Semiconductors

AN10402

LPC2200 interfaced to external memory

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Document information

Info	Content
Keywords	LPC2200, interface, memory
Abstract	This application note describes the design of Philips 32-bit MCU LPC2200 interfacing to 8-bit,16-bit and 32-bit external memory.

PHILIPS

Revision history

Rev	Date	Description
01	20051025	Initial version

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1. External memory controller introduction

1.1 Introduction

The LPC2200 family of microcontrollers provides external memory controller (EMC) module, which can be easily interfaced between the system bus and external (off-chip) memory devices.

1.2 EMC description

The external Static Memory Controller is an AMBA AHB slave module which provides an interface between an AMBA AHB system bus and external (off-chip) memory devices (Fig 1). It provides support for up to four independently configurable memory banks simultaneously. Each memory bank is capable of supporting SRAM, ROM, Flash EPROM, Burst ROM memory, or some external I/O devices.

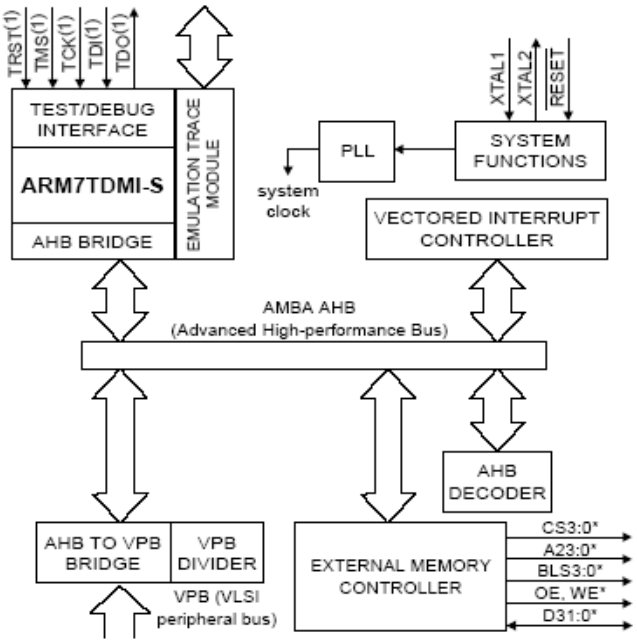

Fig 1. EMC module in LPC2200

Each memory bank may be 8, 16, or 32-bit wide. This module is available in LPC2210//2220, LPC2212/2214 and LPC2290/2292/2294 only now. Since this 144-pin package pins out address lines A[23:0], the decoding among the four banks uses address bits A[25:24]. The native location of the four banks is at the start of the External Memory area identified in Fig 2, but Bank 0 can be used for initial booting under control of the state of the BOOT[1:0] pins.

For more information about EMC of LPC2200, please refer to LPC2200 user manual.

2. LPC2200 interfaced to external memory

The circuit schematics of LPC2200 interfaced to 8-bit, 16-bit and 32-bit memory are given in this section.

2.1 32-bit bank external memory interfaces

2.1.1 32-bit wide memory bank interfaced to 8-bit memory chips

Am28LV008B, an 8 Mbit, 3.0 volt-only Flash memory organized as 1,048,576 bytes, is taken as example. The circuit schematic is given as Fig 2.

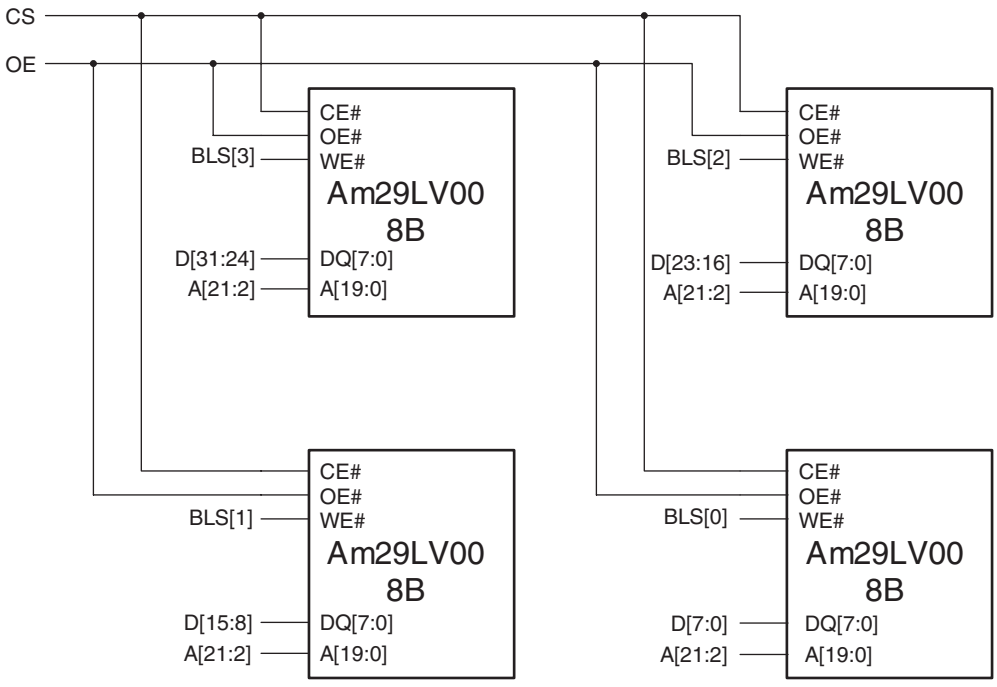

Fig 2. LPC2200 32-bit wide memory bank interfaced to Am29LV008B

2.1.2 32-bit wide memory bank interfaced to 16-bit memory chips

K6F8016T6C, 512 K x16-bit low voltage static RAM, is taken as example. The circuit schematic is as Fig 3.

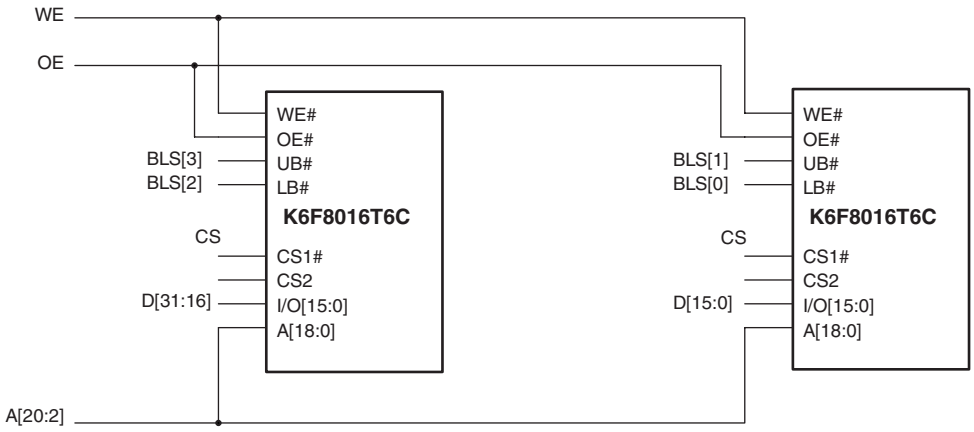

Fig 3. 32-bit wide memory bank interfaced to K6F8016T6C

2.1.3 32-bit wide memory bank interfaced to 32-bit memory chip

The circuit schematic is shown as Fig 4.

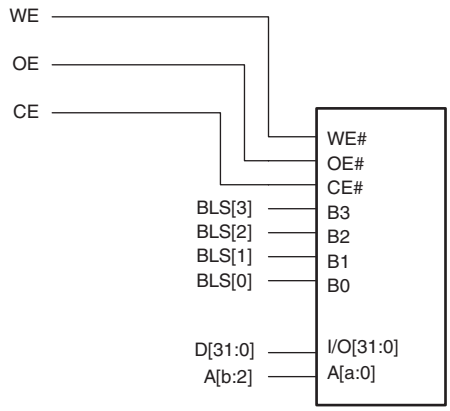

Fig 4. LPC2200 32-bit wide memory bank interfaced to 32-bit memory chip

2.2 16-bit bank external memory interfaces

2.2.1 16-bit wide memory bank interfaced to 8-bit memory chips

The circuit schematic is shown as Fig 5.

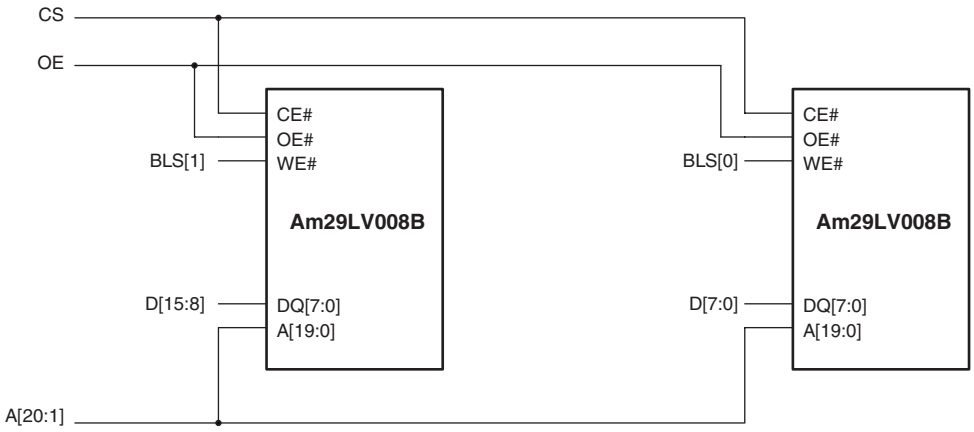

Fig 5. LPC2200 16-bit wide memory bank interfaced to 8-bit memory chips

2.2.2 16-bit wide memory bank interfaced to 16-bit memory chip

The circuit schematic is shown as Fig 6.

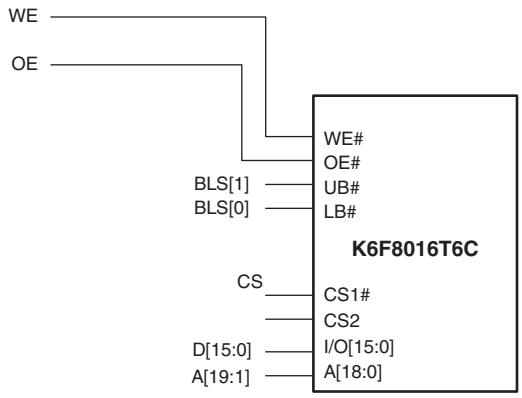

Fig 6. LPC2200 16-bit wide memory bank interfaced to 16-bit memory chip

2.3 8-bit bank external memory interface

The circuit schematic is given as Fig 7.

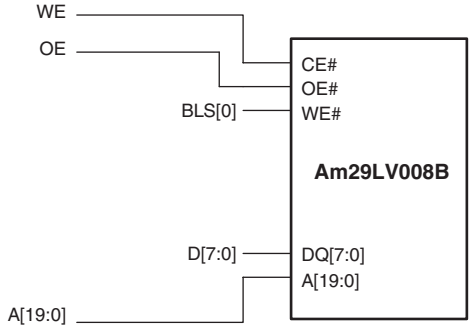

Fig 7. LPC2200 8-bit wide memory bank interfaced to 8-bit memory chip

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5. Contents

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