

## IMS2010 Student Contest Announcement: ASH Receiver

MTT-16 and MTT-2 are pleased to announce the first Student ASH Receiver Design Competition, which will take place at IMS2010 in Anaheim, CA. This Competition is open to all students and graduate students registered at an educational establishment. The competitors are required to design, construct, and measure an Amplifier-Sequenced Hybrid Receiver (ASH receiver) at a frequency of 433.92 MHz. The winner will be judged on the design which demonstrates the lowest power consumption while providing the highest sensitivity. The ASH receivers must be brought to IMS2010 where they will be tested to verify their performance. A representative of the design group must be present at the testing to assist with the evaluation. The winner will receive a prize of US\$1,000 and will be invited to submit a paper describing the design and the experience for IEEE Microwave Magazine. Questions can be sent to Mr. Stefan Zorn at [zorn@lfte.de](mailto:zorn@lfte.de) or to Mr. Benjamin Laemmle at [laemmle@lfte.de](mailto:laemmle@lfte.de). Support for the testing is provided by Rohde & Schwarz GmbH.

ASH receiver competition rules:

- The receiver design may use any type of technology, but must be based on the ASH receiver architecture first published by Darrell L. Ash (see figure 1). The receiver should not include any kind of digital signal reconstruction circuit and should have a conversion gain of at least 60 dB to ensure proper measurement of receiver parameters.
- The receiver must be the result of student effort both in the receiver design and fabrication.
- The receiver mechanical design should allow for internal inspection of all relevant components and circuit elements. The RF ports should be standard 50Ω SMA connectors. DC connections should be banana plugs.
- Further specifications:

Characteristic		Unit
Center Frequency	433.92	MHz
Modulation	Binary ASK	
Data rate	115.2	kbps
Supply Voltage	1.5 – 12	V

- The SAW components are provided by EPCOS AG and will be sent to the participants after a short check of their intended design. Data sheets and S-Parameters of the components are available upon request.
- Receiver entries should be submitted with measured data, including dc supply requirements, conversion gain, and sensitivity (alternatively noise figure).
- The sensitivity will be defined by the minimum input signal level which results in a bit error rate (BER) of  $10^{-3}$ .
- A Figure of Merit will be defined by:  
$$FOM = 20 \log(\text{Power Consumption}) + \text{Sensitivity}$$
- Measurement signal will be a random ASK modulated signal with the specified parameters at room temperature.
- The winner will be based on the successful reception of an ASK modulated signal with an adjacent strong interferer and the minimum FOM measured during official testing. Award

certificates will be presented to all participants at the Student Awards Luncheon. The decision of the judges will be final.

Contestants must notify the MTT-16 committee by emailing to Mr. Stefan Zorn at [zorn@lfe.de](mailto:zorn@lfe.de) or to Mr. Benjamin Laemmle at [laemmle@lfe.de](mailto:laemmle@lfe.de) of their intention to compete in the contest before 15 April 2010. This notification should include information on the university or educational affiliation of the entry, the faculty advisor and a short abstract about the intended design.

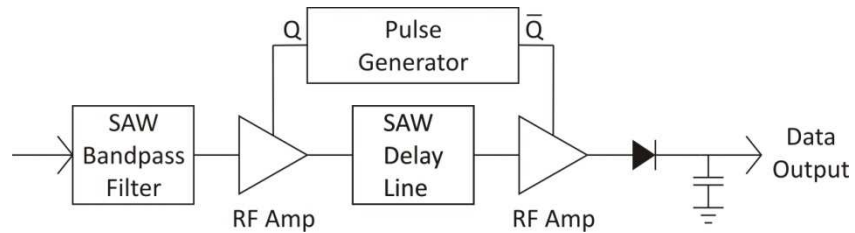


Figure 1: ASH Receiver Topology