Name _____ CM _____ Due date: Monday, 6 Oct.

ECE130-03 Homework #11 Fall 2003

(Hexadecimal and adder)

1 Convert the following unsigned binary numbers to their hexadecimal counterparts.

1001101010010110 = $

1010100110011110 = $

2 Convert the following hexadecimal numbers to their decimal counterparts.

$AB19 =

$FEE =

3 Carry out the following hex additions by hand. The sums could have more hex digits.

(a) $B7A+$8CD = _____ *(b) $C6+$EE=*_____

4 Construct a 4-bit base-11 adder with two 74LS83 chips and a 7485 comparator, other devices such multiplexer, decoder, and gates as needed. Your adder should add two numbers ranging from 0 to A and generate two-digit sum in base-11 form. Sum output of the second adder forms the ones digit and output of a carry circuit forms the tens digit of the final sum.

The first adder will add two numbers to obtain the initial sum. The second adder will add either binary number 0000 or 0101 to the initial sum, depending on the value of the initial sum, to adjust the sum to be in base-11 form. If the initial sum is greater than binary number 1011, 0101 will be added. Otherwise, 0000 will be added to the initial sum. You will need to check both the initial sum and the carry bit of the first adder to decide which number to add for the second adder.

Connect two hex keypads to addend and augend of the first adder chip and tie all carry-in pins to "0". Connect one hex display to ones digit of the sum and a binary probe to the output of tens digit.

Submit one snapshot of your complete adder for each of the following additions. For example, for A+8=17, the hex display for the final sum should show 7 and the final carry out should show 1.

Addend	Augend	Carryout	Sum
3	4	0	7
A	8	1	7
A	A	1	9