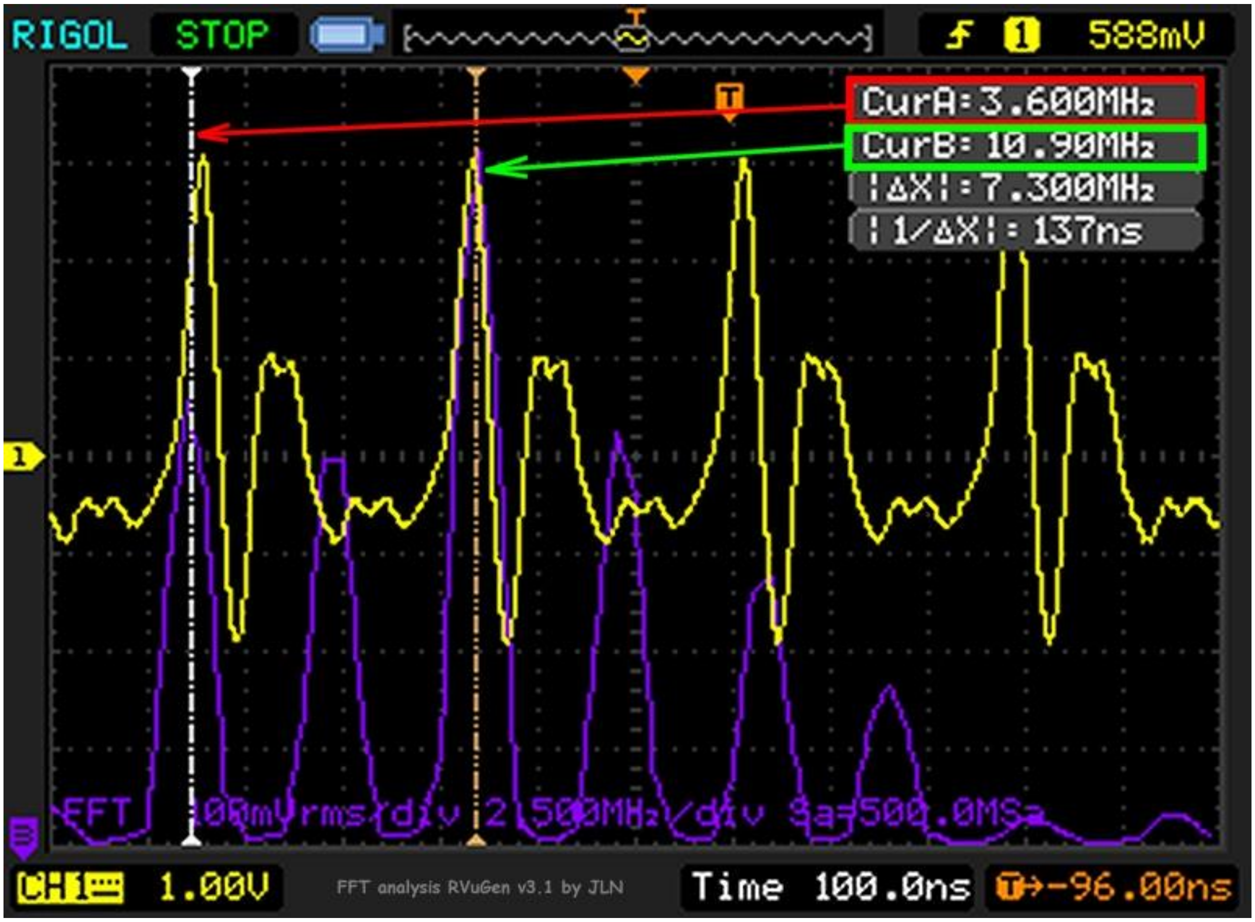




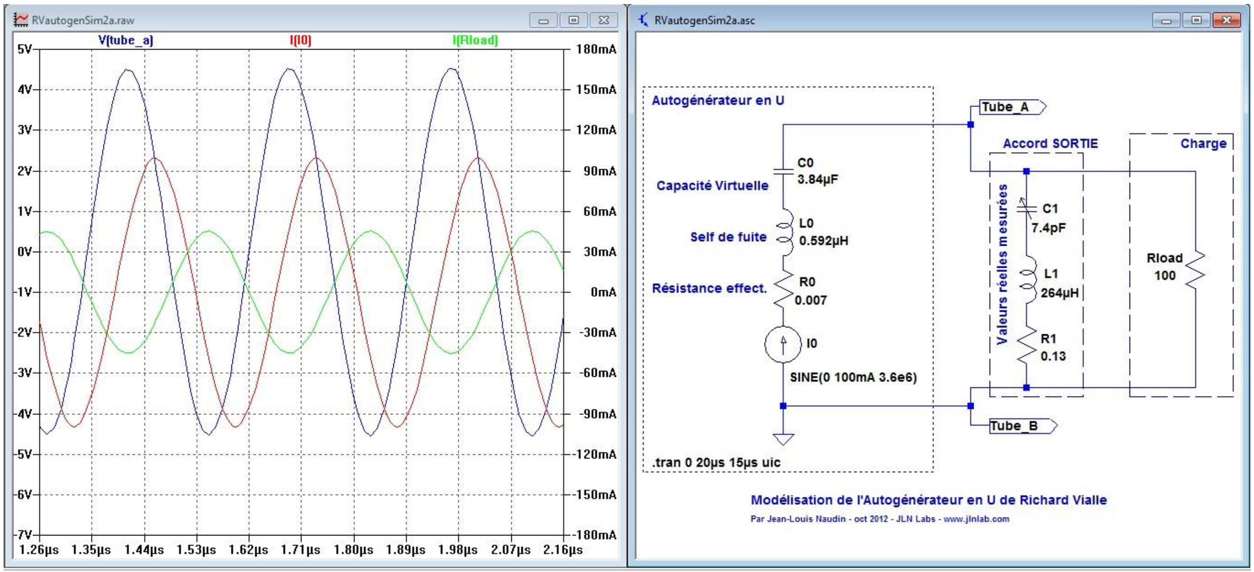
It can be seen that there are many harmonics produced in addition to the sinusoidal 3.6 MHz delivered by the function generator.



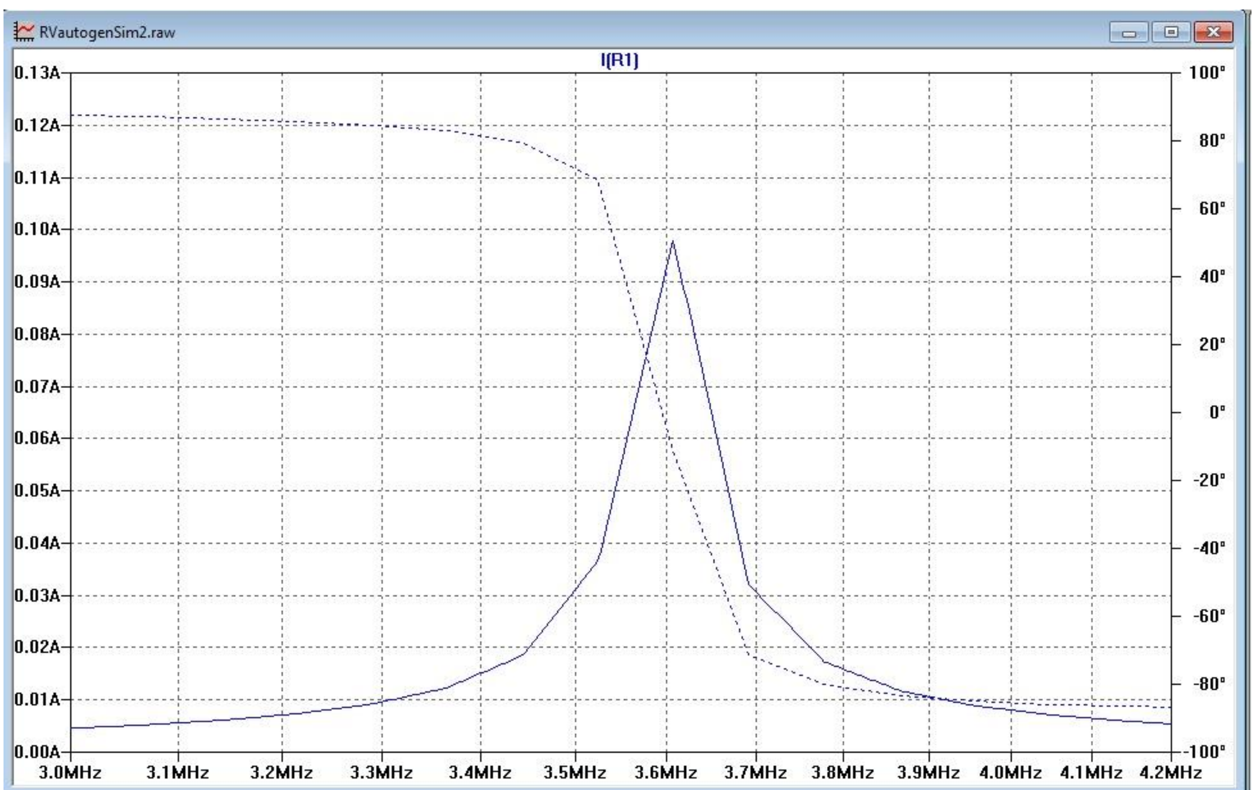
Here is the list of frequencies from the peak of 3.6 MHz: 3.6, 7.3, and 10.9 MHz (highest); 14.5, 18.4, 21.4, 25.2; 28.8, and 32.4 MHz.



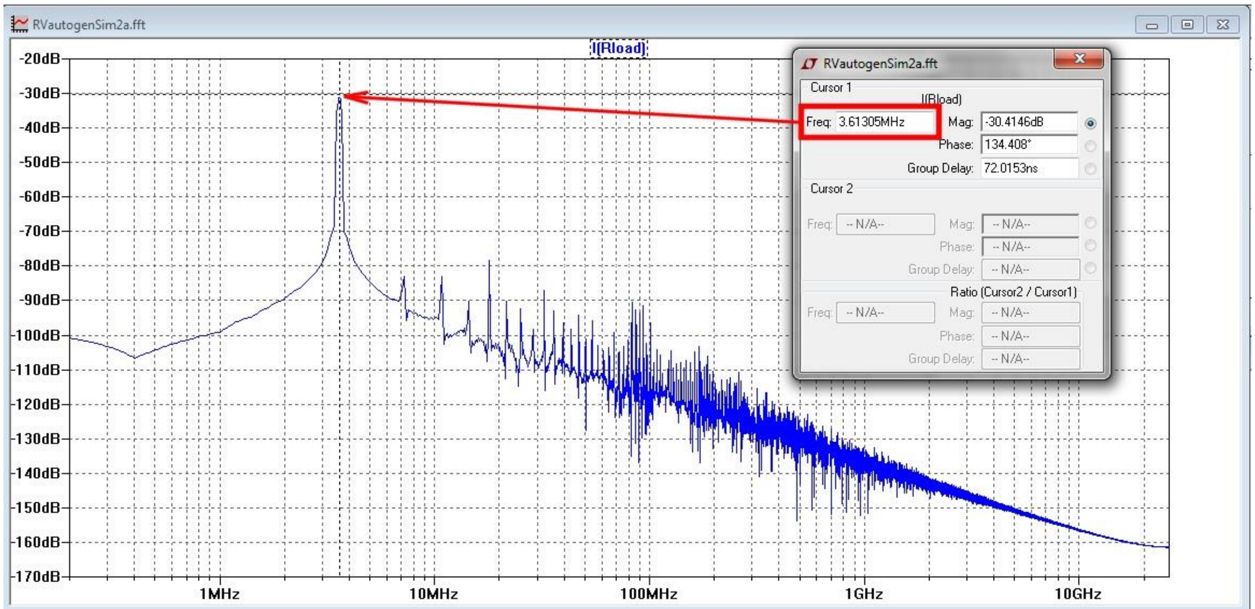
Here is a simulated model of the U-shaped autogenerator. I used the virtual capacity C_o, the leakage choke L_o, and the total effective resistance (with the skin effect) R_o calculated with the theoretical formula of Richard Vialle.



The resonance peak of the series RLC circuit (R1, C1, L1) is indeed at 3.6 MHz on the simulation of the Autogenerator.



Here is the frequency spectrum obtained on the R_{Load} load of 100 Ohms on the simulation of the U-shaped Autogenerator.



Chapter 16

Invariance of the Input Power With or Without the Hot Current Loop Connected to the Output of the Autogenerator

According to Richard Vialle's theory, the energy recovered at the output of the charging lamp is produced by the circulation of the hot current (the movement of free electrons in the conductor) in the hot current loop (made up of the LC circuit and the charge lamp) connected to both ends of the U-tube. The setting in motion of these conduction electrons is produced by what Richard Vialle called the "cold current". See the simplified explanation of Richard Vialle's theory, chapters 10 and 11:

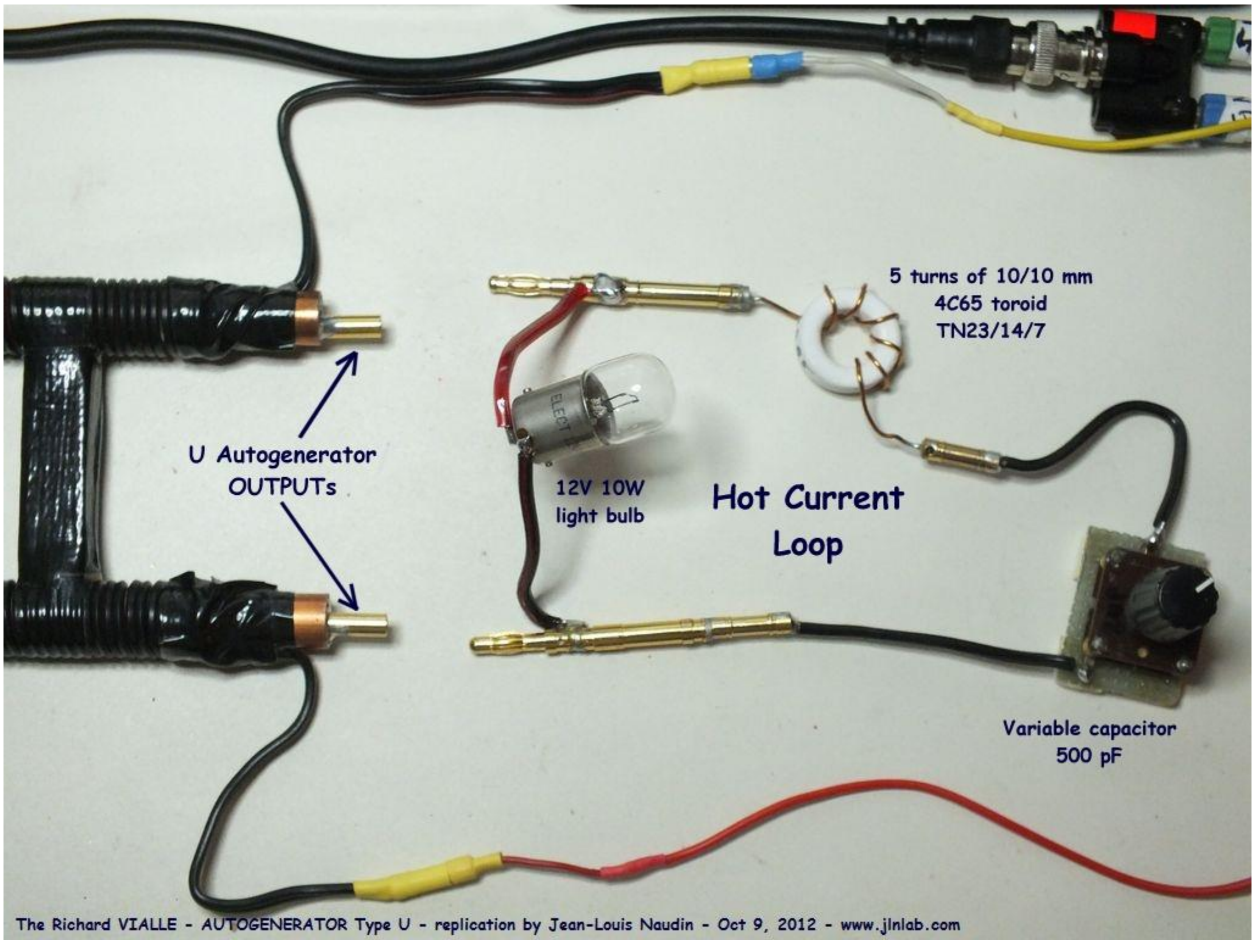
“The synchronous elongation at the frequency n * f_0 (harmonic of f_0) of the orbital electron will produce "a cold current". This "cold current" is not produced by a current of electronic displacement in matter, but simply by a synchronous oscillation of all the orbital electrons. It does not produce heating (no Joule effect), but simply a transfer of electrical energy throughout the conductive bar (like the Newton's pendulum experiment demonstrating the transfer of kinetic energy between 5 balls).

At the terminals of the conductor subjected to this scalar magnetic field and in resonance, an electric field will appear which will cause a "hot current" to circulate, that is to say, a real electronic current which can be used on a resistive load in an external closed circuit (RLC + R_{load} circuit).”

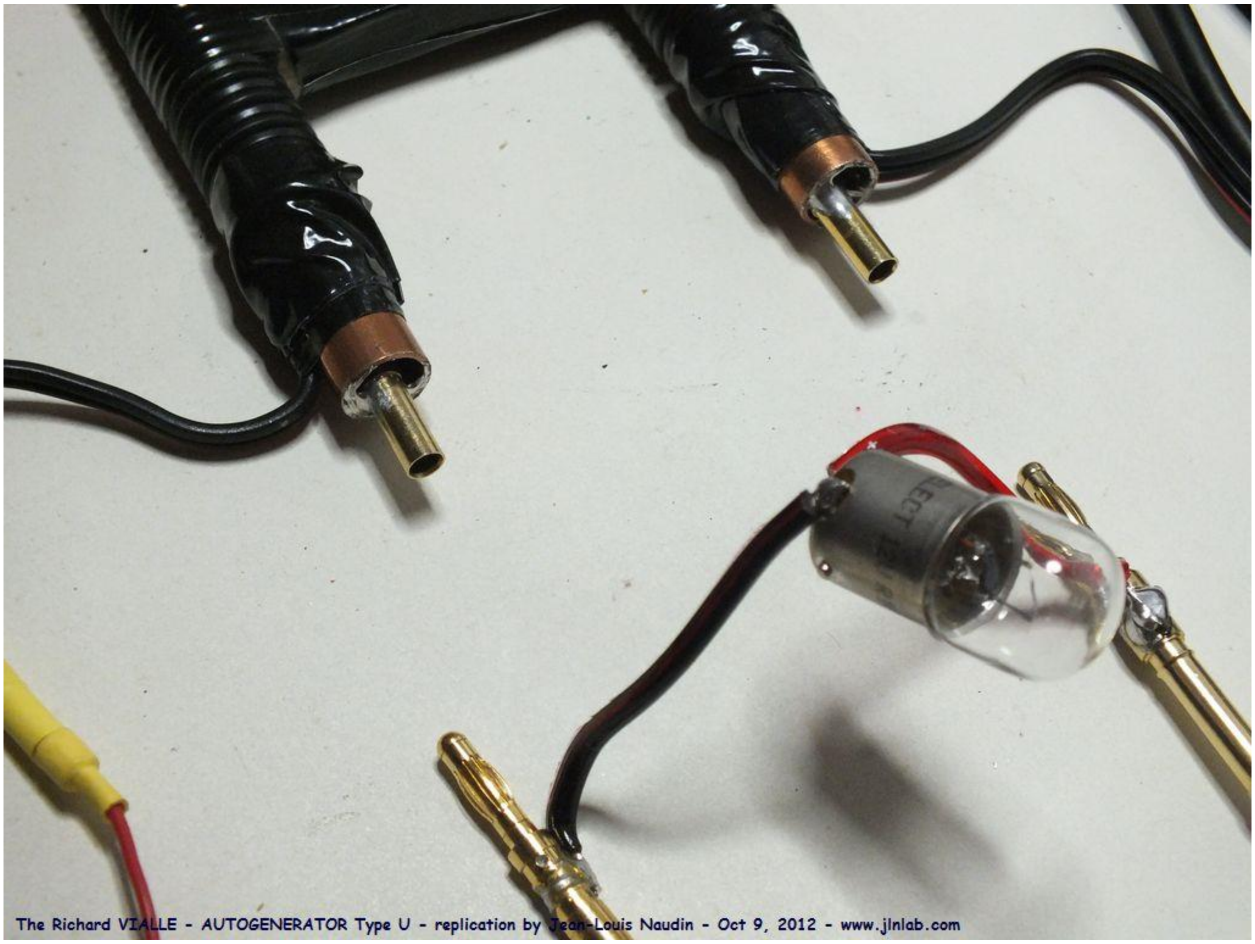
So therefore, if indeed the electronic current usable in the hot current loop is produced only by the parametric elongation of the orbital electrons of the copper atoms of the U-tube, then there should be no EM coupling with the magnetic field d excitation since this magnetic field has the sole purpose of producing the parametric elongation of the orbital radius of the electron around the nucleus. The frequency of the parametric pump is 3.6 MHz for a 1m U-shaped copper tube. I remind you that the U-shaped copper tube is cut in order to limit the movement of the conduction electrons and therefore the losses by Joule effect in the tube. Richard Vialle's autogenerator is not comparable to a simple transformer since the magnetic excitation field is parallel to the U-shaped conductive tube, and moreover this tube is cut in the middle.

So, I wanted to do a verification experiment of the principle stated above.

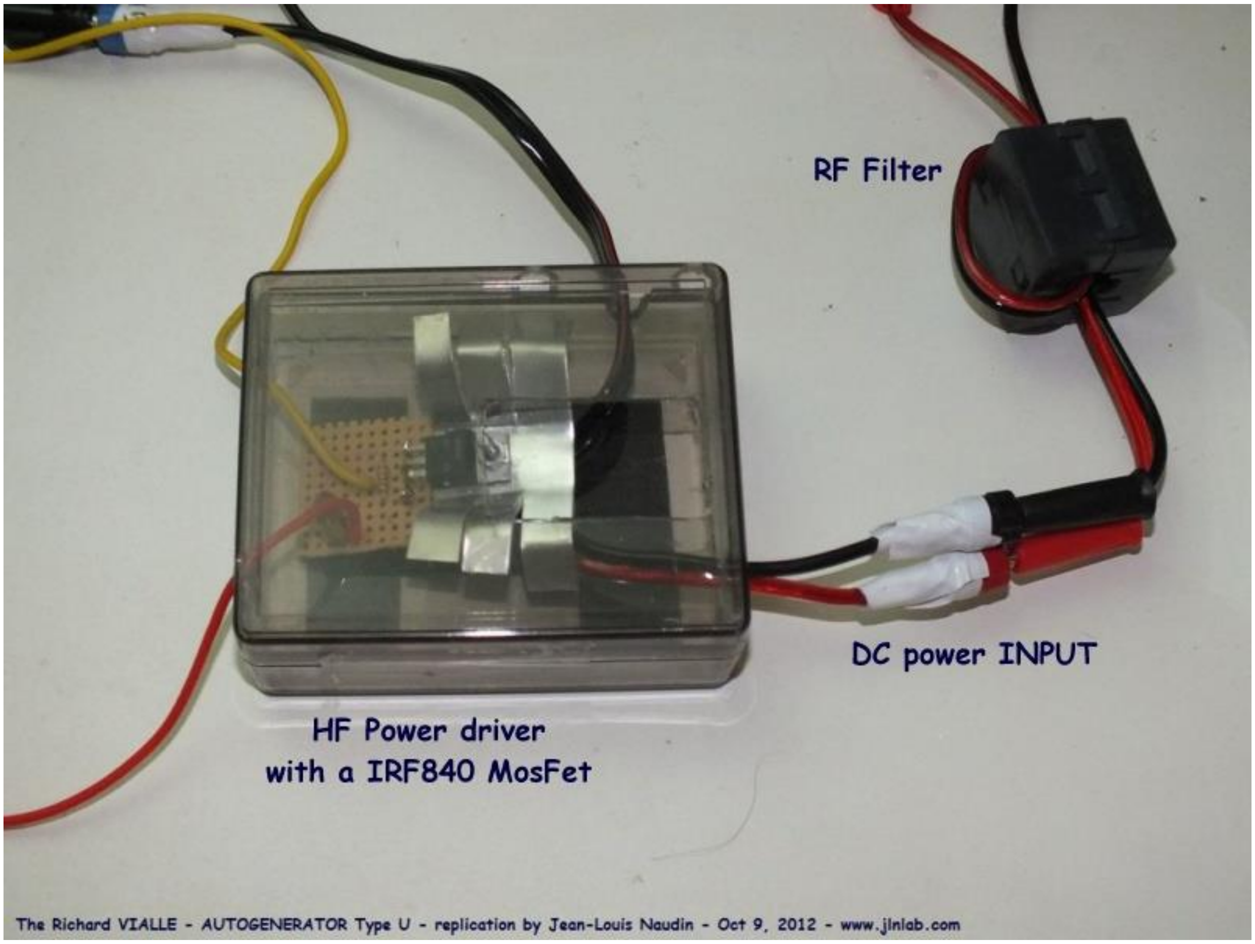
Here is the "hot" current loop with its load. This "hot" current loop consists of an inductor (ferrite core (4C65) 23mm in diameter with 5 turns of 10/10mm wire), a variable capacitor of 500 pF, and a load lamp of 10 W at 12 V. The variable capacitor is finely tuned to the optimum operating point for 3.6 MHz.



Below are the two ends of the U-shaped copper tube (cut in the middle) serving as a "cold" current source.

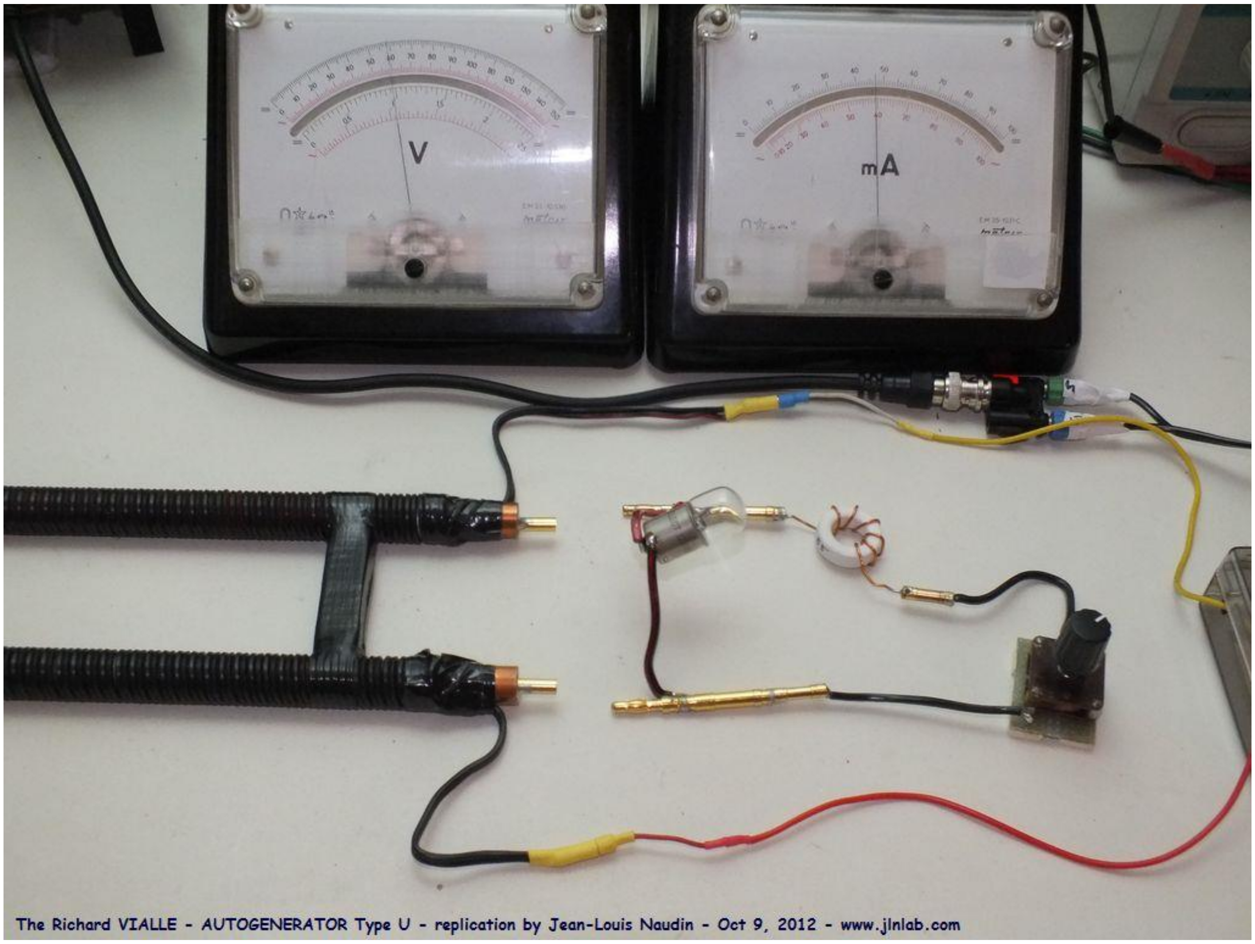


The Wavetek 288 function generator is set to 3.6 MHz sinusoidal, and is connected to the HF amplifier based on a IRF840 MOSFET; it is supplied with 58 V DC. An HF filtering toroid is placed on the DC power supply cables of the amplifier to block any possible return of the HF to the power supply.

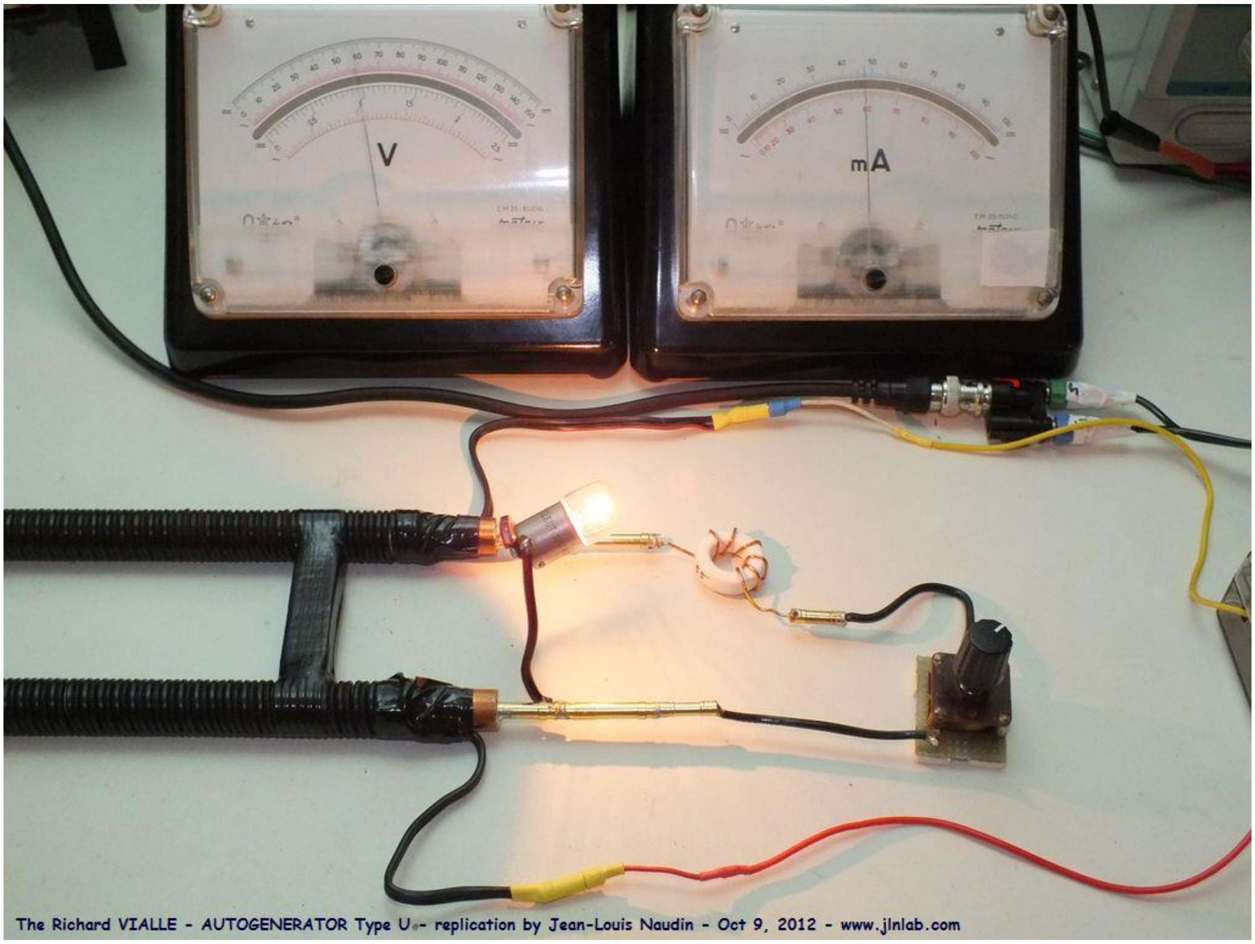


The U-shaped autogenerator is supplied with no load, i.e., with the ends of the U-shaped tube disconnected and the DC input power calculated from the measurements of the current (ammeter calibrated on 500mA DC), and of the direct voltage (voltmeter calibrated on 150 VDC). The DC current is 0.46 / 2 = 0.23 A and the DC voltage is 58 V. At no load the DC power supply of the U-shaped autogenerator is 13.3 Watts, or 58 V * 0.23 A.

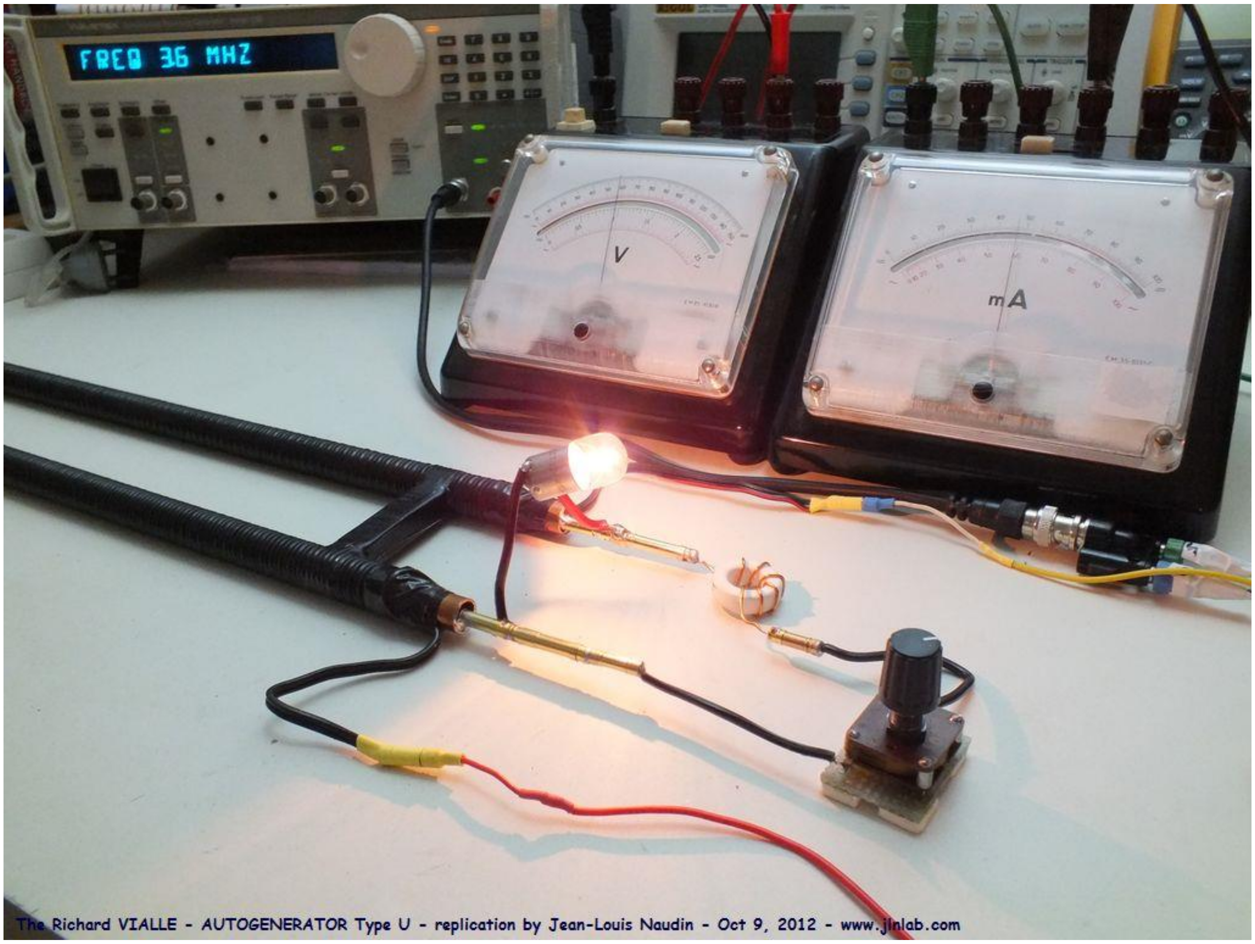
This power is essentially dissipated by the Joule effect in the MOSFET transistor which heats up.



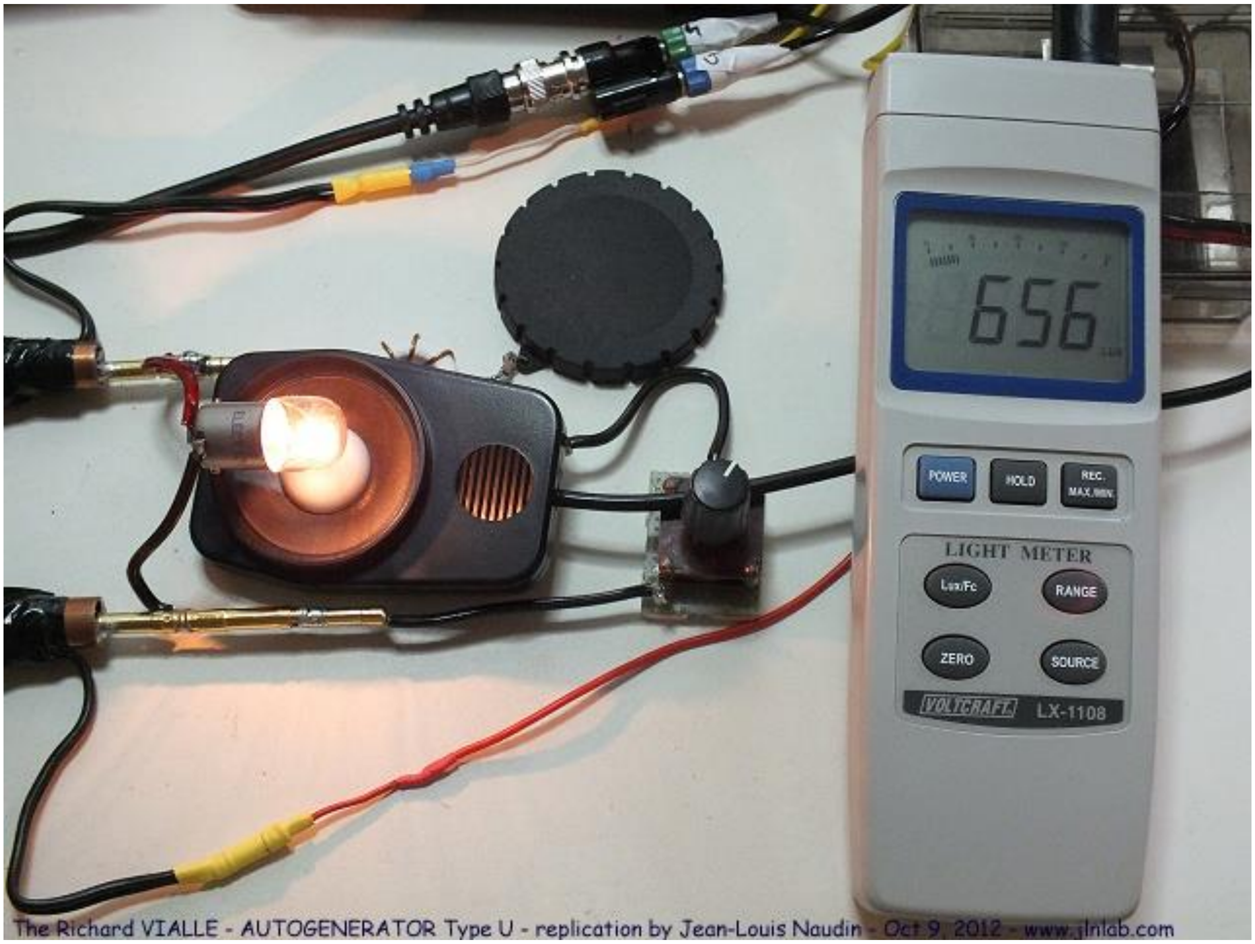
When the "hot" current loop is connected to the U-shaped autogenerator, there is NO noticeable VARIATION in the DC supply power.



In this test, and for this type of adjustment, the 10 W lamp does not light up at full power, the visually estimated power is of the order of 30%.



In order to assess the DC electric power required to light the lamp at the same light intensity as with the autogenerator, I used a Voltcraft LX-1108 Luxmeter.



The Luxmeter optical sensor is placed under the lamp and then covered with a cover to avoid the influence of external light.

A first measurement was carried out with the lamp supplied with the autogenerator: the measured light intensity is 483 Lux.

I then fed the lamp with a DC source and adjusted the power supply to obtain the same light intensity.

The DC power required to obtain the 483 Lux is P = 6.7 V x 0.48 A = 3.2 Watts.

To summarize this interesting experience:

The power supply of the HF amplifier requires 13.3 Watts continuous with the U-shaped autogenerator connected to vacuum (the ends of the U-shaped copper tube are not connected). This power is mostly dissipated by the Joule effect in the MOSFET transistor.

When the "hot current" load loop is connected to the ends of the U-shaped autogenerator, the DC power consumed at the input remains INVALID.

The DC power required to obtain the light intensity of 483 Lux that is equivalent to switching on the lamp with the autogenerator, is 3.2 Watts.

It is interesting to note once again that there is no feedback of the 3.2 Watts produced at the output of the U-shaped autogenerator on the latter's power source.

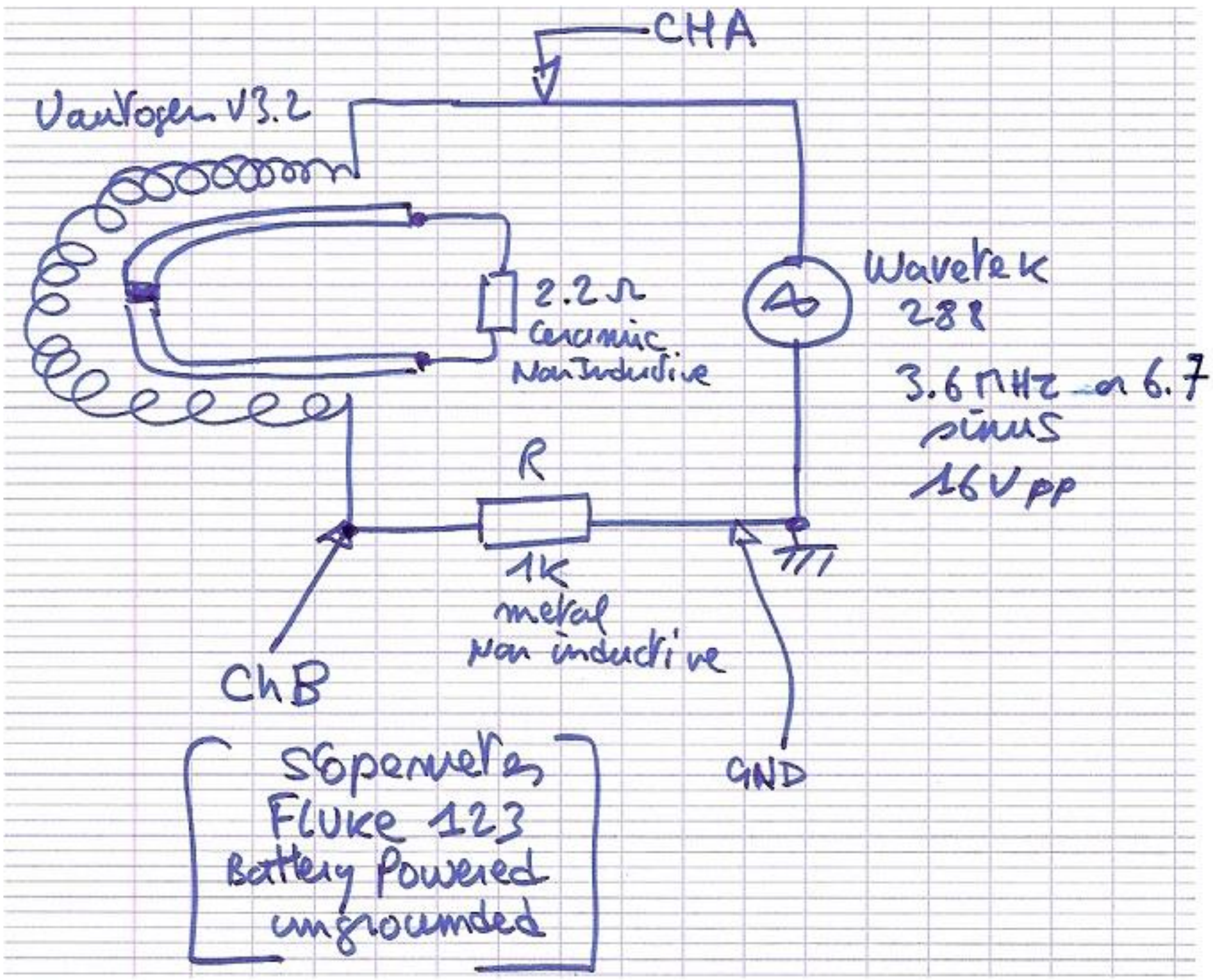
Here is a video of the experience:

https://youtu.be/ZKV9Xjy5kgg

Chapter 17

Demonstration of Negative Power at the entrance to the U-shaped Autogenerator

In this new series of measurements, I reproduced the diagram and the measurement method carried out by Pascuser during his first COP measurements on October 10 on Richard Vialle's autogenerator. In order to have a completely independent measurement of the mass effects, I used a battery-powered Fluke 123 oscilloscope; the probes used are Rigol RP2200 passive probes put on the 10x calibration in order to reduce their input capacity and also increase their impedance. Here is the diagram of my assembly:



探头参数 (Probe Characteristics)		
操作环境	Operation Environment	0~50℃，0~80%RH
存放环境	Storage Environment	-20~60℃，0~90%RH
探头尺寸	Size	140±2cm
探头重量	Weight	About 45g
带　宽	Bandwidth	1X: DC~7MHz 10X: DC~150MHz
上升时间	Rise time	1X: 50ns 10X: 2.3ns
衰减率	Attenuation Ratio	10:1 or 1:1 Switchable
输入阻抗	Input Resistance	1X: 1MΩ ±2% 10X: 10MΩ ±2%
输入电容	Input Capacitance	1X: 100pF±20pF 10X: 17pF±5pF
最大输入	Maximum Input	1X: CAT II 150V AC 10X: CAT II 300V AC
补偿范围	Compensation Range	5pF~29pF

探头零件清单 (Accessory Kit)			
Item	名称描述	Description	Quantity
1	探头	Probe	2
2	探头钩	Retractable Hook Tip	2
3	补偿调节棒	Adjustment Tool	1
4	绝缘保护帽	Locating Sleeve	2
5	标识环（黄,粉,浅蓝,深蓝）	Marker Rings (yellow, pink light blue, and dark blue)	8
6	接地鳄鱼夹	Ground Lead	2
7	接地弹簧	Ground Spring	2

北京普源精电科技有限公司
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E-mail:service@rigol.com

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156# CaiHe Village, ShaHe Town, ChangPing District, Beijing, China
Tel: (86-10)80706688 Fax: (86-10)80705070
Post Code: 102206 E-mail:service@rigol.com

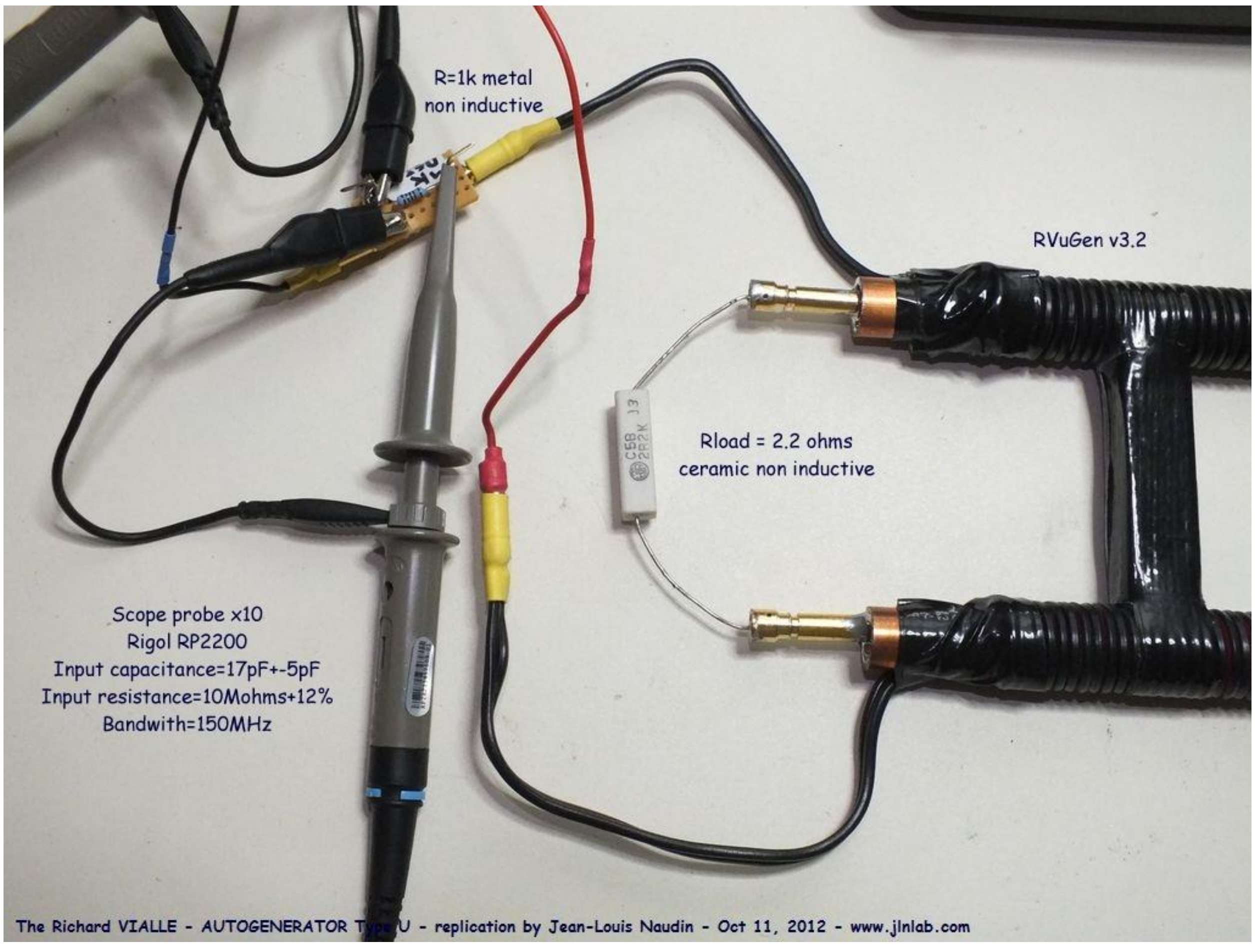
RIGOL®

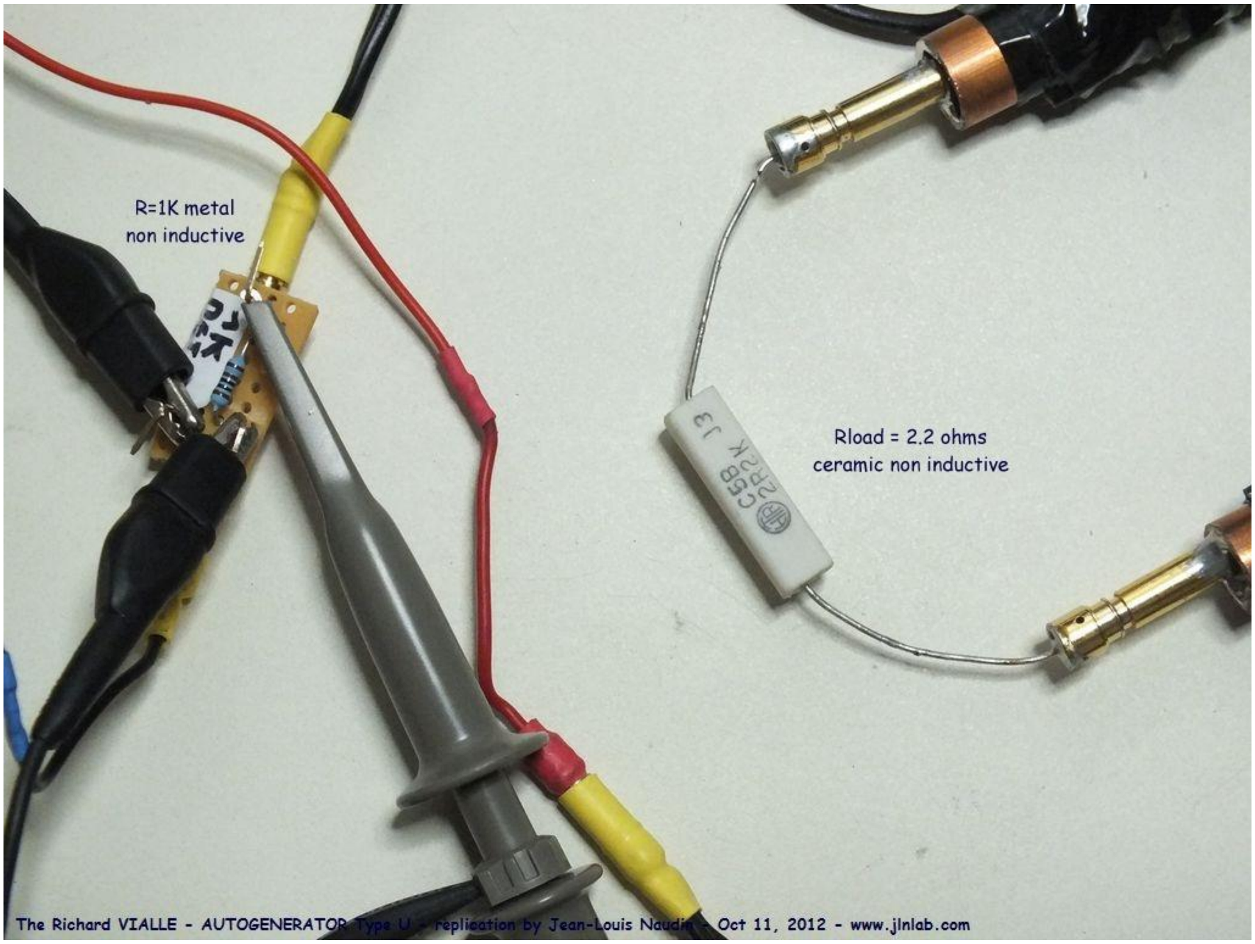
用户手册
User's Guide

RP2200型无源示波器探头

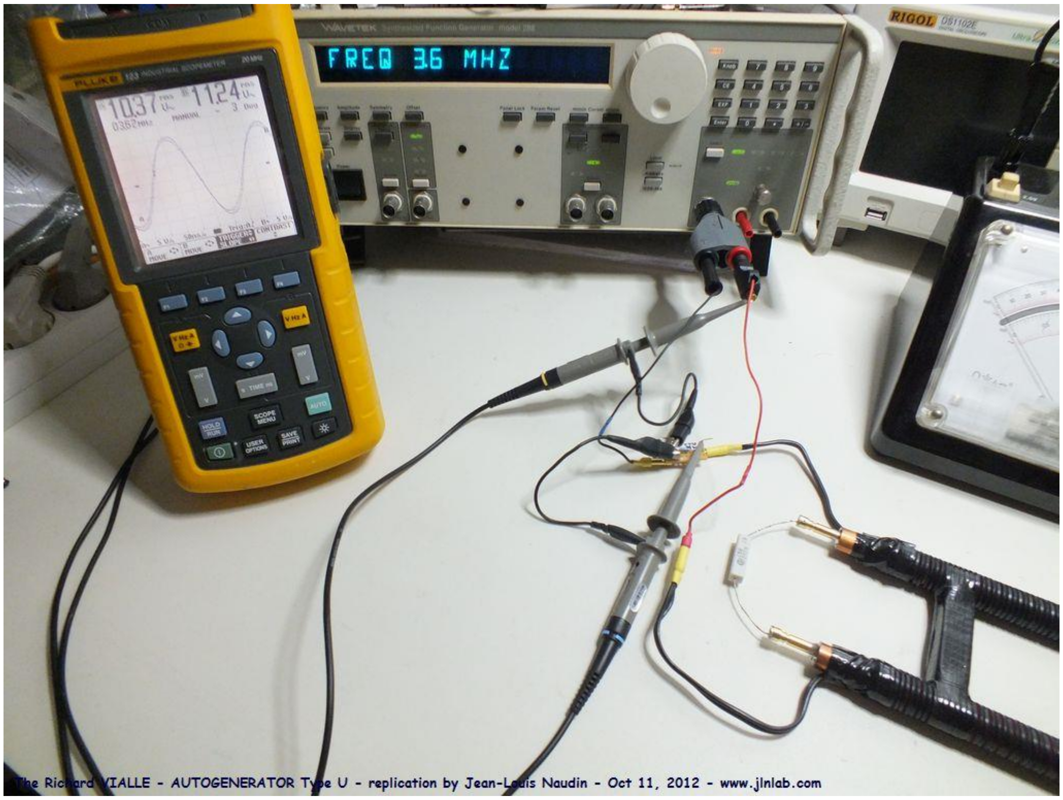
RP2200 Passive Oscilloscope Probe

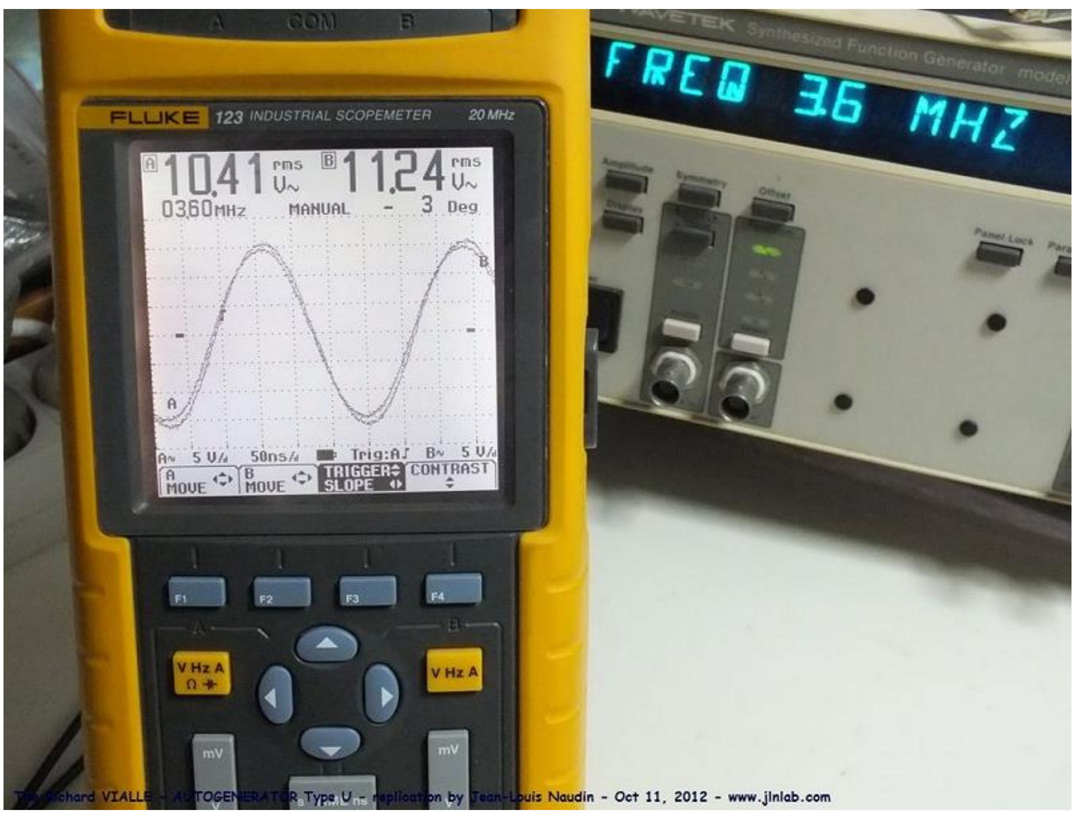
The U-shaped Autogenerator is supplied directly by the Wavetek 288 function generator with a sinusoidal signal via a 1k Ohm (non-inductive) metal resistor allowing the measurement of the input current of the coil. The voltage measurement is carried out with channel A (ChA) at the terminals of the coil and the current measurement with channel B (ChB) at the terminals of the 1K Ohm resistor. A non-inductive 2.2 Ohm ceramic resistor is connected as an output load on the ends of the U-tube of the U-shaped Autogenerator.

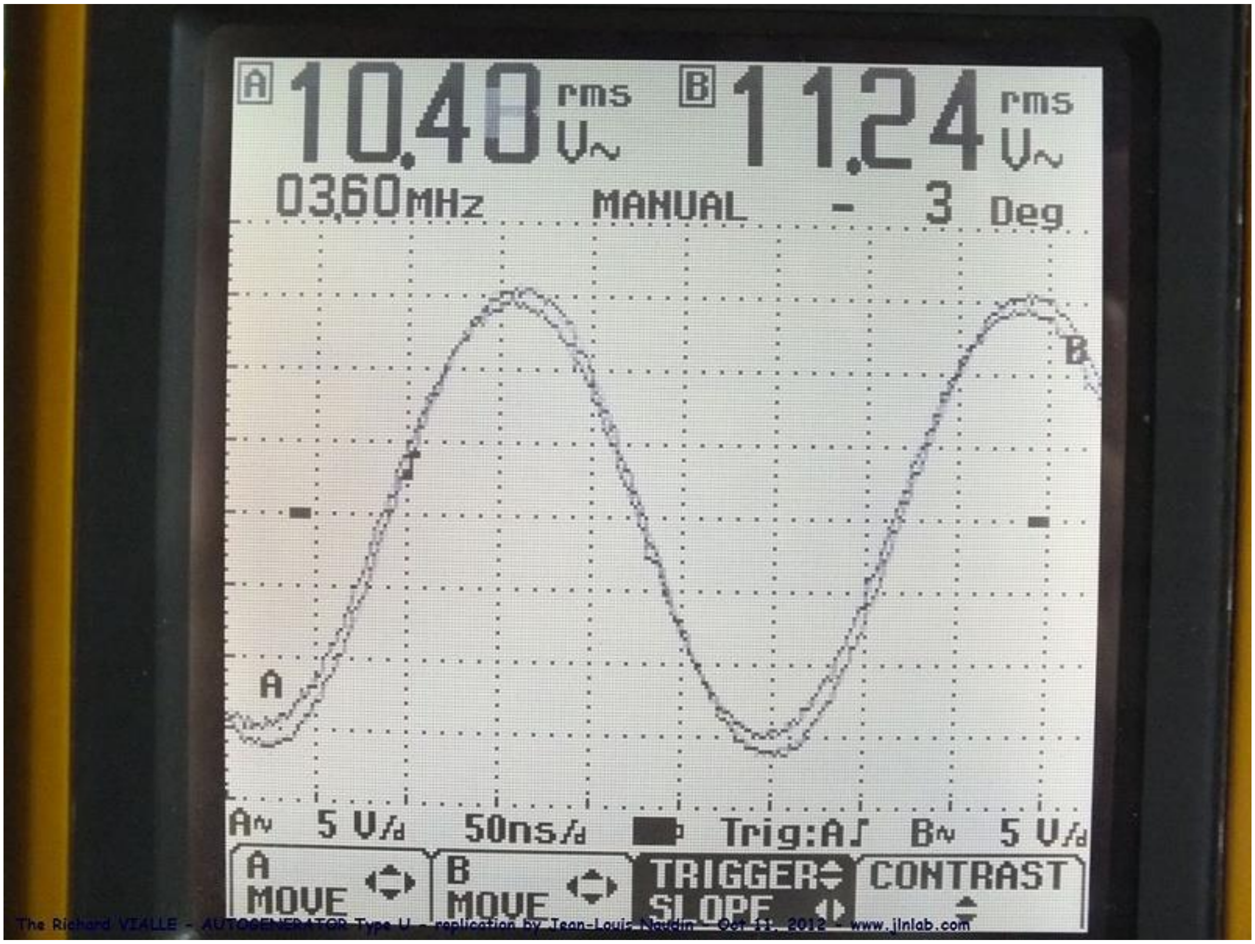




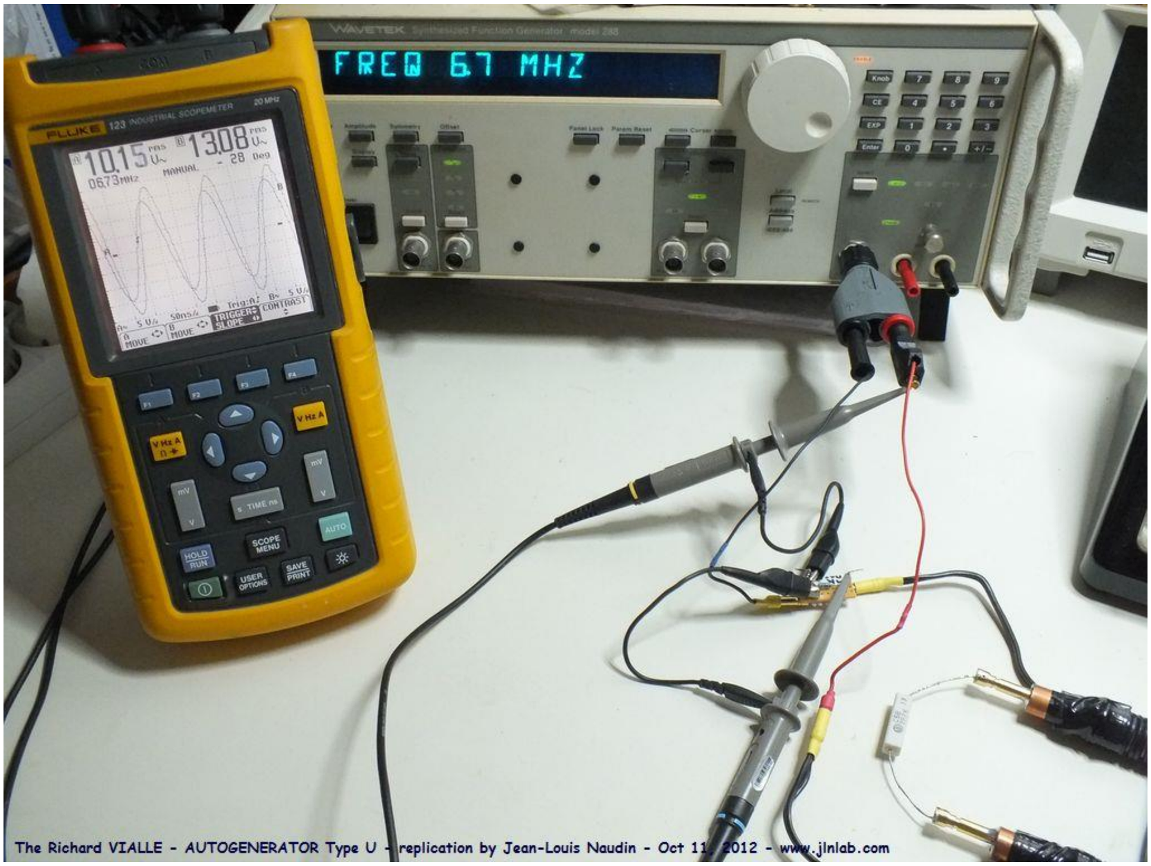
A first measurement is carried out at 3.6 MHz:

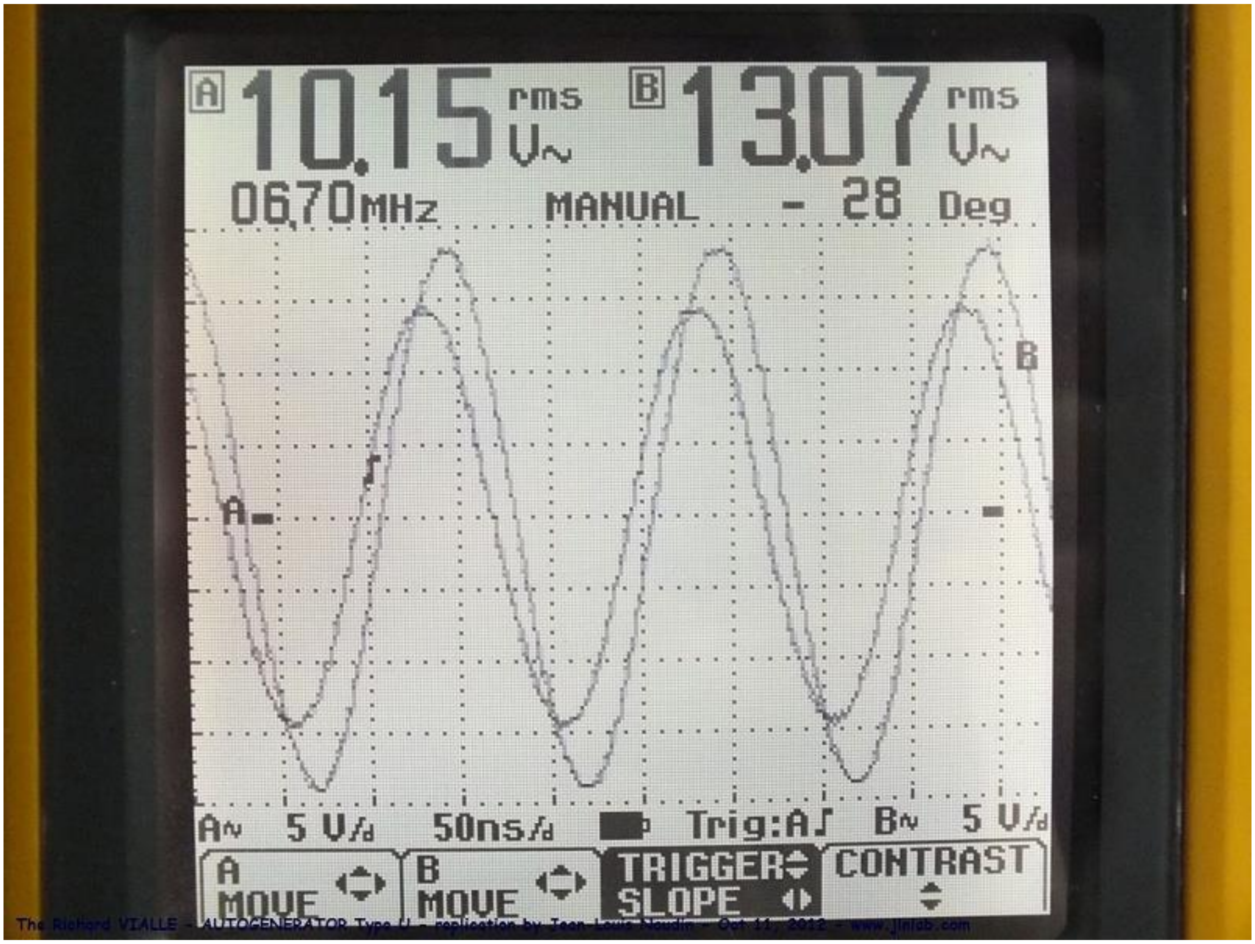

FREQ 3.6 MHZ
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 11, 2012 - www.jlnlab.com


FLUKE 123 INDUSTRIAL SCOPEMETER 20 MHz
A 10.41 rms V~ B 11.24 rms V~
0.360 MHz MANUAL - 3 Deg
A~ 5 V/d 50ns/d Trig:A B~ 5 V/d
A MOVE
B MOVE
TRIGGER SLOPE
CONTRAST
FREQ 3.6 MHZ
Wavetek Synthesized Function Generator
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 11, 2012 - www.jlnlab.com



A second measurement is taken at 6.7 MHz:


FREQ 6.7 MHZ
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 11, 2012 - www.jlnlab.com



Here are the comments and verification calculations made by Pascuser about my measurements:

Pascuser wrote on: Friday October 12, 2012 at 6 hours, 30 minutes:

By making the calculations while correctly taking into account the oscilloscope probes, I can calculate things with the electrical model, and compare them with your measurements.

However, I am missing the inductance of the coil of the U (it is not the same as the first time).

So I did my calculations with the inductance of my coil, which should be roughly the same (they are to be done again when you give me your values). I will make an Excel file which will calculate the model automatically by filling in the values of the capacitors of the probes and the coil inductance.

Legend:

ZA: dipole impedance measured by ChA.

VA: voltage measured in RMS amplitude on ChA, same for VB and ChB.

I placed myself at 3.6MHz.

Calculations:

ZB = 871 - 335j (instead of 1000 Ohms if no probe) -> apparent impedance of 933.4 ohms

ZA = 707 - 367j

VB / VA = 1.17

Phase shift VB compared to VA = 6.4° (almost in phase therefore)

Actual measurements by J-L Naudin:

VB / VA = 11.24 / 10.40 = 1.08

Phase shift of VB compared to VA = -3 ° (almost in phase therefore)

We already have a not too bad agreement which could be better with the real measurement of the inductance of the U coil. Already this shows that Mr. Naudin has something which corresponds to the proper assembly.

For the COP (always with the inductance identical to mine therefore):

Current flowing in the winding: I = 12 mA

Total winding consumption + resistance = 125.1 mW

Pload = 126.3 mW

It is necessary to subtract the powers, therefore what enters the system at the entrance:

Preal = 125.1 - 126.3 = -1.2mW

We are in negative power!!

I now placed myself at 6.7MHz:

ZB = 661 - 473j -> apparent impedance of 813.2 ohms

ZA = 465 - 322j

VB / VA = 1.44

Phase shift of VB with respect to VA = -0.9° (almost in phase)

Measurements:

VB / VA = 13.07 / 10.15 = 1.29

Phase shift of VB with respect to VA = -28°

So there the reports do not coincide too much with the model.

For the COP (always with the inductance identical to mine therefore):

Current flowing in the winding: I = 16.1 mA

Total winding consumption + resistance = 144 mW

Pload = 171 mW

Preal = 144-171 = -27 mW

Even more negative power!

And if the model takes into account the capacitance of the probes being removed, we remain able to have "more cash" without a more subtle phenomenon, and we have even more negative power in both cases:

3.6 MHz:

Total winding consumption + resistance = 116.7 mW

Pload = 126.33 mW

Preal = -9.6 mW

So more negative power.

6.7MHz:

Total winding consumption + resistance = 117.1 mW

Pload = 170.8 mW

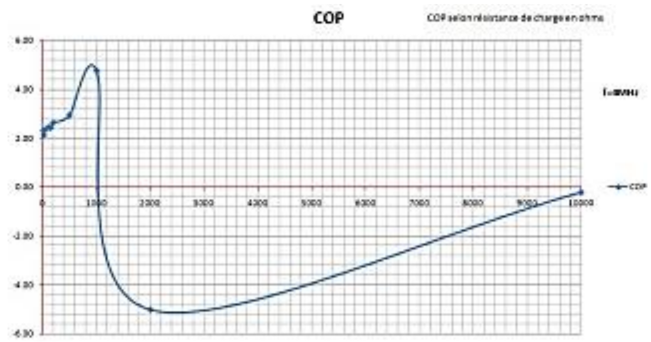
Preal = -53.7 mW

So more negative power still.

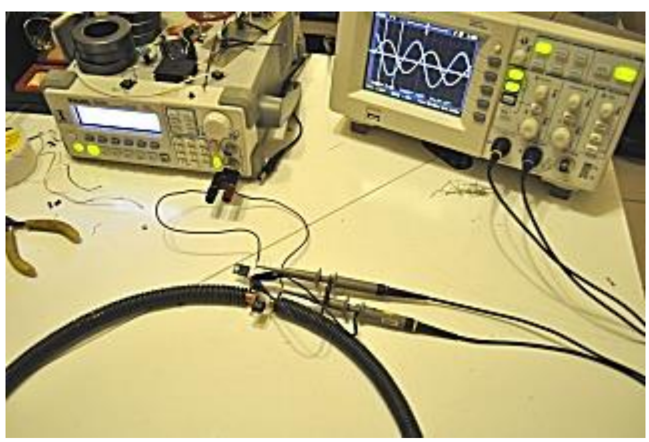
In any case, we are a winner for showing the big physics anomaly. And since there is no mass coupling either, and good probes, we are not going to reproach you for having a "Made in China" oscilloscope (this is what I was told by email to say that I had wrong measurements because obviously we had to find a reason. What is more is it is wrong; it is not made in China), and J-L Naudin finds the same results. That confirms that it is the measurement which is thus.

Yes, the negative power is well measured!!

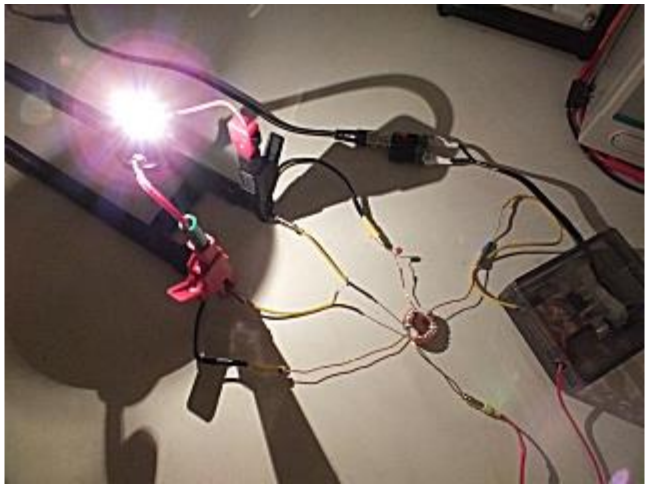
See as well:



Parametric study of the PERFORMANCE of the Autogenerator as a function of the output load by Pascuser.



Successful replication by MIZUNO57 of Pascuser's COP measurements.

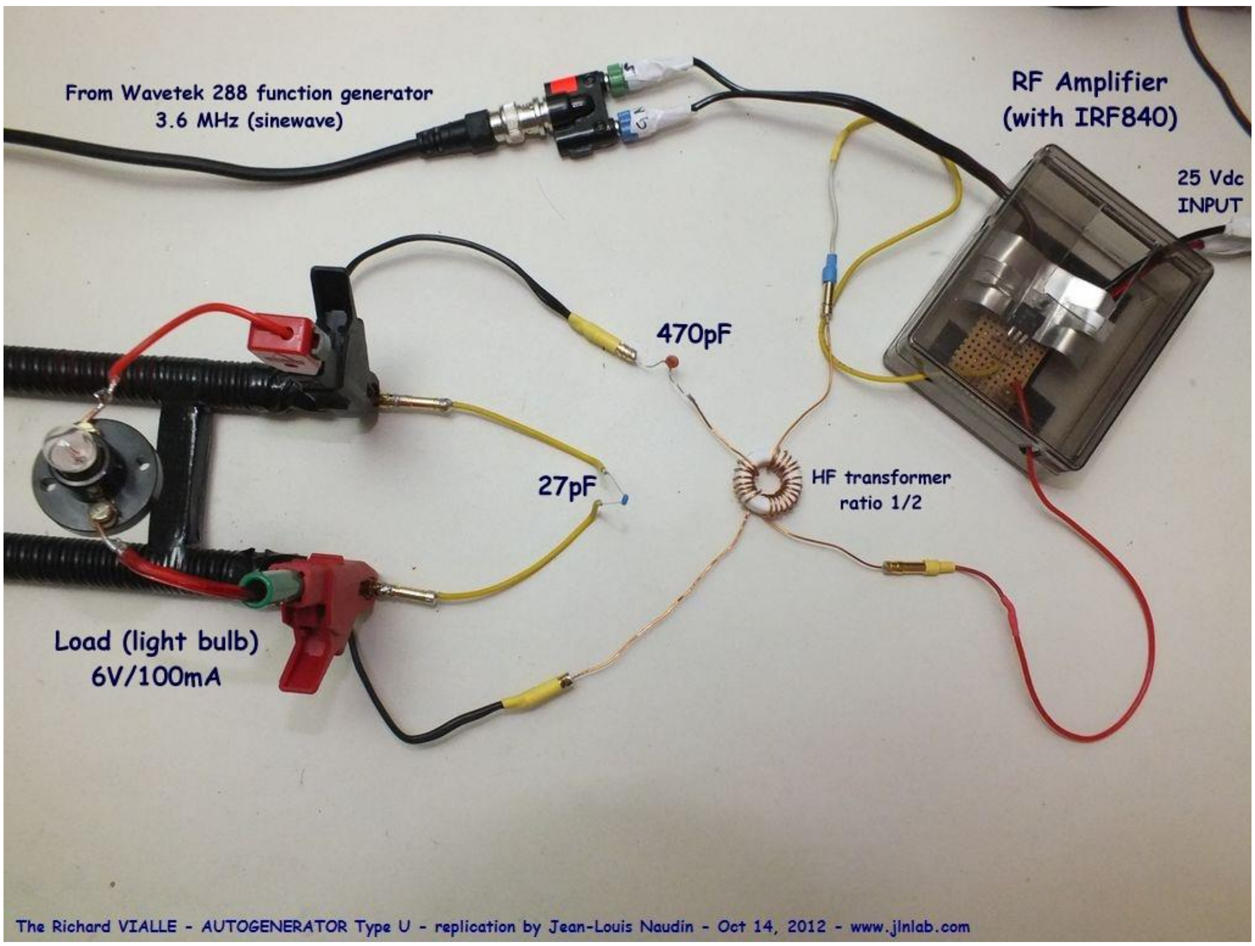


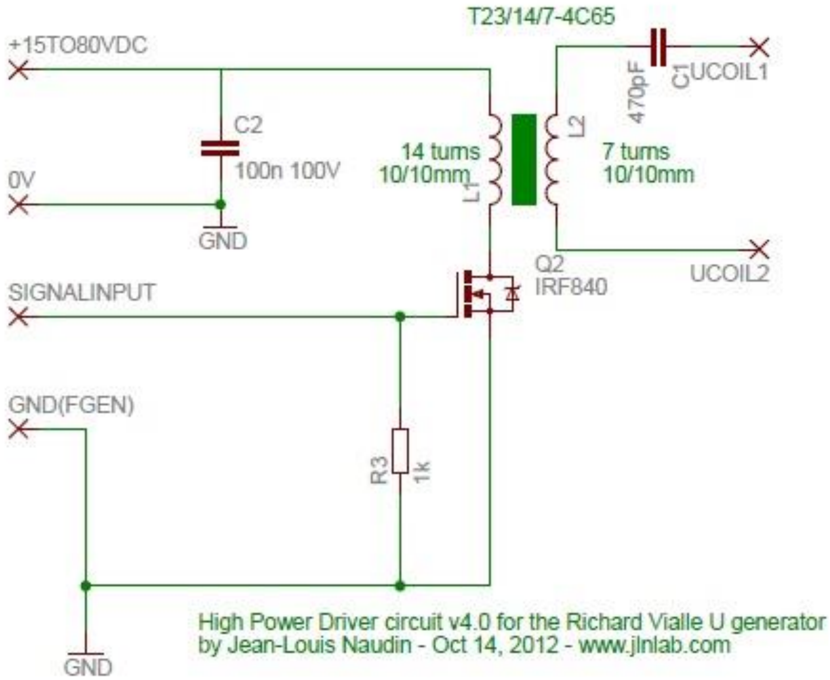
Testing of the U-shaped Autogenerator v4.0 with a new optimized pilot circuit.

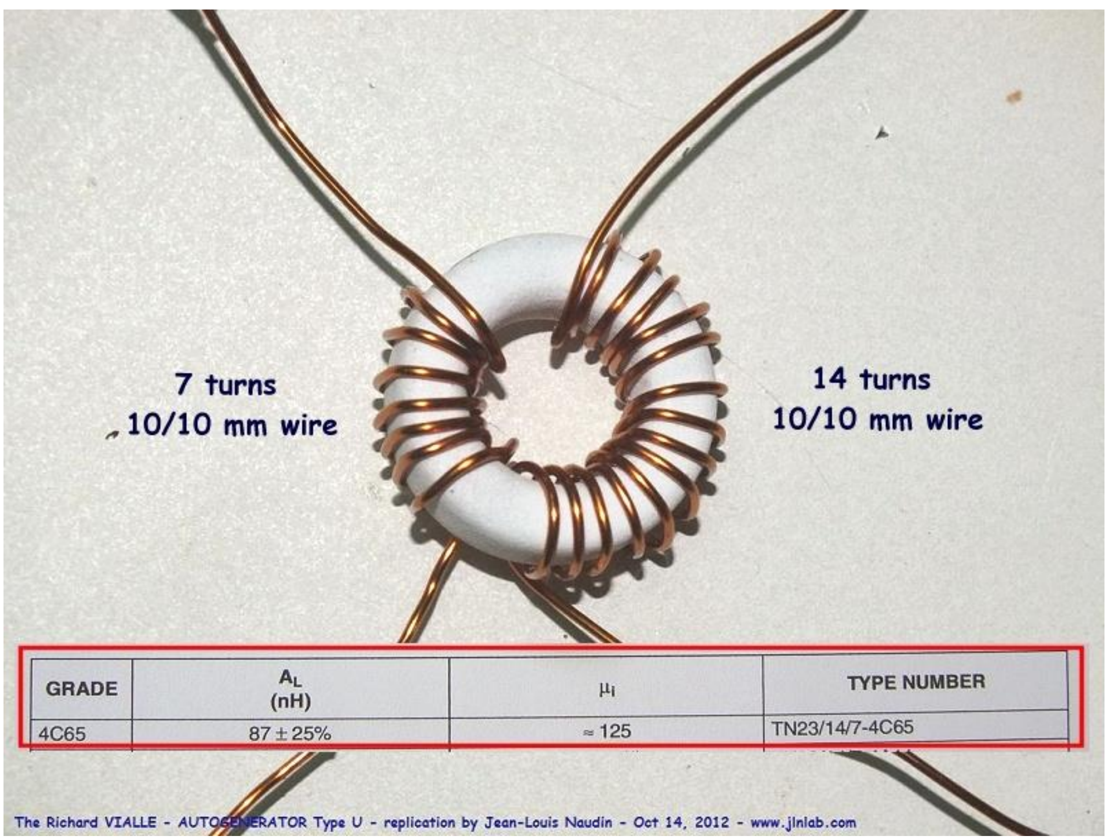
Chapter 18

Testing of the U-shaped Autogenerator v4.0 with a New Optimized Pilot Circuit

Here is a new version (v4.0) of the RF amplifier circuit for the U-shaped Autogenerator by Richard Vialle. The circuit has been optimized in order to reduce the input power. Here is the diagram of my assembly, and the detail of the different connections:

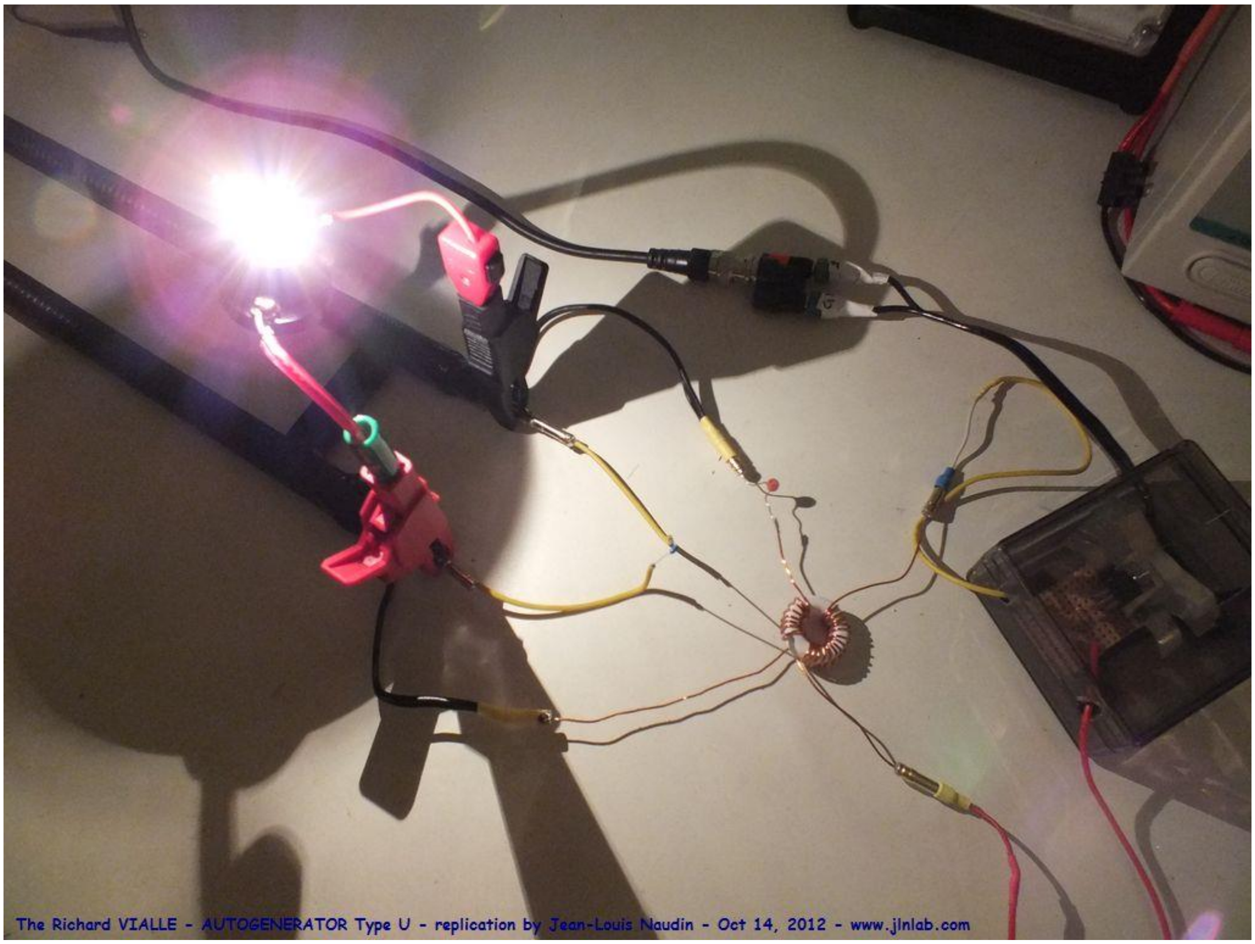






GRADE	A_L (nH)	μ_i	TYPE NUMBER
4C65	87 ± 25%	≈ 125	TN23/14/7-4C65

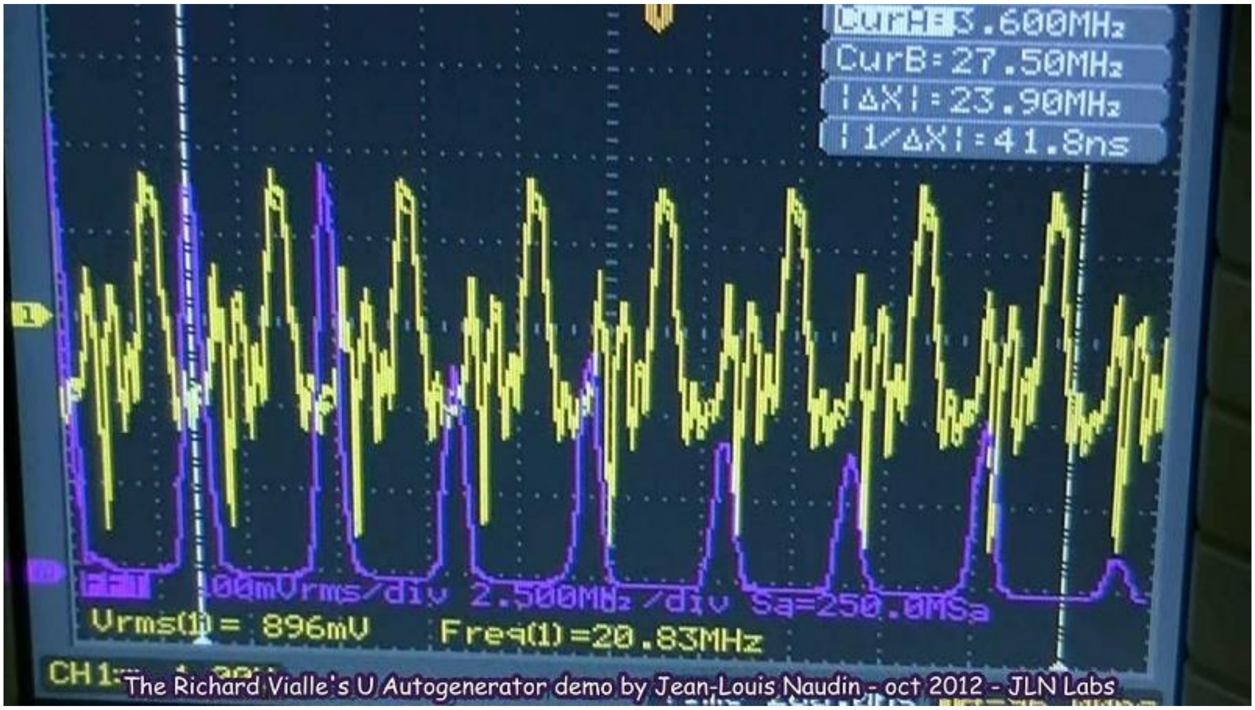
As soon as the U-shaped Autogenerator is started up, the charging lamp lights up at full power and a notable drop in the input power can be observed on the DC power supply when the output charging lamp is connected to the power supply. With the autogenerator in operation, it only takes 25 Volts DC to power the assembly compared to the 58 Volts of the previous version.

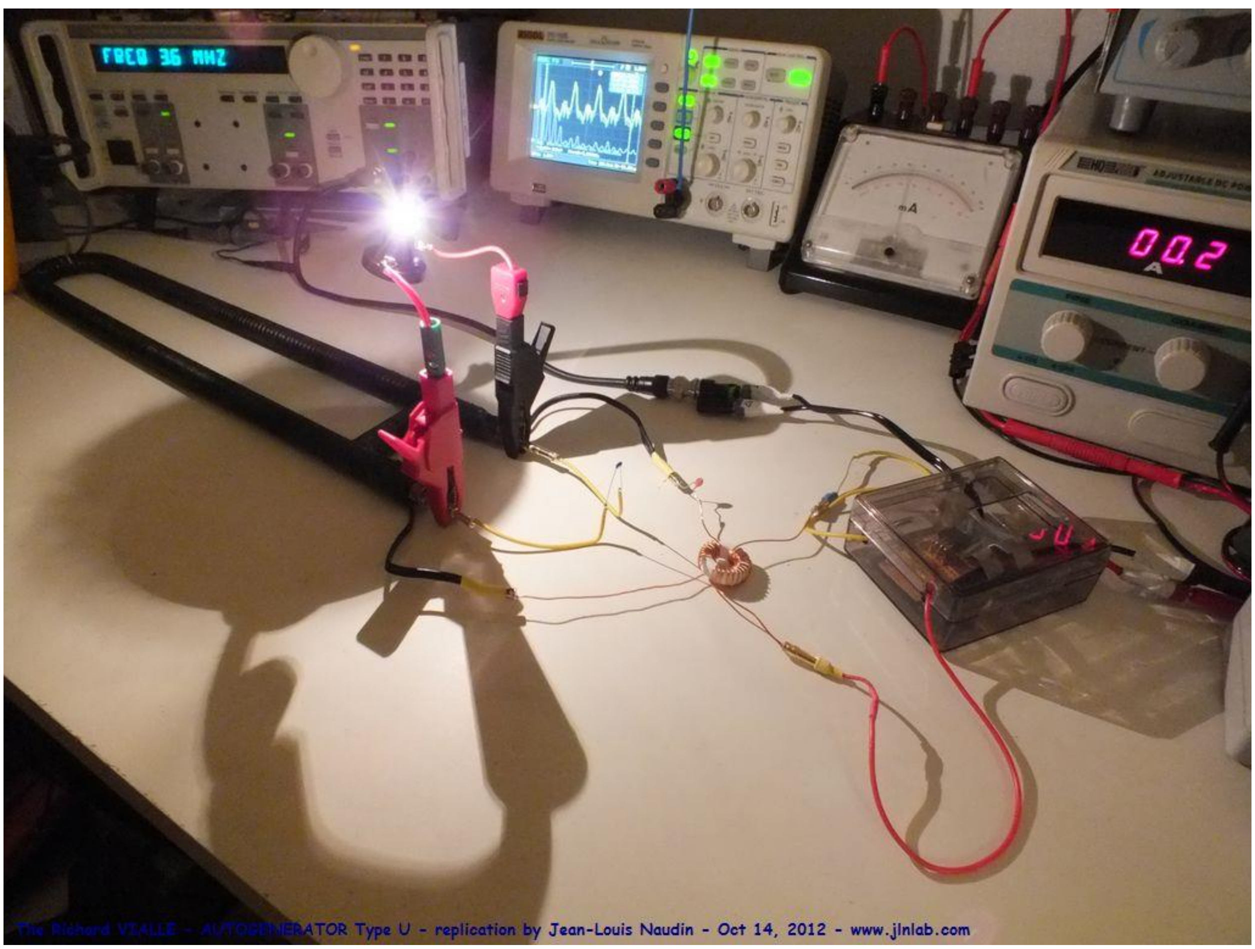


It is also interesting to note that although the driving frequency of the U-shaped autogenerator is 3.6 MHz sinusoidal (delivered by the Wavetek 288 function generator), the device is capable of jamming a radio on the FM band (88 to 108 MHz) placed more than 2 meters from the assembly. We hear a white noise in the loudspeaker of this radio. The signal produced by the U-shaped autogenerator in operation produces a very rich spectrum of frequencies.

The oscilloscope was used as a spectrum analyzer. I connected an antenna to the channel 1 input.

The oscilloscope was placed approximately 50 cm from the operating U-shaped autogenerator.


CurB:27.50MHz
|ΔX|:23.90MHz
|1/ΔX|:41.8ns
Vrms(1)= 896mV
Freq(1)=20.83MHz
The Richard Vialle's U Autogenerator demo by Jean-Louis Naudin - oct 2012 - JLN Labs


FREQ 36 MHZ
mA
00.2
A
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 14, 2012 - www.jlnlab.com

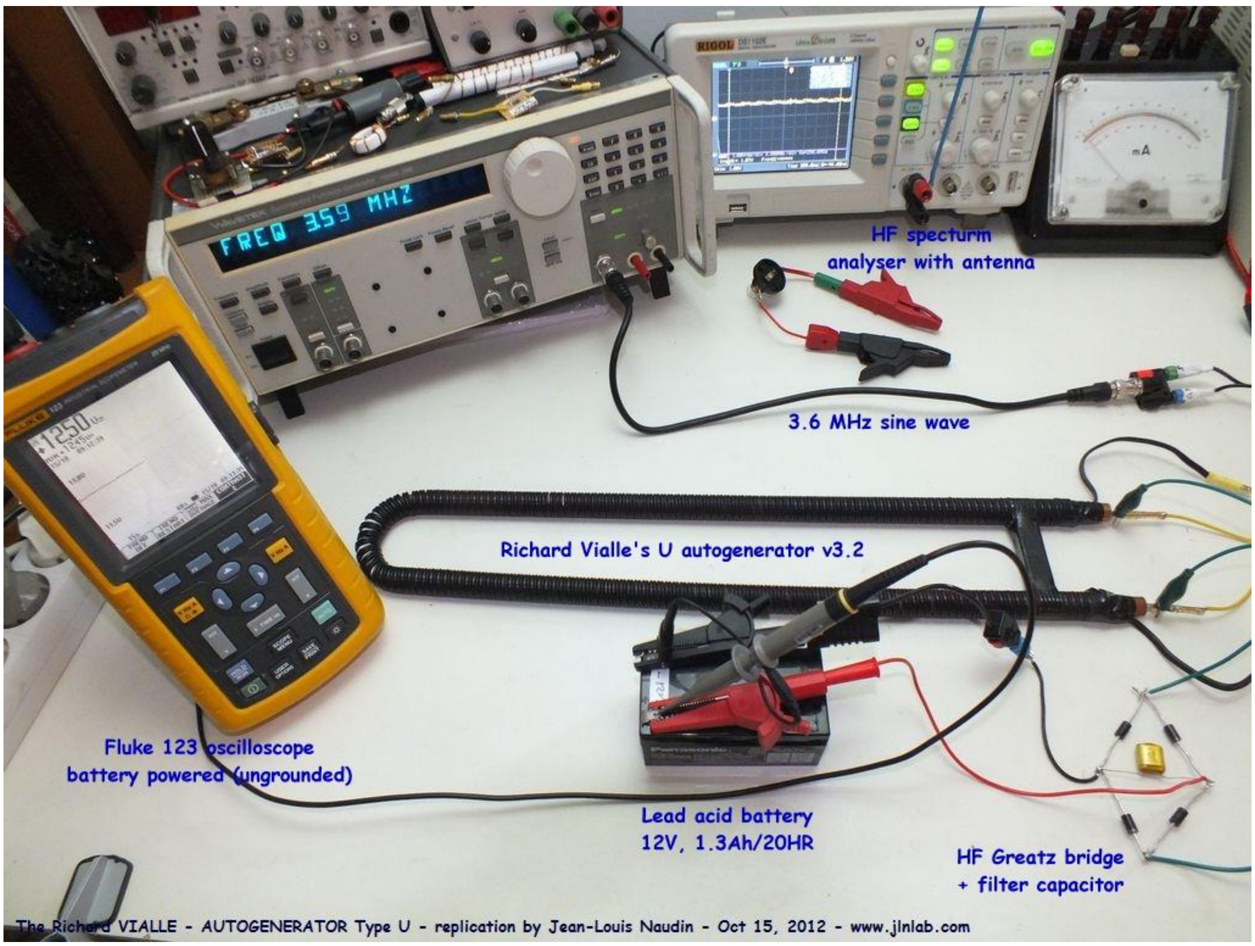
Here is a video of the experience:

https://youtu.be/_ZH30jzGIak

Chapter 19

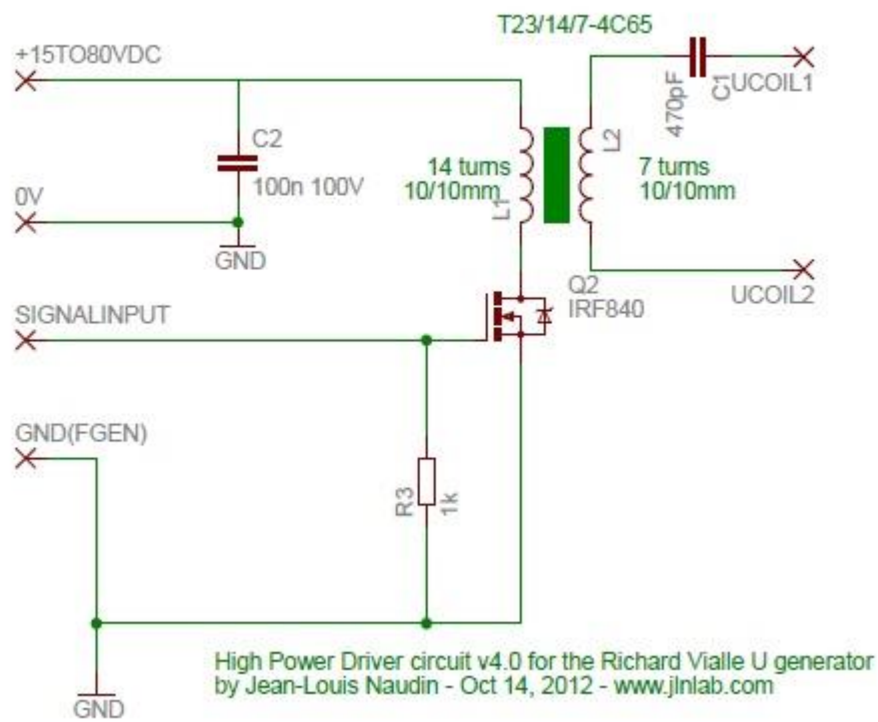
Successful Battery Charge with the U-shaped Autogenerator v4.1

Following the performance improvement of the U-shaped Autogenerator v4.0 tested previously, I tried to see if it was possible to use and recover the energy produced to recharge a battery. The goal being to try to re-loop the autogenerator on itself in a future experiment. Here is the diagram of my assembly and the details of the different connections:

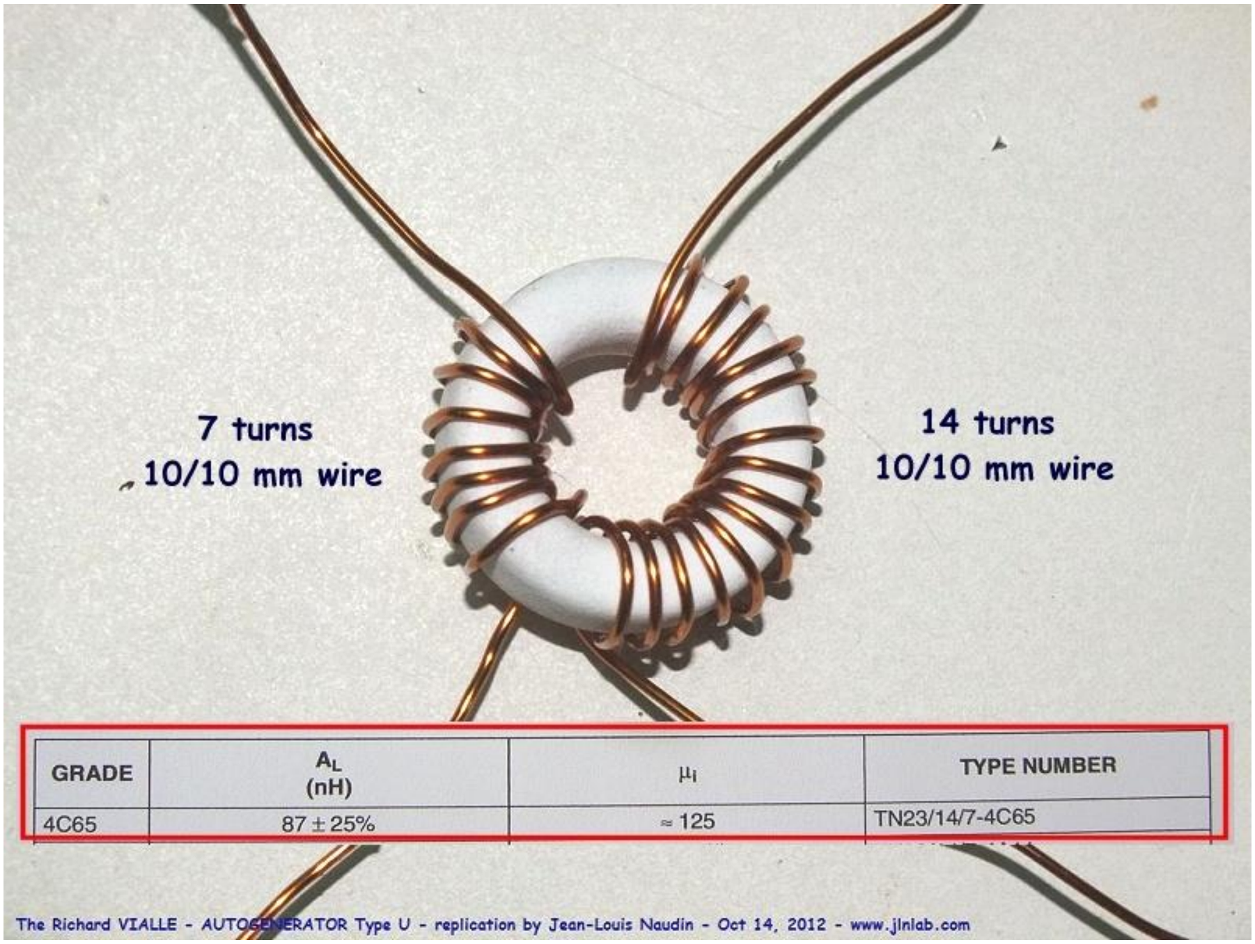


Above is the test setup before battery charging. The U-shaped autogenerator is stopped, and the battery is at 12.5 Volts.

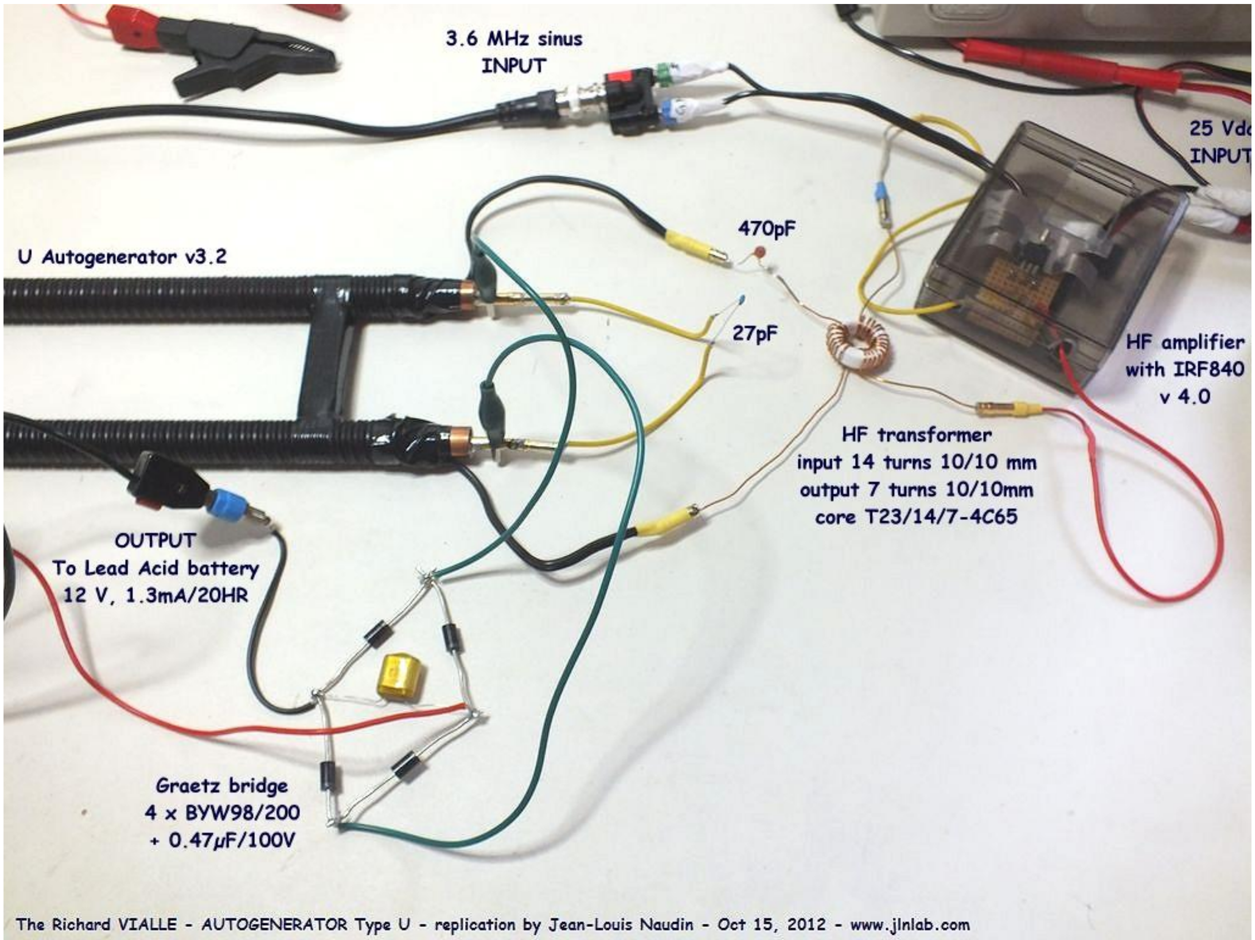
I used the mechanics of the Autogenerator v3.1, tested successfully previously, and driven by the HF V4 amplifier (diagram below).



Below, the HF toroid connected between the output of the HF amplifier and the U-shaped Autogenerator.

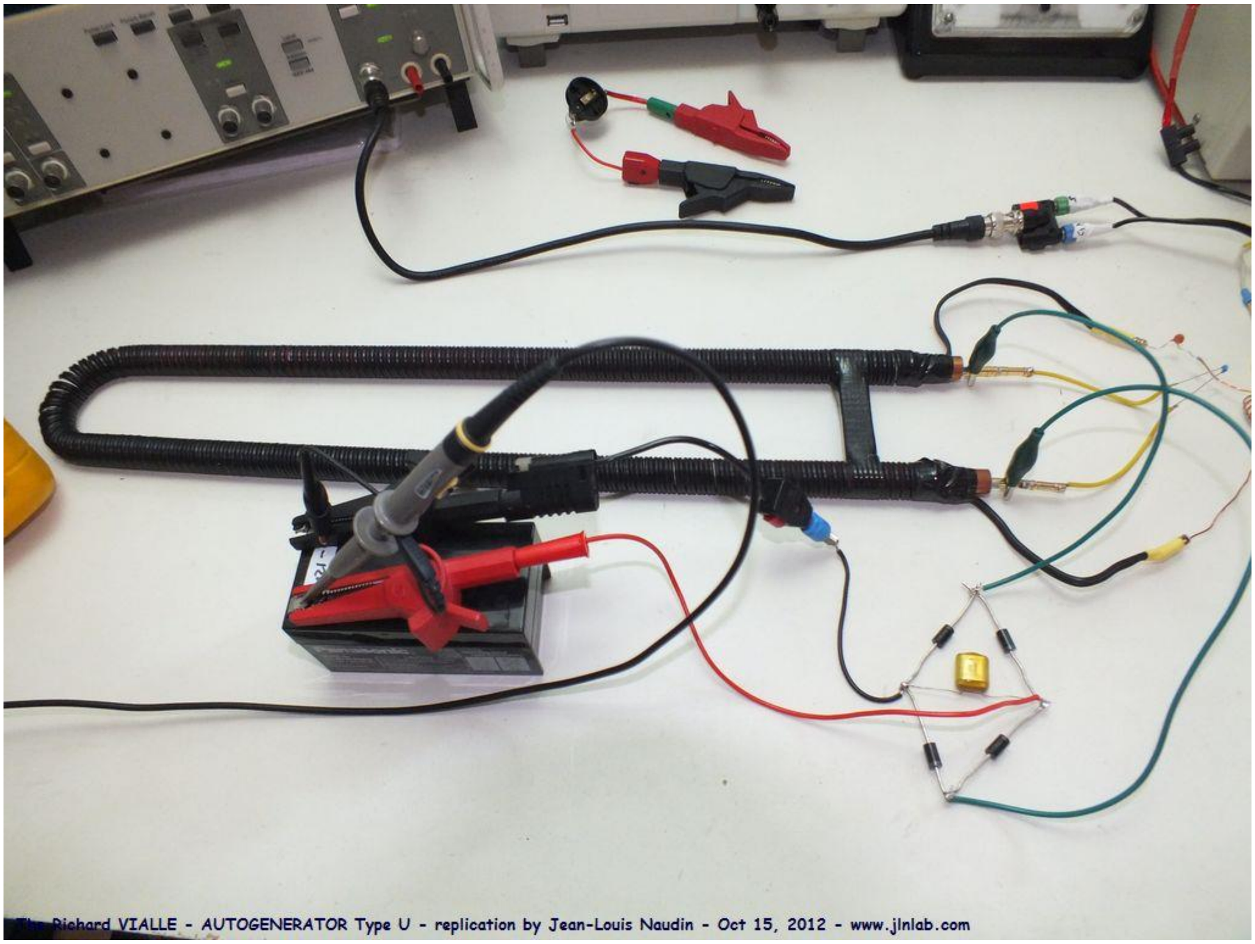


This time, I did not connect an output load lamp as before, but a Graetz HF rectifier bridge made up of 4 BYW98/200 fast diodes and a 470nF 100V smoothing capacitor. This HF rectifier bridge makes it possible to have a direct voltage to recharge the lead-acid battery.



At the exit of the Graetz HF bridge, I connected a partially discharged Panasonic lead-acid battery (Model LC-R121R3PG) of 12V, 1.3Ah at 20 hour rate.

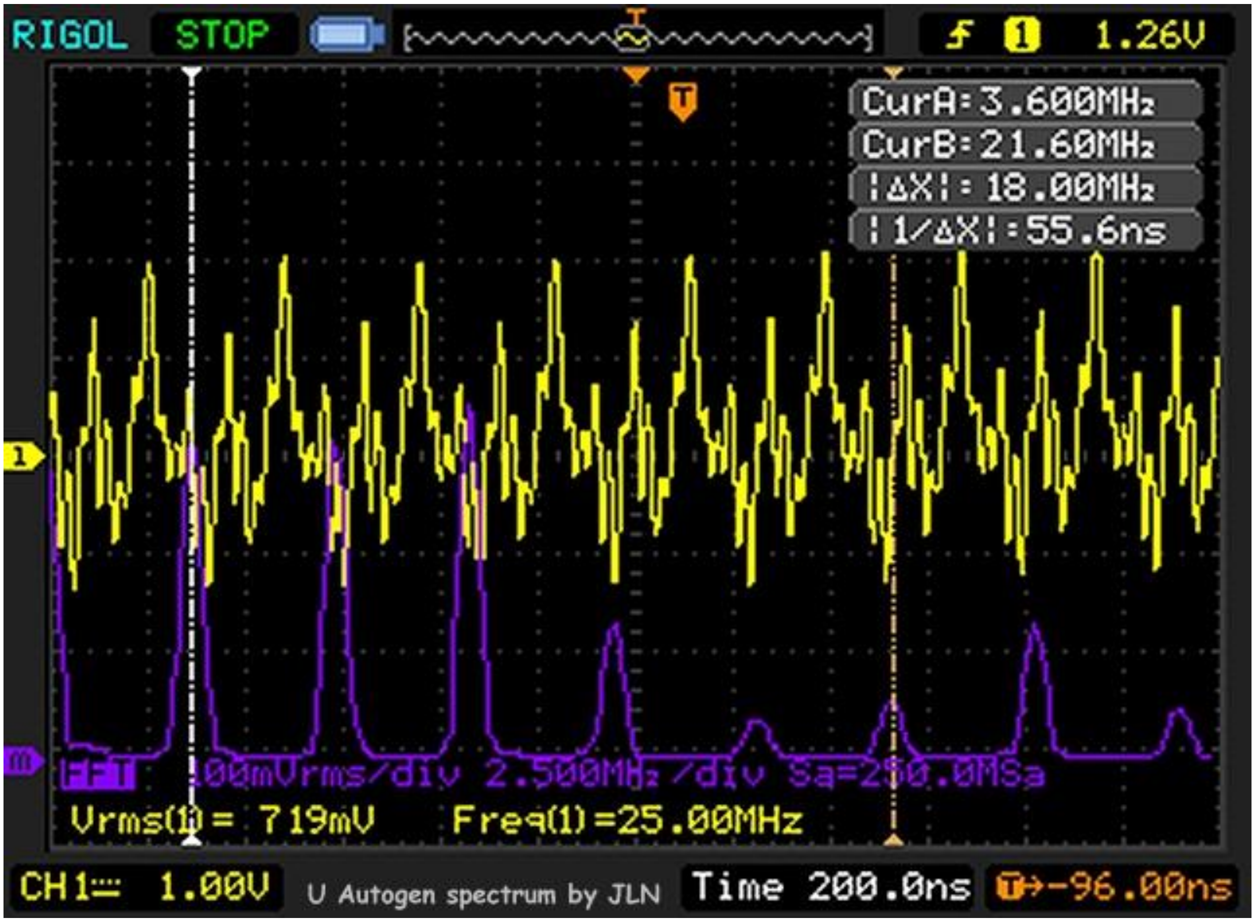
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 15, 2012 - www.jlnlab.com



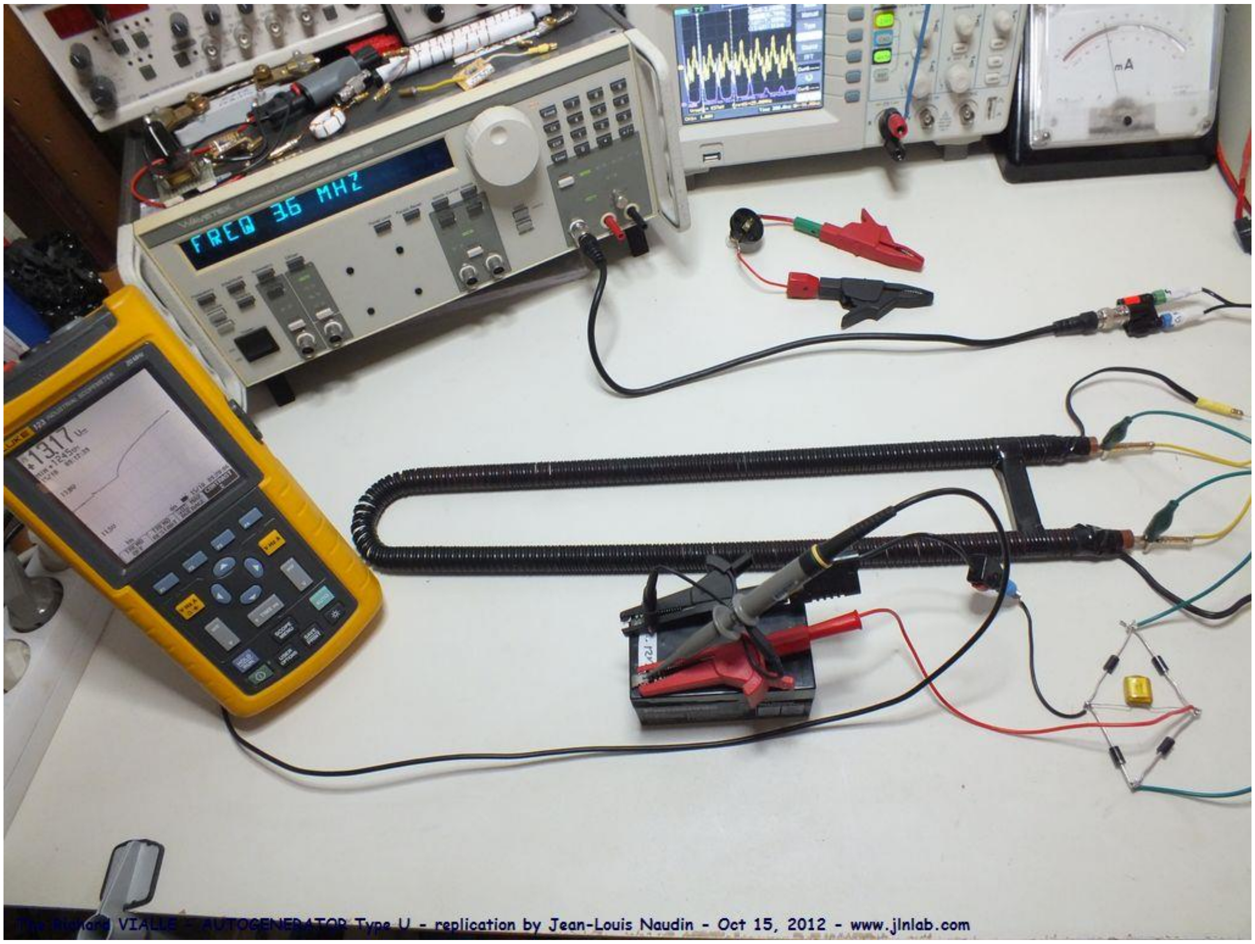
It is also interesting to note that, although the driving frequency of the U-shaped autogenerator is 3.6 MHz sinusoidal (delivered by the function generator Wavetek 288), the signal produced by the U-shaped autogenerator in operation produces a spectrum very rich in frequencies.

The oscilloscope was used as a spectrum analyzer, I connected an antenna to the channel 1 input.

The oscilloscope is placed approximately 50 cm from the operating U-shaped autogenerator.



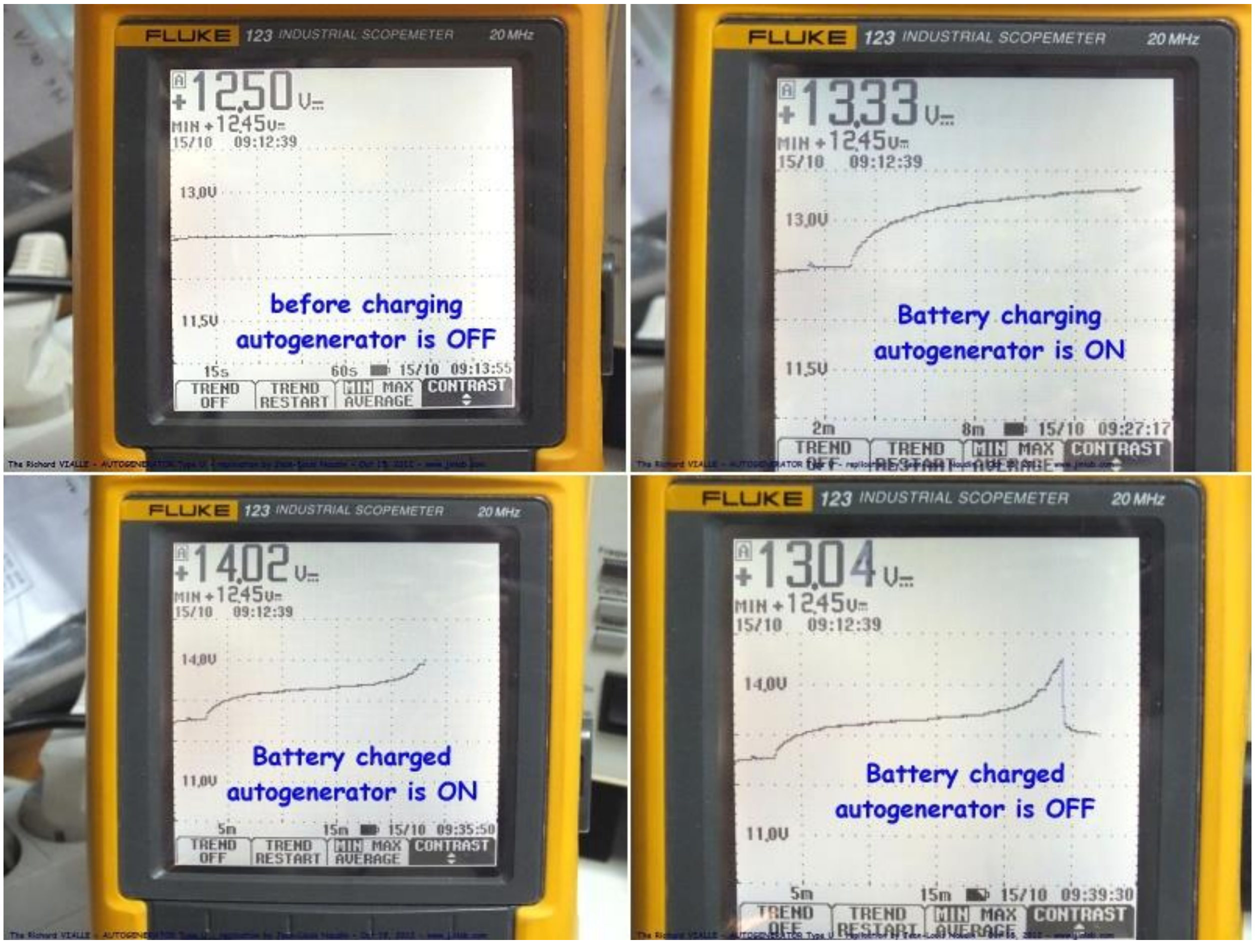
I connected the Fluke 123 oscilloscope powered by its own internal batteries (therefore "fully ungrounded") to record the voltage across the 12 V battery terminals in order to monitor the evolution of its charge.



Above is the test setup. While the battery is charging, the U-shaped Autogenerator is running and the battery is charging quickly.

The voltage went from 12.5 Volts to 13.17 Volts in a few minutes.

Here are some screenshots taken during battery charging by the U-shaped Autogenerator V4.1:



After about twenty minutes, the voltage measured at the terminals of the battery rose exponentially, exceeding very quickly 14 Volts. I was therefore forced to stop the U-shaped autogenerator following this runaway. You will see for yourself this runaway battery voltage on the test video. Here is the load curve; we can clearly see the moment (vertical drop in voltage) when I stopped the Autogenerator following the runaway battery voltage.

Here is some additional information about the state of charge of a lead-acid battery:

Typical voltages of a lead-acid battery (Pb):

14.4V (2.6V / cell): MAXIMUM voltage at the end of rapid charging. Beginning of gas formation.

13.8V (2.3V / cell): Safety voltage for the end of charging

12.6V (2.1V / cell): No-load voltage of a fully charged battery.

12.0V (2.0V / cell): No-load voltage of a half-charged battery.

11.7V (1.95V / cell): No-load voltage of a discharged battery.

It is normal to notice that when the charging process is stopped (Autogenerator Off), the voltage drops to a lower value. This is the resting voltage of the battery. What is important is that this rest voltage at the end of charging is greater than the initial rest voltage before charging.

Here is a video of the experience:

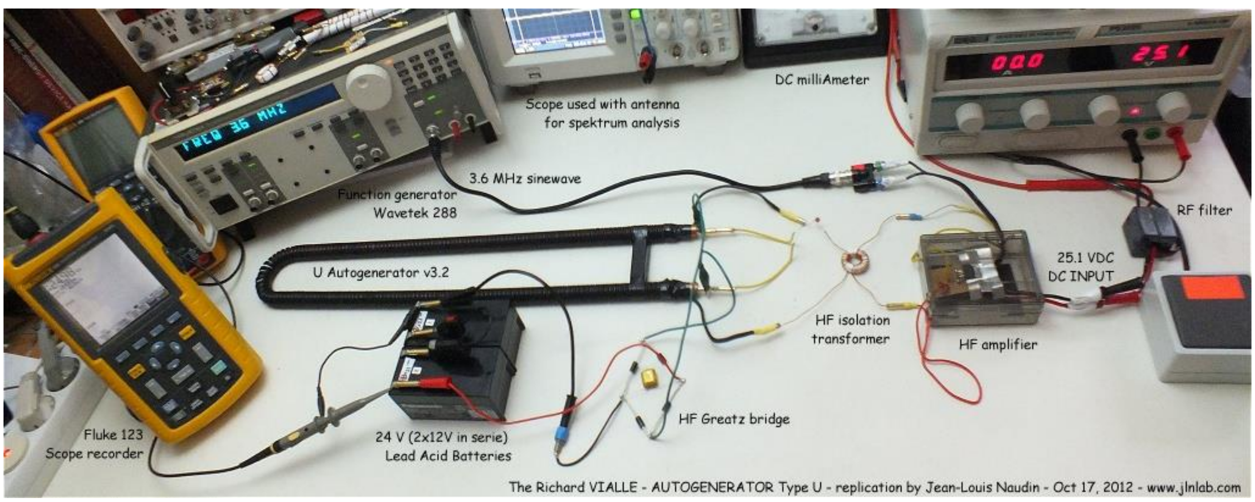
https://youtu.be/GNzfIHdMzHo

Chapter 20

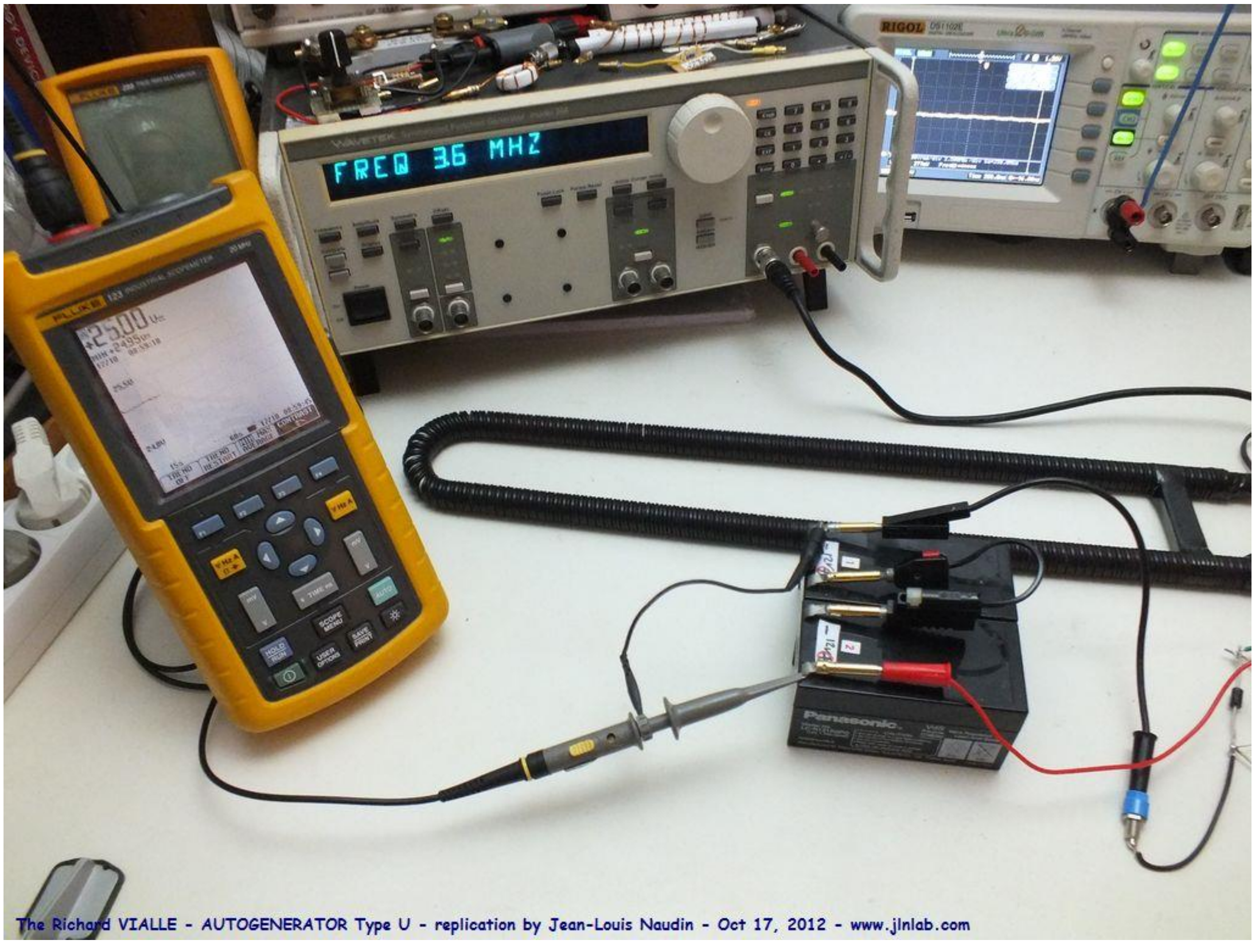
Load tests of a 24 Volt Battery with the U-shaped Autogenerator Supplied at 25 Volts

Following the successful tests of charging a 12 V battery with the U-shaped Autogenerator v4.1 supplied with 25 V DC, I tried this time to charge a battery of equivalent voltage. I therefore connected at the output two 12 V batteries connected in series, i.e., a voltage of 24 V. I used exactly the same configuration of the Autogenerator so as not to change the parameters and settings.

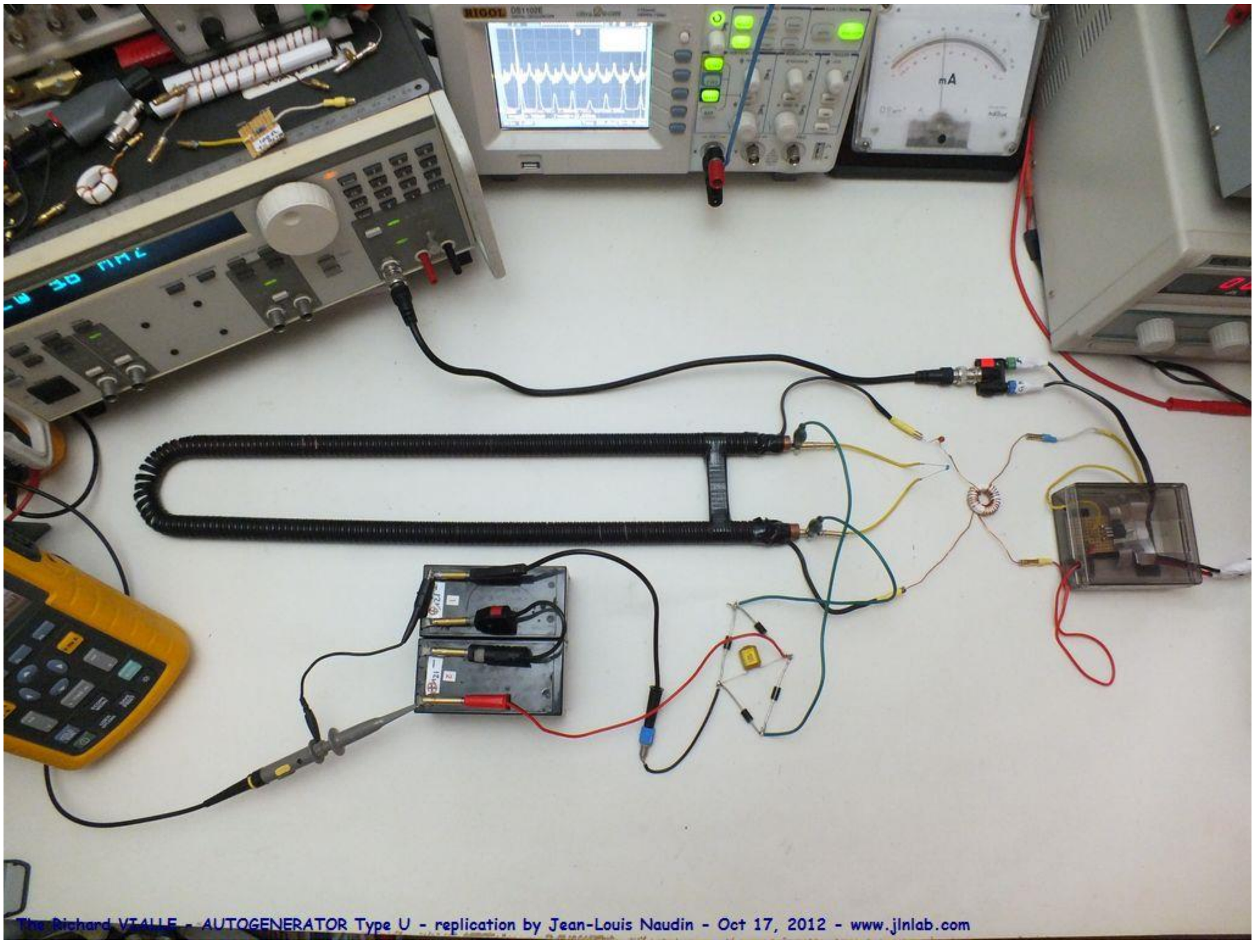
Here is the diagram of my assembly and the detail of the different connections:



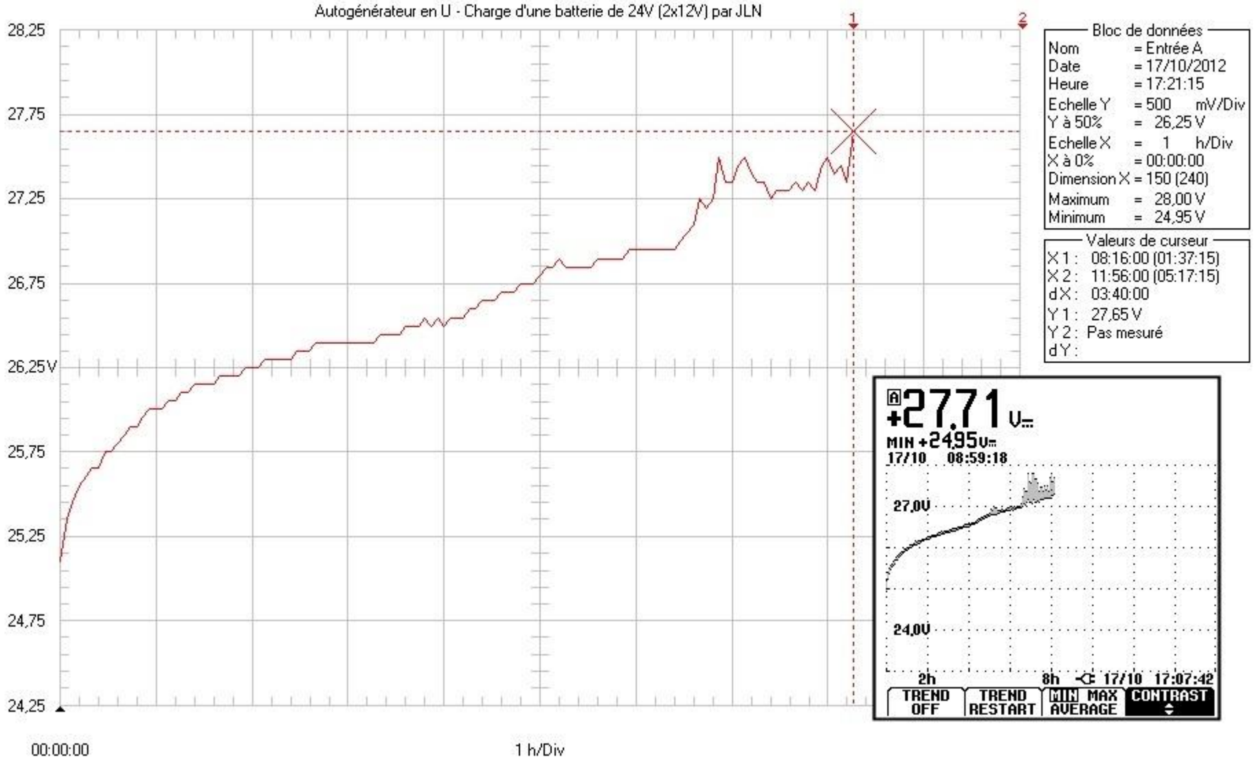
Below is the test setup before charging the battery; the U-shaped autogenerator is shut down and the battery is at approximately 25 Volts.



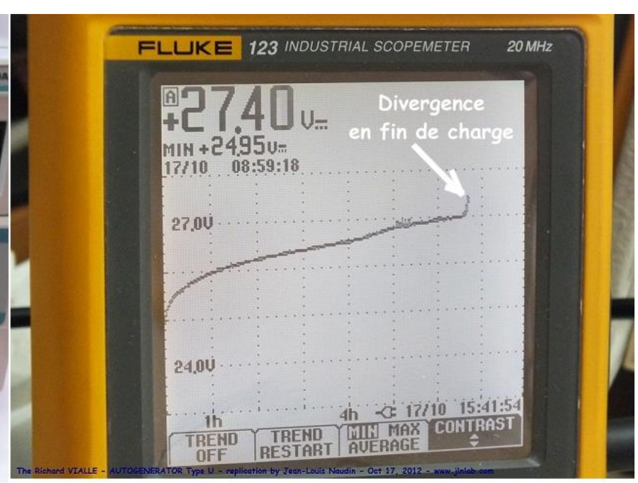
At the exit of the Graetz HF bridge, I connected two Panasonic lead-acid batteries (Model LC-R121R3PG) of 12V, 1.3Ah at 20 hour rate, partially discharged, and connected in series to constitute a 24V battery.



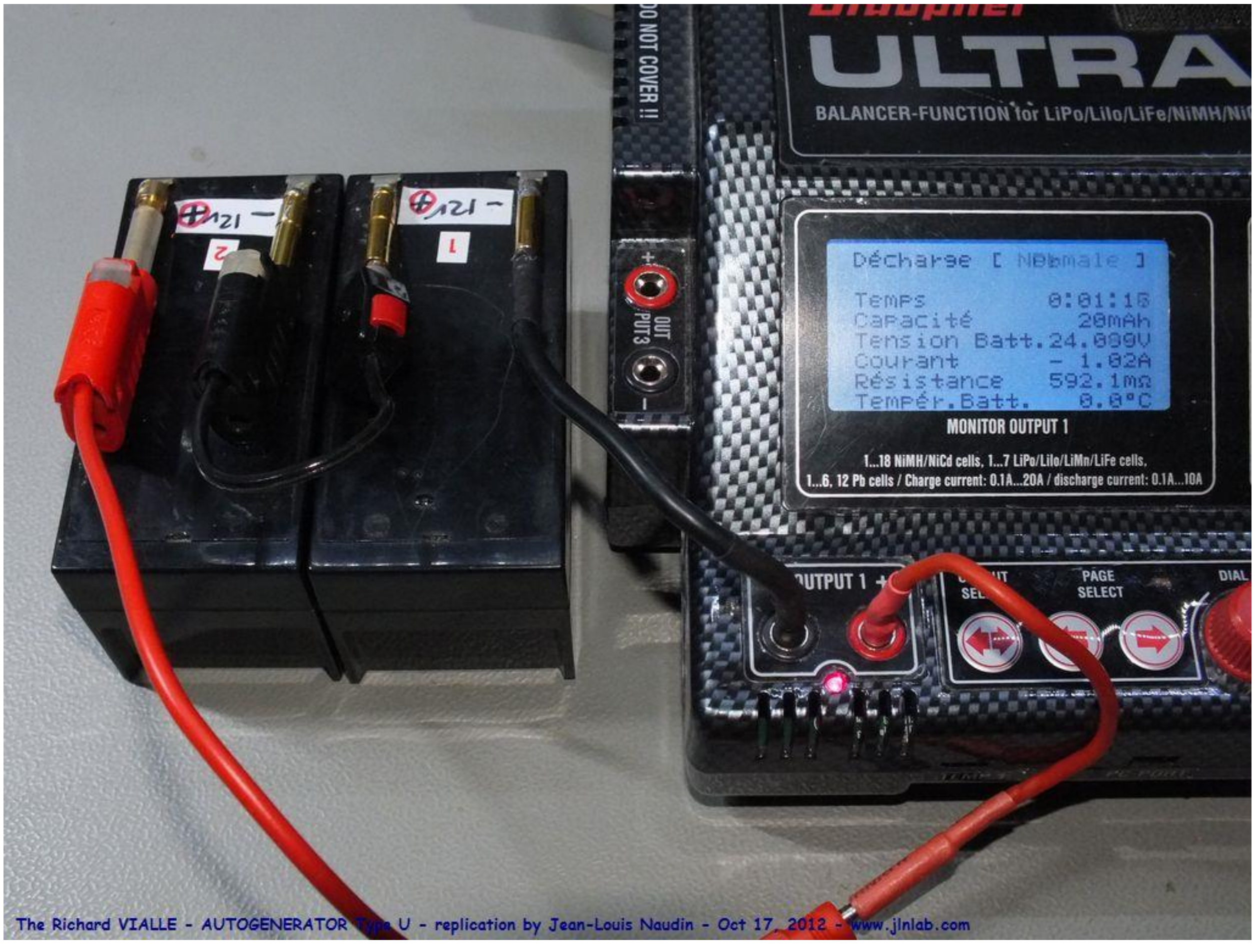
Here is the curve showing the 24 V battery charge:



At final charging, there was an acceleration of the slope of the voltage at the terminals of the 24 Volt battery; the voltage exceeded 27 Volts and I had to interrupt the U-shaped autogenerator in order to preserve the life of the battery. This phenomenon of runaway was also produced previously with a 12 V battery under the same conditions; what is interesting to note this time is that the voltage at the battery terminals has become greater (27 V) than the supply voltage of the HF amplifier, which is 25 V.



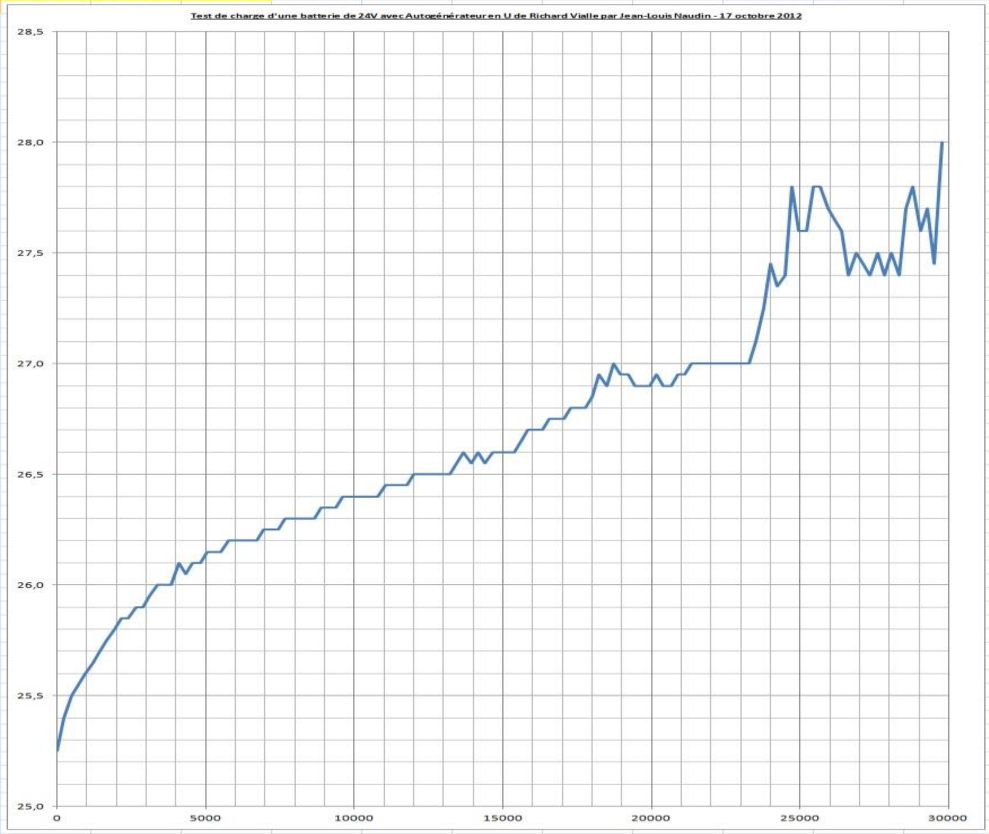
After stopping the experiment, I put the 24 V battery in a discharge test to measure its internal resistance. It is 592.1 mOhms.

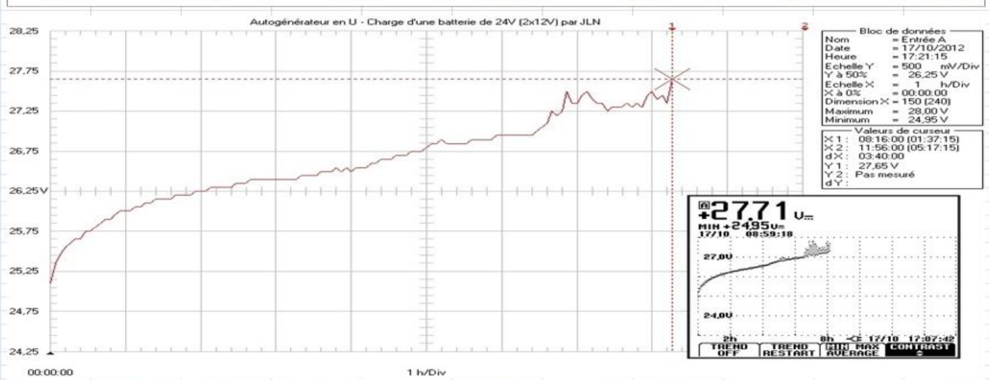


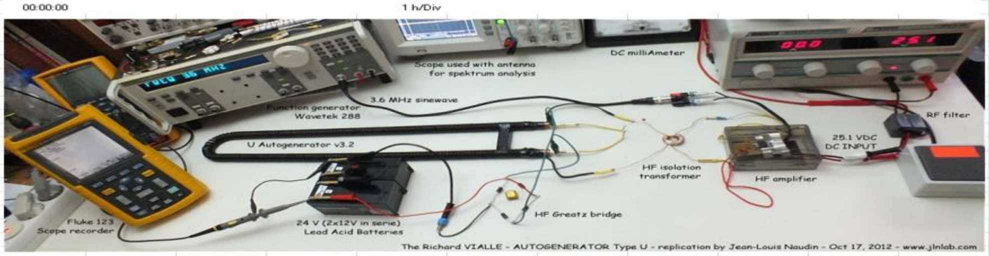
You can view all the battery voltage data recorded during this test below.

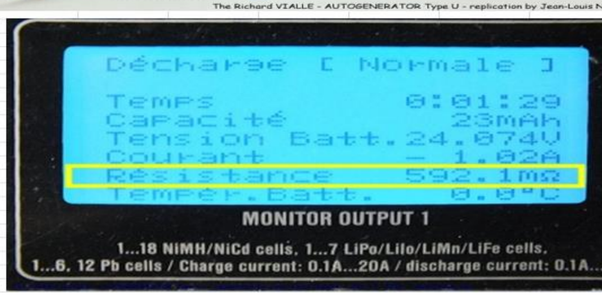
Autogénérateur en U - Charge d'une batterie de 24V (2x12V) par JLN 17-oct-12 www.jlnlab.com

Temps(s)	Tension batterie (V)
0	25,3
240	25,4
480	25,5
720	25,6
960	25,6
1200	25,7
1440	25,7
1680	25,8
1920	25,8
2160	25,9
2400	25,9
2640	25,9
2880	25,9
3120	26,0
3360	26,0
3600	26,0
3840	26,0
4080	26,1
4320	26,1
4560	26,1
4800	26,1
5040	26,2
5280	26,2
5520	26,2
5760	26,2
6000	26,2
6240	26,2
6480	26,2
6720	26,2
6960	26,3
7200	26,3
7440	26,3
7680	26,3
7920	26,3
8160	26,3
8400	26,3
8640	26,3
8880	26,4
9120	26,4
9360	26,4
9600	26,4
9840	26,4
10080	26,4
10320	26,4
10560	26,4
10800	26,4
11040	26,5
11280	26,5
11520	26,5
11760	26,5
12000	26,5
12240	26,5
12480	26,5
12720	26,5
12960	26,5
13200	26,5
13440	26,6
13680	26,6
13920	26,6
14160	26,6
14400	26,6
14640	26,6
14880	26,6
15120	26,6
15360	26,6
15600	26,7
15840	26,7
16080	26,7
16320	26,7
16560	26,8
16800	26,8
17040	26,8
17280	26,8
17520	26,8
17760	26,8
18000	26,9
18240	27,0
18480	26,9
18720	27,0
18960	27,0
19200	27,0
19440	26,9
19680	26,9
19920	26,9
20160	27,0
20400	26,9
20640	26,9
20880	27,0
21120	27,0
21360	27,0
21600	27,0
21840	27,0
22080	27,0
22320	27,0
22560	27,0
22800	27,0
23040	27,0
23280	27,0
23520	27,1
23760	27,3
24000	27,5
24240	27,4
24480	27,4
24720	27,8
24960	27,6
25200	27,6
25440	27,8
25680	27,8
25920	27,7
26160	27,7
26400	27,6
26640	27,4
26880	27,5
27120	27,5
27360	27,4
27600	27,5
27840	27,4
28080	27,5
28320	27,4
28560	27,7
28800	27,8
29040	27,6
29280	27,7
29520	27,5
29760	28,0







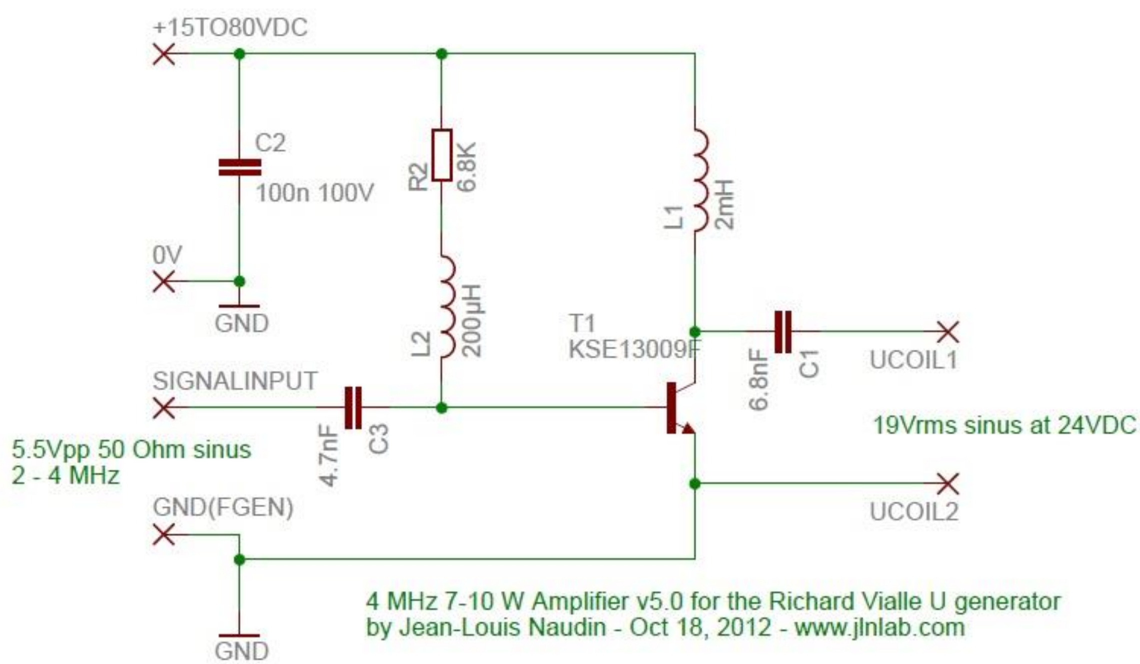


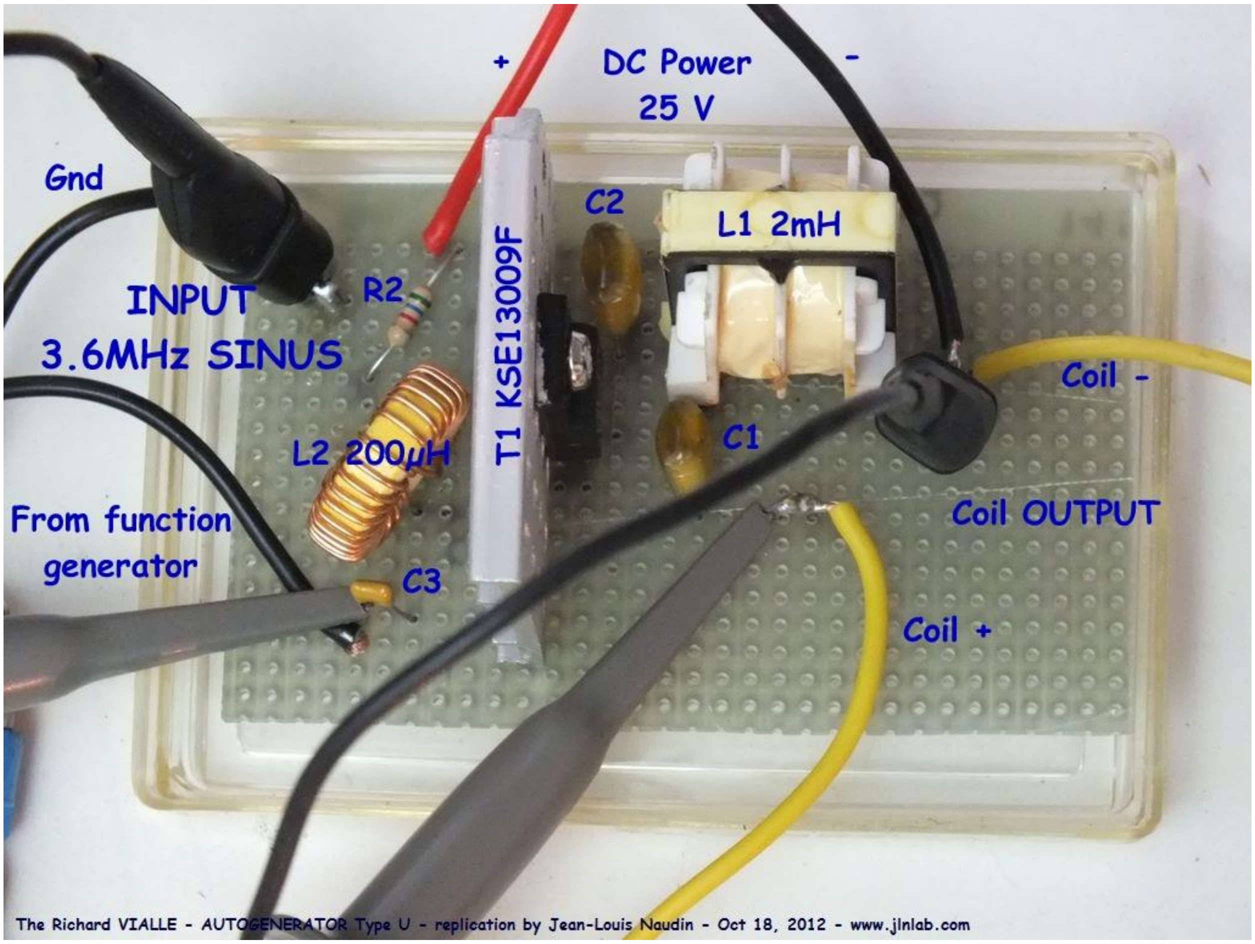
Chapter 21

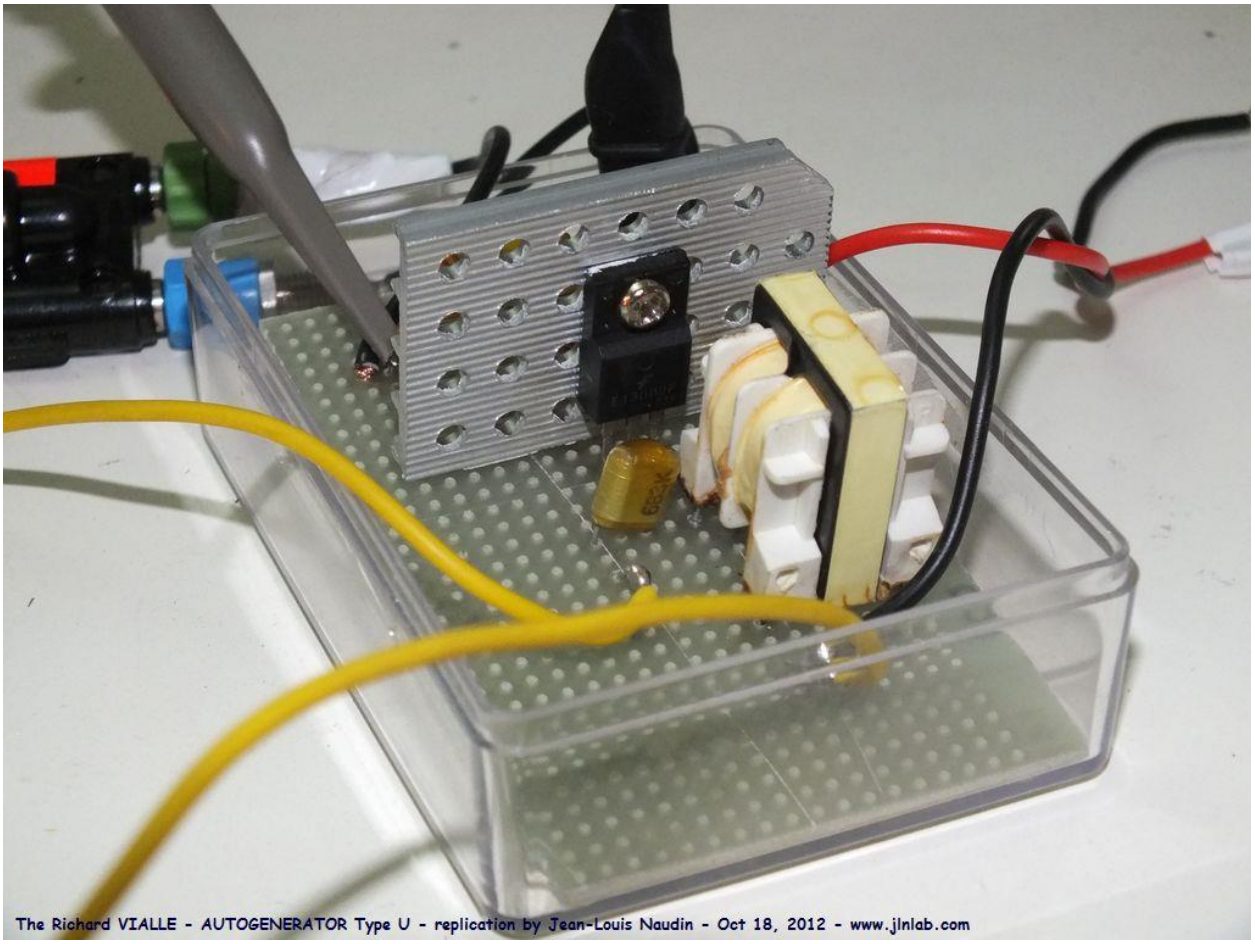
Testing of the New HF Power Amplifier V5.0 (sinusoidal) for the U-shaped Autogenerator

Here is a new HF power amplifier to drive Richard Vialle's U-shaped Autogenerator. This small single transistor HF Amplifier is capable of producing a pure sine wave at 3.5 MHz of 20 Vrms (approximately 8 Watts on a 50 ohm load); it operates smoothly up to 5 MHz. All you have to do is connect this HF amplifier to a function generator capable of producing a sine wave signal of 5.5 Vpp. This HF Amplifier uses a Fairchild KSE13009F transistor, this type of transistor is commonly used in switching power supplies (for PCs for example). You can also use the Fairchild BUT11A transistor (equivalent) because it seems that the KSE13009F is no longer manufactured today.

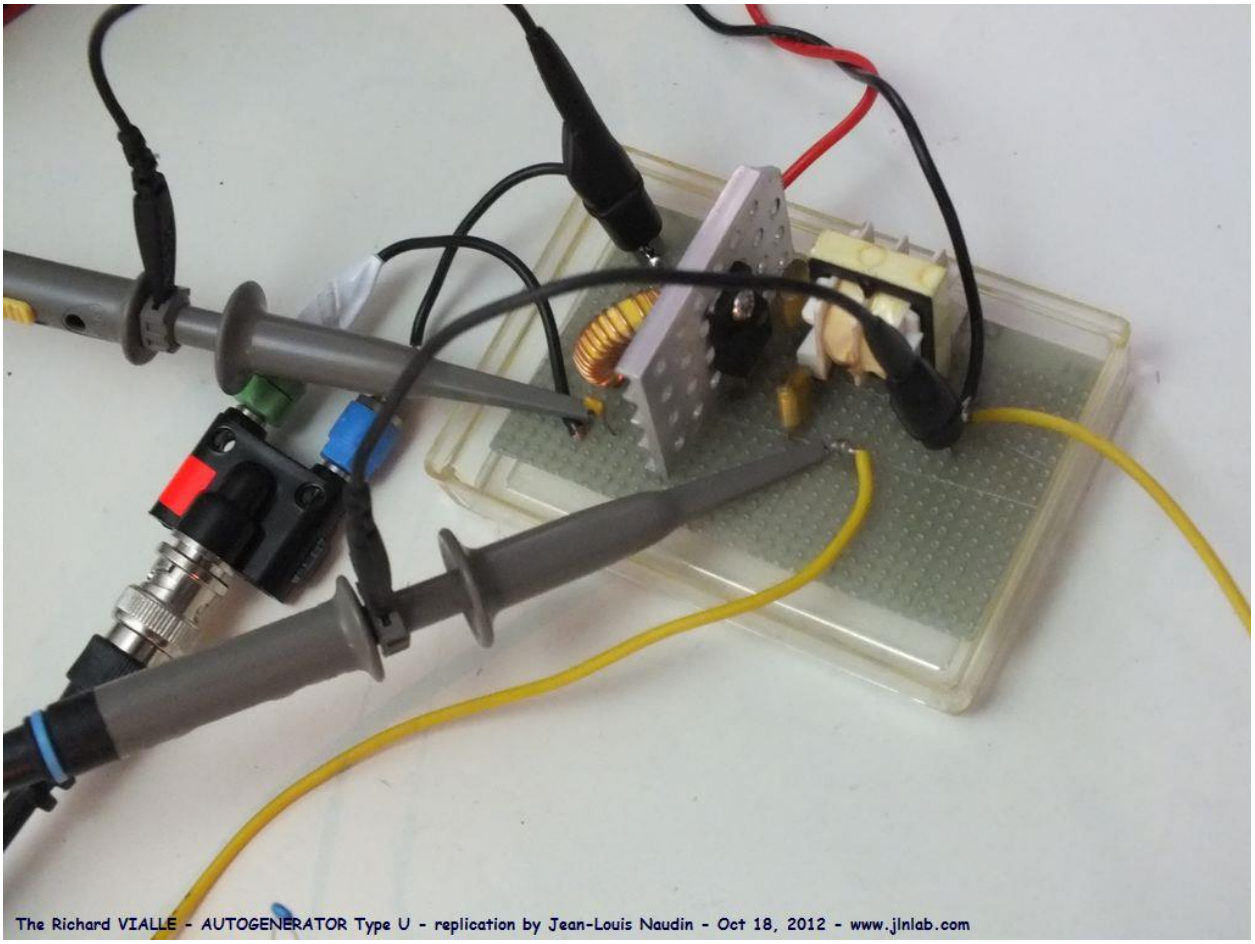
Here is the diagram of this HF amplifier and the details of the different connections:




+
DC Power
25 V
-
Gnd
C2
L1 2mH
INPUT
3.6MHz SINUS
R2
T1 KSE13009F
Coil -
L2 200µH
C1
From function
generator
C3
Coil OUTPUT
Coil +
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 18, 2012 - www.jlnlab.com

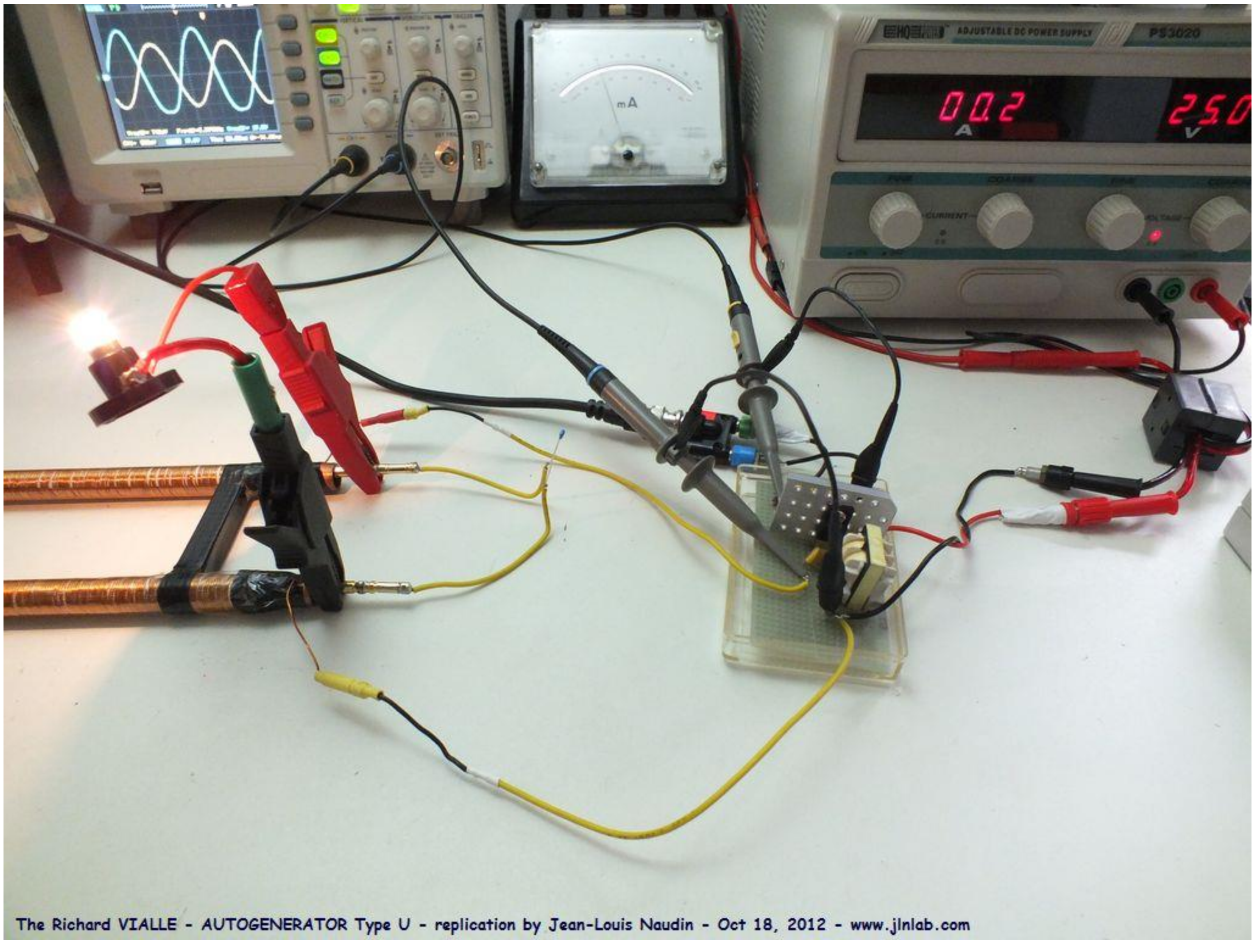


The transistor is mounted with a small heat sink on an epoxy plate; in the foreground we see the 2mH HF coil and the 6.8nF output capacitor.

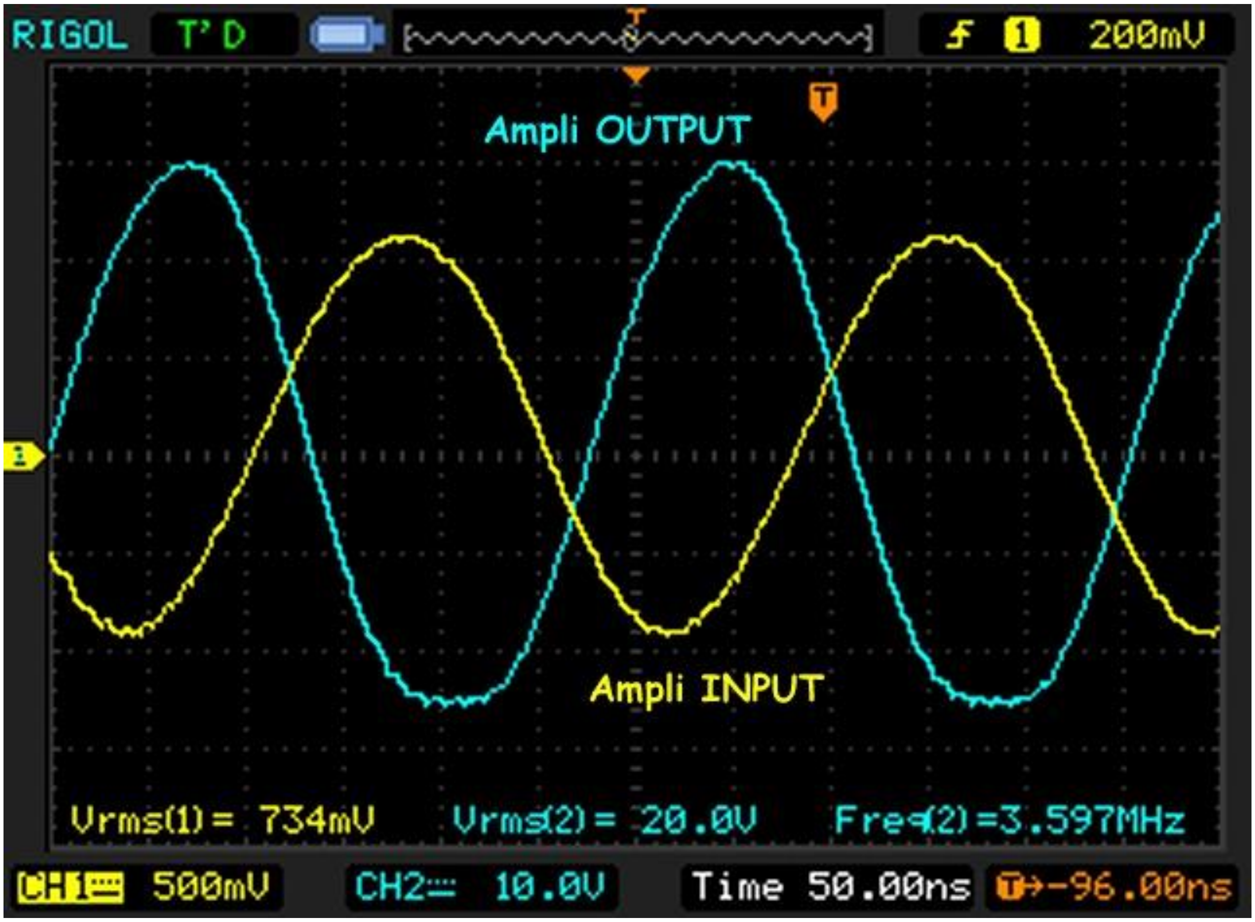


The assembly of this HF amplifier is simple and inexpensive (we find the transistor at around €1.50).

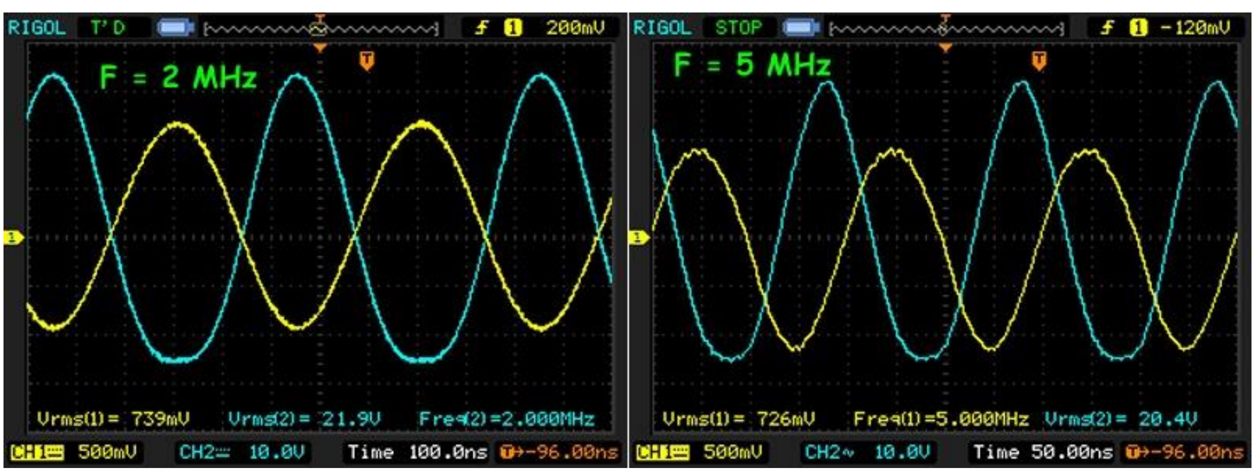
Above I connected the oscilloscope to measure the input signal injected by the function generator and compare it to the output signal.

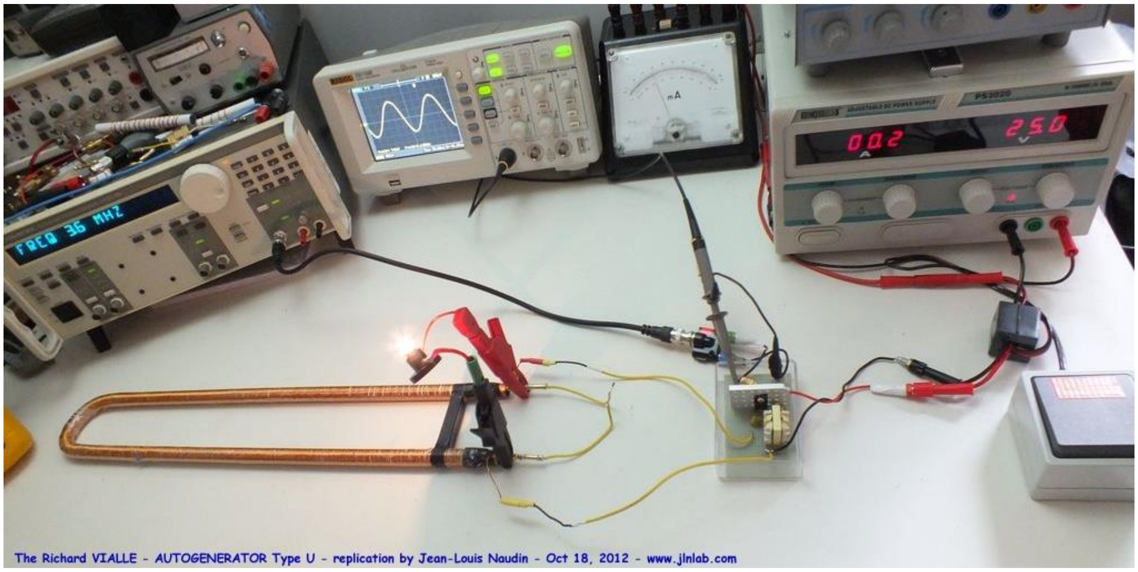


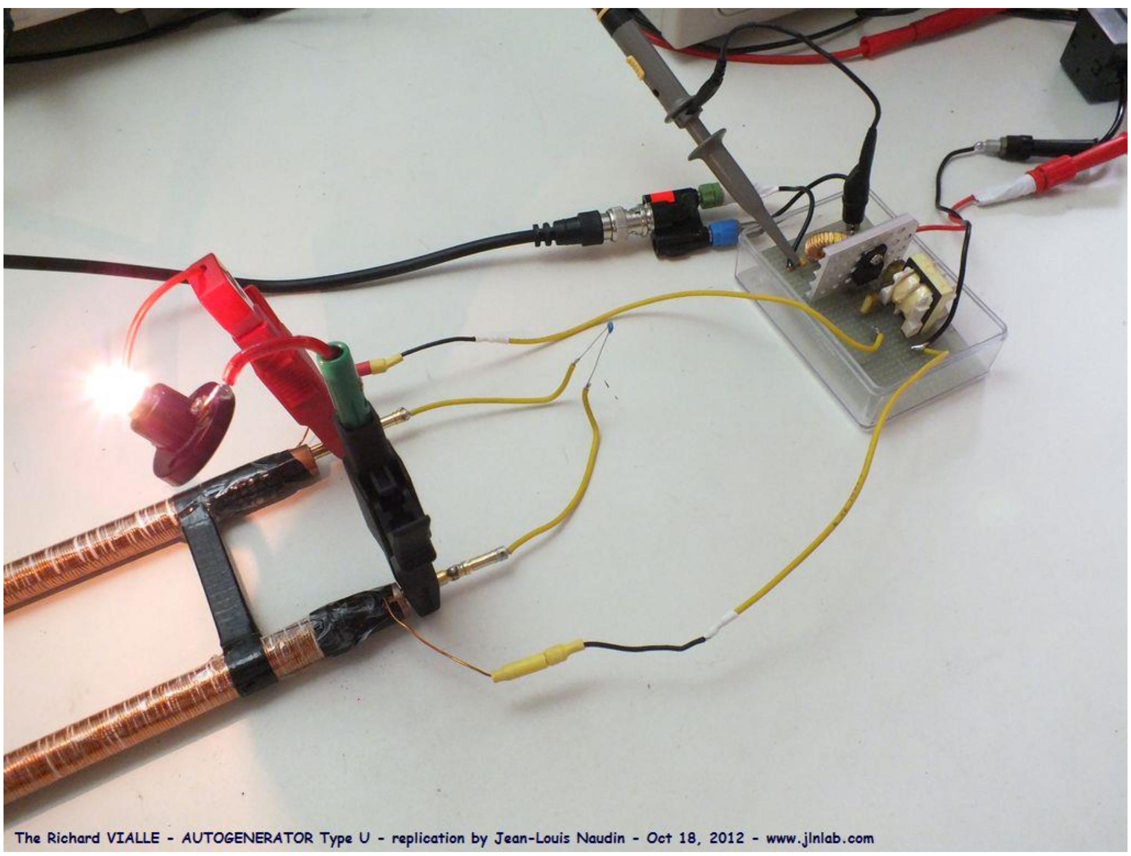
Below, here is the oscillogram. We see that the output is sinusoidal and at 20 Vrms (at 3.6 MHz), with a supply voltage of 25 VDC.



Here are the tests of the amplifier at 2 MHz and 5 MHz.







The 6V 100mA charging lamp lights up without any problem when the generator is set to 3.6 MHz.

What is very interesting to observe is that the consumption of the HF Amplifier is totally invariant WITH or WITHOUT the Autogenerator connected to its output.

Here is the video of the test of this HF Amplifier V5.0, and which demonstrates this fact:

https://youtu.be/1bu3h834vgk

Additional technical documents:

Datasheet of the Fairchild KSE13009F transistor

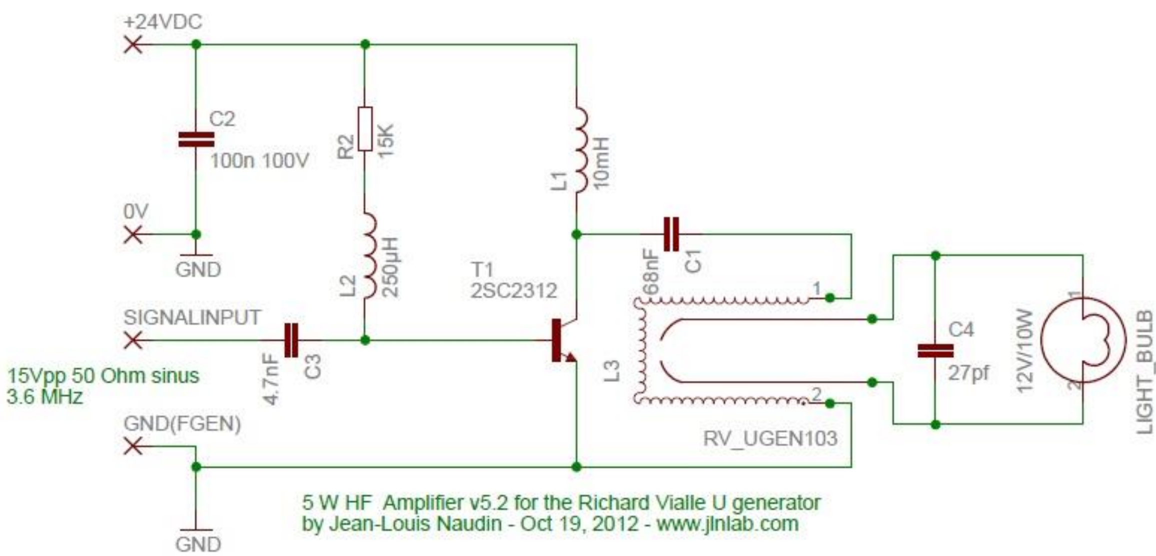
Fairchild BUT11A Transistor Datasheet

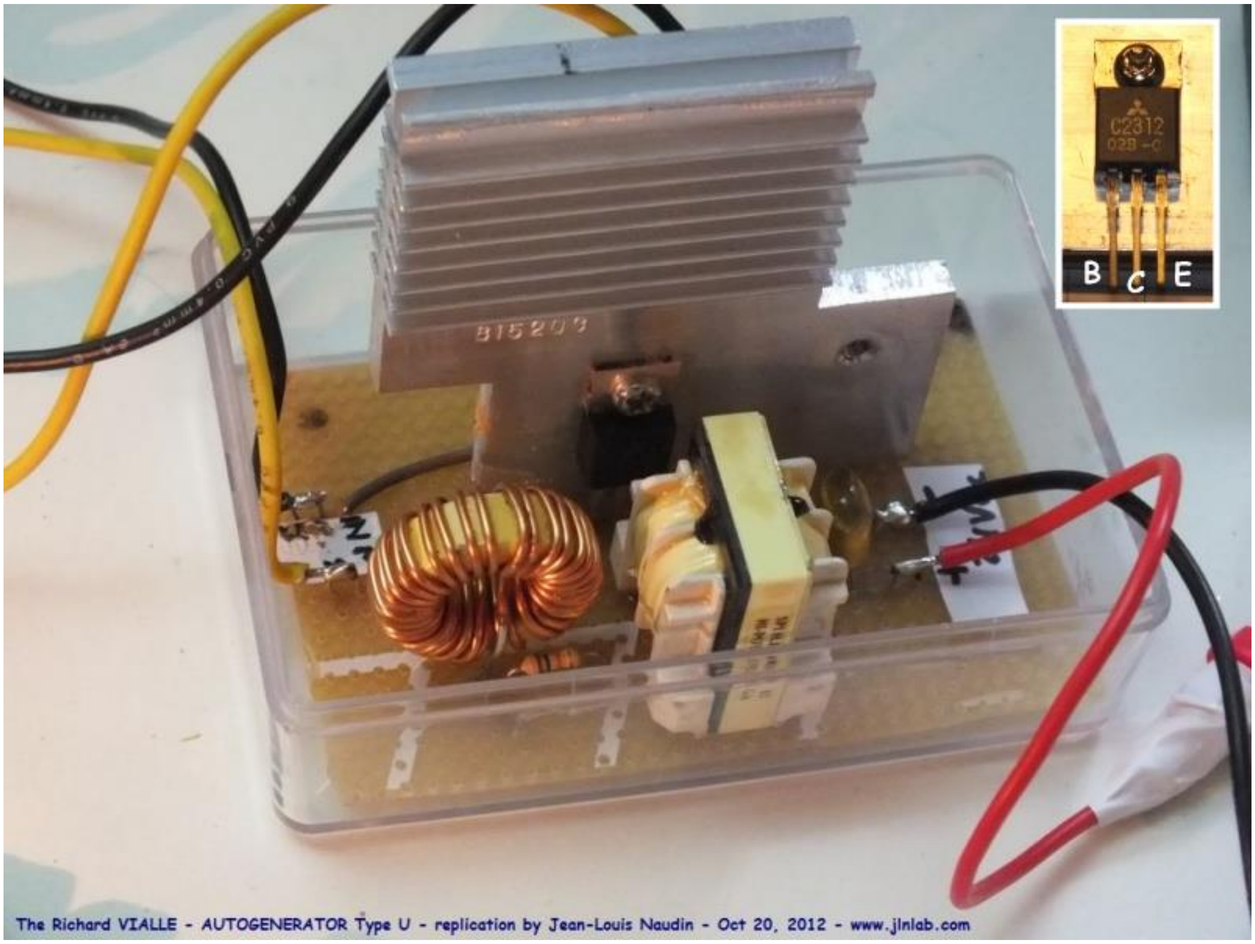
Chapter 22

Measurements of the HF IN and OUT power of the U-shaped Autogenerator

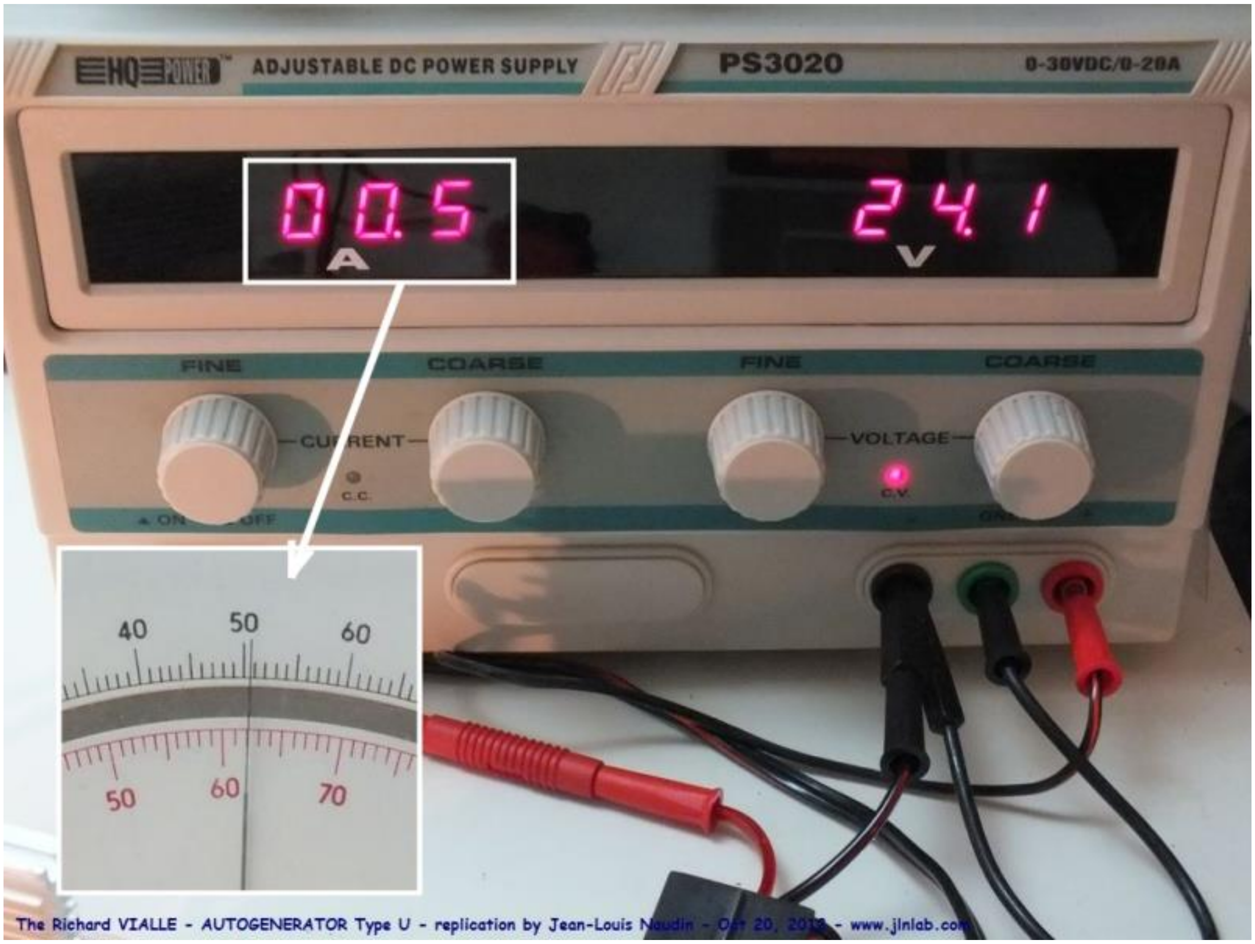
Here is an interesting measure of the HF power supplied and reflected by Richard Vialle's U-shaped Autogenerator. I made a new HF power amplifier based on the original diagram used by Richard Vialle and using a real Mitsubishi 2SC2312 transistor (watch out for clones). This small HF amplifier with a transistor is capable of supplying 5 Watts HF over several tens of MegaHertz with a 24 V DC power supply. This amp is driven by a sinusoidal function generator. The input / output RF power of the autogenerator coil is measured with an Alan KW520 HF Watt / SWR meter. This device is connected in series between the HF amplifier and the coil of the U-shaped autogenerator.

Here is the diagram of this HF amplifier and the details of the different connections:

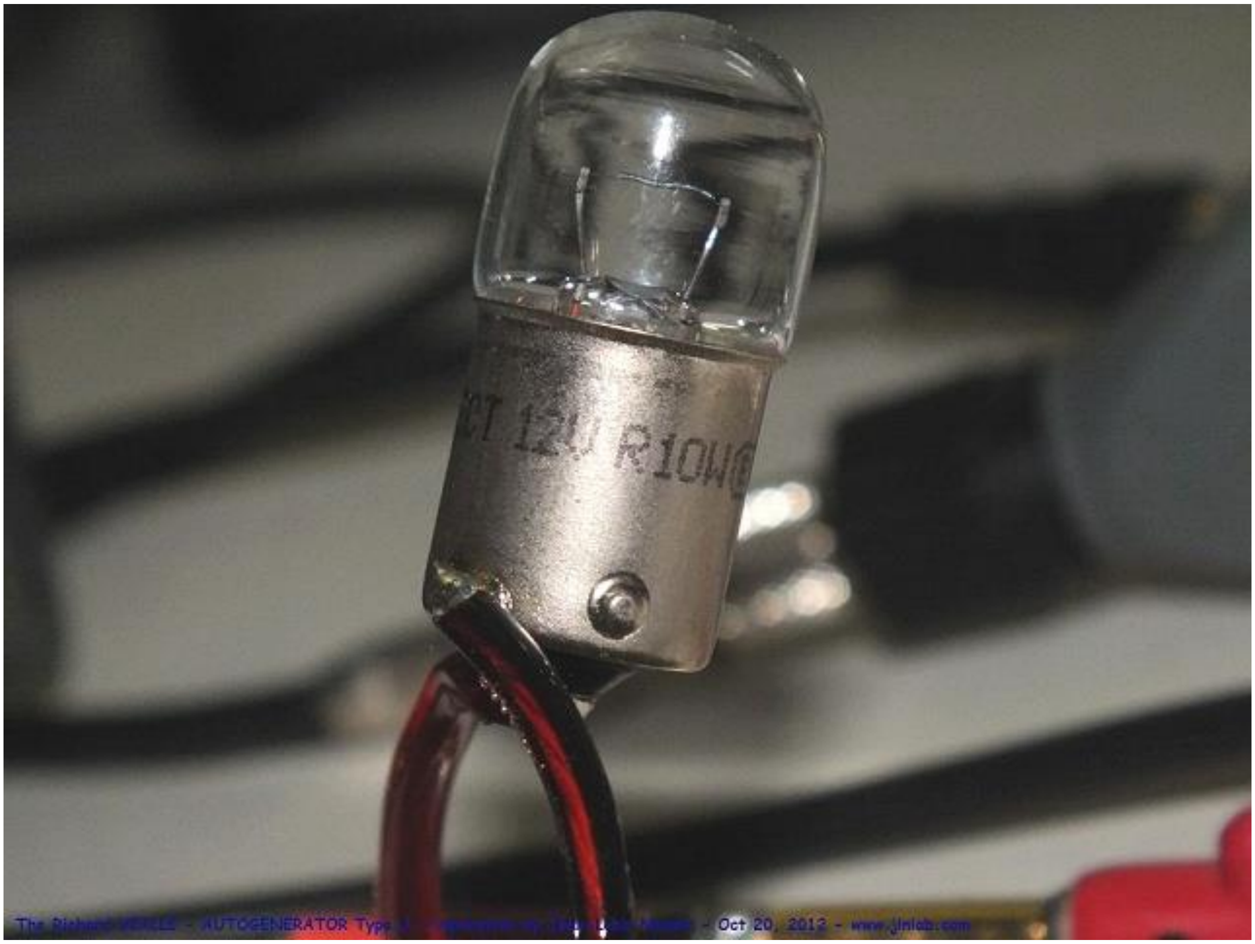




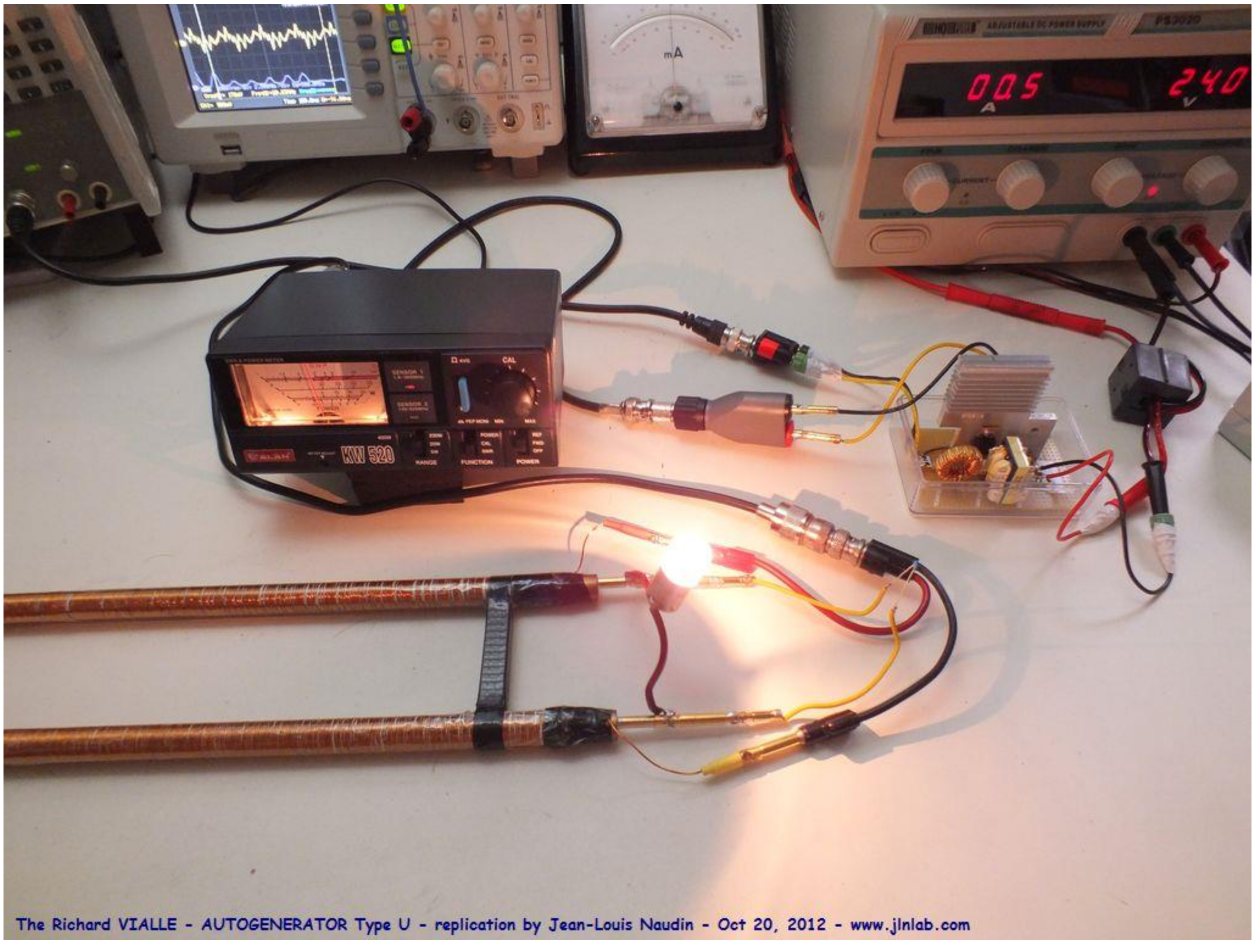
The HF amplifier is supplied with 24 V DC.



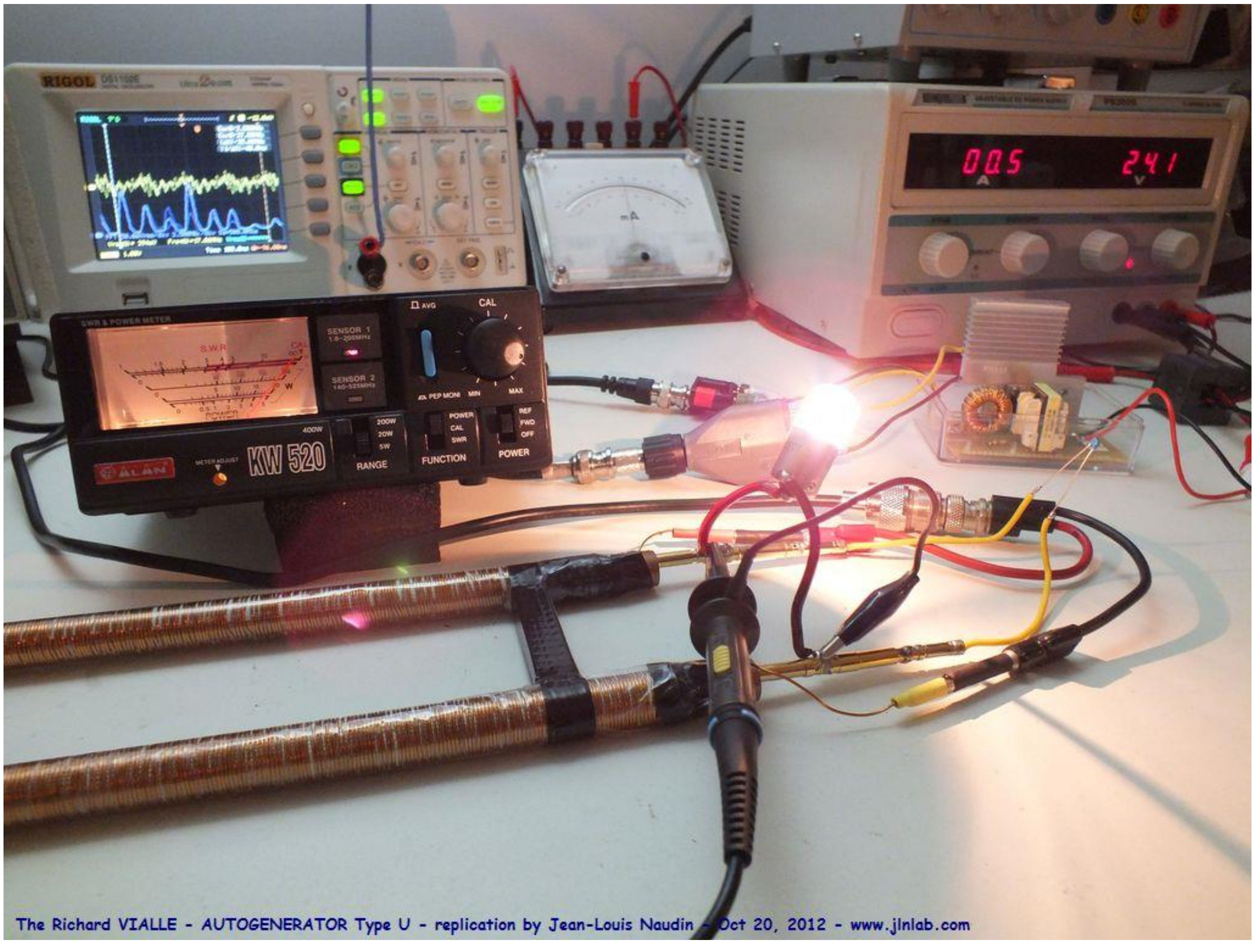
The charging lamp connected to the U-tube of the autogenerator is a 12V 10W lamp.



Here is the configuration used during the test. The voltage at the lamp terminals is measured with a Fluke 123 "True RMS" oscilloscope powered by its internal batteries and therefore "fully ungrounded".



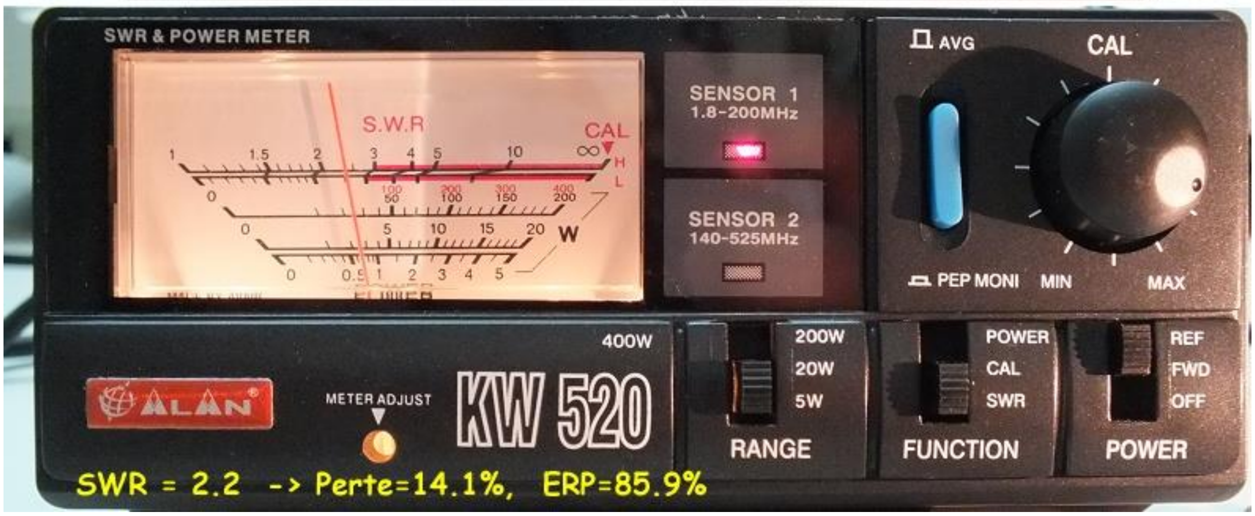
Below is the KW520 Watt / SWR meter which measures the direct power transmitted to the U-shaped autogenerator.



Here are the measurements of the DIRECT and REFLECTED HF power at the input of the autogenerator.

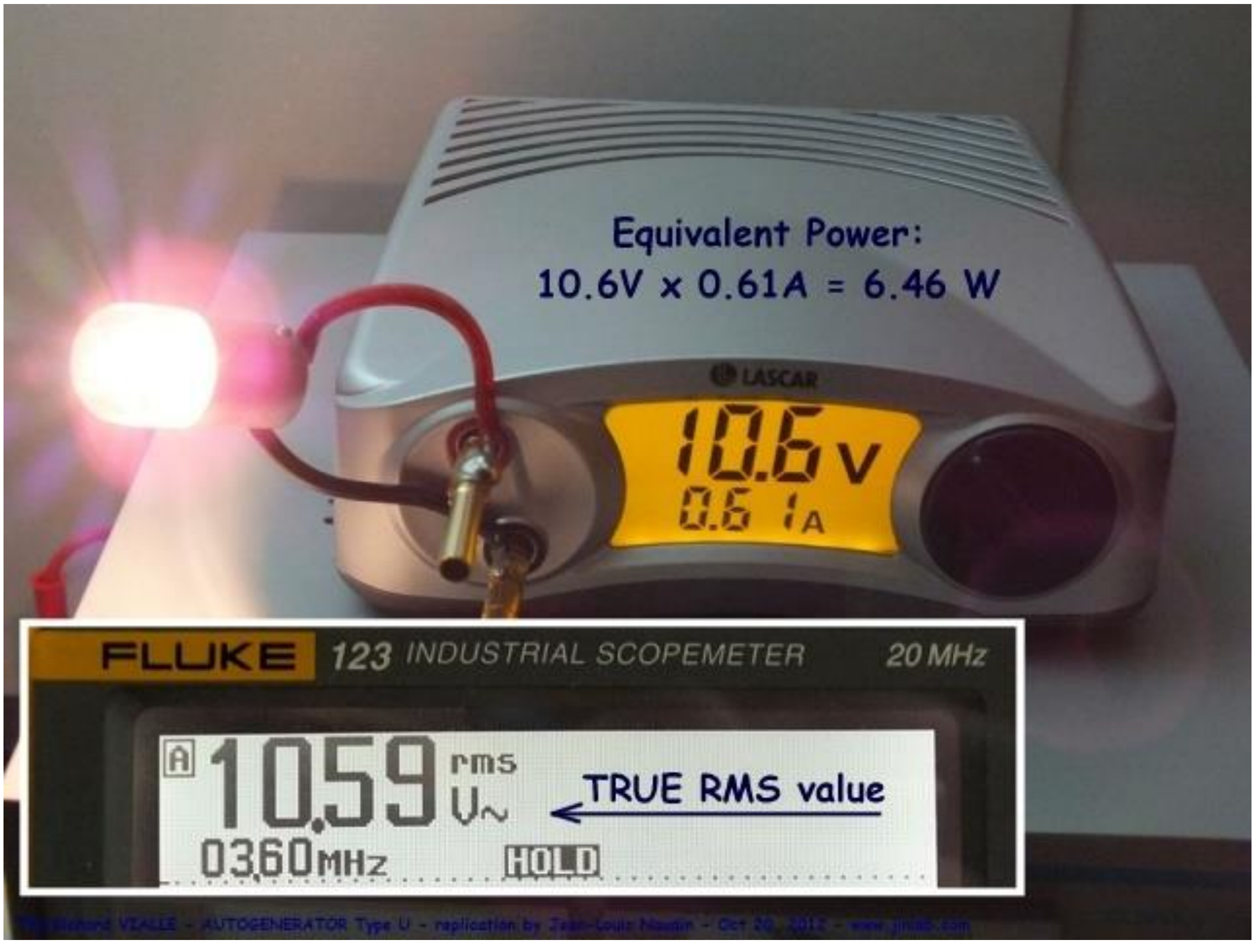
DIRECT HF power is 4.5 Watts, and REFLECTED HF power is 0.65 Watts.

Here are the measurements of the SWR (after calibration (top photo)) at the inlet of the autogenerator.



The voltage measured at the terminals of the charging lamp with the Fluke 123 "True RMS" oscilloscope is 10.6 Volts RMS.

This gives an equivalent power on the direct current charging lamp of 6.46 Watts.



Equivalent Power:
10.6V x 0.61A = 6.46 W
LASCAR
10.6 V
0.61 A
FLUKE
123 INDUSTRIAL SCOPEMETER
20 MHz
A
10.59 rms V~
TRUE RMS value
03.60 MHz
HOLD

To summarize, all of these power measurements:

The operating frequency of the U-shaped autogenerator is 3.6 MHz sinusoidal,

The HF amplifier consumes 12.05 Watts = 24.1 V x 0.5 A,

The direct HF power at the input of the coil of the U-shaped autogenerator is 4.5 Watts of which 0.65 Watts are reflected,

The HF power actually consumed by the U-shaped autogenerator is 4.5W - 0.65W = 3.85 Watts,

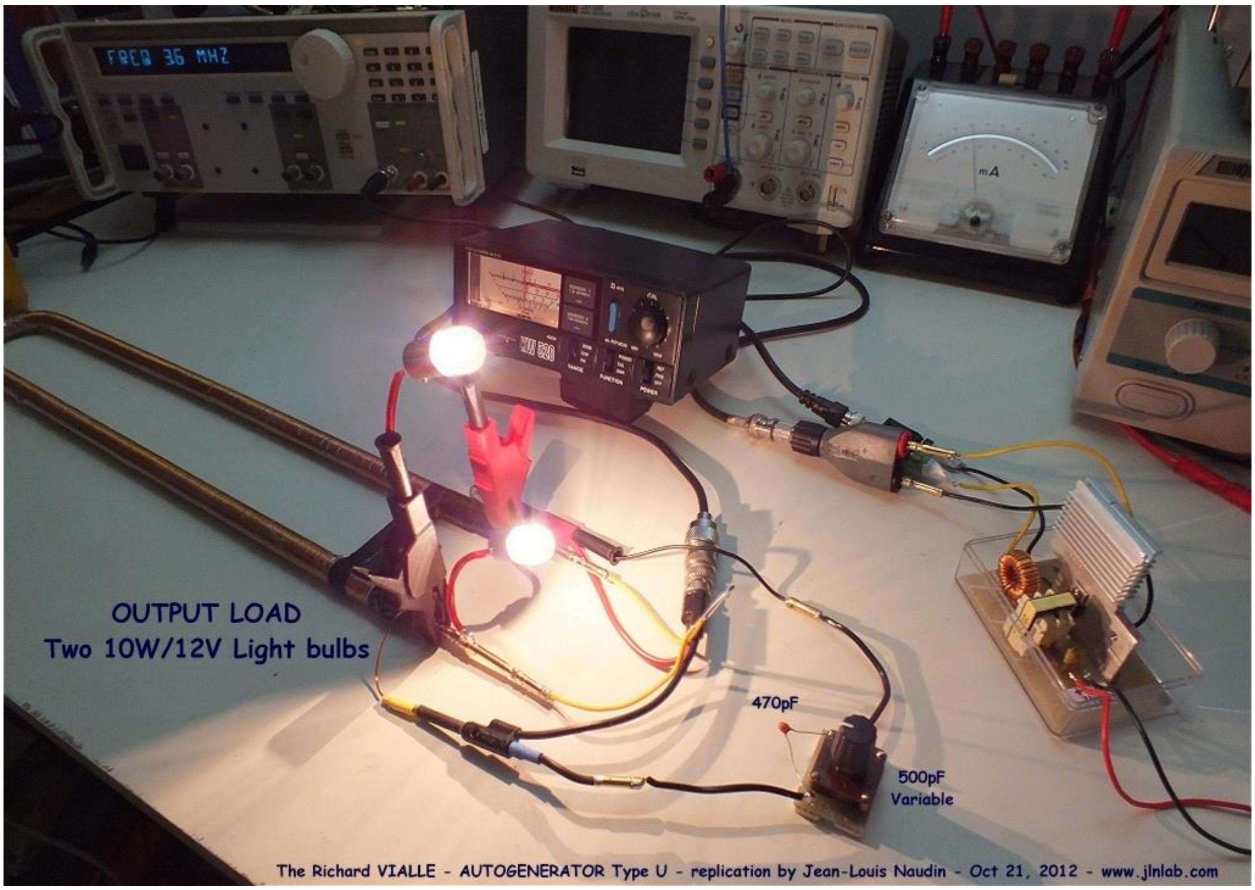
The power dissipated by the 12V 10W lamp is 10.6 V x 0.61 A = 6.46 Watts.

Here is the video of the HF power measurement on the U-shaped autogenerator:

https://youtu.be/F_Mal1ZPcik

Update October 21, 2012: With a precise tuning of the Autogenerator coil with a variable capacitor in parallel, it is possible to produce a lot of power at the output of the U with this small HF amplifier.

Below: Two 10W 12V lamps (connected in parallel on the output of the U) and lit at full power:

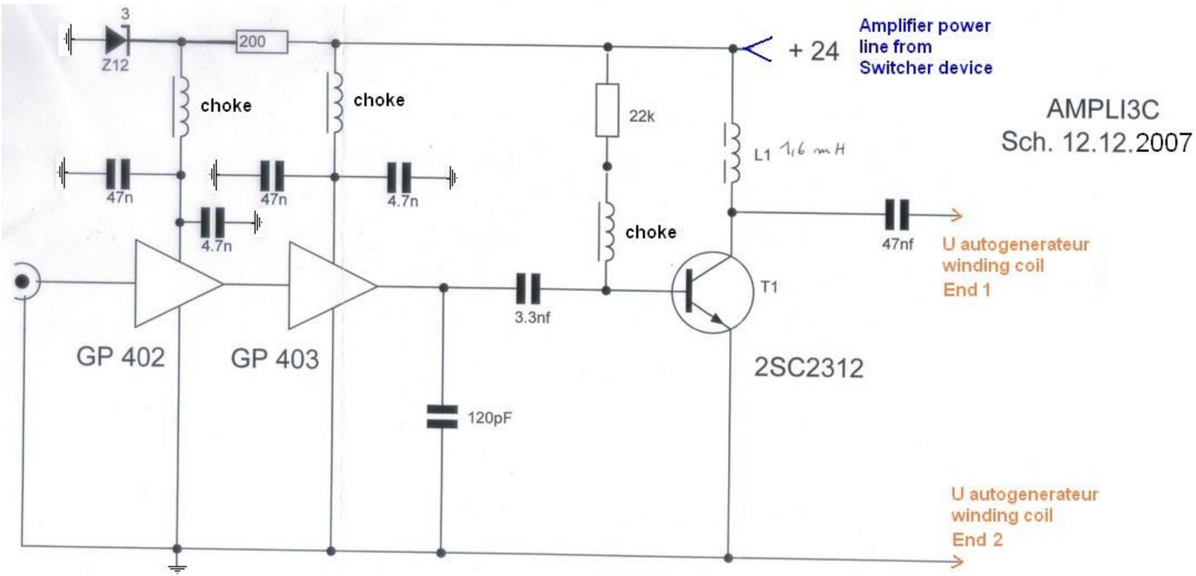


Additional technical documents:

Datasheet of the Mitsubishi 2SC2312 transistor

Alan KW520 HF Watt / SWR Meter Datasheet

The original diagram of the HF Amplifier used by Richard Vialle on his U-shaped autogenerator:


3
Z12
200
choke
choke
Amplifier power
line from
Switcher device
+ 24
AMPLI3C
Sch. 12.12.2007
22k
L1 1,6 mH
47n
47n
4.7n
4.7n
choke
47nf
U autogenerateur
winding coil
End 1
3.3nf
T1
GP 402
GP 403
2SC2312
120pF
U autogenerateur
winding coil
End 2

Chapter 23

Input / Output HF Power Measurements on a Load Resistor

TECHNICAL NOTE of October 26, 2012:

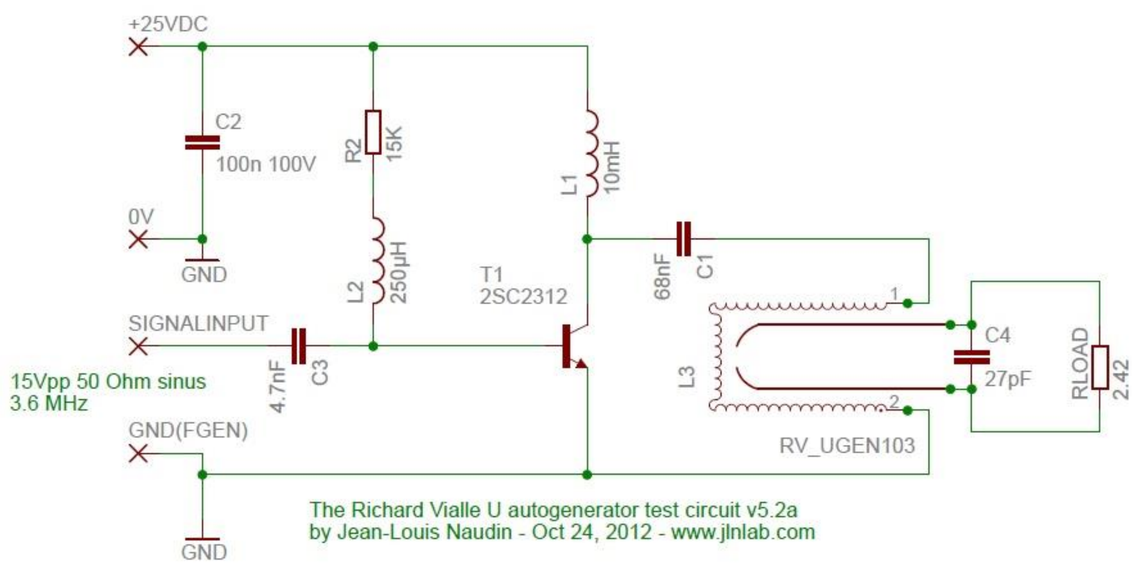
Following further verification measurements and investigations regarding the 2.2 ohm ceramic load resistor that I used in this experiment, it turns out that this resistor is inductive as it is made of a resistive alloy wound around a ceramic core.

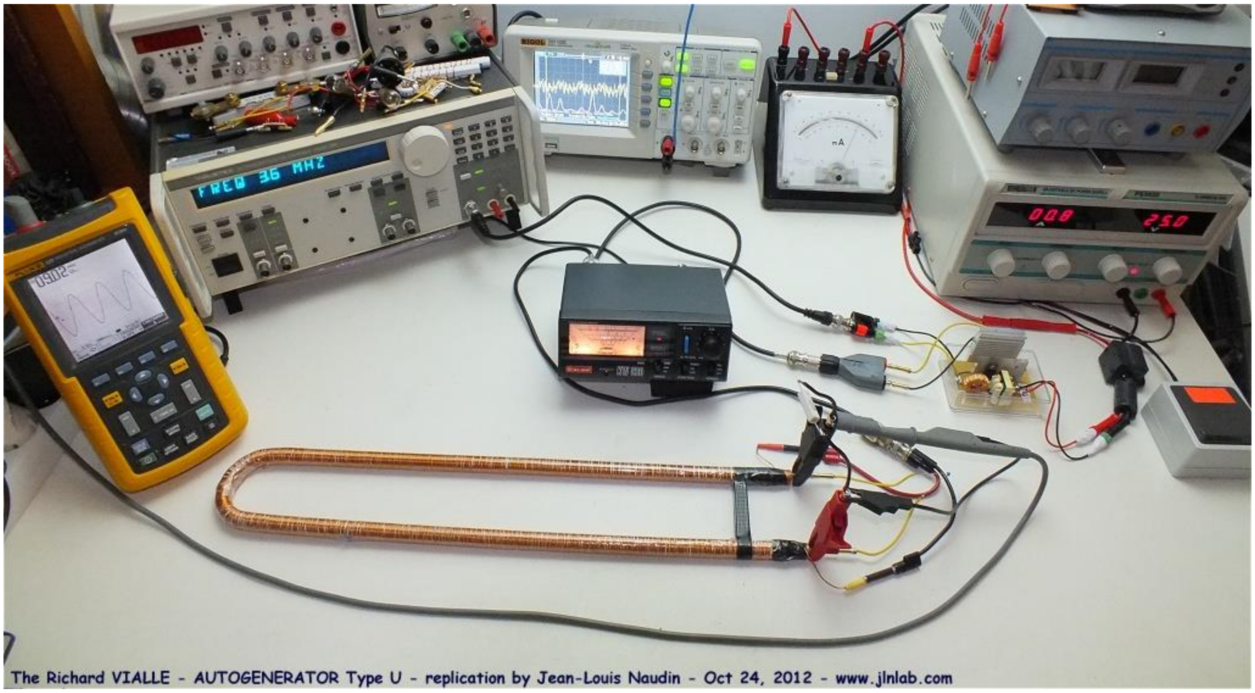
This hidden inductive side of this ceramic resistor gives a high impedance at 3.6 MHz. The value of the RMS voltage across the load resistor is correct but the calculation (used in this test) of the dissipated power is wrong because it did not take into account the impedance at 3.6 Mhz of this ceramic load resistor. It is therefore necessary to use resistors certified as non-inductive by the manufacturer and/or to use other methods of measuring the power at the output of the autogenerator (optical or thermal for example).

This technical note concerns only this part of the experience, and does not call into question the other parts of this topic.

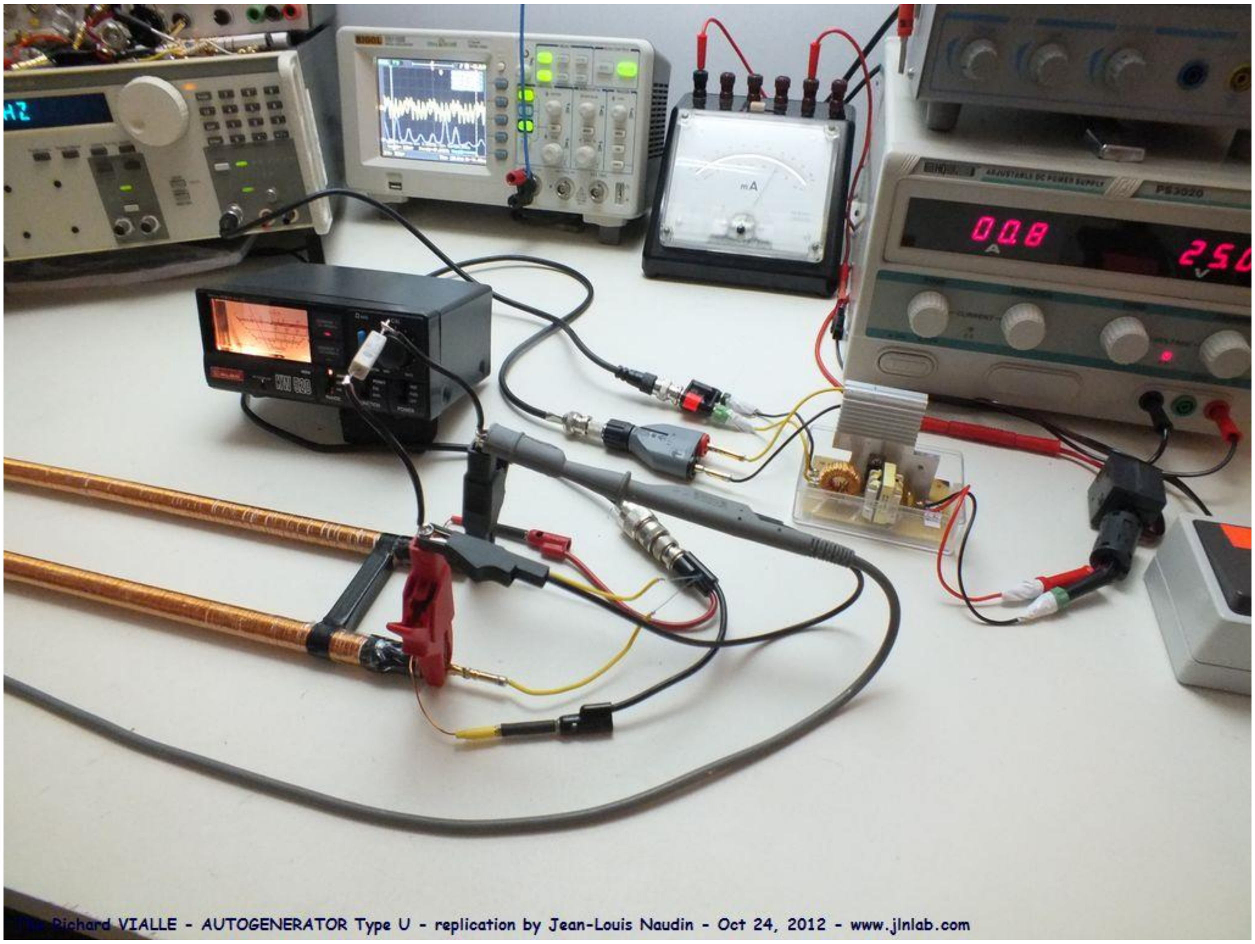
****

Following the previous measurements that I carried out with the Alan KW520 Watt / SWR meter with a load lamp connected to the output of the U-shaped Autogenerator of Richard Vialle, I therefore continued the tests by replacing the lamp with a low value non-inductive ceramic resistor. I was able to lower the value of the SWR (Standing Wave Ratio or SWR) from 2.2 to 1.9. I used the same setup with the new HF Power Amplifier based on the original schematic used by Richard Vialle, and using a real Mitsubishi 2SC2312 transistor. This amplifier is driven by a Wavetek 288 sinusoidal function generator. The Watt / SWR meter is connected in series between the HF amplifier and the coil of the U-shaped autogenerator.

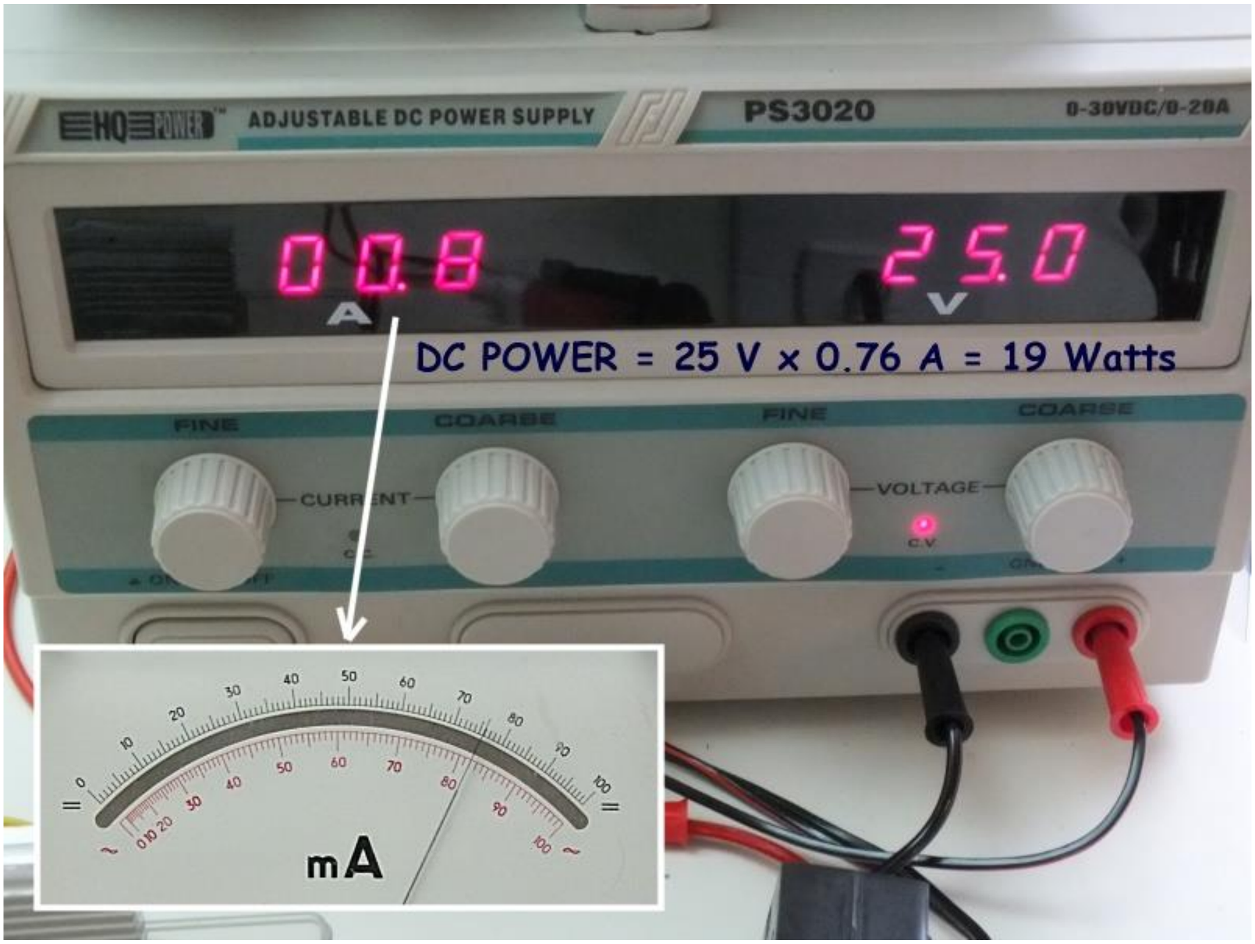




Here is the configuration used during the test. The voltage across the resistor is measured with a Fluke 123 "True RMS" oscilloscope powered by its internal batteries and therefore "fully ungrounded".



The HF amplifier is supplied with direct voltage and consumes 19 Watts.



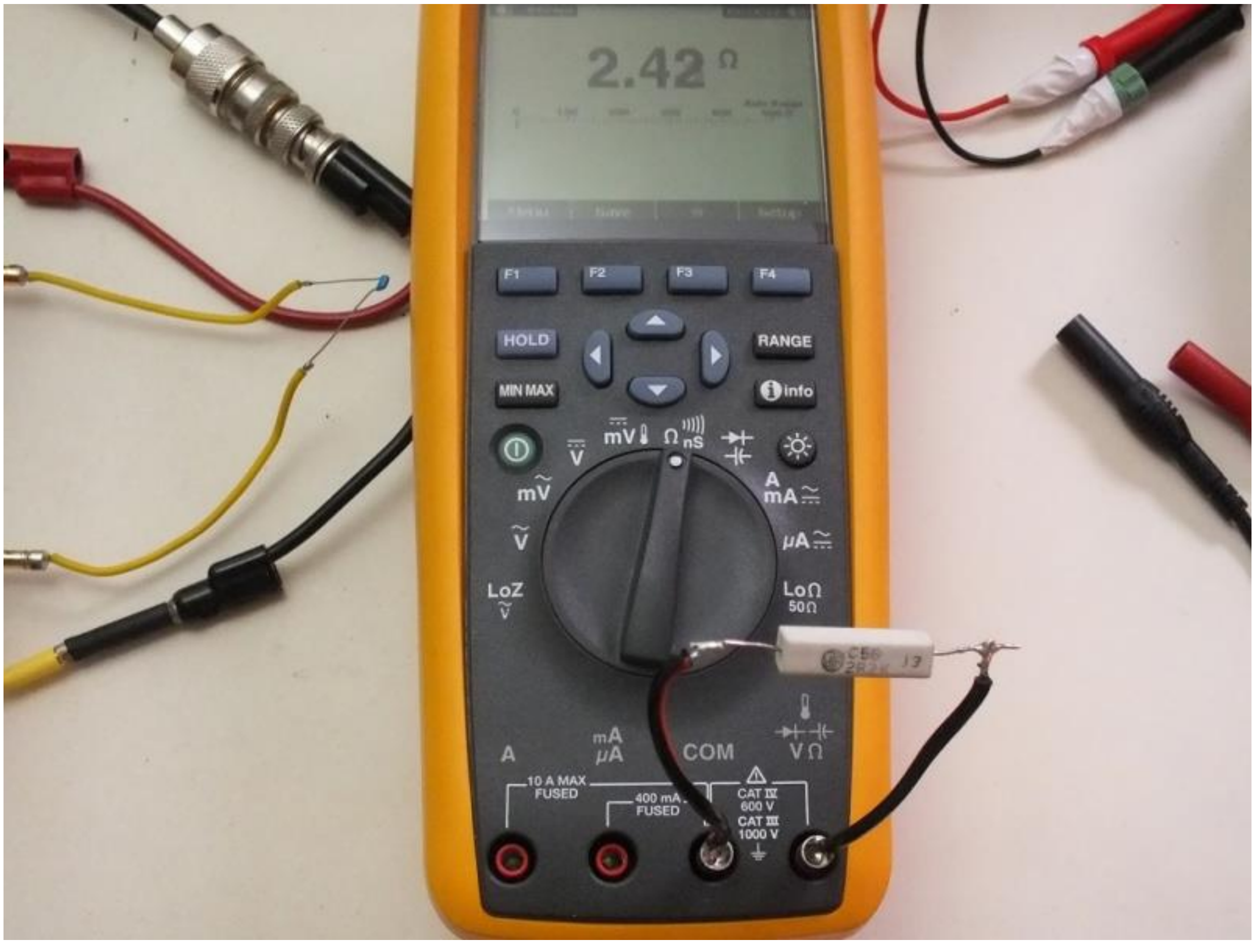
We see above the KW520 Watt / SWR meter which measures the direct power transmitted to the U-shaped autogenerator.

Here are the measurements of the DIRECT and REFLECTED HF power at the input of the autogenerator.

DIRECT HF power is 15 Watts, and REFLECTED HF power is 1 Watt.

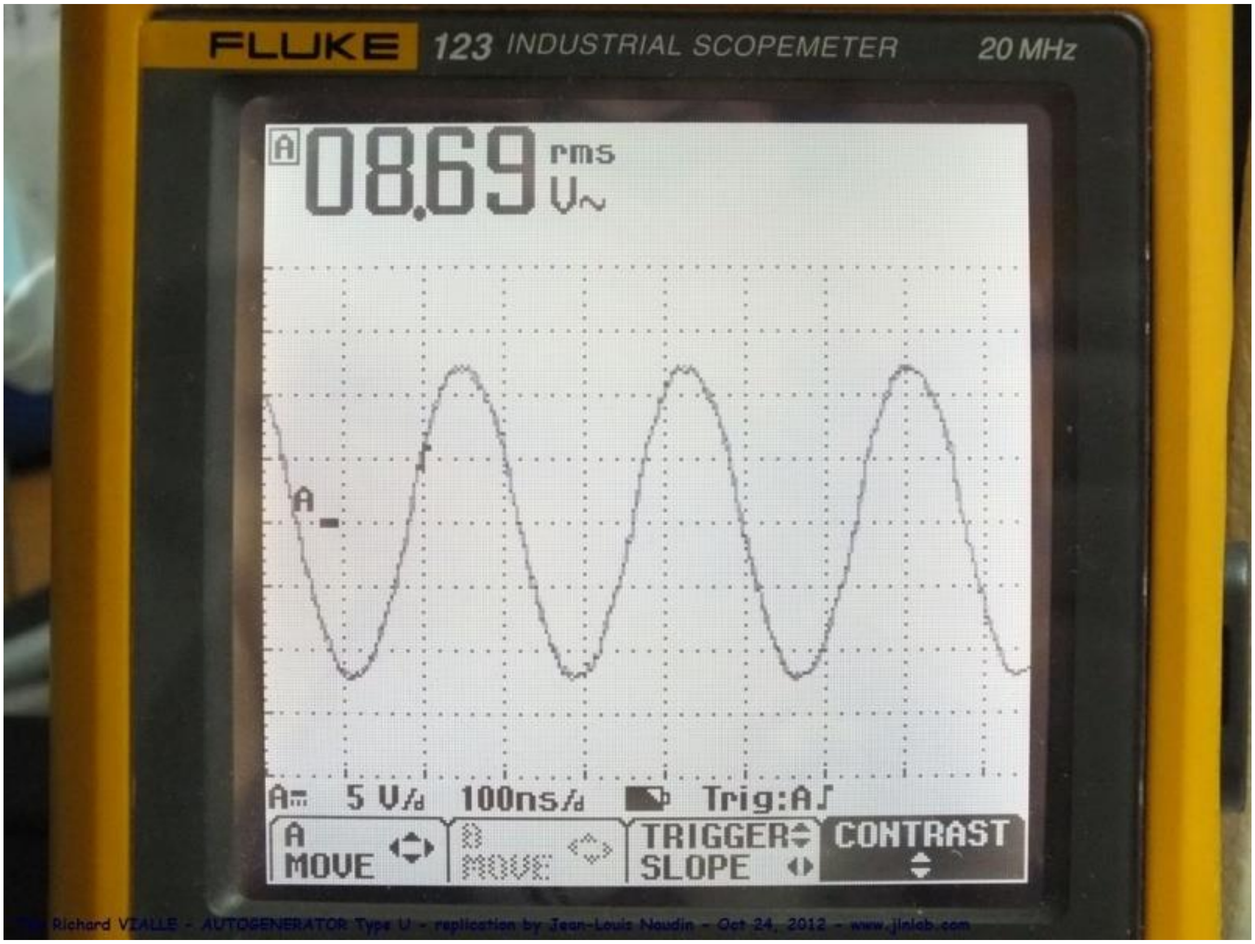
Here are the SWR measurements after calibration (top photo), at the inlet of the autogenerator; The SWR is 1.9.

The load resistance is measured with an ohmmeter and its exact value is 2.42 Ohms.



The voltage measured across the load ceramic resistor (please see the previous technical note) with the Fluke 123 "True RMS" oscilloscope is 8.69 Volts RMS.

You can see that the HF Amplifier delivers a pure sine wave across the load resistor.



This gives an output power dissipated on the load resistor of 31.2 Watts (FALSE, see the technical note mentioned previously).

To summarize, all of these power measurements:

The operating frequency of the U-shaped autogenerator is 3.6 MHz sinusoidal,

The HF amplifier consumes 19 Watts = 25 V x 0.76 A,

The direct HF power at the input of the coil of the U-shaped autogenerator is 15 Watts of which 1 Watt is reflected,

The HF power actually consumed by the U-shaped autogenerator is 15W - 1W = 14 Watts,

The power dissipated in the form of heat in the load resistor in the OUTPUT is 31.2 Watts (FALSE, see the technical note mentioned previously).

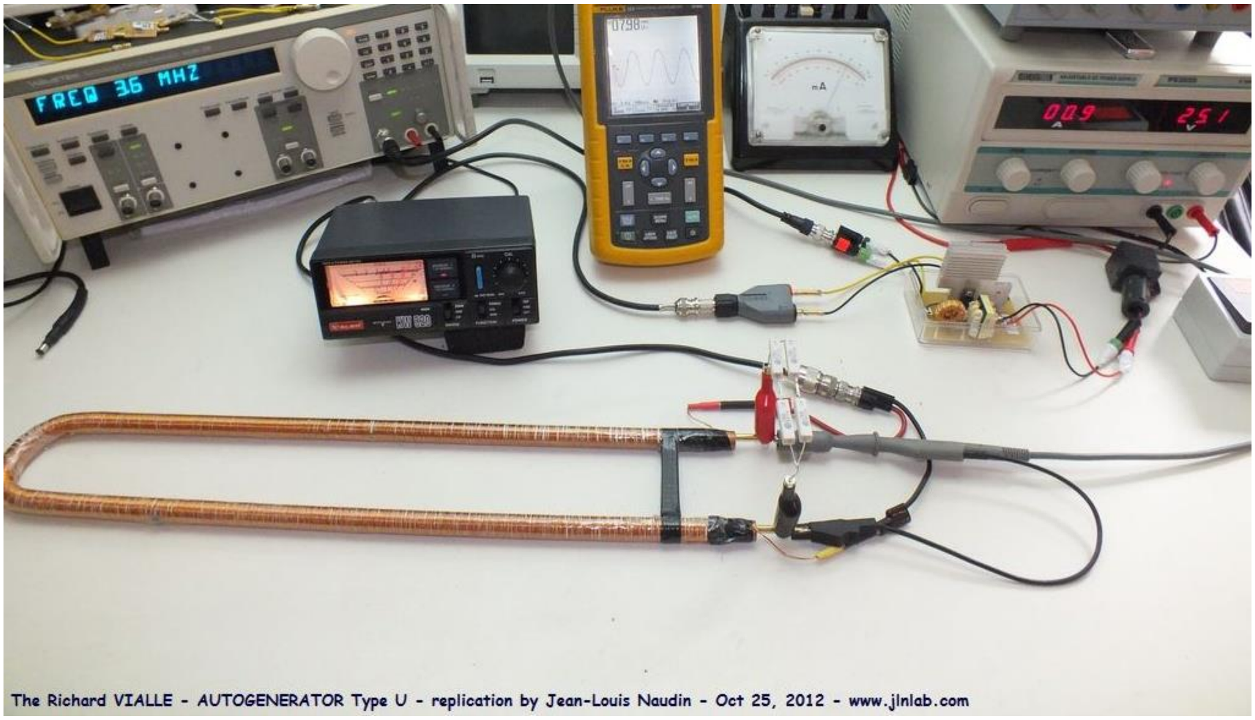
A note about the load resistance: It is important to note that the load resistance gets enormously hot, which causes its value to drift and therefore the voltage at its terminals changes (we see it in the video of the test). At the start of the experiment, the voltage at its terminals is around 9 Vrms, and at the end of the experiment it is around 7 Vrms because of its temperature drift. In a next experiment, I will make an assembly of 4 resistors of 2.2 Ohms (2 resistors in series and connected in parallel) in order to have greater heat dissipation and reduce this temperature drift.

Additional Notes from Oct 25, 2012:

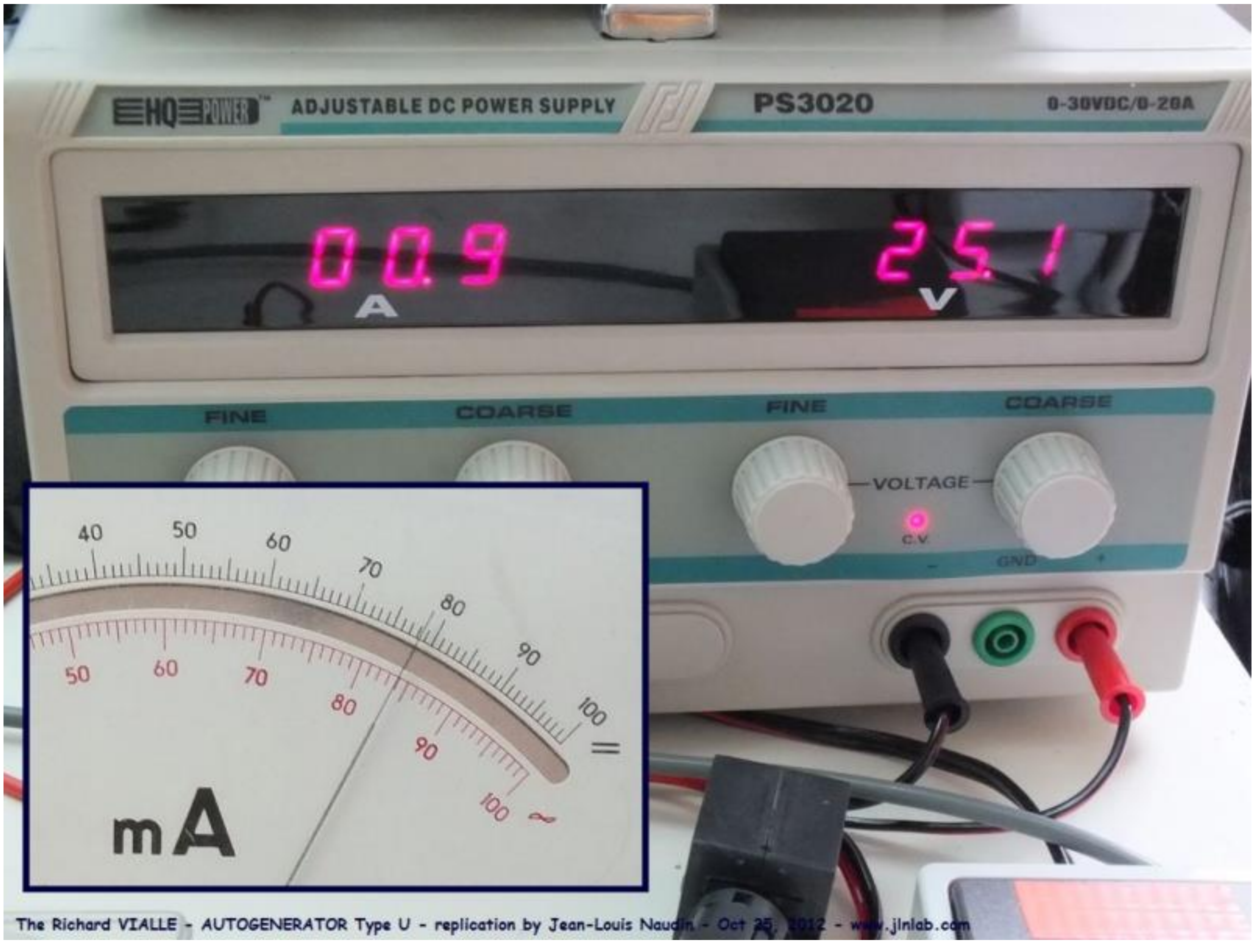
As a result of yesterday's tests causing an excessive rise in the temperature of the load resistor and causing the voltage measured at its terminals to drift, I preferred to distribute the heat over 4 identical resistors connected in series / parallel mode (2 resistors in series and connected in parallel). So the new measured value of the load resistance is 2.27 Ohms.

The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin -

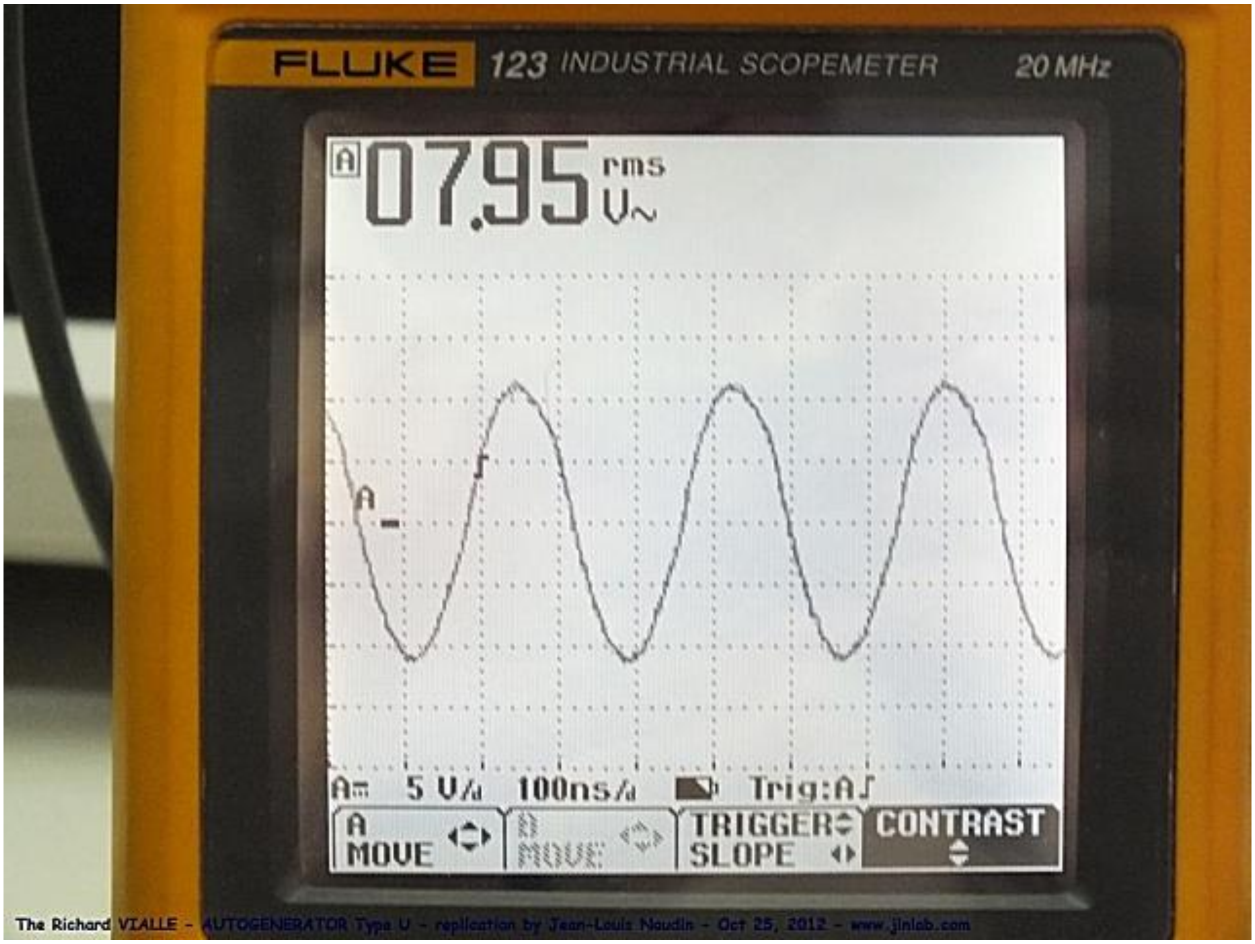
The frequency (3.6 MHz) and HF power parameters remain unchanged: Direct HF power = 15 W for 1 Watts reflected.



The DC power supply of the HF amplifier is similar:



The RMS voltage measured at the terminals of the load with the Fluke 123 "True RMS" oscilloscope is 7.95 Vrms.



This gives an output power dissipated on the load resistor of 27.8 Watts (FALSE, see the technical note mentioned previously).

This time the voltage across all 4 load resistors is relatively stable, although they are very hot.

To summarize all of these power measurements:

The operating frequency of the U-shaped autogenerator is 3.6 MHz sinusoidal,

The HF amplifier consumes 19.57 Watts = 25.1 V x 0.78 A,

The direct HF power at the input of the coil of the U-shaped autogenerator is 15 Watts of which 1 Watt is reflected,

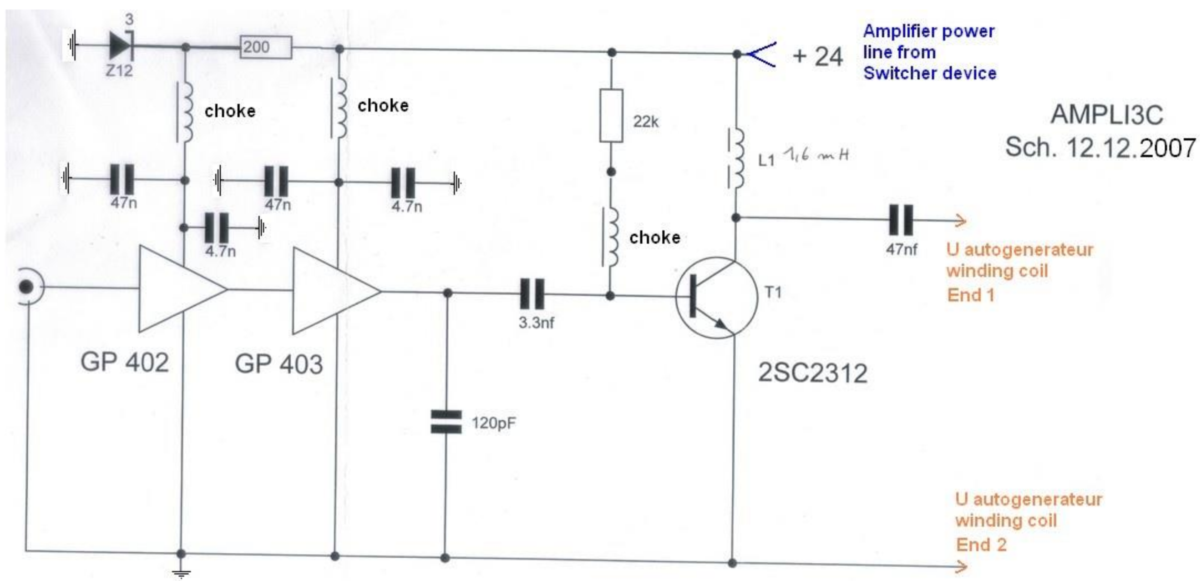
The HF power actually consumed by the U-shaped autogenerator is 15W - 1W = 14 Watts, The power dissipated in the form of heat in the load resistor OUTPUT is 27.8 Watts (FALSE, see technical note mentioned previously).

Additional technical documents:

Datasheet of the Mitsubishi 2SC2312 transistor

Alan KW520 HF Watt / SWR Meter Datasheet

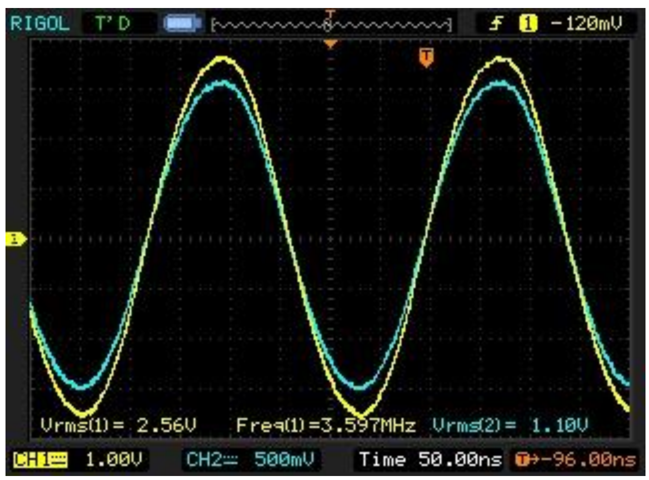
The original diagram of the HF Amplifier used by Richard Vialle on his U-shaped autogenerator:



Chapter 24

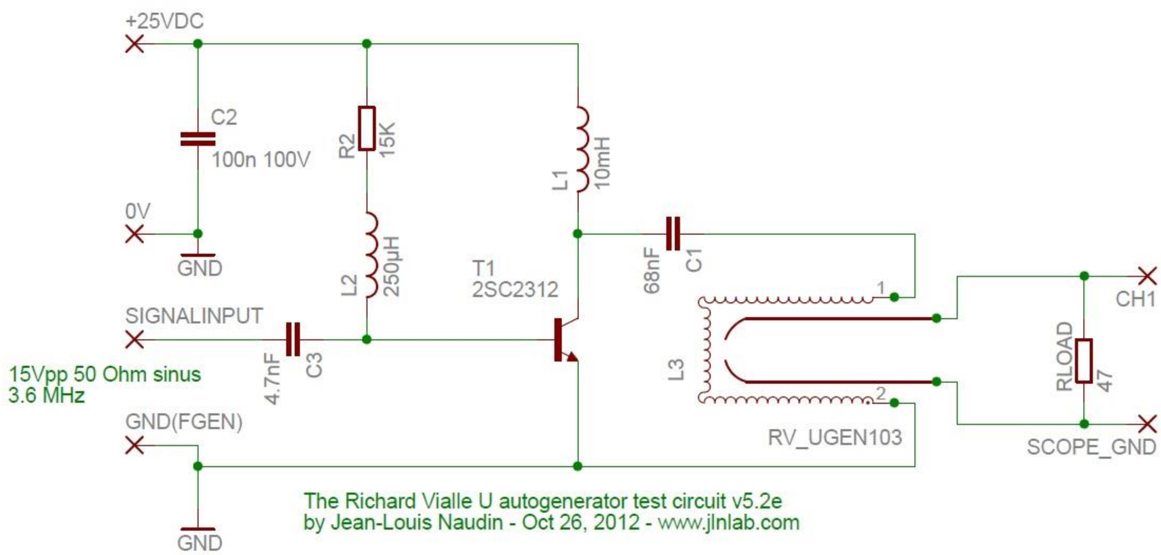
Input / Output Power Measurements with True Non-Inductive Resistance

During my last tests and I/O power measurements of Richard Vialle's U-shaped Autogenerator loaded with a load resistor, I unfortunately used a ceramic resistor which was inductive, contrary to what the seller said. It distorted my calculation of the power dissipated by the Joule effect in this resistor since the impedance of the latter was greatly increased at the frequency of 3.6 MHz, because of this parasitic inductive aspect (see my technical note for the previous test). So I started the test again using a real NON-INDUCTIVE 47 Ohm resistor. I myself checked the non-inductive aspect at the frequency of 3.6 MHz with the oscilloscope by observing the phase shift between current and voltage on the Wavetek 288 function generator.



The exact measured value of this 47 Ohm resistor is 46.23 Ohms

Here is the configuration used during this new load test. The voltage measurement across the resistor is carried out with the Rigol digital oscilloscope, and the data is then transferred to a PC for a point-by-point calculation of the RMS voltage and power dissipated in this non-inductive resistor.


+25VDC
C2
100n 100V
R2
15K
L1
10mH
0V
GND
L2
250µH
T1
2SC2312
68nF
C1
SIGNALINPUT
4.7nF
C3
15Vpp 50 Ohm sinus
3.6 MHz
L3
RLOAD
47
CH1
GND(FGEN)
RV_UGEN103
SCOPE_GND
GND
The Richard Vialle U autogenerator test circuit v5.2e
by Jean-Louis Naudin - Oct 26, 2012 - www.jlnlab.com


FREQ 3.6 MHZ
The Richard VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 26, 2012 - www.jlnlab.com

Here are the DIRECT and REFLECTED HF power measurements made with the KW520 Watt / SWR meter connected to the input of the autogenerator.

The DIRECT HF power is 2.6 Watts, and the REFLECTED HF power is 0.9 Watt.

The useful HF power injected into the U-shaped Autogenerator is therefore 1.7 Watts.

Here is the signal measured across the load resistor and digitized by the oscilloscope.

The oscilloscope probe is placed on the 10x calibration in order to minimize its influence on the measurement.

The signal is slightly distorted, it is for this reason that I preferred to carry out a numerical calculation of the voltage and the RMS power point by point via the computer.

The digital oscilloscope data (in CSV format) of the voltage measurement at the resistors are available as an Excel file.

It can be seen that the value of the RMS voltage given in real time by the oscilloscope (10.1 Vrms) is indeed equal to the value calculated (10.11 Vrms) by computer and this despite the slight deformation of the curve. I will therefore be able to take into consideration the RMS value displayed and processed in real time by the oscilloscope (True RMS).

To summarize all of these power measurements:

The operating frequency of the U-shaped autogenerator is 3.6 MHz sinusoidal,

The HF amplifier consumes 4.5 Watts = 25 V x 0.18 A,

The direct HF power at the input of the coil of the U-shaped autogenerator is 2.6 Watts of which 0.9 Watts is reflected,

The HF power actually consumed by the U-shaped autogenerator is 2.6W - 0.9W = 1.7 Watts,

The power dissipated in the form of heat in the load resistor in the OUTPUT is 2.61 Watts.

Additional technical documents:

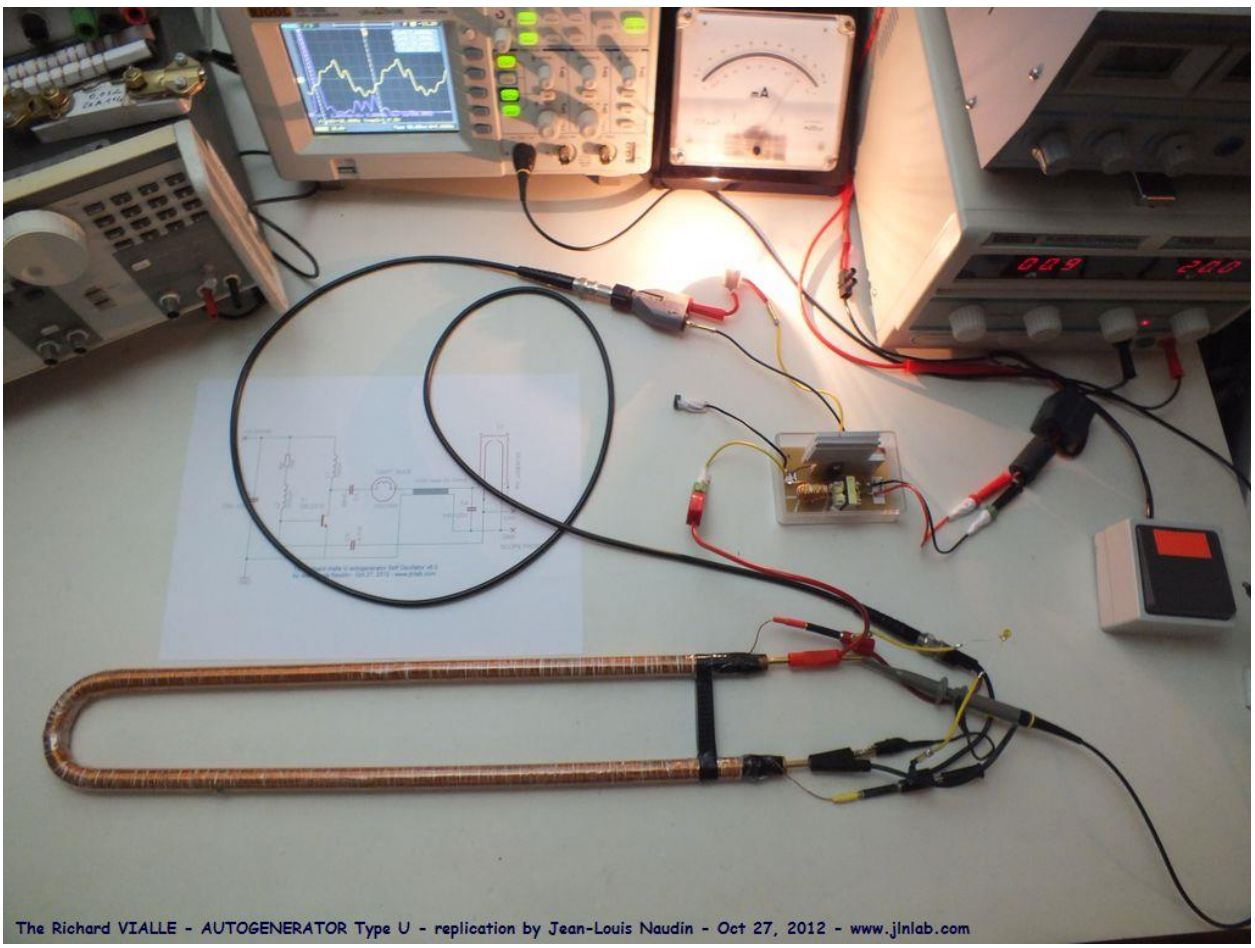
Datasheet of the Mitsubishi 2SC2312 transistor

Alan KW520 HF Watt / SWR Meter Datasheet

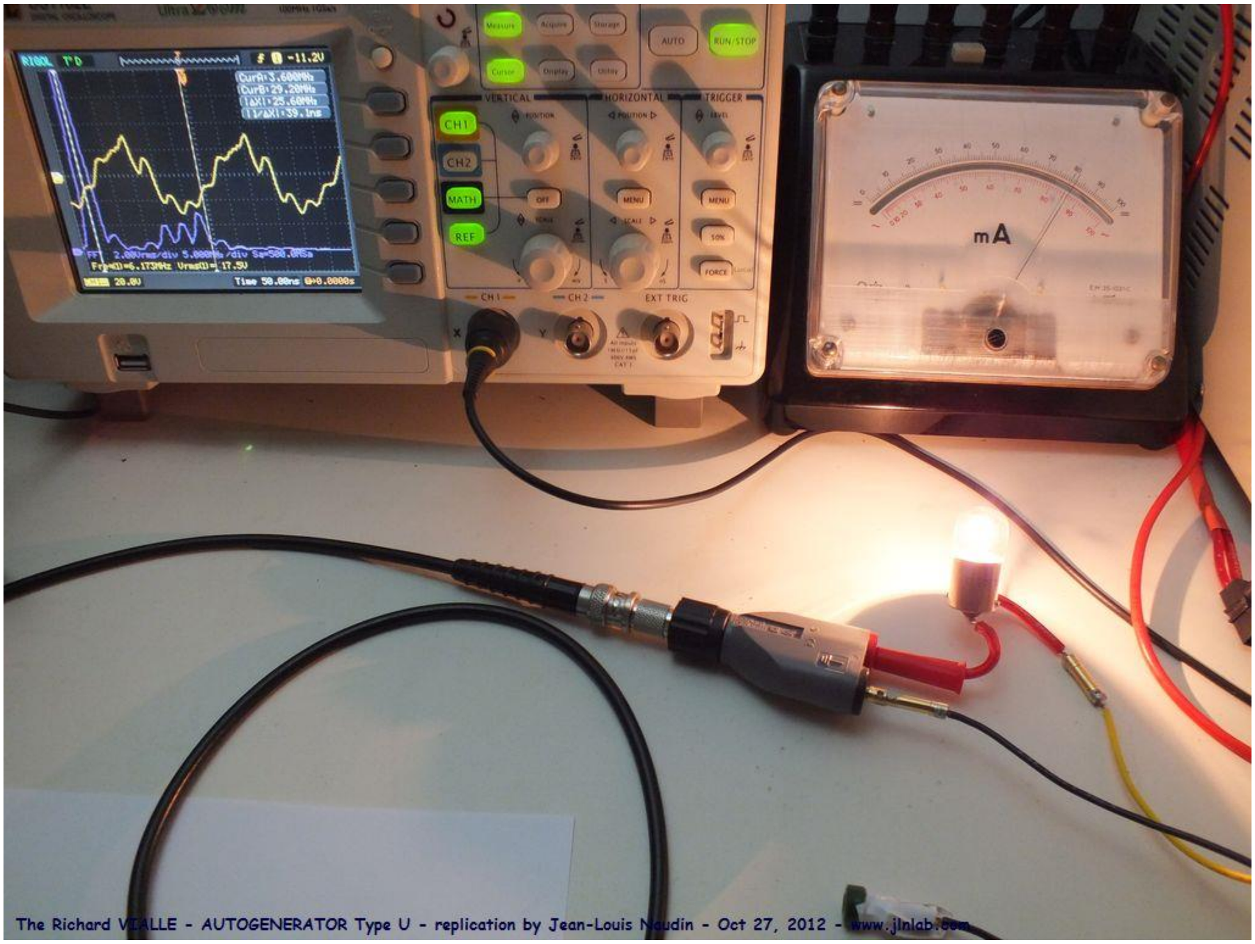
Chapter 25

Diagram of a Power Auto-Oscillator (10W HF) for the U-shaped Autogenerator

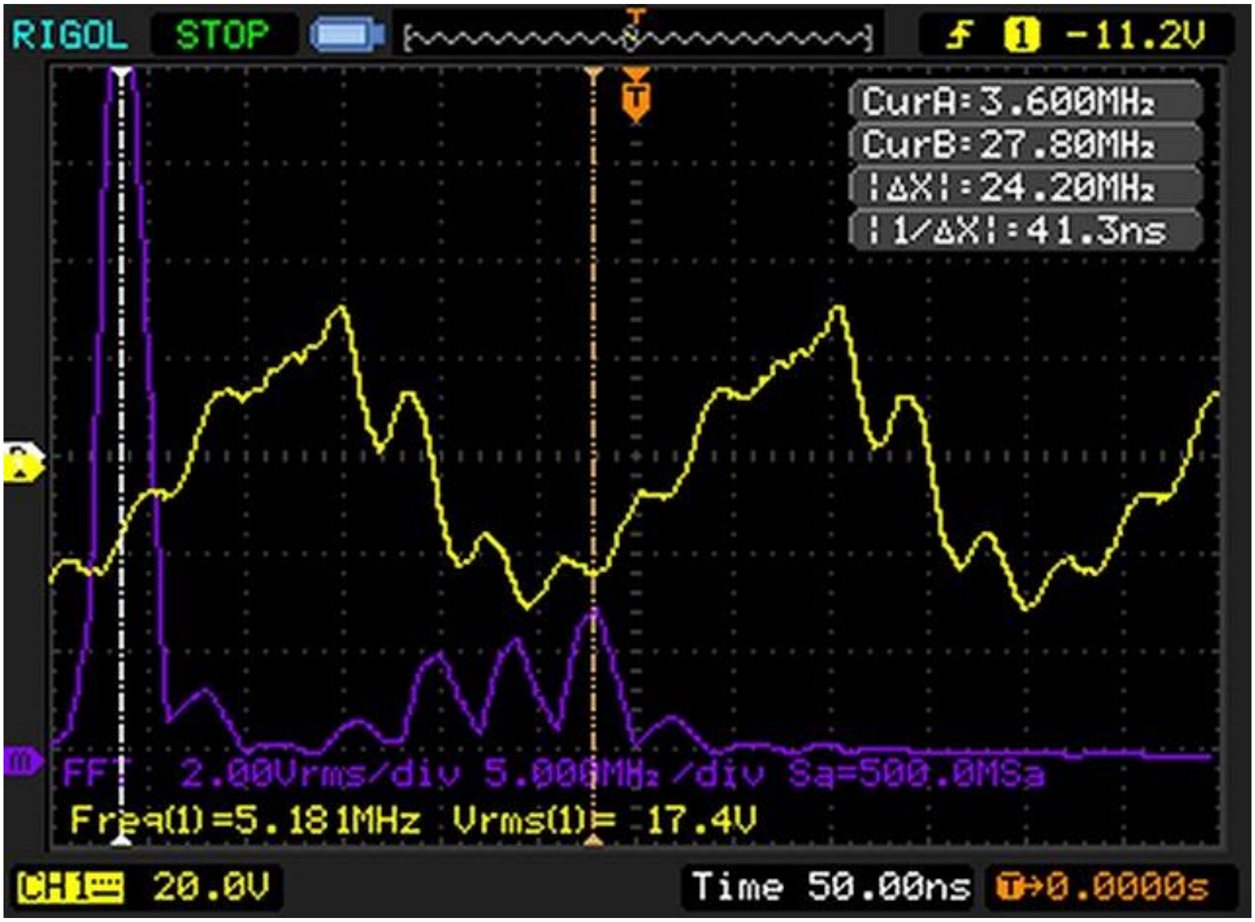
Here is a very interesting assembly for your experiments, it is a power AUTO-OSCILLATOR (10W HF) for the U-shaped Autogenerator by Richard Vialle. It only uses a single 2SC2312 HF transistor and allows you to light a 12V at 10W lamp without any problem. This auto-oscillator does not require an external function generator, and self-synchronizes itself to the optimum operating frequency. It is supplied with a DC voltage of 15 to 24 V.



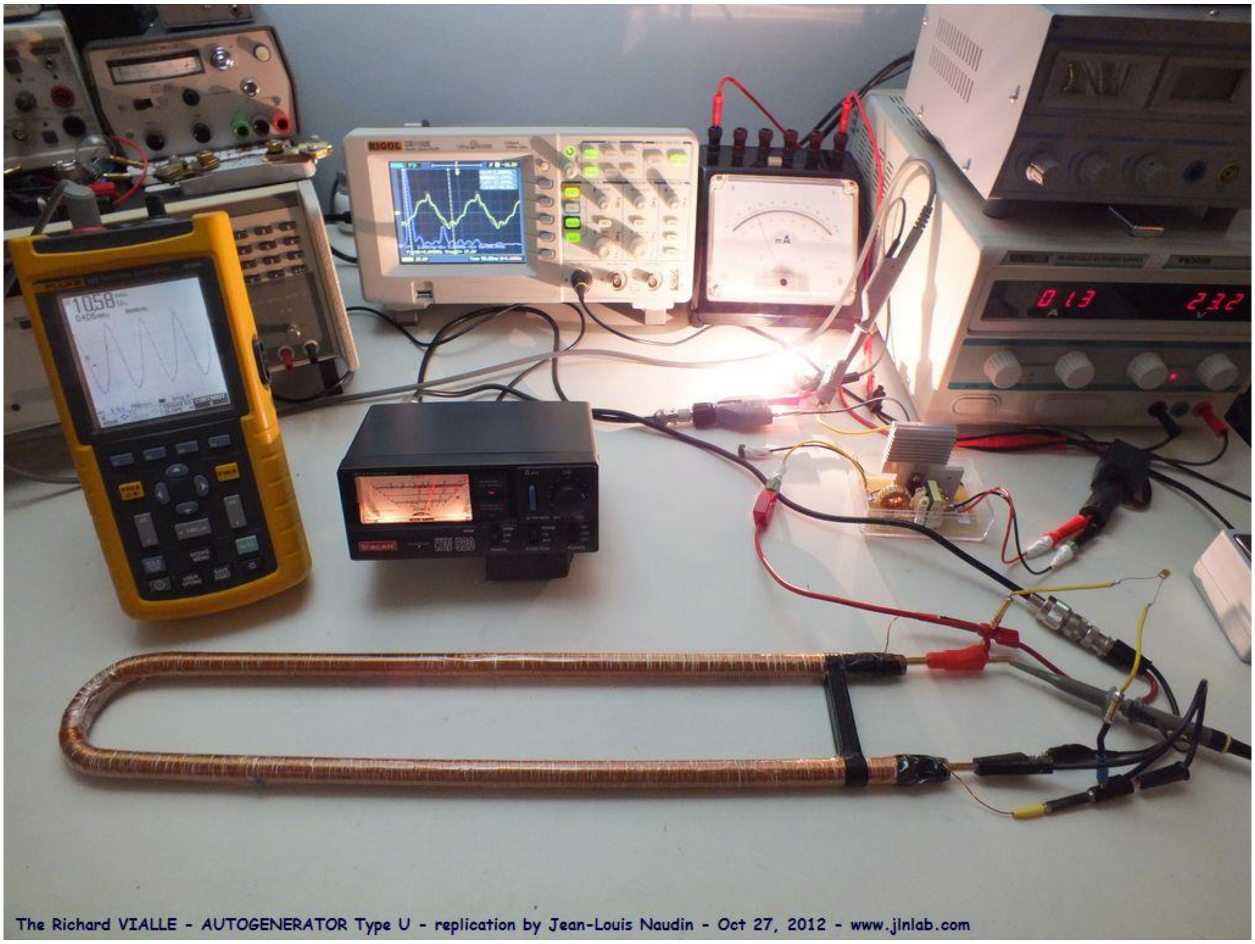
The 12 V at 10 Watts charging lamp lights up without any problem via the HF power produced with this auto-oscillator.



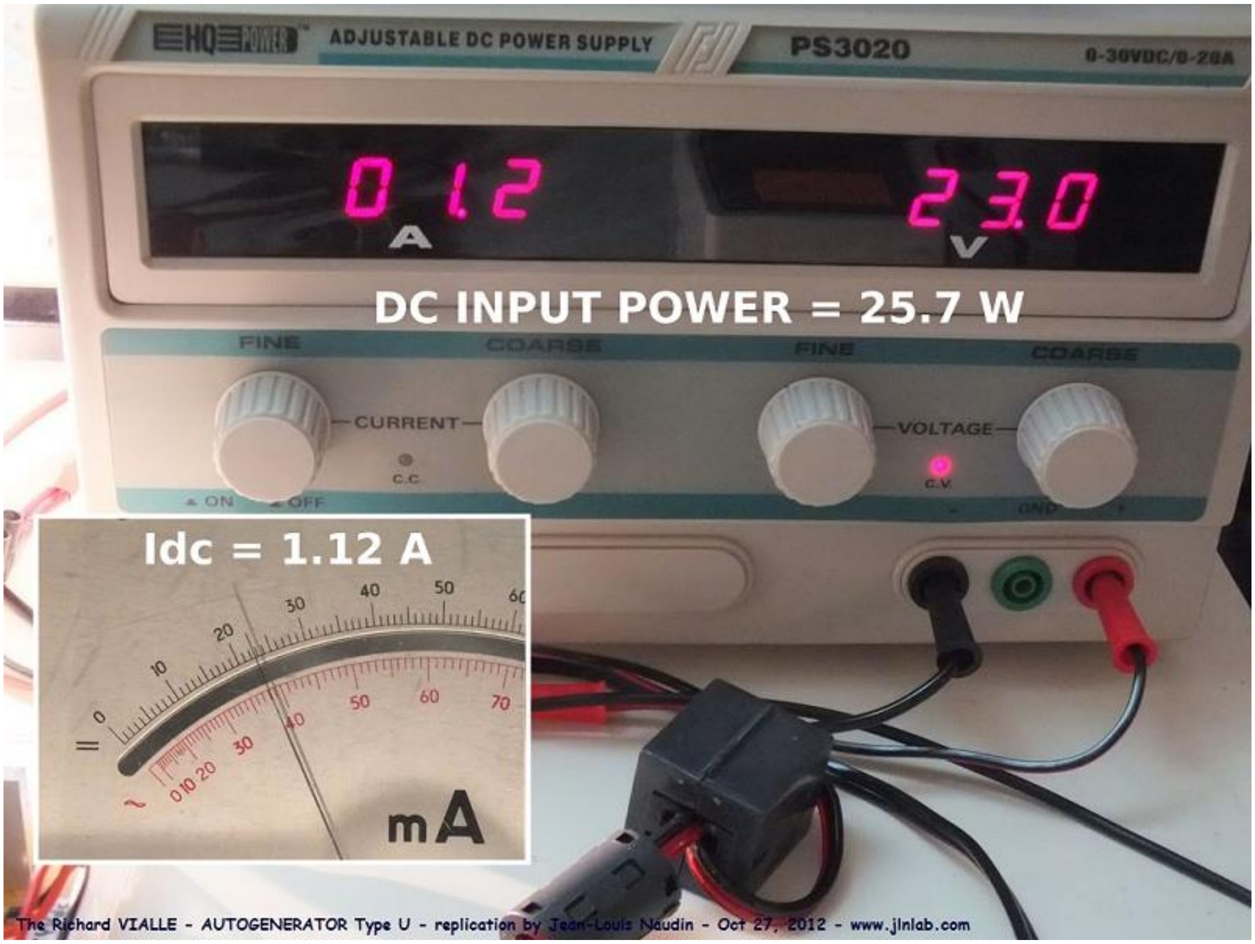
This auto-oscillator synchronizes itself on the peak of maximum energy, here it's operating frequency is 3.6 MHz.



I measured the I/O power flow with the KW520 Watt / SWR meter connected in series with the U-shaped Autogenerator coil, as well as the RMS voltage across the charging lamp with the Fluke 123 True RMS oscilloscope.



Here are the parameters of the DC power supply of the Auto-Oscillator V6:



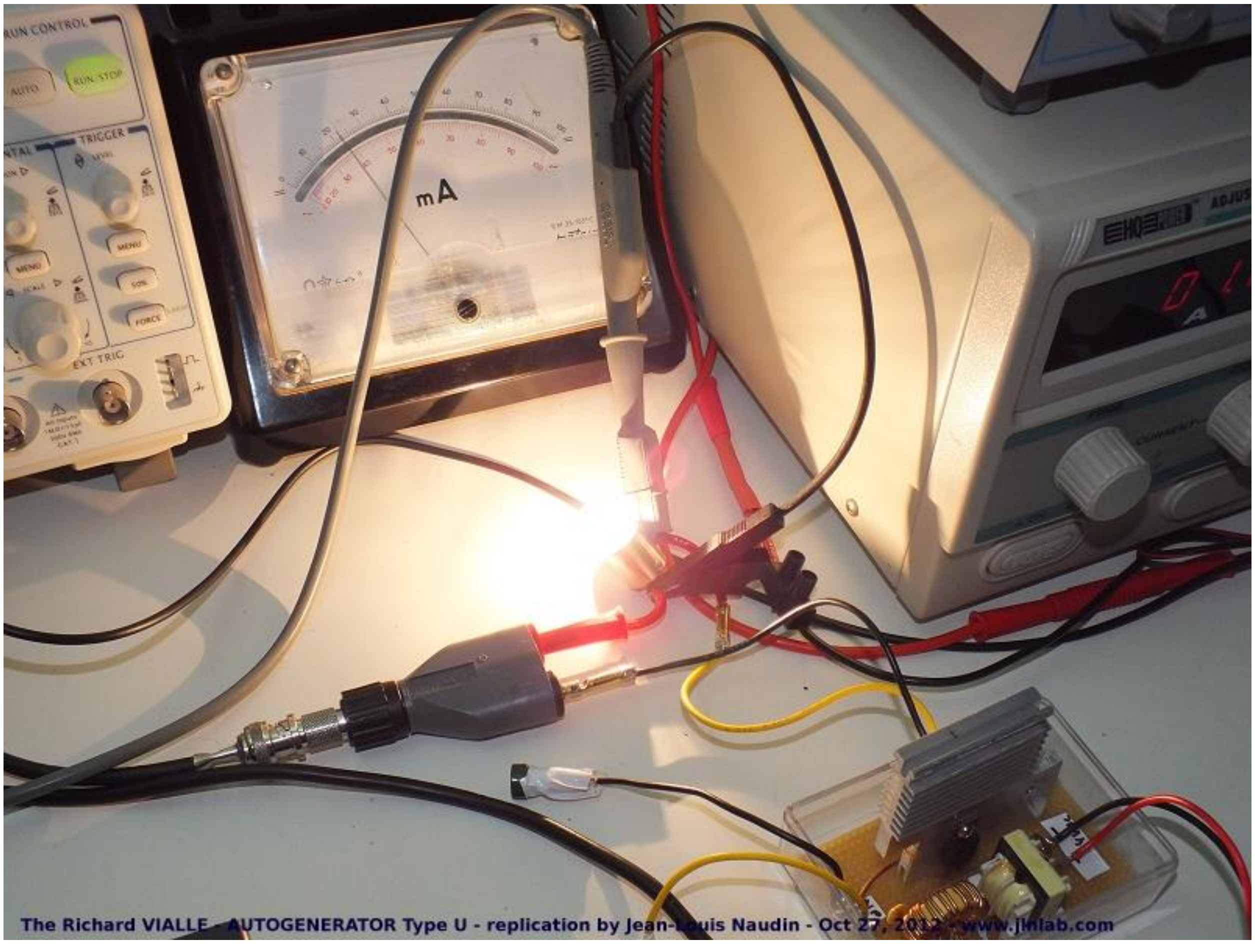
Here are the DIRECT and REFLECTED HF power measurements made with the KW520 Watt / SWR meter connected to the input of the autogenerator.

DIRECT HF power is 10 Watts, and REFLECTED HF power is 5 Watts.

The useful HF power injected into the U-shaped Autogenerator is therefore 5 Watts. The RMS voltage across the charging lamp with the Fluke 123 True RMS oscilloscope is 10.6 Vrms. This gives an equivalent power (continuously) produced of 6.5 Watts.

For the measurement of the voltage at the terminals of the charging lamp, it is imperative to use a floating oscilloscope (ungrounded).

It is for this reason that I used the Fluke 123 oscilloscope powered with its internal batteries.



The Fluke 123 oscilloscope probe which measures the RMS voltage at the terminals of the lamp is connected as closely as possible, i.e., on the base of the bulb so as to minimize the parasitic leakage inductance (which risks falsifying the measurement).

To summarize, here are the I/O power measurements performed on this Auto-Oscillator generator V6.0:

1. It's self-synchronous operating frequency with my U-shaped Autogenerator is 3.6 MHz,

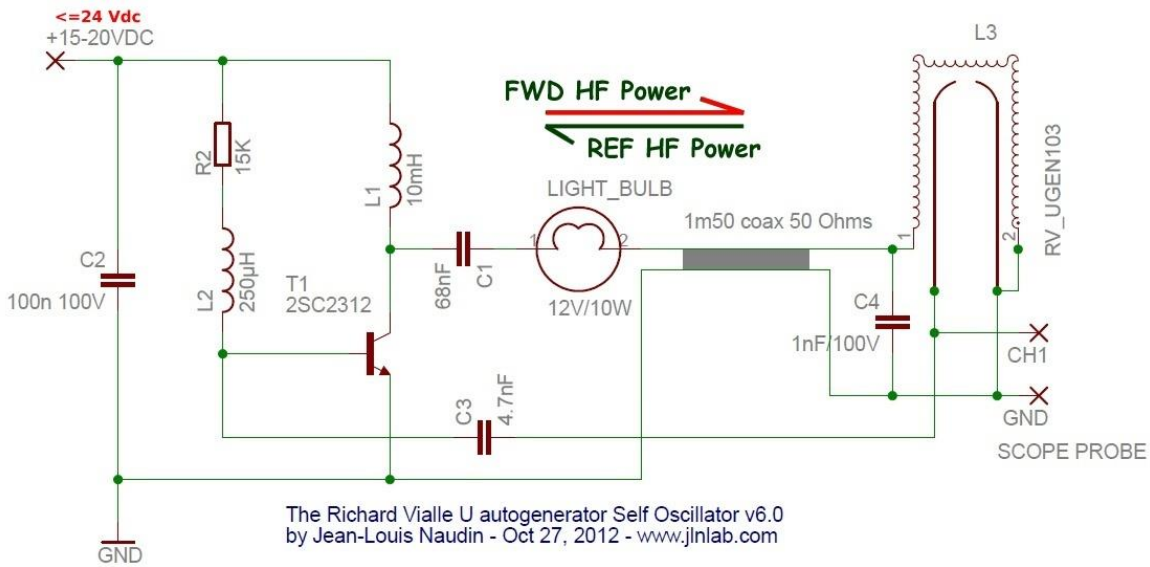
2. The Auto-oscillator consumes 25.7 Watts = 25 V x 1.12 A,

3. The direct HF power at the input of the coil of the U-shaped autogenerator is 10 Watts of which 5 Watts are reflected,

4. The HF power actually consumed by the U-shaped autogenerator is 10 W – 5 W = 5 Watts,

5. The power of the lamp is 6.5 Watts or 65% of its nominal power (10W).

Here is the schematic of my Auto-Oscillator generator V6.0. As you can see, it uses exactly the same schematic as the HF Amplifier V5.2 using the 2SC2312 transistor. Only the external connection is different in order to put it in a self-synchronous loop on itself.



Important comments on the diagram: It is very important to use the coaxial cable of 1 meter at 50 Ohms. It allows us to adjust the SWR (Standing Wave Ratio or SWR) of the assembly to its operating frequency of 3.6 MHz and thus obtain optimum performance. For the first few tests, I recommend that you start with a low supply voltage (around 10V), then gradually increase. The lamp should light up without any problem at around 15V and reach its optimum brightness around 22-23 V. Never exceed 24 V, otherwise the 2SC2312 transistor will burn out. If the oscillator does not start, the 50 Ohm cable is not the right length; try 50cm, 1m, and 1.50m.

You will also notice that the voltage of the DC power supply can have a value greater than its rest value (oscillator stopped). This means that part of the reflected energy (negative power of the autogenerator) returns to the DC power supply; it is not an artifact, and you can check it with a simple needle voltmeter connected to the DC power supply.

Good experiments and explorations.

Here is the demonstration video of the Auto-Oscillator Generator in Action with the U-shaped Autogenerator:

https://youtu.be/OU9SVJxMkKU

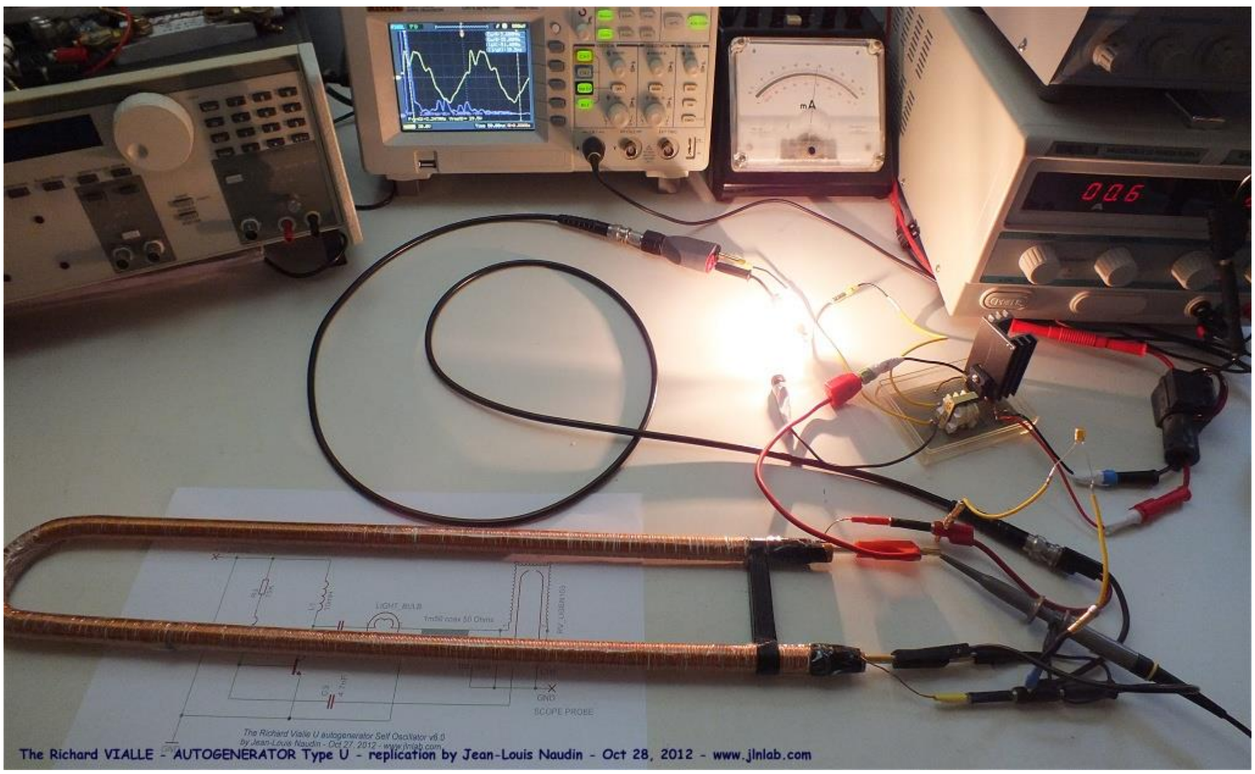
Here is the video on the I/O power measurement with the Generator Auto-Oscillator connected to the U-shaped autogenerator:

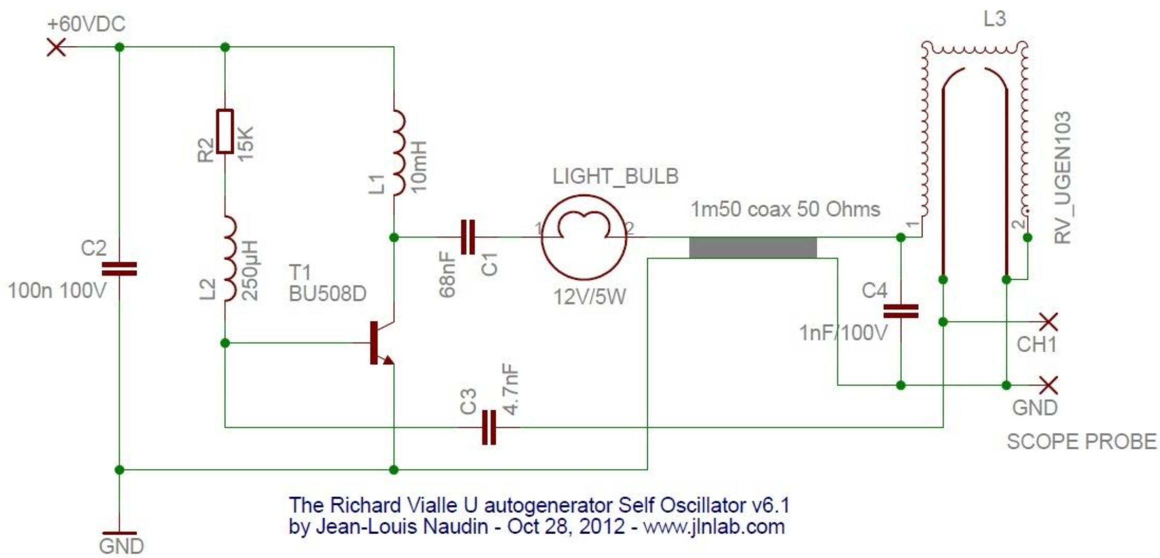
https://youtu.be/cz8kArhIHg0

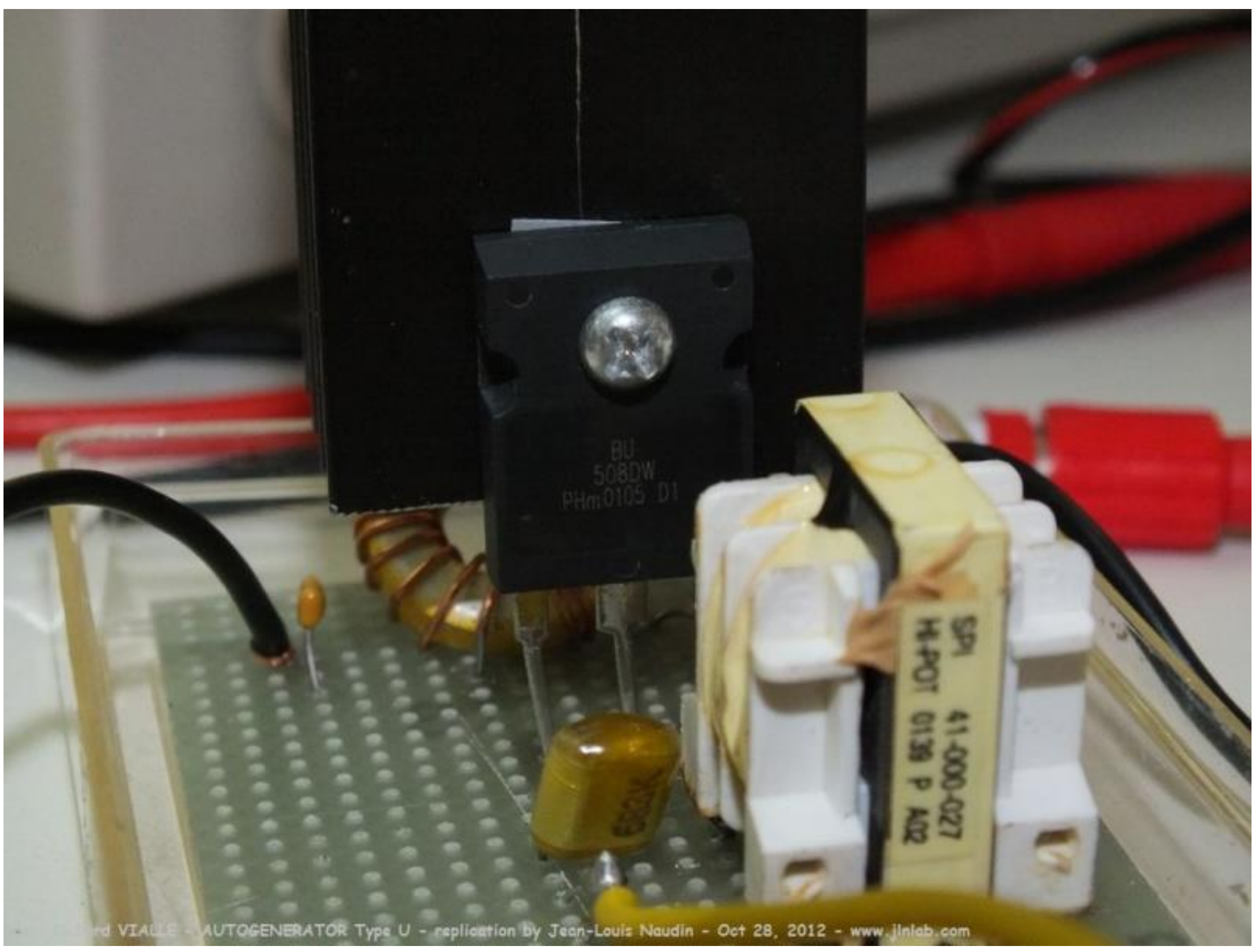
Additional Notes from Oct 28, 2012:

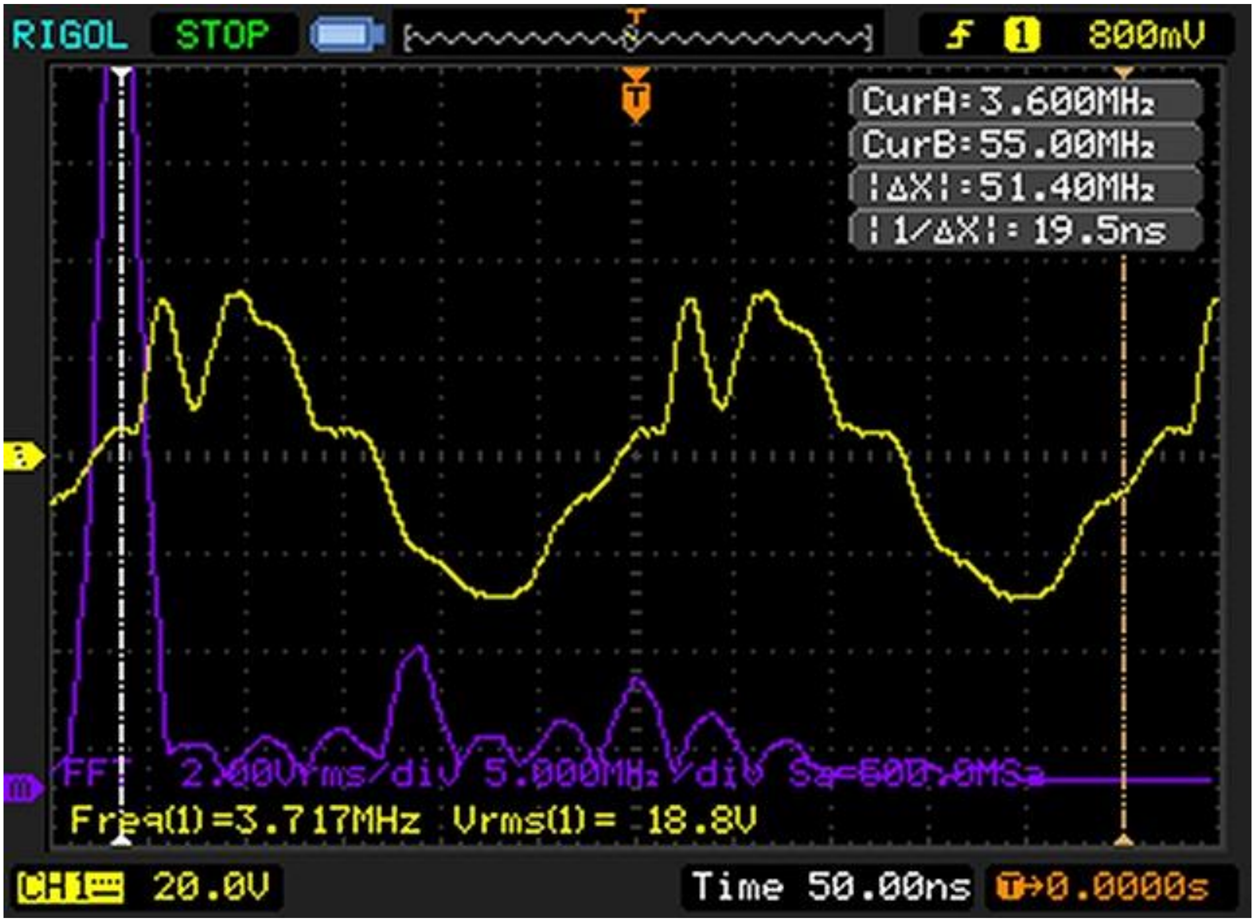
Here are some variations of the HPSO (High Power Self Oscillator):

A variant of HPSO (v6.1) which works with a BU508D transistor is significantly more robust than the 2SC2312 or 2SC1969. This version requires 60 VDC and only supplies a 5W 12V lamp unlike the 2SC version which supplies a 10W 12V lamp. On the other hand, the BU508D supports a Vceo voltage of 700V and Vces of 1500V, so it is more robust and less prone to breakdown following an overvoltage as is the case with the 2SC2312 or 2SC1969. It allows you to make adjustments and focus without too much risk before going to the final assembly with the 2SC.

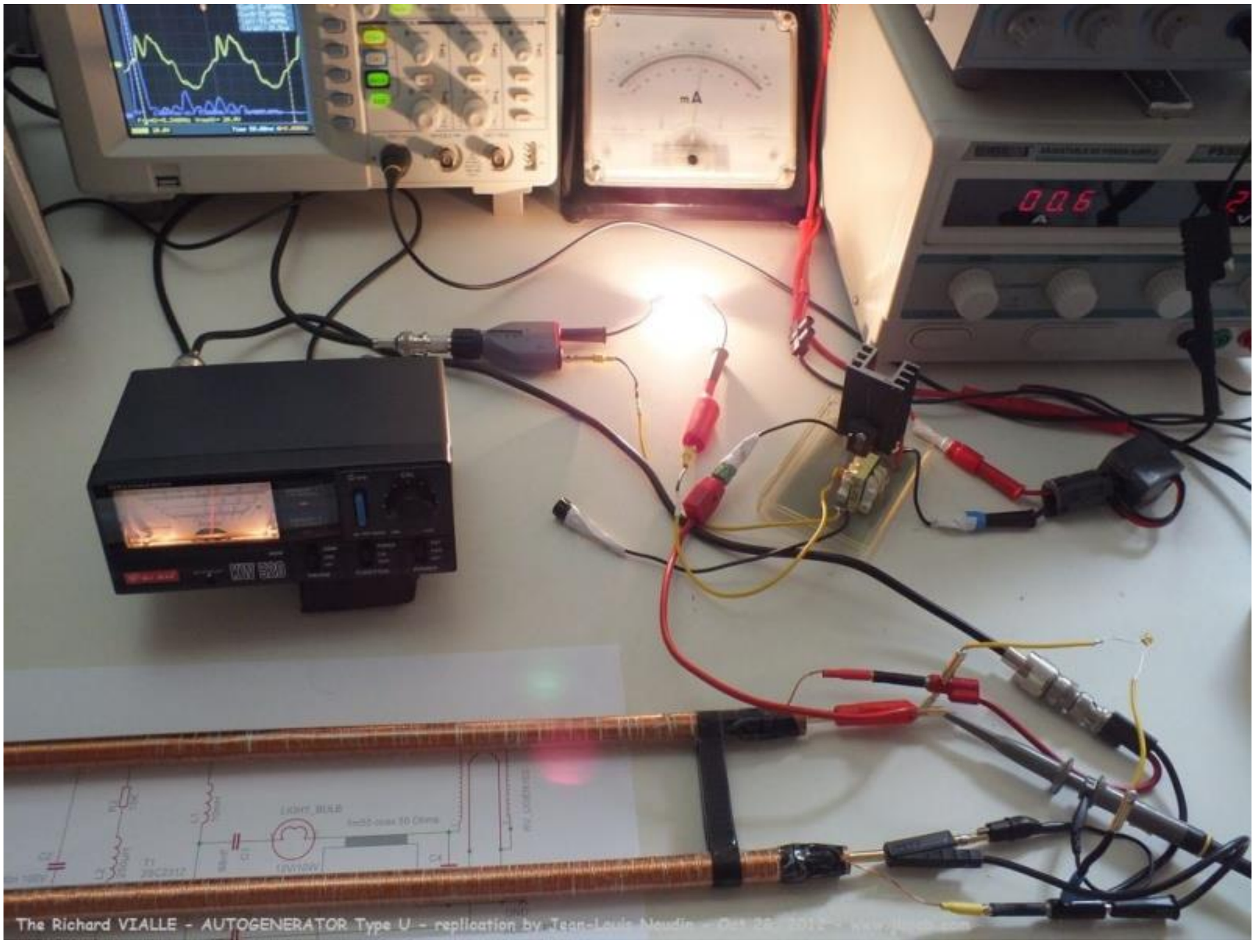



+60VDC
R2
15K
L1
10mH
LIGHT_BULB
1m50 coax 50 Ohms
L3
RV_UGEN103
C2
100n 100V
L2
250µH
T1
BU508D
68nF
C1
12V/5W
C4
1nF/100V
CH1
GND
C3
4.7nF
SCOPE PROBE
GND
The Richard Vialle U autogenerator Self Oscillator v6.1
by Jean-Louis Naudin - Oct 28, 2012 - www.jlnlab.com


BU
508DW
PHm0105 D1
SPI 41-000-027
HI-POT 0136 P A02
rd VIALLE - AUTOGENERATOR Type U - replication by Jean-Louis Naudin - Oct 28, 2012 - www.jlnlab.com

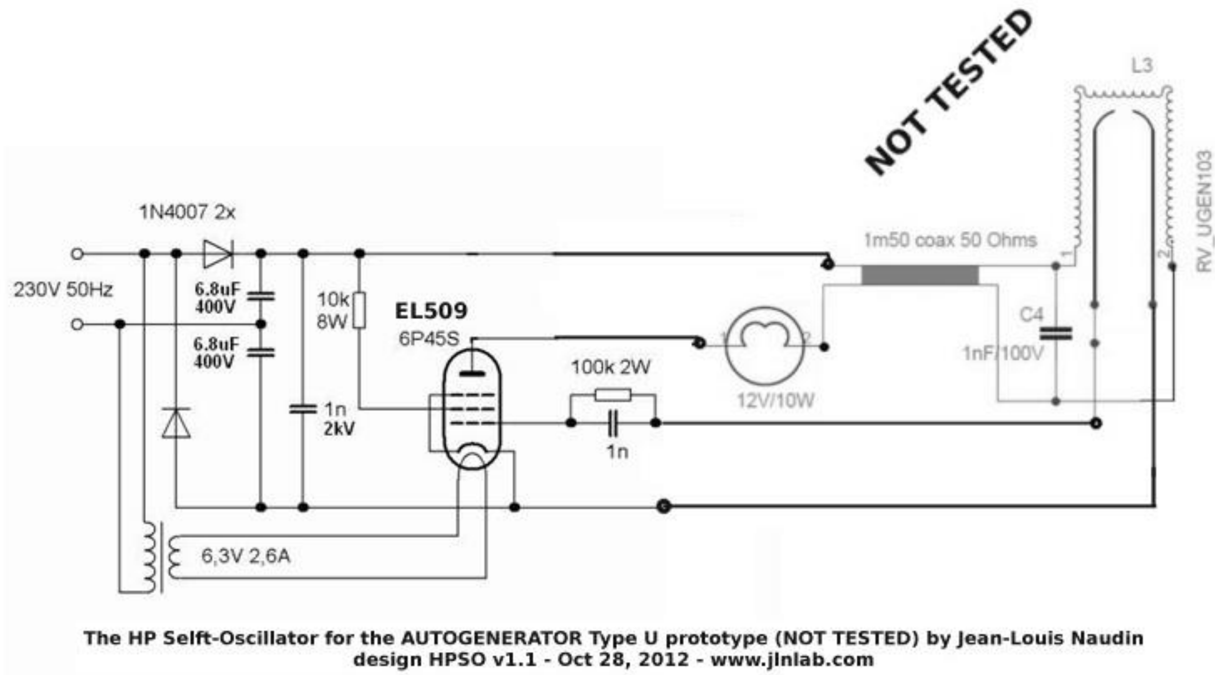


This version is auto-synchronized on the maximum energy peak at the frequency of 3.6 MHz.

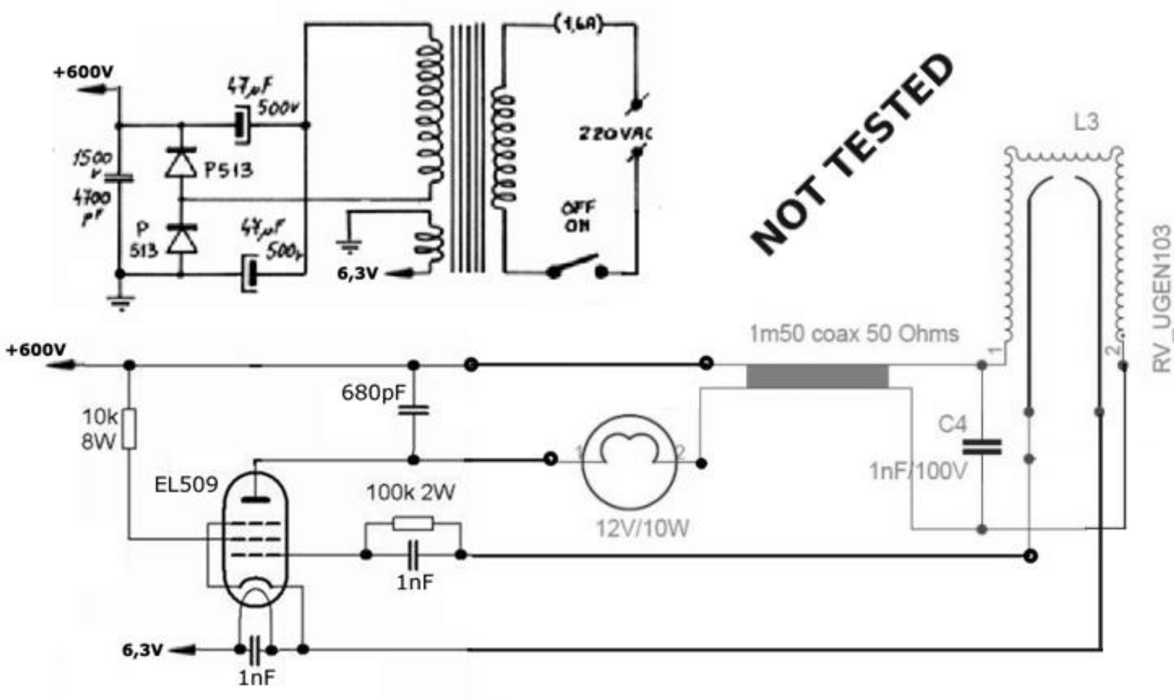


Here are two other variants using vacuum tubes (type EL509) that I have not yet tested. We could achieve even more output power.

Warning!!! In these last 2 variants, there is presence of High Voltage; it is imperative to handle it with extreme caution. Always disconnect the assembly from the mains before any manipulation.



The HP Selft-Oscillator for the AUTOGENERATOR Type U prototype (NOT TESTED) by Jean-Louis Naudin
design HPSO v1.1 - Oct 28, 2012 - www.jlnlab.com



The HP Selft-Oscillator for the AUTOGENERATOR Type U prototype (NOT TESTED) by Jean-Louis Naudin
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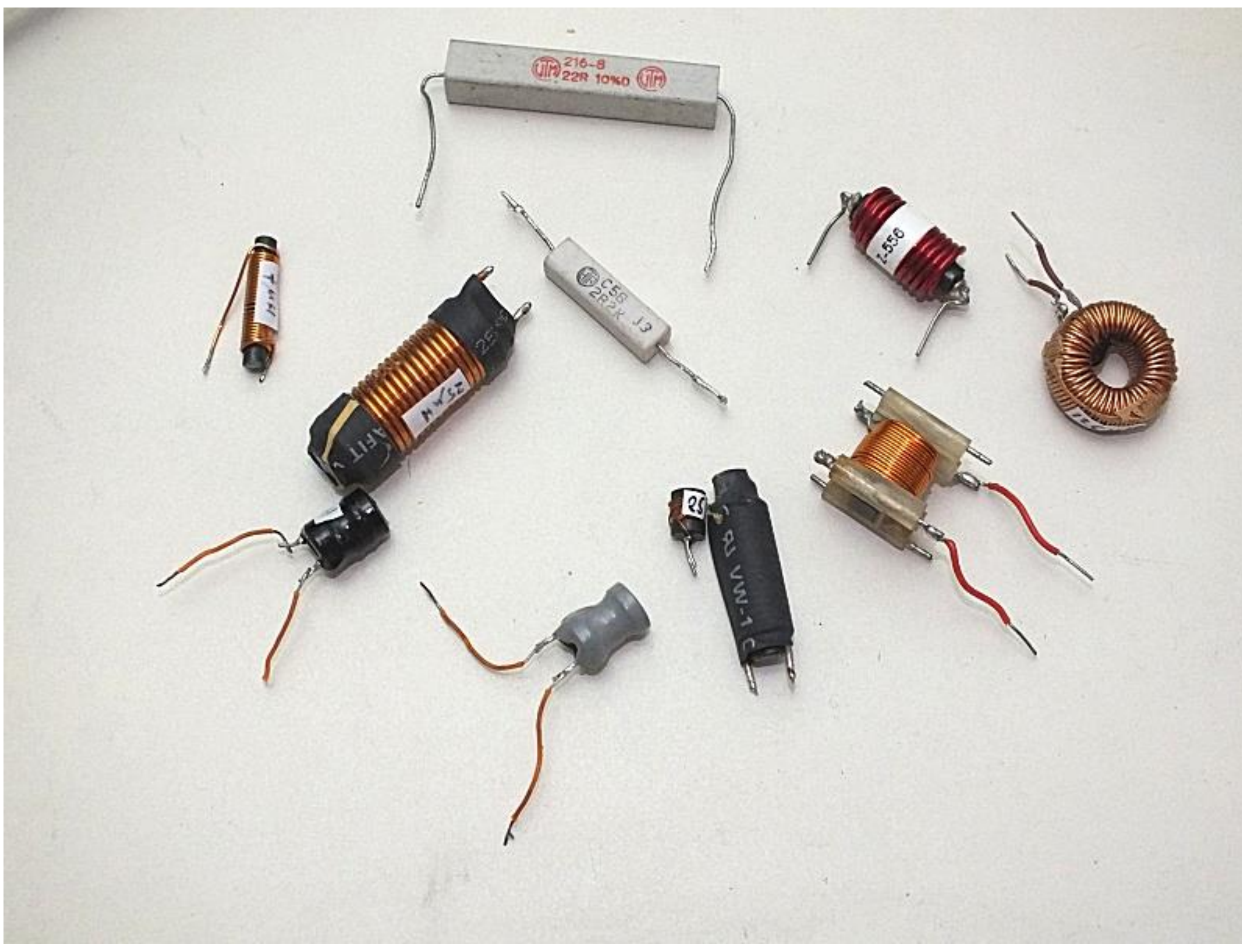
Chapter 26

A Simple and Very Practical Method of Inductance Measurement Without an Inductance Meter

You do not all have at home a high-end inductance meter (or even a simple inductance meter) to measure low inductance values (from a few tens of µH to a few hundred µH). Most mid-range inductance meters on the market have a measurement range that goes from a few tens of µH to a few Henrys. Here, as part of this series of experiments on the Richard Vialle Autogenerator, we use low value inductors (a few tens of µH to a few hundred µH) and moreover we need to use NON-INDUCTIVE RESISTORS to perform a reliable measurement of the RMS power at the output of the Autogenerator.

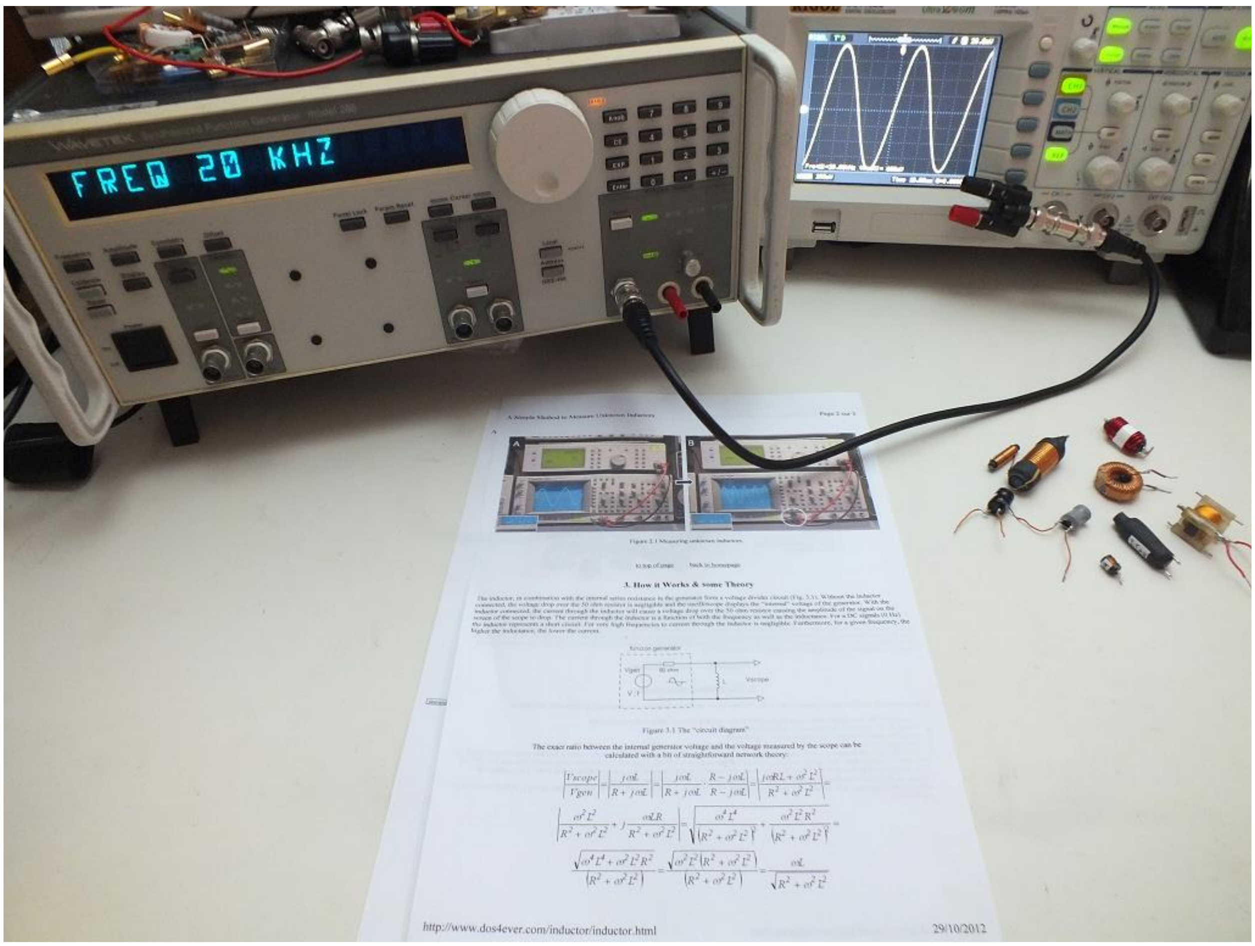


I discovered on the Internet an excellent, very reliable, and precise method to measure inductances (without an inductance meter) and also to unmask any inductive resistances. This method was written by Ronald Dekker in "A Simple Method to Measure Unknown Inductors." I have applied this method myself, and I find it really simple and very practical, and therefore I share it with you with some personal comments:

To know the value of an unknown inductance, you do not need an inductance meter but simply:

1. An oscilloscope,

2. An HF generator capable of supplying between 20 KHz and a few MHz SINUSOIDAL at 1 Vp-p (1 volt peak to peak) on a 50 Ohms output.

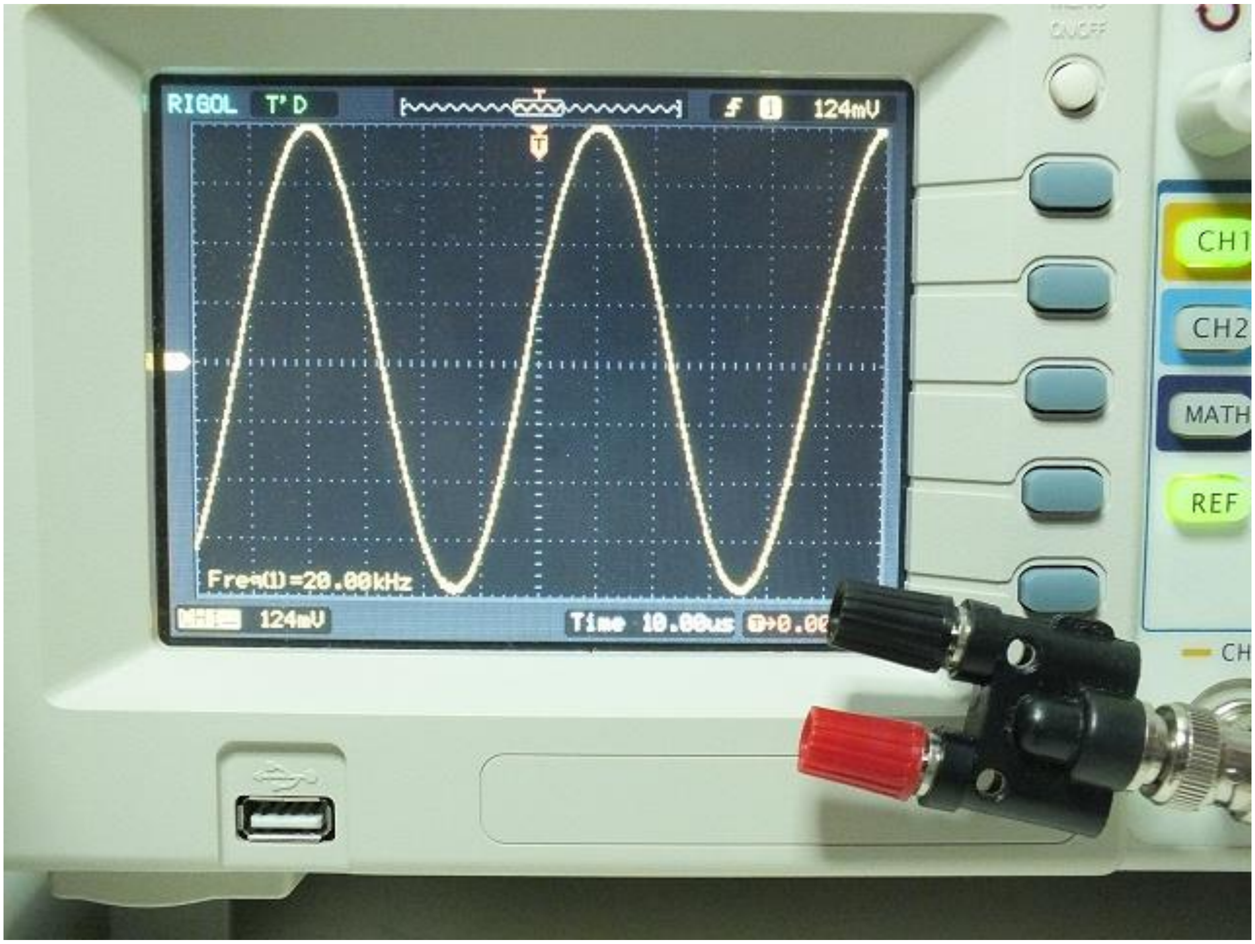


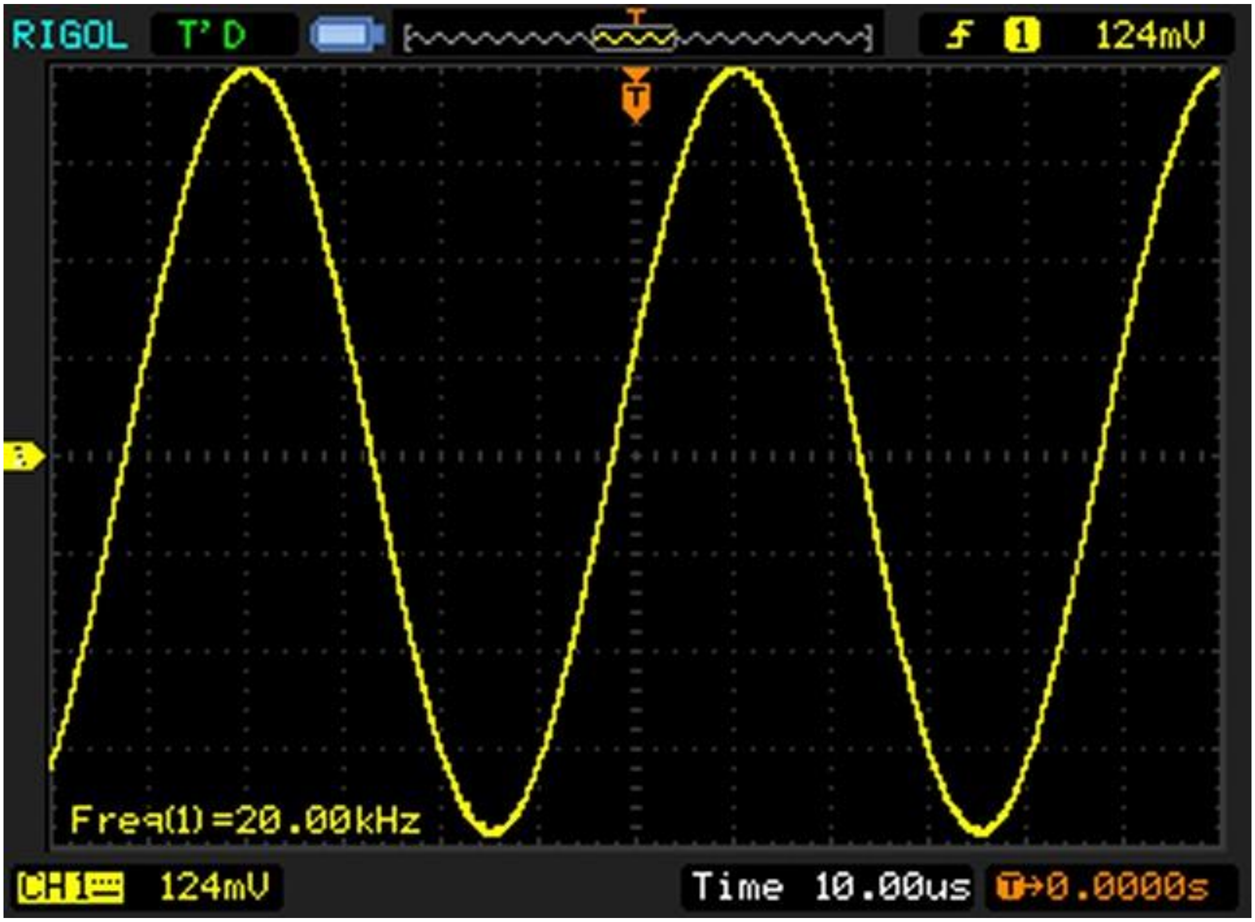
Here's how to do it:

1. Connect the 50 Ohms output of the function generator directly in parallel to the Channel 1 input of the oscilloscope.

2. Program the function generator for 20 KHz, 1 Vp-p, Sinusoidal.

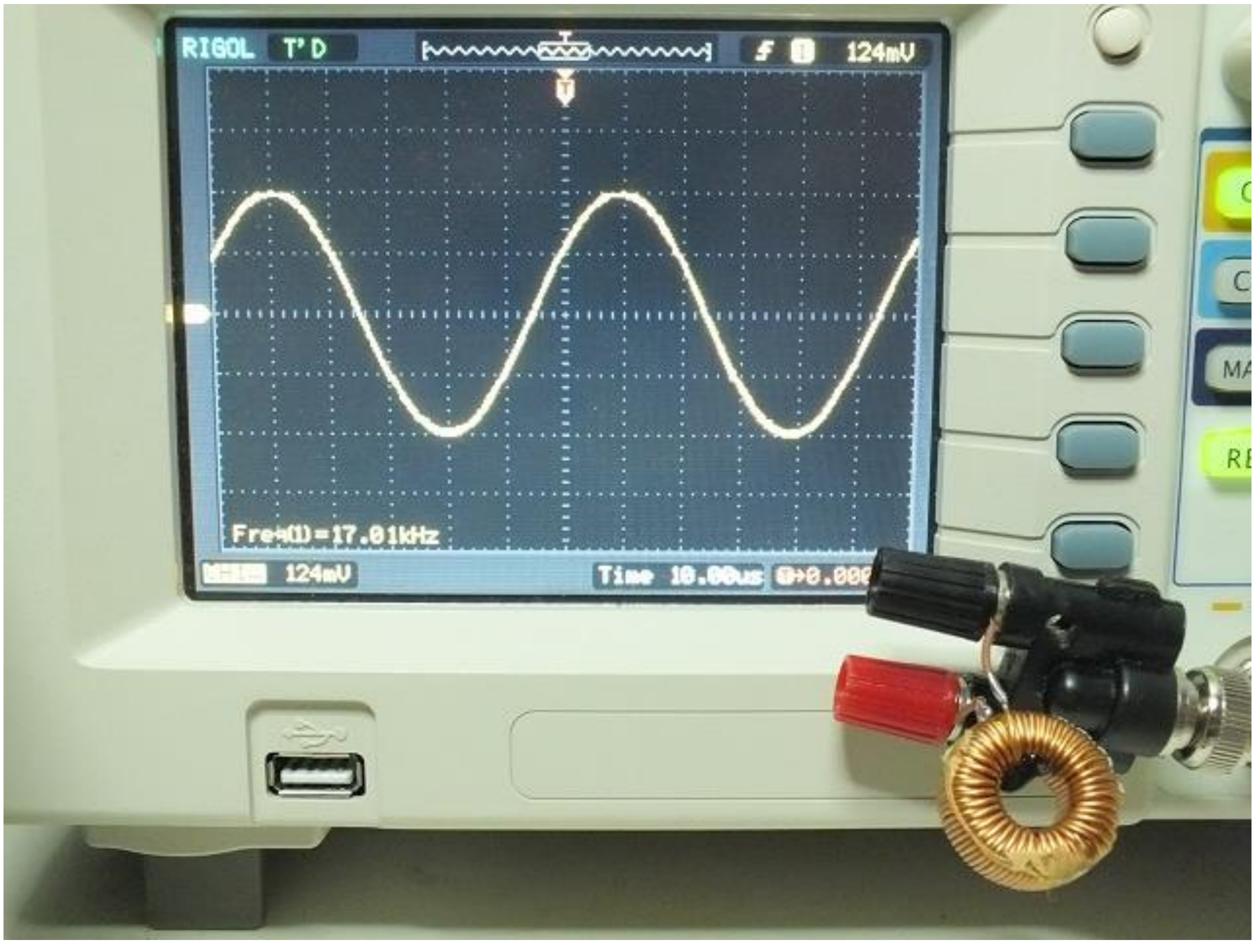
3. Adjust the scale of Channel 1 of the oscilloscope so as to obtain a sine wave covering the entire height of the screen; here it is +/- 4 squares.

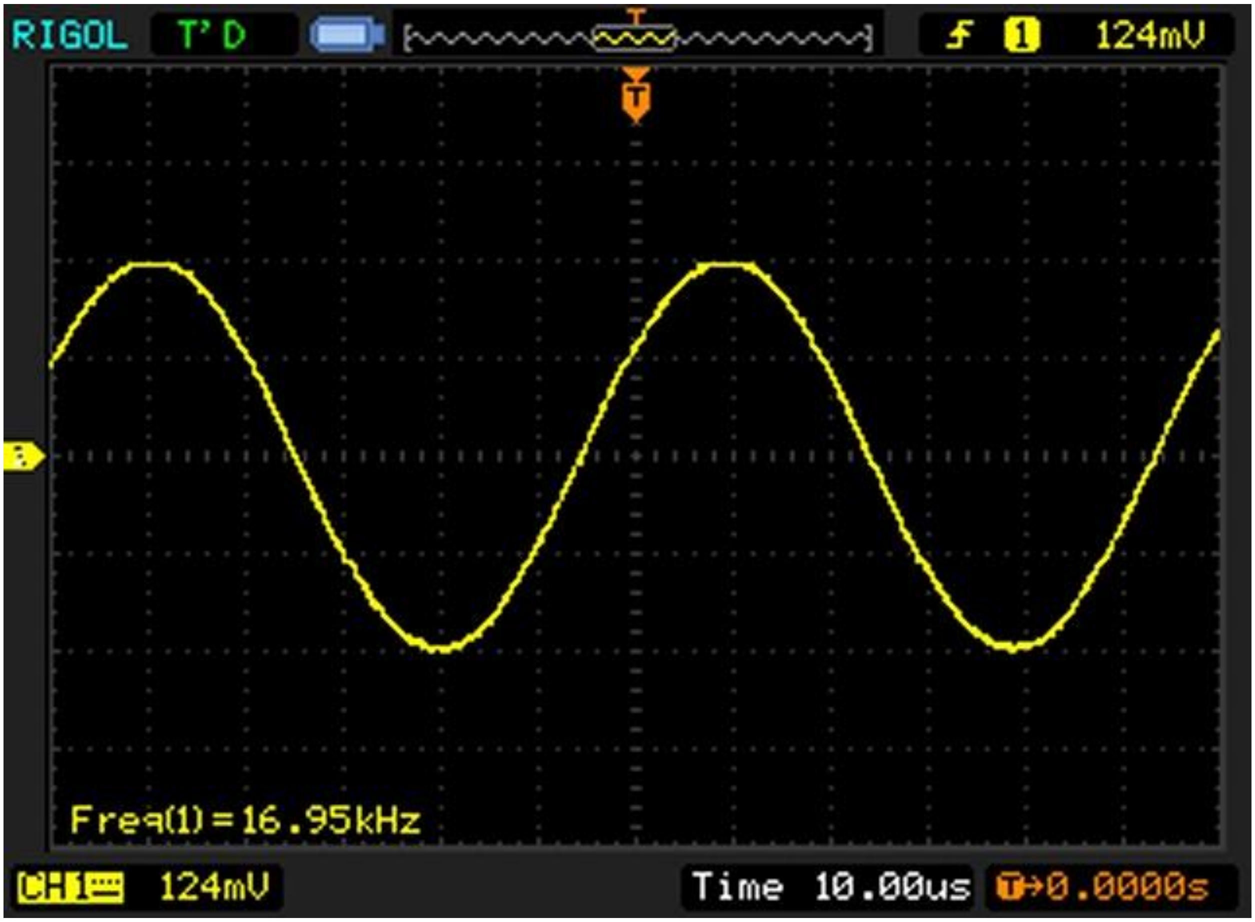




4. Connect the inductor whose value you want to know across the oscilloscope; use the shortest possible connection. The signal will decrease since the inductor is connected in parallel on Channel 1.

5. Then increase or decrease the frequency of the function generator so as to obtain 50% of the amplitude of the initial signal (in step 3). Here it is +/- 2 squares.


RIGOL T'D
124mV
Freq(1)=17.01kHz
124mV
Time 10.00us



Note the frequency; in our example it is 17 KHz.

6. The value of the inductance is calculated according to the formula of Ronald Dekker:

L = 4570 / f

f is the frequency in KHz and L is the inductance in µH

In our example, the inductance is therefore L = 4750/17 = 279 µH

For the demonstration of Ronald Dekker's formula, please see his document "A Simple Method to Measure Unknown Inductors."

Below I applied this method (without the calculation) to test and unmask a ceramic resistor that was sold to me as Non-Inductive .

To check if the tested resistance is inductive or not, I programmed the function generator in SWEEP mode from 20KHz to 5MHz:

A non-inductive resistance will give a constant amplitude signal while an inductive resistance will give a signal that will increase with frequency.

This video shows the difference between a non-inductive resistor (like the one I used lately) and a resistor that is inductive in the HF range.

https://youtu.be/eAA1WYzg21c

Good experiences.