

The University of Alabama in Huntsville
Electrical & Computer Engineering Department
CPE/EE 421/521 01
Homework #2
Due December 8, 2004

Name: _____

1. (50 points)

(a) (20 points) Design a microcomputer system with the 68000 microprocessor and three 16-bit peripherals PER1, PER2 and PER3 using 512-byte address windows starting at address \$07 D000. You may use AND, OR, NOT, NAND, NOR, XOR logic gates, LS138 (3 to 8 decoder), LS148 (priority encoder) or any other standard digital circuits.

(b) (30 points) Design the logic interface necessary to implement vectored interrupts: PER1 and PER2 have level 2 interrupts and PER3 has a level 5 interrupt. Describe how the 68000 responds to an external interrupt request using the standard vector interrupt acknowledgment method. How does a peripheral device respond to an IACK cycle on the bus? Describe how the 68000 will distinguish between an interrupt from PER1 and PER2. What are uninitialized interrupts? Illustrate relevant internals of the peripheral device.

2. (20 points) Describe the bus arbitration sequence and draw a timing diagram of control signals for the MC68000.

BR*

BG*

BGACK*

2. (30 points) Design a circuit to insert three wait-states per EPROM (EPROM* signal is active) access and five wait-states per RAM memory access (RAM1* or RAM2* signal is active). (Note: one wait state is ONE CLOCK CYCLE long)