

Das US-Patentbüro hat zwei neue Patente unserer canadischen Partnerfirma **Focus Microwaves Inc.** zugelassen. Patentiert wurden der *Low Frequency Harmonic Load Pull Tuner* und der *Low Frequency Electro-Mechanical Impedance Tuner*!

### [New patent issued to Focus Microwaves](#)

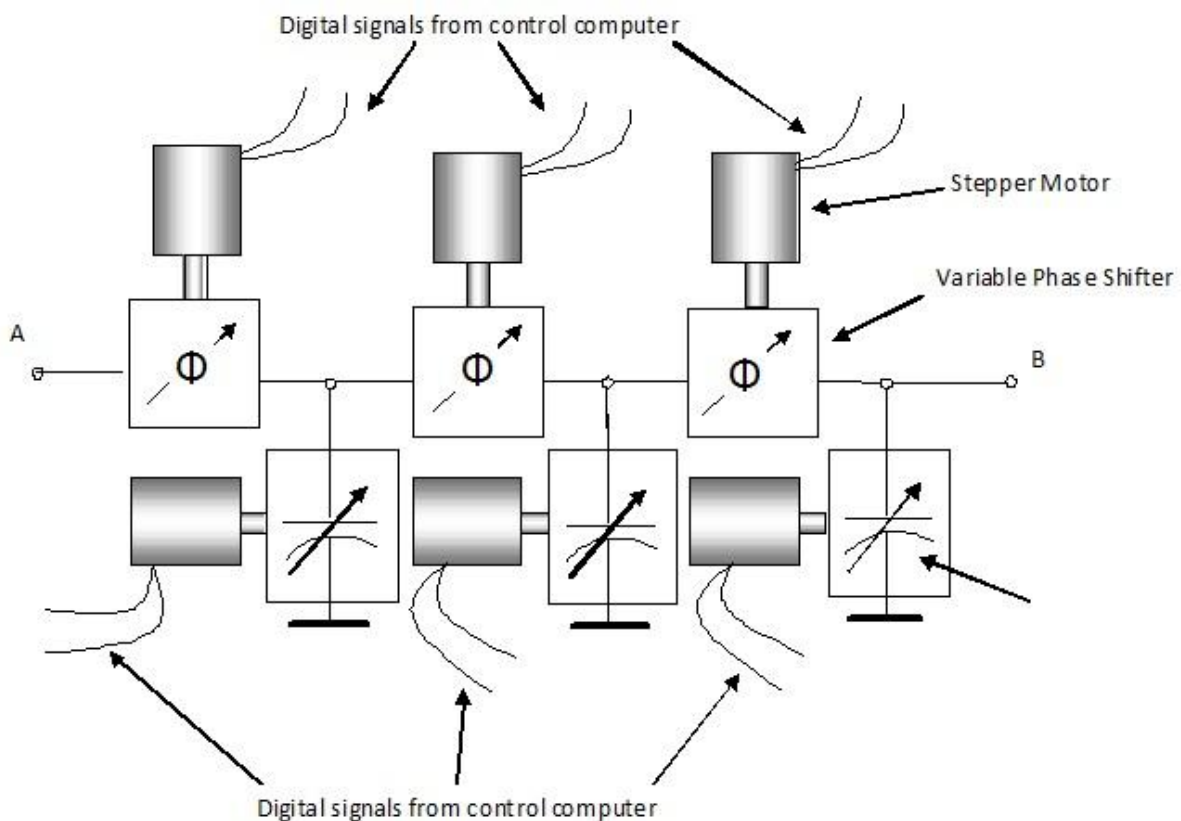
#### **LOW FREQUENCY HARMONIC LOAD PULL TUNER AND METHOD**

Inventor: Christos Tsironis

Validity date (Filing): 22 December 2006

##### Abstract:

An electro-mechanical harmonic load pull tuner uses three variable and adjustable shunt air capacitors and three variable and adjustable series phase shifters and creates independently controllable impedances at three harmonic frequencies in frequency ranges between below 20 and up to 250 MHz. Independent harmonic tuning is possible because the combination of adjustable shunt capacitors and series phase shifters allows generating more than  $10^{19}$  impedance states at each frequency covering the entire Smith chart; appropriate impedance-search Error Function-based optimization algorithms allow fast harmonic tuning for impedance tuning and matching the output of RF transistors and amplifiers at the fundamental and harmonic frequencies. Stepper motors, drivers and control software are used to automate, calibrate and use the harmonic tuner in an automated harmonic load pull measuring setup.



### [New patent issued to Focus Microwaves](#)

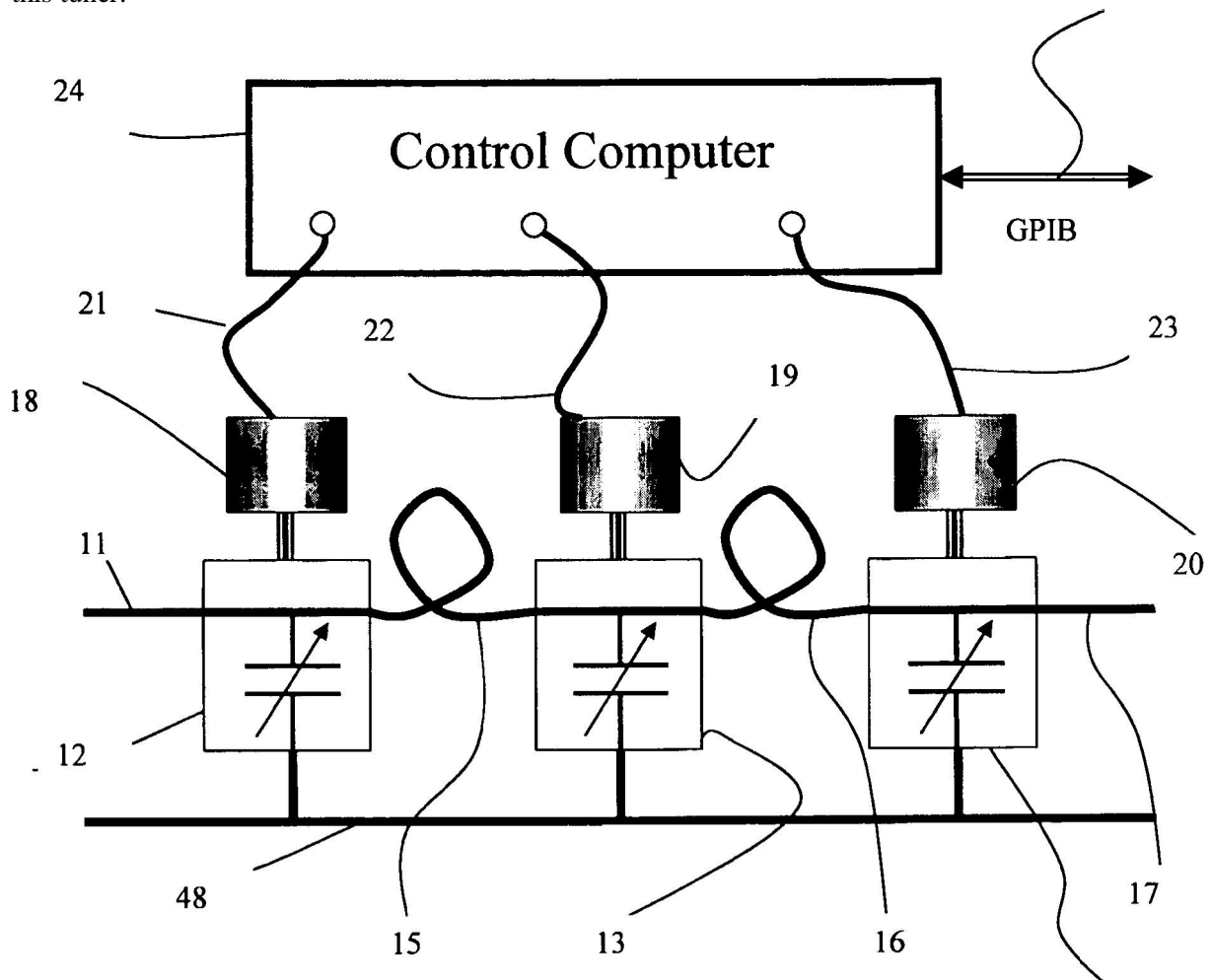
#### **LOW FREQUENCY ELECTRO-MECHANICAL IMPEDANCE TUNER**

Inventor: Christos Tsironis

Validity date (Filing): 14 June 2005

Abstract:

A segmented, electro-mechanical, remotely controlled programmable impedance tuner for the frequency range between below 10 and above 200 MHz uses a cascade of three or more continuously variable mechanical capacitors interconnected by a set of two or more low loss flexible or semi-rigid cables; the electrical length of the interconnecting cables determines the frequency ranges at which tuning coverage of the entire area of the Smith chart is optimum; for maximum impedance coverage the length is to be chosen such as to generate a transmission phase shift of approximately 60 degrees at the center frequency between each capacitor stage. Remote tuning is possible by changing the value of the capacitors using electrical stepper motors. The tuner is calibrated using a vector network analyzer and appropriate "de-embedding" algorithms and the data are saved in the memory of the control computer, which then allows tuning to any user defined impedance within the tuning range. Reflection factor values between 0 and 0.99 can be obtained using this tuner.



Weitere News, Datenblätter und Application Notes sind abrufbar unter: [www.focus-microwaves.com](http://www.focus-microwaves.com)

Für Rückfragen, ob technisch oder kaufmännisch rufen Sie uns bitte unter +49 7309/9676-0 an oder senden Sie eine email an [Achim@tssd.com](mailto:Achim@tssd.com)!

Wir unterstützen Sie gerne mit fachlicher Beratung! Tuner und passende Messinstrumente (von Agilent und R&S) sind ebenfalls vorhanden!

Wir freuen uns von Ihnen zu hören und verbleiben

mit freundlichen Grüßen

Elke Schwarzer

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