DAC and ADC System for Wideband MIMO OFDM Wireless Communication Systems

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In our project, we produced the MIMO OFDM wireless channel analyzer. Finally, we finished a system which mainly performed a function after data was received. So, DAC and ADC are directly connected each others. The data coming out from the ADC will be transmitted to SRAM for temporary store, and then moved into a SD card through a SPI data transfer interface. The whole system is controlled by AVR microprocessors.

Wireless communication became more and more popular nowadays. Different advanced wireless communication such as 4G systems, promises to significantly improve the data rates of their predecessors. There are many technologies to improve wireless communication.

- Multiple input multiple output (MIMO) which can increase the throughput of the whole system
- Orthogonal frequency-division multiplexing (OFDM) which can make the efficiency higher
Our project could not achieve as our initial target. The first reason:
- The ADC is slower than our expectation (maximum speed: 1MHz).
- We could not find a faster ADC in a common way.
- Fast ADC is not common used in the market.

The second reason:
- The test result of the speed of SD card was much lower than the ideal speed (100Mbyte / second)
- Different SPI interface (software/hardware) would affect the speed.
- Coding

Further Work
- FAT format can be implemented.
- USB can be added to communication with computer.
  Computer can read the data though USB interface in SD card directly.
- We can buy a higher speed DAC, ADC and SRAM. That can improve our performance significantly.