

FZ1604 ABSTRACT

Freescale Wireless Design Challenge Entry FZ1604 Abstract

If you're actively involved in boxing or are acquainted with it from television or the movies, then it is easy to see what a great sport it is for improving one's self-confidence and fitness level. The only potential problem with it is that, if you get in the ring with an opponent, you can get hurt (even by accident). You can work out by yourself and 'shadow-box' in front of the mirror but that can be so one-sided and boring! How much fun is that? Wouldn't it be great if we could change that and add some *virtual* excitement and motivation to our workouts?

This project is a real-time interactive virtual boxing system. Incorporating high-quality digitized audio and speech feedback, it simulates a bout with an imaginary opponent while providing audio motivational cues and other helpful feedback. The accelerometer output that is used to gauge the motion of each fist is wirelessly transmitted to the main MCU board. This, in turn, monitors the 'strikes', time remaining and - generally - the user's performance during the workout.

It is designed to be very user-friendly and offers three different skill level settings, with bouts ranging from three to six rounds.

The digitized audio is via Winbond's ISD2500 series of CHIPCORDER ICs. The 2560 has been chosen, giving us the highest quality sample rate. It has a built-in amplifier and holds a full minute's worth of audio messages. It is used in MESSAGE CUEING with CONSECUTIVE ADDRESSING OPERATIONAL MODE, thus utilizing only 4 MCU IO pins.

On powerup, the ISD2560 is placed in standby (low-power mode) - this is where it will be when not playing audio. It then plays an introduction and the user is prompted to choose a level by striking out at the right moment; this 'menu' will keep repeating until a choice is made or the unit is turned off.

A periodic interrupt timer is utilized to accurately measure the time passed.

When a choice is made, the audio simulation of a boxing match with the round number and fight bell sounding proceeds to start. During the three-minute rounds, the accelerometers register the 'strikes' and transmit the axis data to the MCU via the MC13192 transceiver chip. Decisions based on this info and the timer are then made and the respective audio cues played back.

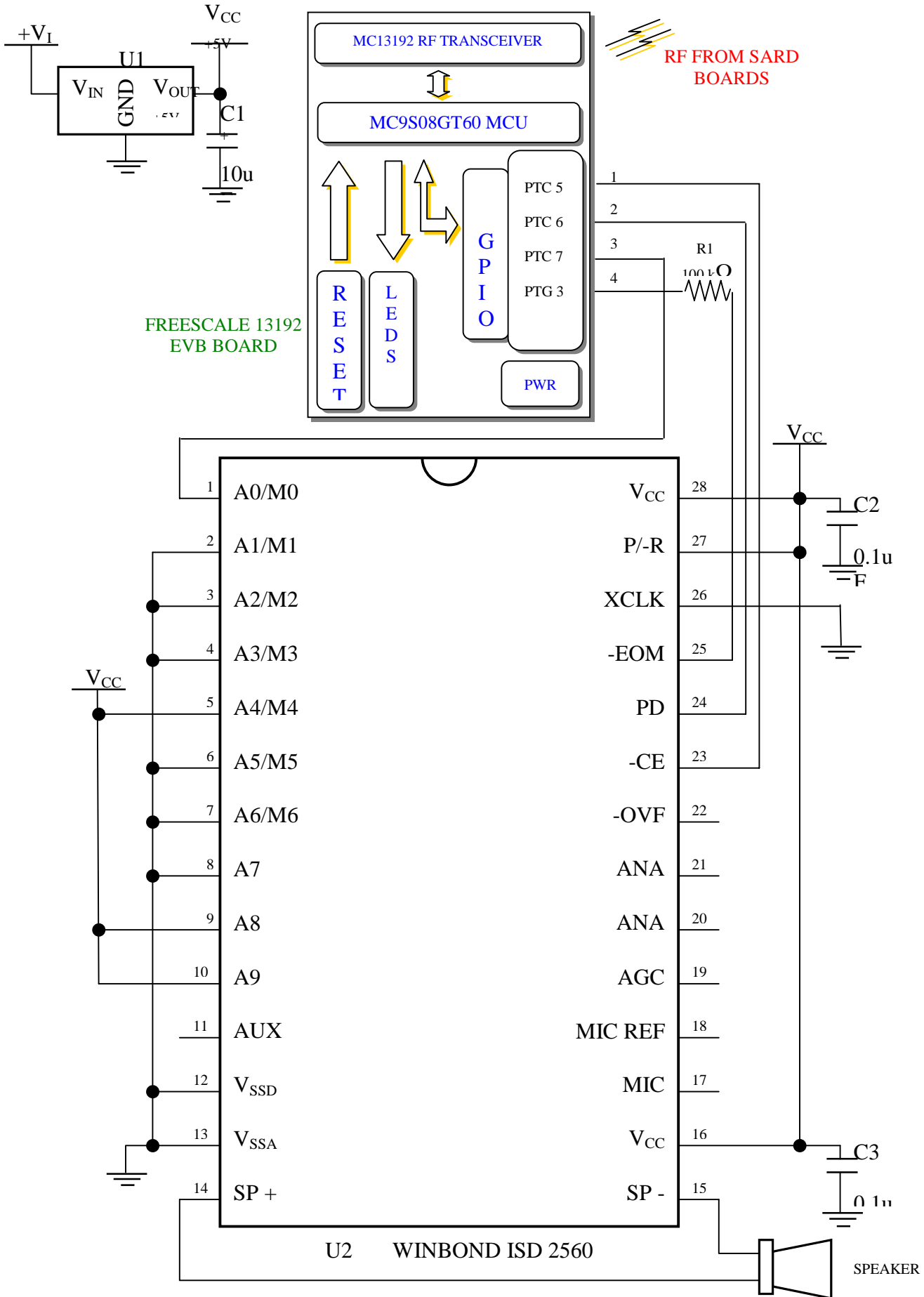
At the end of the round, if it's not the last one, the periodic interrupt timer counts down a 60-second rest period while playing crowd cheering and 'coach' feedback.

This process repeats until the number of rounds (as per level setting) is done or there are enough strikes to cause a 'knockout'.

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