

[Request Information](#)

[Permalink](#)

## CMOS Linear Differential Distributed Amplifier and Distributed Active Balun

Tech ID: 21589 / UC Case 2011-218-0

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,742,851	06/03/2014	2011-218

### BRIEF DESCRIPTION

The technology is a distributed amplifier (and distributed balun) that can be used in broadband communication links. It features a two-stage transconductance stage with single input and dual-output. With this technology, users will see improved overall gain without degrading bandwidth, improving the overall gain-bandwidth product.

### FULL DESCRIPTION

The invention is a distributed amplifier (as well as a distributed balun) that can be used in broadband wireless/wired communication links. A novel transconductance (gm) stage is used as the gain stage, with the distributed architecture that is capable of improving voltage gain and linearity without degrading bandwidth, power consumption, and physical area. The gm stage includes one input and two output terminals, which leads to two input/output signal paths. It also includes a parallel-RL bandwidth compensation circuit that prevents bandwidth degradation without affecting gain and power consumption.

Distributed amplifiers (DAs) are extensively used for amplification of broadband wired/wireless signals. Techniques have been proposed to improve DA performance by altering parameters such as gain, bandwidth and power. One method to improve voltage gain in DAs is to use a multi-stage transconductance (gm) stage. Previous implementations of this method involve using only the output of the last gm stage as an output. In this invention, UCI researchers have altered the gm stage such that the output nodes of all stages in the gm cell are connected, improving the overall voltage gain without degrading bandwidth or sacrificing power.

### SUGGESTED USES

Broadband wireless/wired transceiver design, multi-purpose broadband test/measurement equipment.

### ADVANTAGES

Improves overall voltage gain and linearity without degrading bandwidth, power consumption, or sacrificing chip area.

### CONTACT

Ben Chu  
ben.chu@uci.edu  
tel: .



### INVENTORS

- » Heydari, Payam
- » Jahanian, Amin

### OTHER INFORMATION

### KEYWORDS

CMOS, amplifier, balun, broadband, wireless communication, wired communication

### CATEGORIZED AS

- » **Communications**
  - » Internet
  - » Networking
  - » Wireless
- » **Computer**
  - » Hardware

## PUBLICATIONS

Amin Jahanian, Payam Heydari, "A CMOS 818-GHz GBW Differential Distributed Amplifier with Distributed Active Input Balun," IEEE RFIC Symposium, June 2011.

Amin Jahanian and Payam Heydari, "A CMOS Distributed Amplifier with Distributed Active Input Balun Using GBW and Linearity Enhancing Techniques," IEEE Trans. on Microwave Theory and Techniques, vol. 60, no. 5, pp. 1331-1341, May 2012. [IEEE T-MTT Special Issue of RFIC Symp. 2011]

## LEAD INVENTOR

### Payam Heydari

Department of Mechanical and Aerospace Engineering  
Henry Samueli School of Engineering  
University of California, Irvine

<http://www.ece.uci.edu/~payam/>

» Security

» Software

» **Engineering**

» Engineering

» **Security and Defense**

» Cyber security

» **Semiconductors**

» Design and  
Fabrication

» **Sensors &  
Instrumentation**

» Process Control

» Scientific/Research

## RELATED CASES

2011-218-0

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Signal Statistics Compression-Based Quantization Method in an ADC
- ▶ Phased-Locked Loop Coupled Array for Phased Array Applications

**UCI** Beall  
Applied Innovation

5270 California Avenue / Irvine, CA  
92697-7700 / Tel: 949.824.2683



© 2011 - 2015, The Regents of the University of  
California  
Terms of use  
Privacy Notice