Notes

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Revision History

November 20, 2001: Initial publication.

December 18, 2001: Added RC32351.

Introduction

This application note describes the interfacing requirements between the RC32355/RC32351 and the Micrel KS8993 3-port & Micrel KS8995E 5-port switches. Information on Micrel/Kendin products can be found at:

http://www.kendin.com/products2.html

The RC32355/RC32351 is an integrated processor that combines a MIPS32 instruction set (ISA) CPU core with a number of on-chip peripherals, to enable direct connection to boot memory, main memory, IO, Utopia 1 & 2 compliant peripherals, USB, TDM, and MII compliant components. The RC32355/RC32351 also includes system logic for DMA, reset, interrupts, timers and dual UARTs.

The single Ethernet MAC with MII interface contained within the RC32355/RC32351 is generally adequate for most systems. However, occasionally a need arises for a second or third Ethernet port in a specific application. One example is connecting more than one PC to a SOHO router or gateway. In cases where this is required, an integrated Ethernet switch often provides an optimal solution. Since these devices integrate the necessary auxiliary MACs with the Ethernet PHYs, one of these devices can be used to replace the single Ethernet PHY normally used with the RC32355/RC32351 without substantially increasing the final component count in the resulting system.

RC32355/RC32351 to Micrel KS8993/995E Interfacing Requirements

The RC32355/RC32351 is connected to an Ethernet PHY through a MII (Media Independent Interface) port. The KS8993 contains three 10/100 physical layer transceivers and three MAC (Media Access Control) units with an integrated layer-2 switch. This device can be used as a three-port switch with the third port decoupled from the physical port. In this mode access to the third MAC is provided using a reverse MII interface so that an external MAC, like the one located in the RC32355/RC32351, can be connected directly. The KS8995E is identical to the KS8995E except that it has five ports rather than three.

The net result of connecting the KS8993 to the RC32355/RC32351 is dual Ethernet interfaces (see Figure 1). The effect of the KS8995E is similar, but it results in a quad Ethernet interface (see Figure 2).
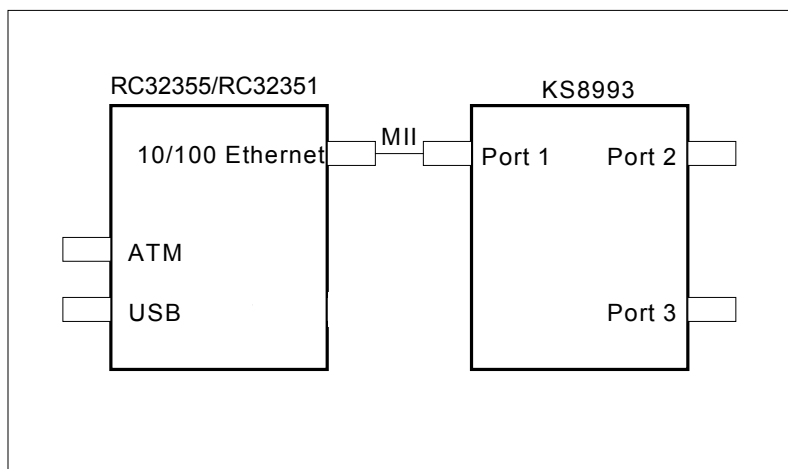
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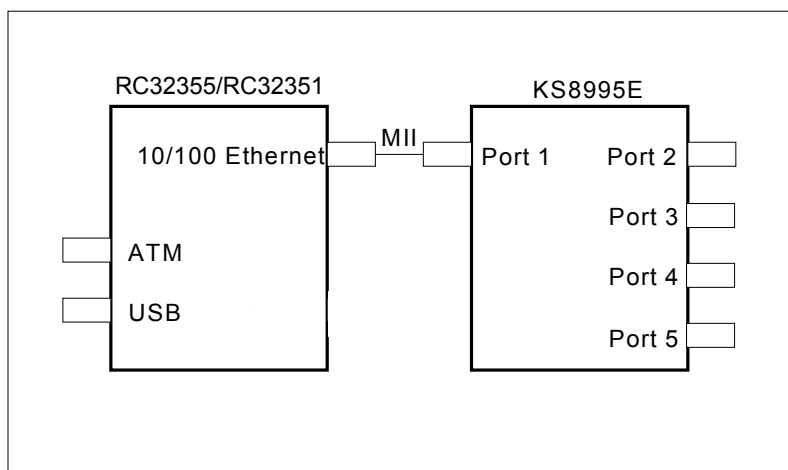**Figure 1 RC32355/RC32351 to KS8993 Block Diagram**

Figure 2 RC32355/RC32351 to KS8995E Block Diagram

RC32355/RC32351 to KS8993/995E Hardware Connections

Figure 3 is a schematic showing the connection between the RC32355/RC32351 and the KS8993. The KS8993 does not implement an MII management interface. Both the KS8993 and KS8995E are completely configured via pin strapping. The critical strapping for the KS8993 is shown in Figure 3. The KS8993 is strapped into reverse MII mode via the MIIS1 and MIIS0 pins.

Figure 4 shows the connections for the KS8995E. The KS8995E does not need special configuration to get it in reverse mode. There are a variety of other strapping options for the device. These options affect the behavior of the PHYs and need to be configured differently for different systems. Accordingly, strapping options are not shown in either Figure 3 or Figure 4. Reference circuits are provided in the KS8993/995E data sheets for Pull Up/Down and Float information.
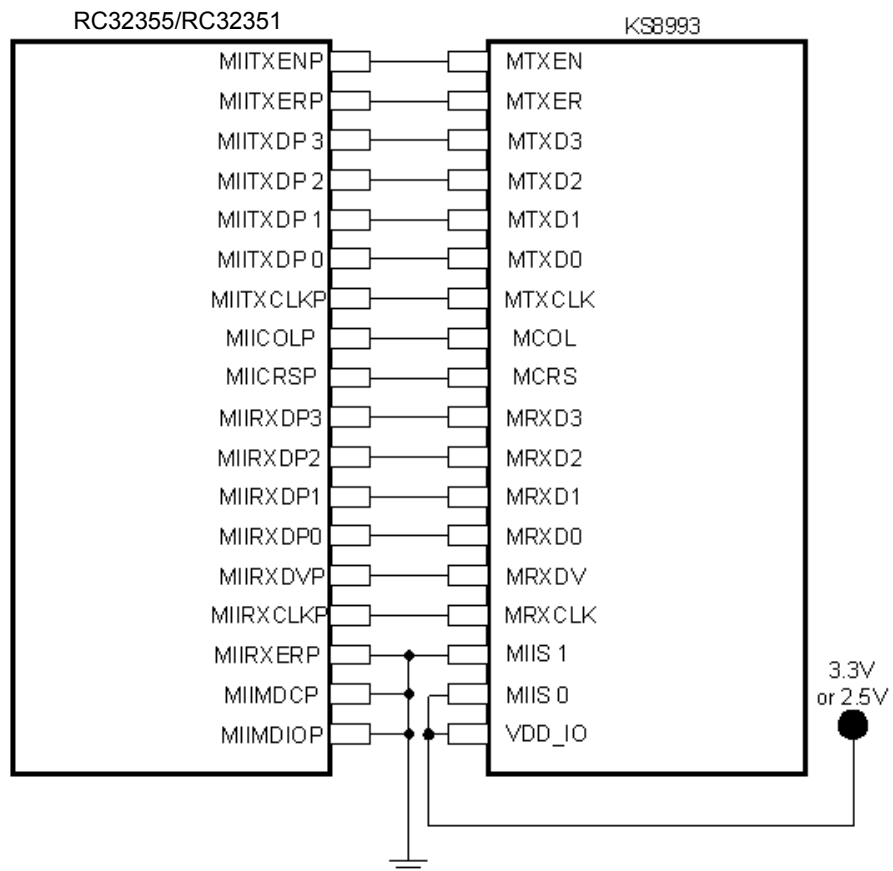
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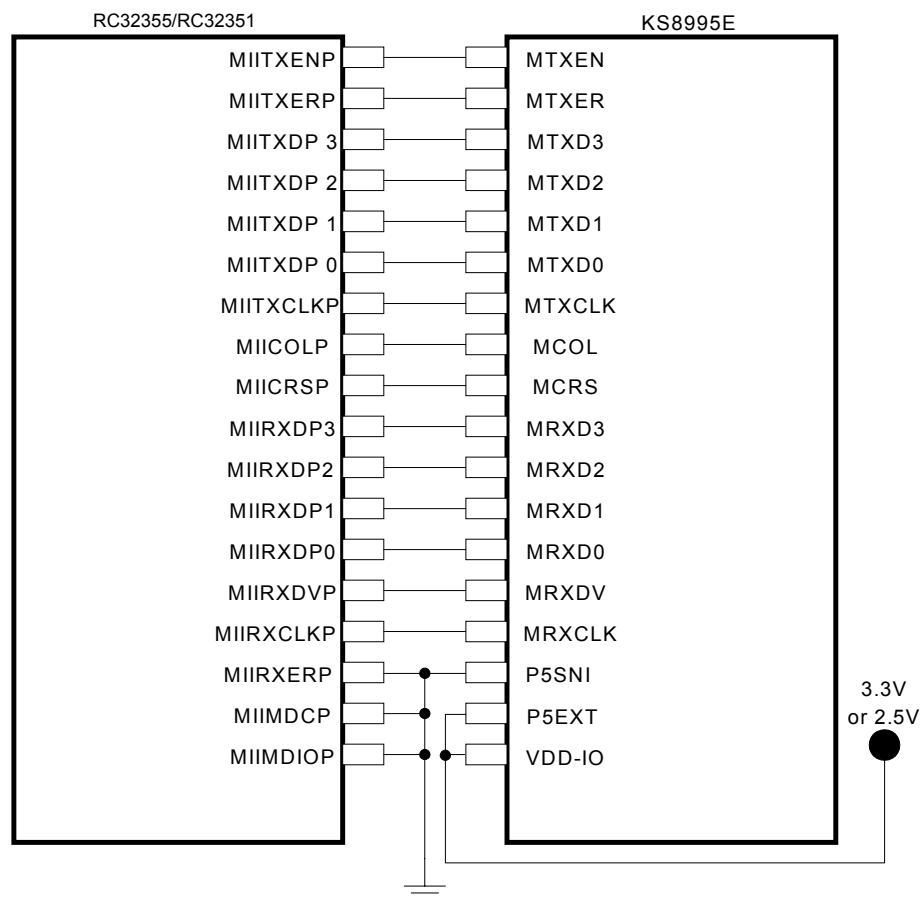**Figure 3 Hardware Connections Between RC32355/RC32351 and KS8993**

Notes

RC32355/RC32351   KS8995E

RC32355/RC32351	KS8995E
MIITXENP	MTXEN
MIITXERP	MTXER
MIITXDP 3	MTXD3
MIITXDP 2	MTXD2
MIITXDP 1	MTXD1
MIITXDP 0	MTXD0
MIITXCLKP	MTXCLK
MIICOLP	MCOL
MIICRSP	MCRS
MIIRXDP3	MRXD3
MIIRXDP2	MRXD2
MIIRXDP1	MRXD1
MIIRXDP0	MRXD0
MIIRXDVP	MRXDV
MIIRXCLKP	MRXCLK
MIIRXERP	P5SNI
MIIMDCP	P5EXT
MIIMDIOP	VDD-IO

3.3V or 2.5V

Figure 4 Hardware Connections Between RC32355/RC32351 and KS8995E

RC32355/RC32351 to KS8993/995E Software Requirements

Because the KS8993 and KS8995E devices do not require configuration information to be sent via the management interface, there are no special software requirements associated with using these devices.

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