

Introduction

The KS8695X offers 2 LED indicators per Ethernet port. Each of these LED indicators can be configured to indicate the following: Speed, Link, Full Duplex, Collision, Activity, Full Duplex/Collision, or Link/Activity. The LAN LEDs are configured in the KS8695X Switch Engine Control Register at offset 0xE800. Bits 27:25 control LANxLED1. Bits 24:22 control LANxLED0. The WAN LEDs are configured in the KS8695X WAN Miscellaneous Control Register at offset 0xEA0C. Bits 6:4 control WAN LED1, and bits 2:0 control WAN LED0. The programming values are shown below.

Table 1 LED Indicator Programming

Bits	LED Indicator	LED state
000	Speed	On
001	Link	On
010	Full Duplex	On
011	Collision	Blink
100	Activity	Blink
101	Full Duplex/Collision	On/Blink
110	Link/Activity	On/Blink
111	Disabled	Off

In the case where an extra LED is needed to support legacy implementations there are two solutions. The first is to use a single GPIO per port as the speed LED indicator. The second is to use just 2 GPIO and an external chip to provide a third LED indicator per port. This application note will address the second solution.

Implementation

The advantage of the second solution mentioned above is that it uses a minimum amount of GPIO to provide a third LED indicator per port. The disadvantage is that it requires an external IC.

The following is an illustration of the hardware connection for this proposed solution.

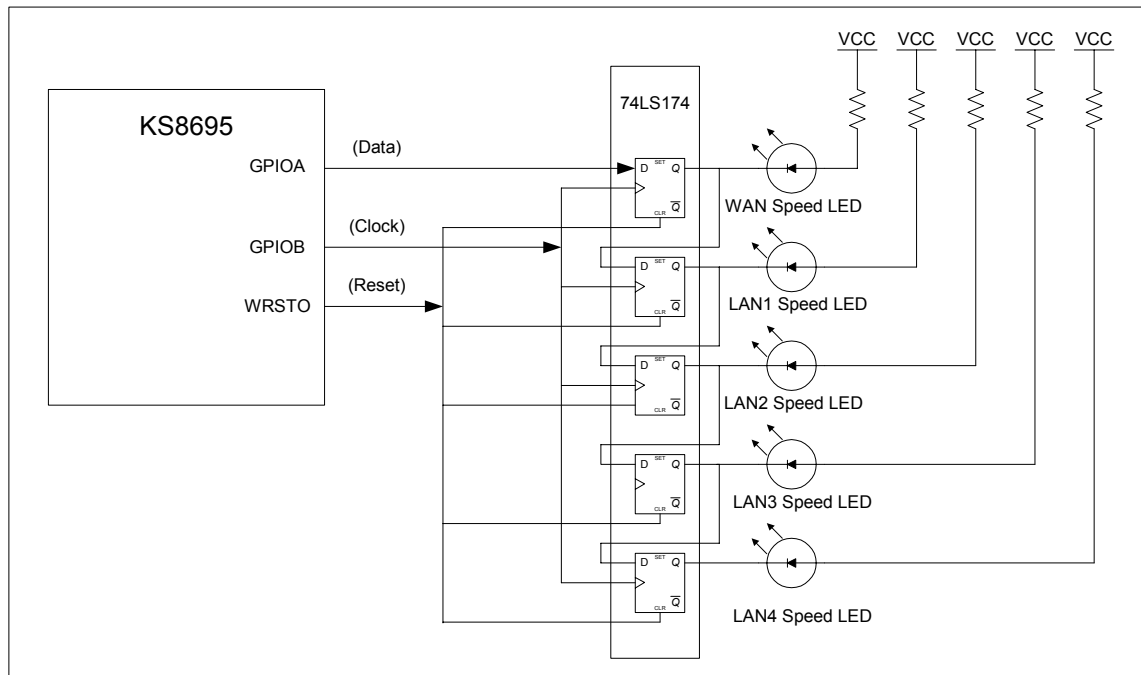


Figure 1 LED Support Using Minimum GPIO

This solution is accomplished using a 74LS174 or similar IC. The 74LS174 contains 6 D type flip flops. Only five are shown in the illustration. Software also needs to be written for this solution. The software will read the port registers to determine the speed that each port is connected at. Then the software will generate a serial data stream consisting of each port's link speed on GPIOA. The software must also toggle the state of GPIOB, which will serve as the clock signal. By toggling GPIOB as the clock signal, the software can shift the serial data on GPIOA into the appropriate registers to indicate the speed for each port. Below is a timing diagram illustrating how the port speed data will be shifted into the registers.

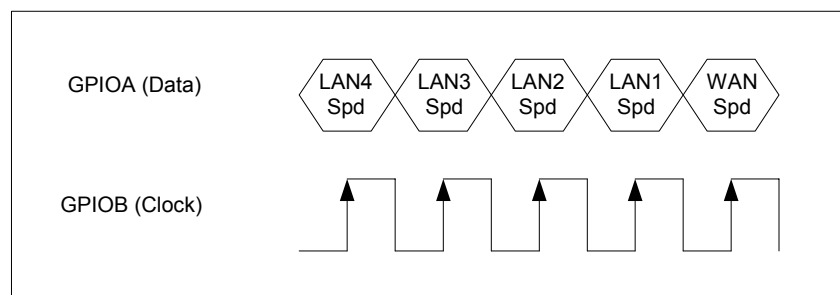


Figure 2 Serial Shift Speed Data Timing Diagram

The reset input on the 74LS174 will be connected to the KS8695X reset output WRSTO. This will ensure that the 74LS174 comes up in a known state at reset time, before any programming of the registers is done. This cost effective solution provides a way for the customer to support 3 LEDs per port with minimal effort.

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