

# **Nintendo Virtual Joystick**

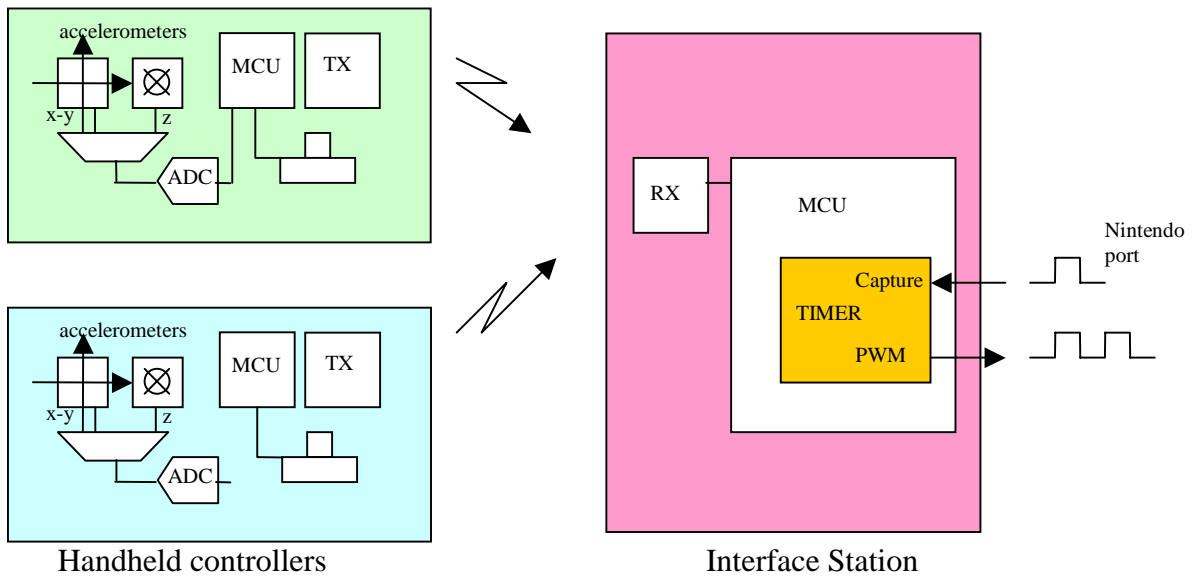
**A Remote Nintendo Game Controller  
Created with Freescale Wireless Development Kit  
Project number: FZ1599**

## **Abstract**

On the large TV screen is a battle scene. Away from the screen, you are waving a small device in your hand. As you wiggle your hand, the British secret agent 007 on the screen runs, turns, aims, and shoots the target. In your other hand, a similar device allows you to push the buttons to switch weapons and open doors. As you're playing, you can move freely from the sofa to the floor, or even jump to the table at back of the room. There are no wires tangling in front of you. You are using the remote virtual joystick for Nintendo game machine built with Freescale accelerometer sensor and ZigBee RF transceiver technology!

The remote virtual joystick is constructed using Freescale Wireless Development Kit. It is simple, low-cost, and effective. There is no need for any additional hardware or soldering. Two Sensor Application Reference Design (SARD) boards in the development kit are preassembled with 3-D accelerometer sensors. They are used as the remote handheld controller. The accelerometer sensors sense the SARD board's tilting angle, and this orientation information is forwarded as joystick actions to the Nintendo game console through the RF link. The ZigBee RF Transceiver Evaluation Board (EVB) is the interface connecting to the Nintendo game machine (Figure 1). The EVB receives and stores the accelerometer and button action data from the remote SARDs. The EVB also pools the data request from the Nintendo game machine, which comes 60 times per second. It lastly forwards joystick actions, which come from accelerometer data, along with button actions to the game machine with correct timing. The versatile timer in the onboard Freescale microcontroller MC9S08GT60 decodes commands from the Nintendo and generates data sequences delivered to the game machine port, eliminating additional hardware circuitry for interfacing with the Nintendo game machine. The short latency of the IEEE 802.15.4 RF transmission standard makes the game controller's response quick and accurate. The collision avoidance scheme of the RF transmission allows the two controllers on both hands to transmit data without worry of interference of each other. Although this is built for the Nintendo 64 game machine, with a simple minor modification of the software, it can be used for the Nintendo Gamecube, the newest game console, since the interface and the bit timing sequence is same, except that more bits are used in the sequence for the newer version.





System block diagram



Playing game using the remote virtual joystick. (Note that the user is holding the 9V battery).



The connection to the Nintendo 64 game console